

KIC 004042709

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})
004042709-01	OBS	No	445.968825	574.542430	120.5	5.271	10.8	2.4	61.25	3757	87.43	354.75
004042709-02	OBS	No	478.168370	469.020657	404.5	3.325	7.8	7.4	61.25	3757	137.56	323.26

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004042709-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004042709-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

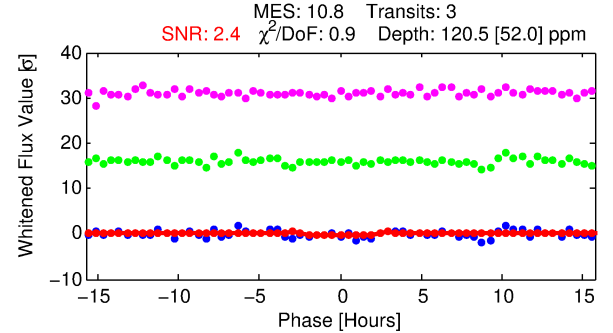
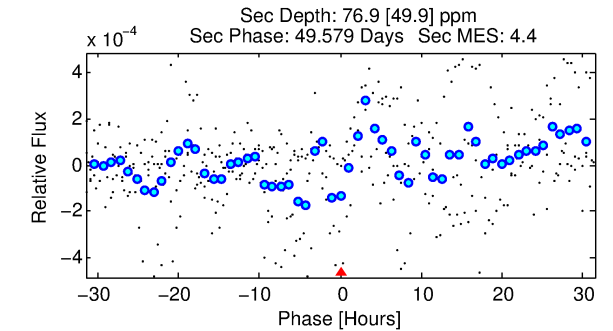
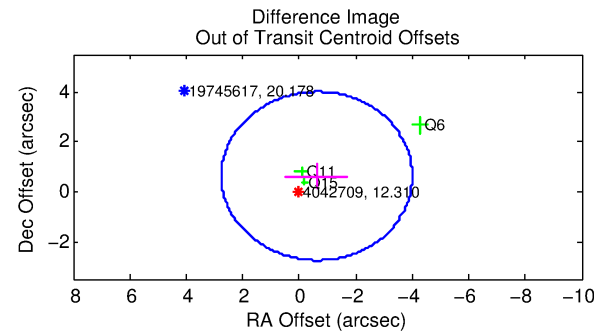
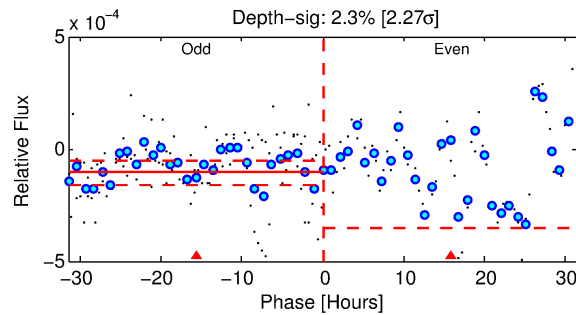
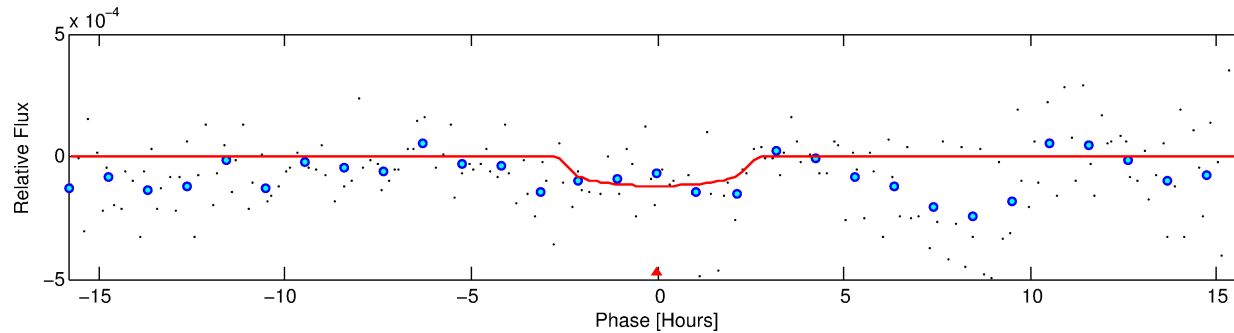
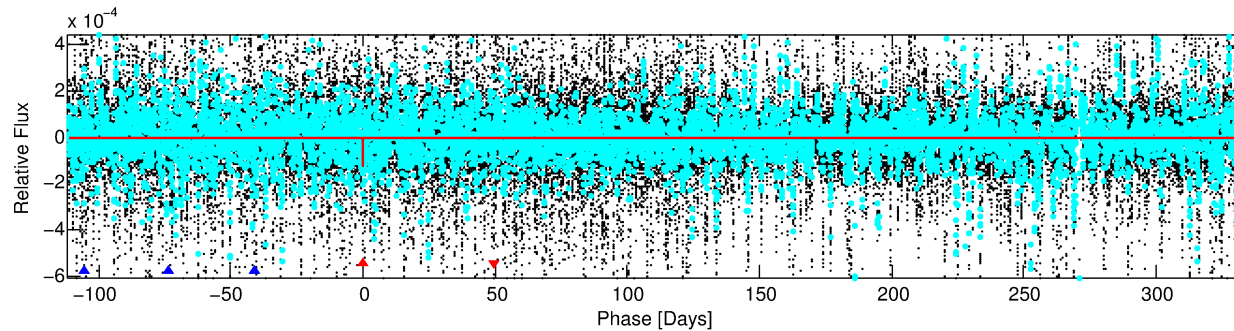
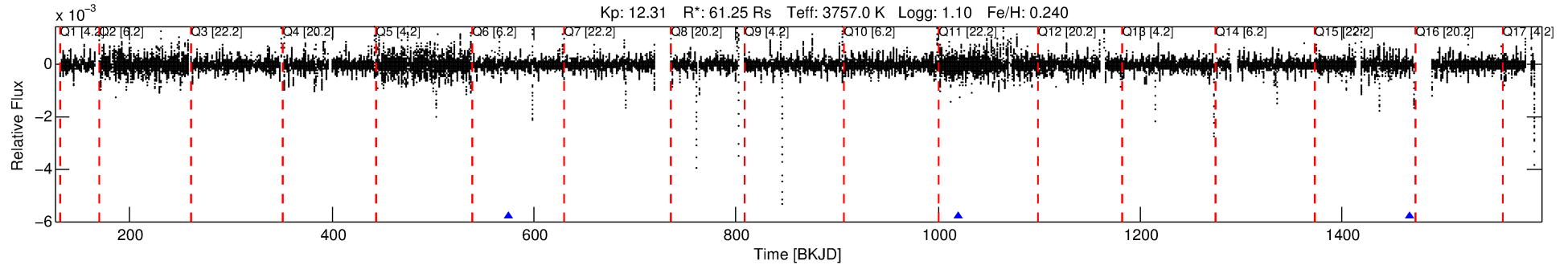
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004042709-01

No Significant Match Found

DV One-Page Summary

KIC: 4042709 Candidate: 1 of 2 Period: 445.969 d



DV Fit Results:

Period = 445.96882 [0.01104] d
Epoch = 574.5424 [0.0163] BKJD
Rp/R* = 0.0131 [0.0140]
a/R* = 285.93 [947.24]
b = 0.91 [0.63]
Seff = 354.75 [57.08]
Teq = 1107 [45] K
Rp = 87.43 [95.01] Re
a = 1.3739 [0.1678] AU
Ag = 10.45 [23.45] [0.40 σ]
Teffp = 3077 [1724] K [1.14 σ]

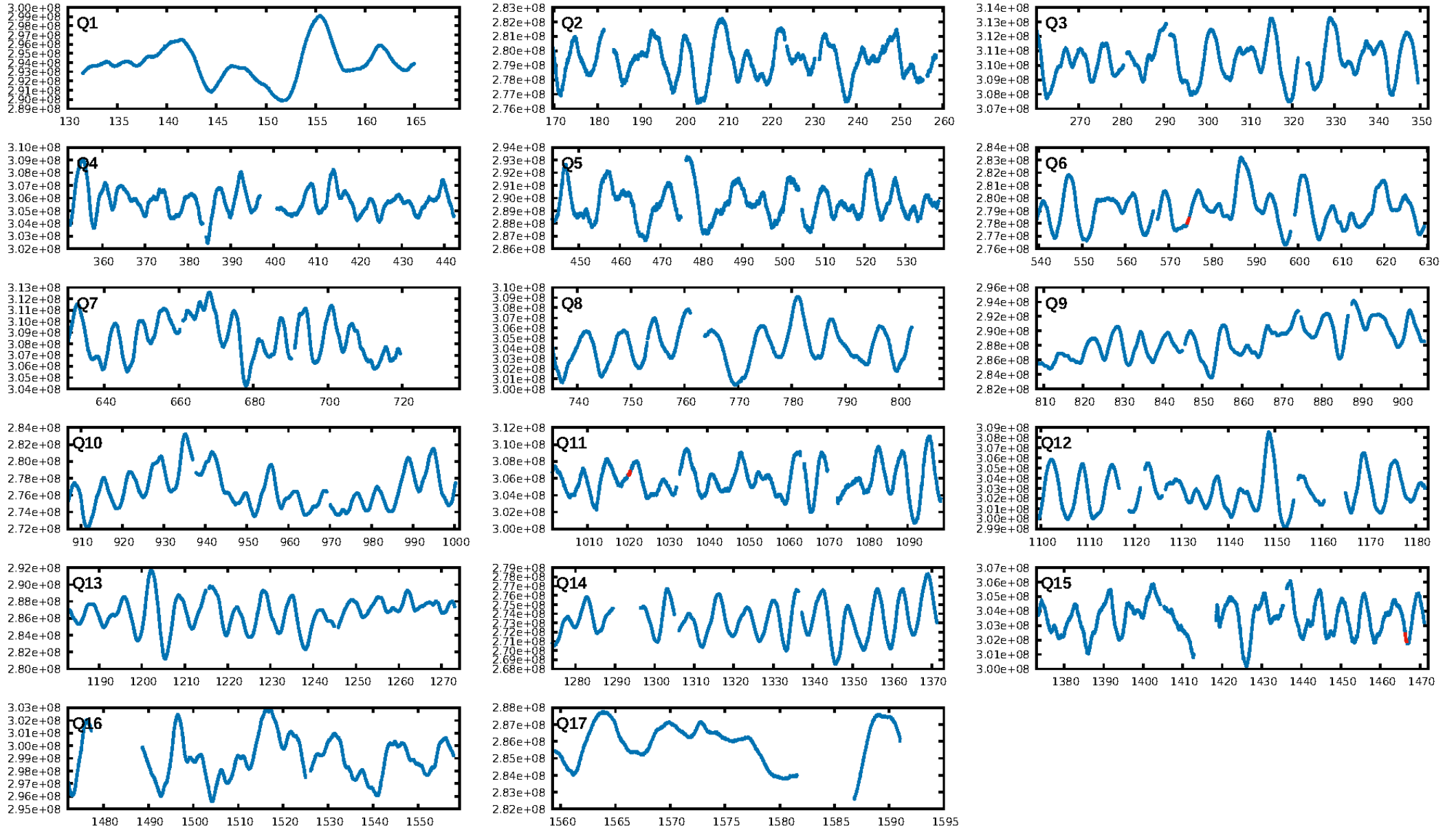
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [124.01 σ]
ModelChiSquare2-sig: 33.6%
ModelChiSquareGof-sig: 99.3%
Bootstrap-pfa: 7.84e-06
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -1.002
Centroid-sig: 42.7%
Centroid-so: 1.932 arcsec [0.77 σ]
OotOffset-rm: 0.883 arcsec [0.78 σ]
KicOffset-rm: 0.889 arcsec [0.64 σ]
OotOffset-st: 1/2/0/0 [3]
KicOffset-st: 1/2/0/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

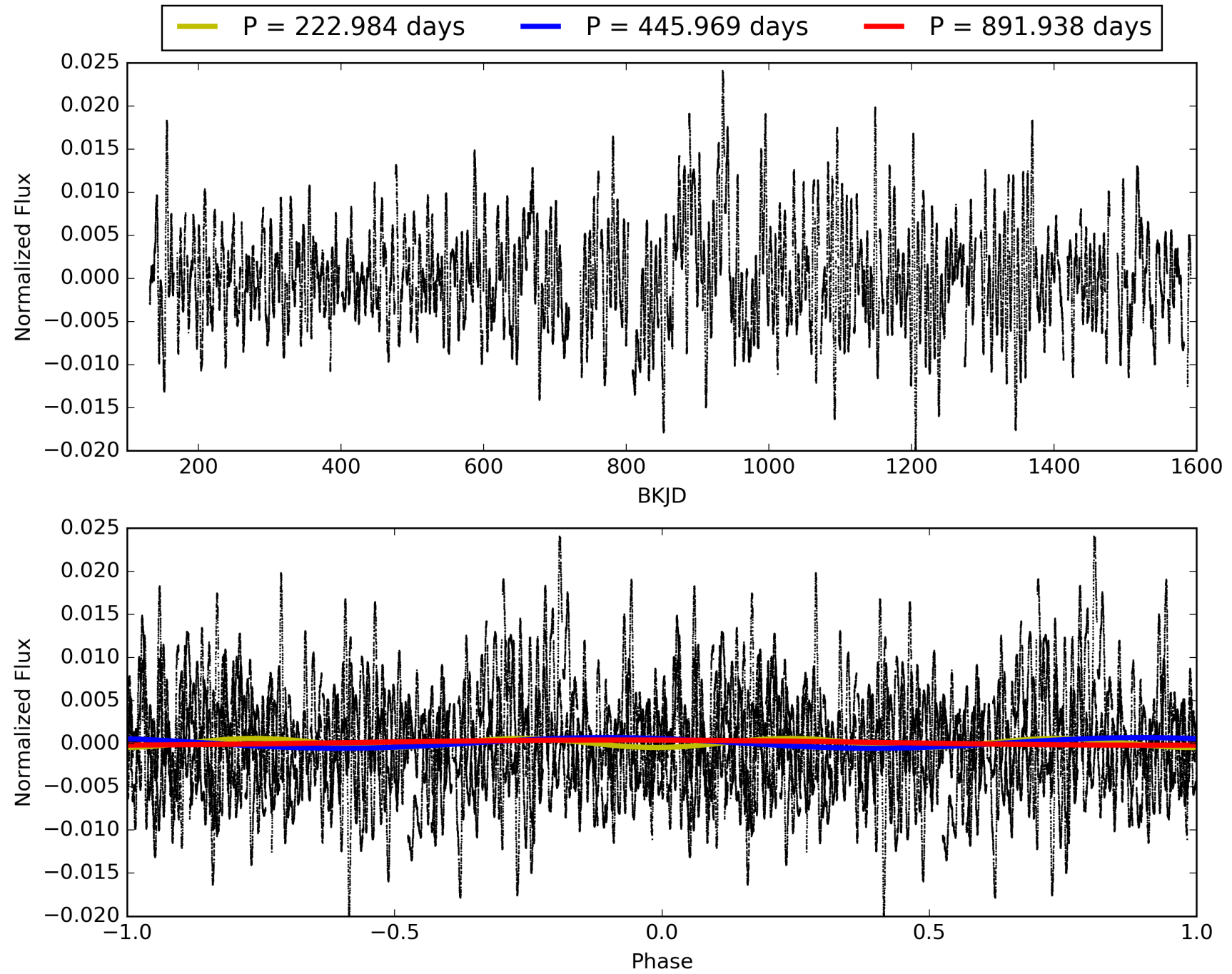
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:51:49 Z

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

TCE 004042709-01, PDC Light Curves

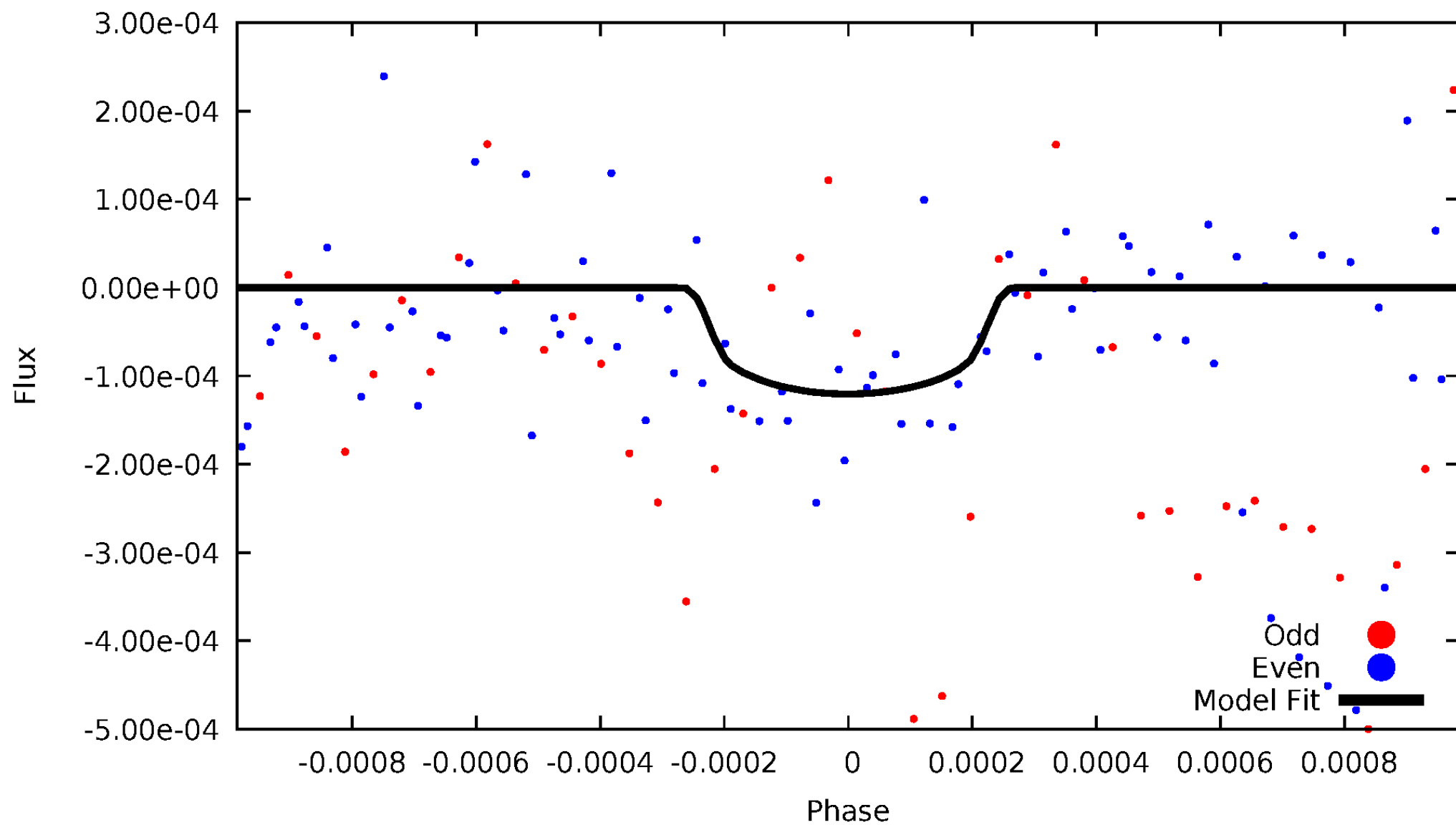


TCE 004042709-01



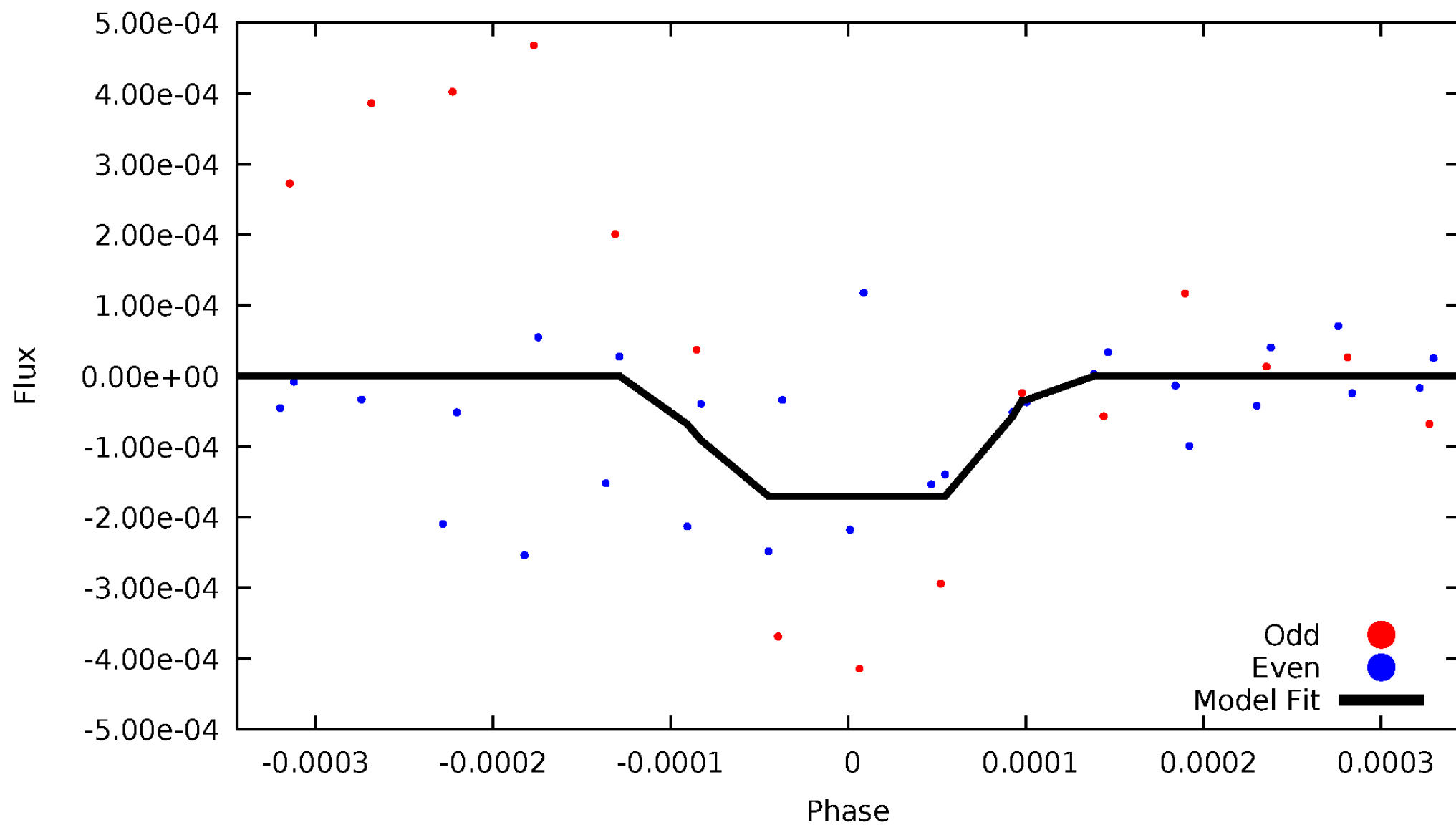
DV Odd/Even

TCE 004042709-01



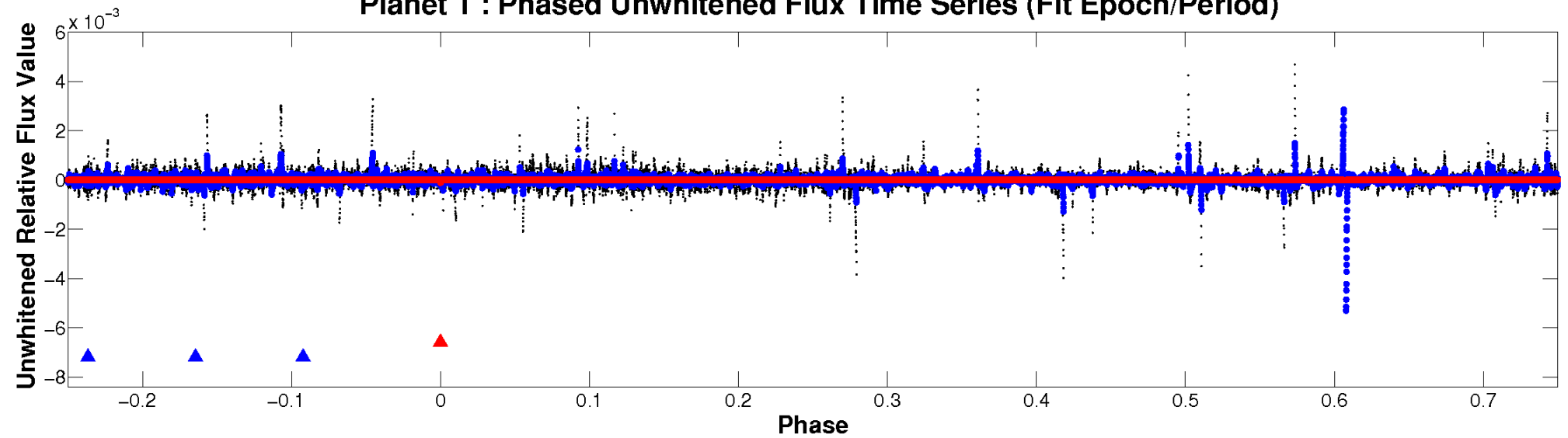
ALT Odd/Even

TCE 004042709-01

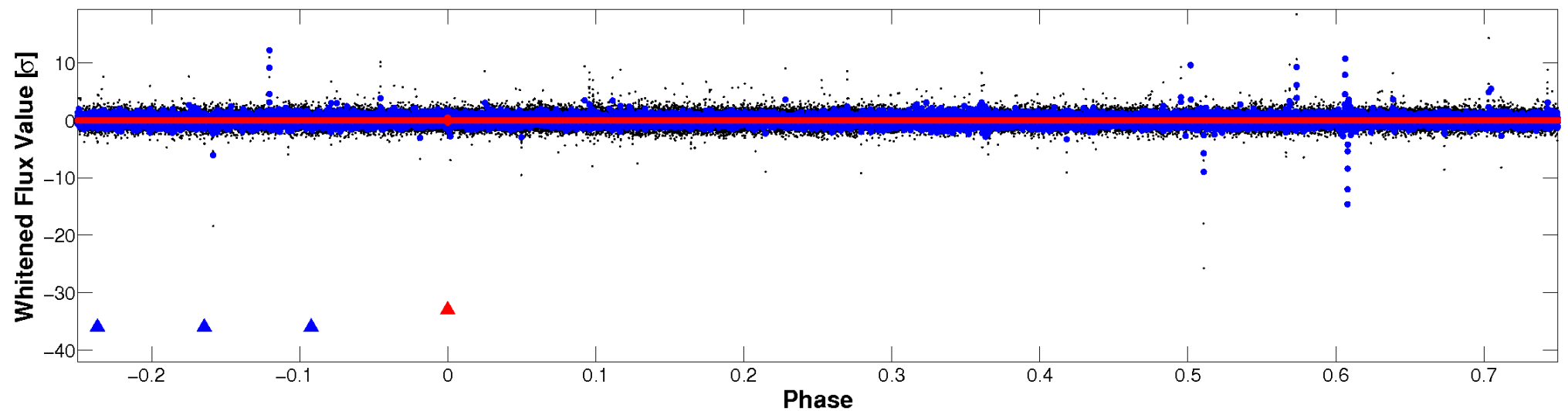


Non-Whitened Vs. Whitened Light Curve

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

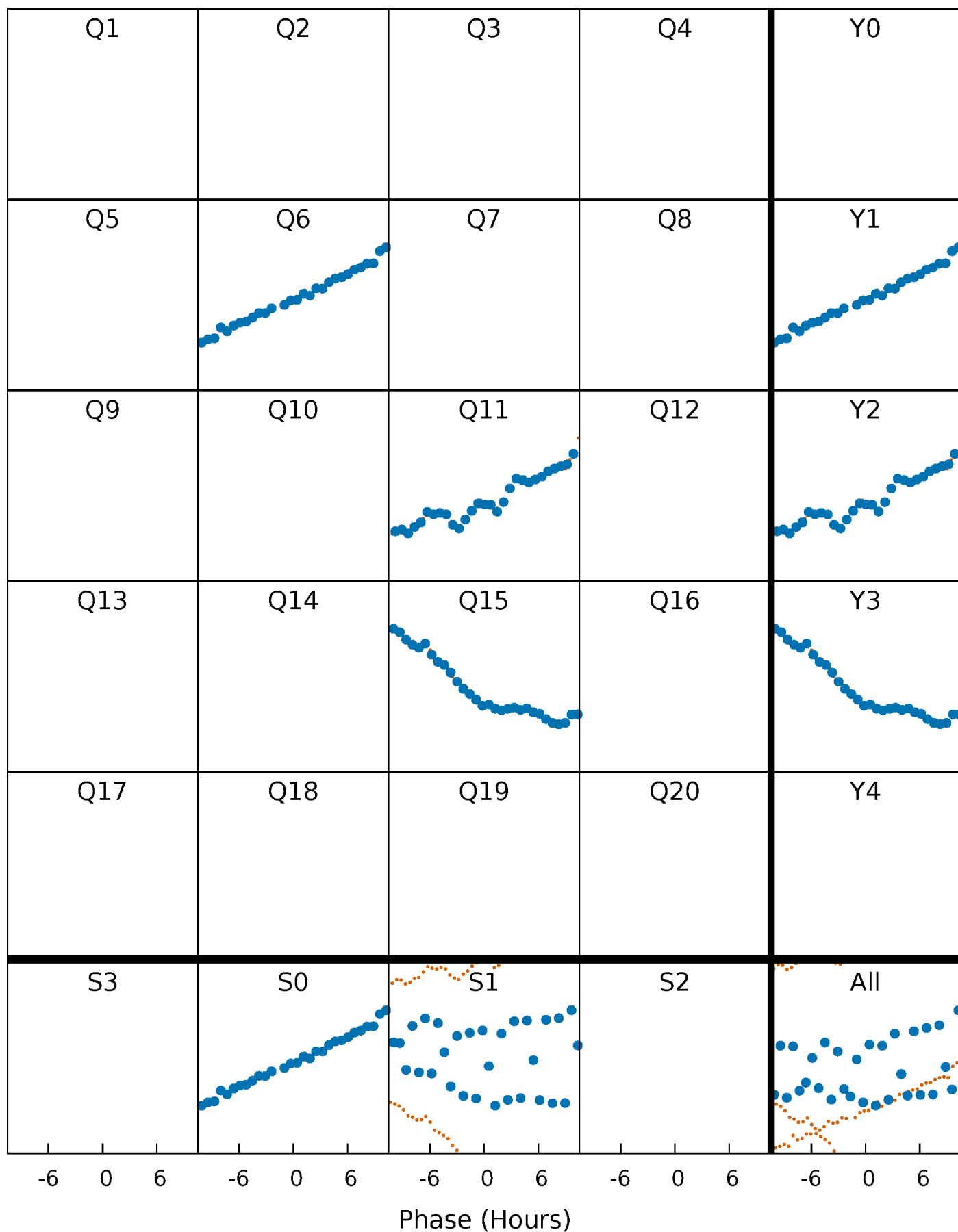


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



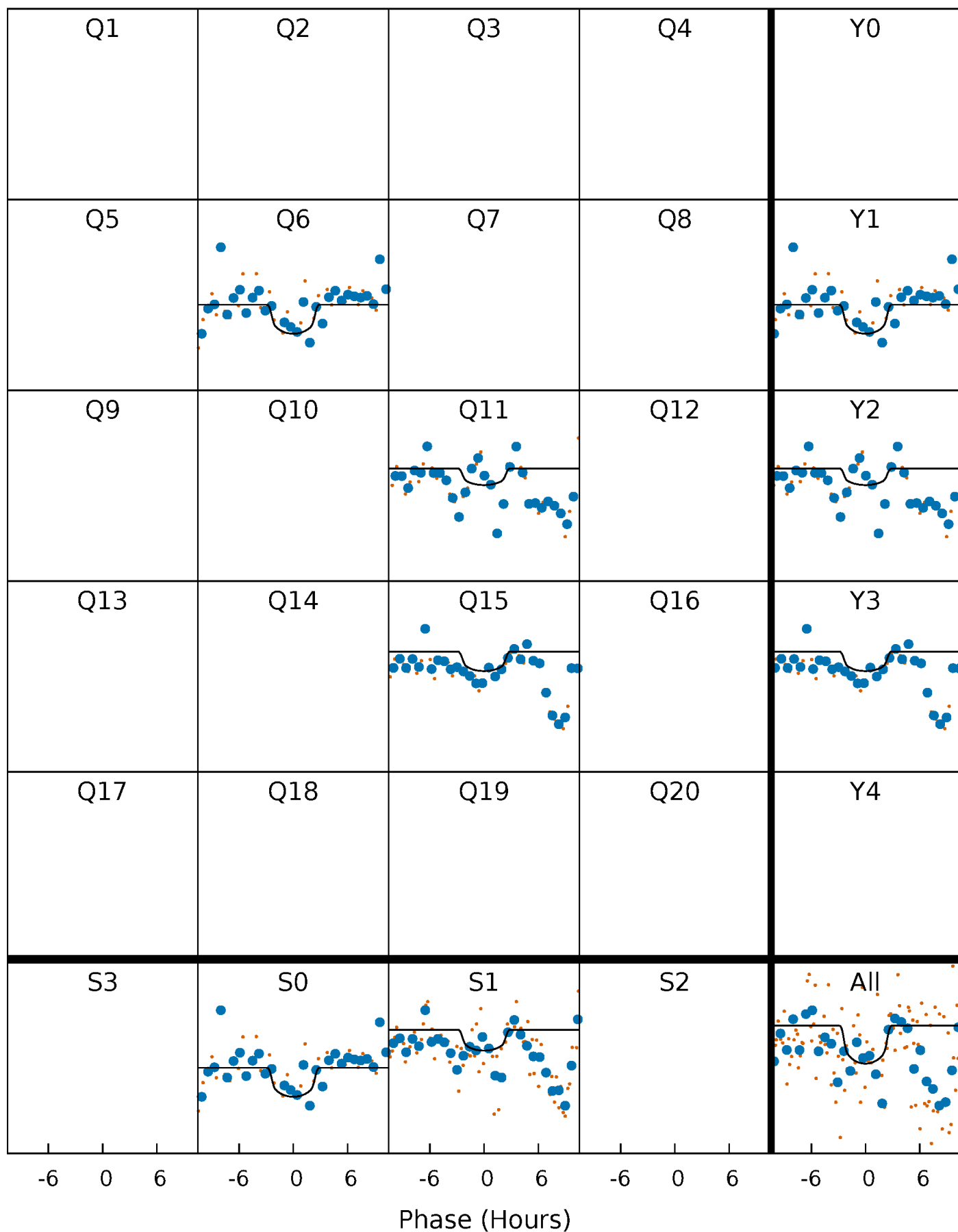
PDC Quarter-Phased Transit Curves

TCE 004042709-01 P=445.968825 Days $T_0=574.542430$ (BKJD)



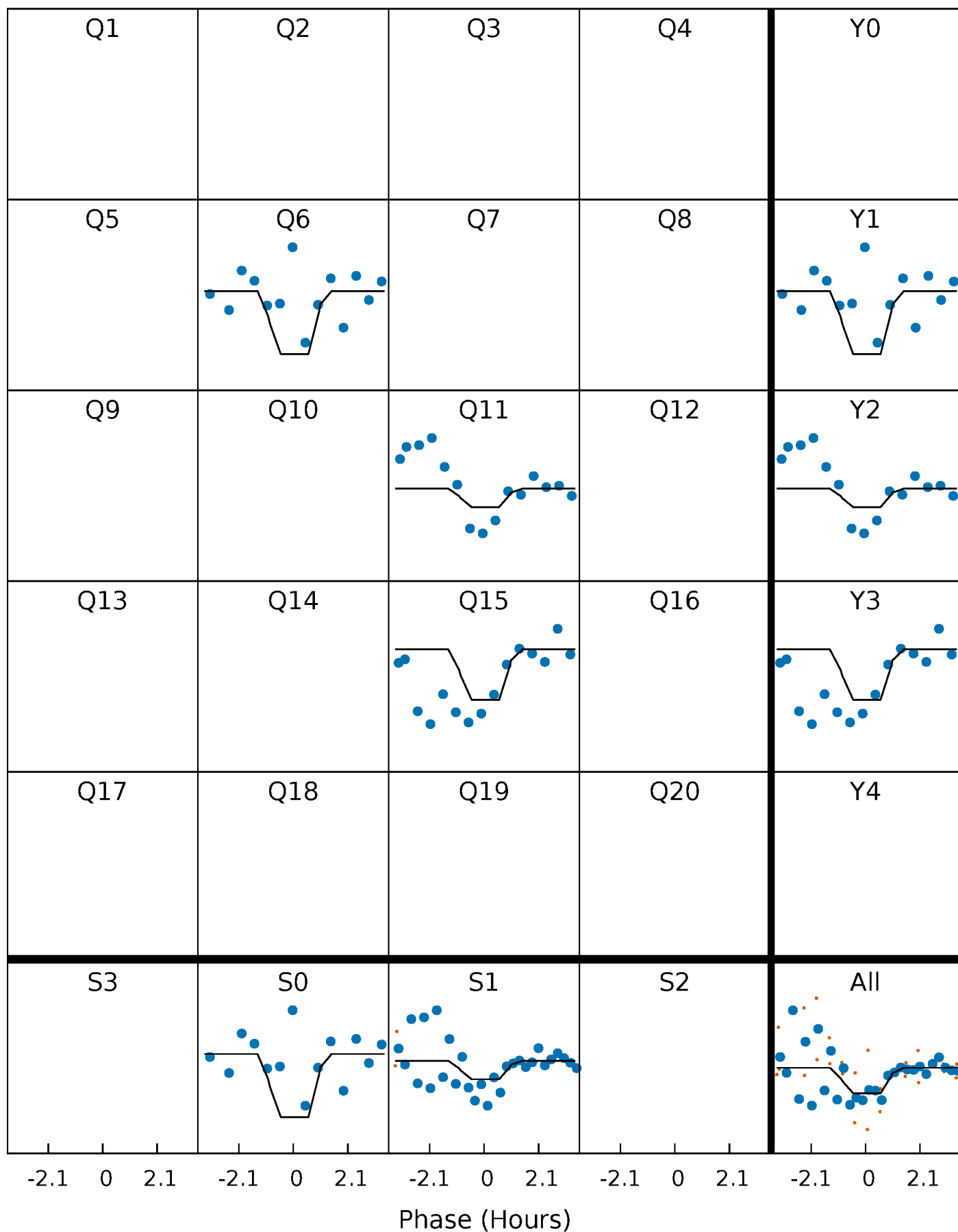
DV Quarter-Phased Transit Curves

TCE 004042709-01 P=445.968825 Days $T_0=574.542430$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

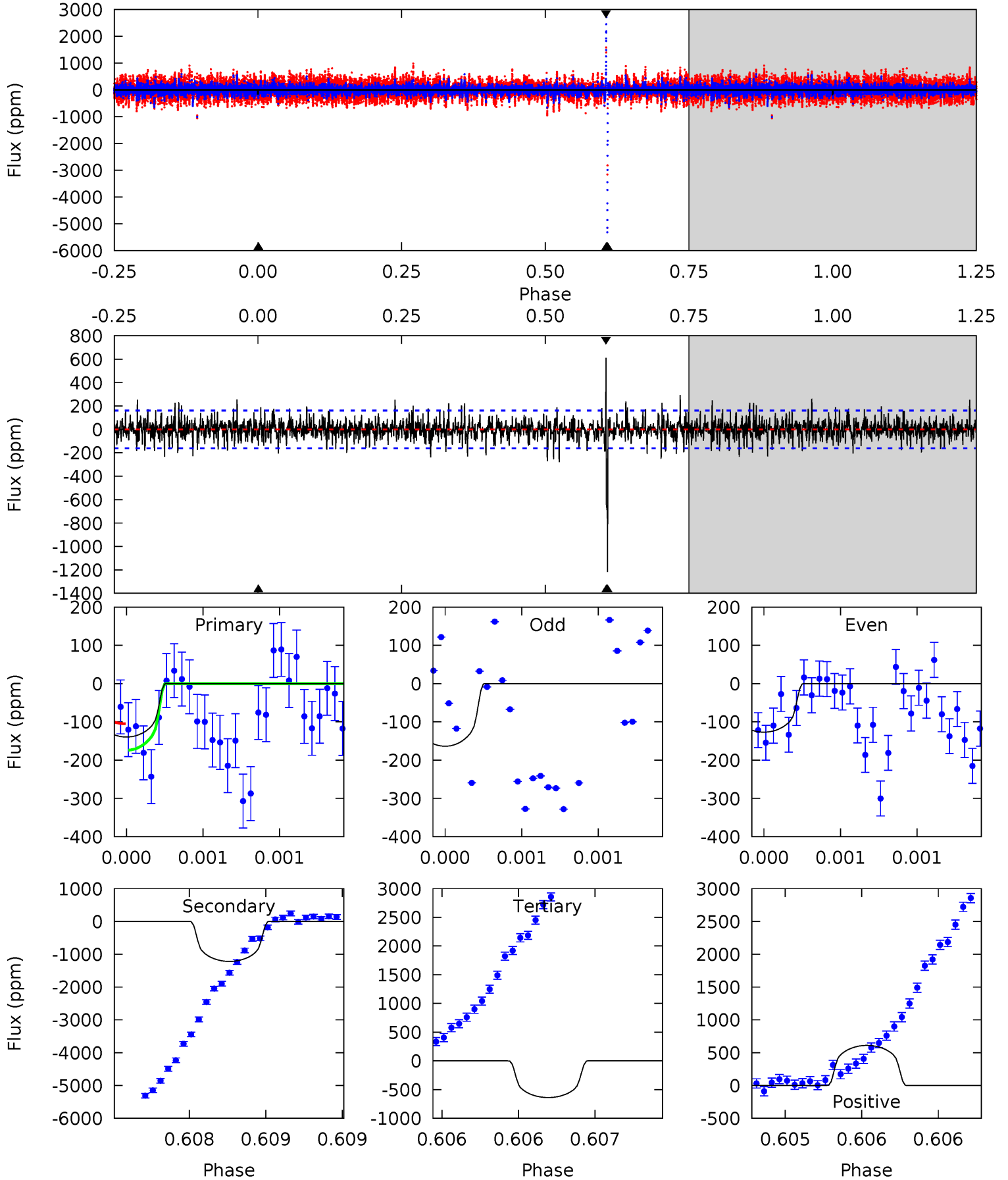
TCE 004042709-01 P=445.982881 Days $T_0=574.592944$ (BKJD)



DV Model-Shift Uniqueness Test

004042709-01, P = 445.968825 Days, E = 128.573605 Days

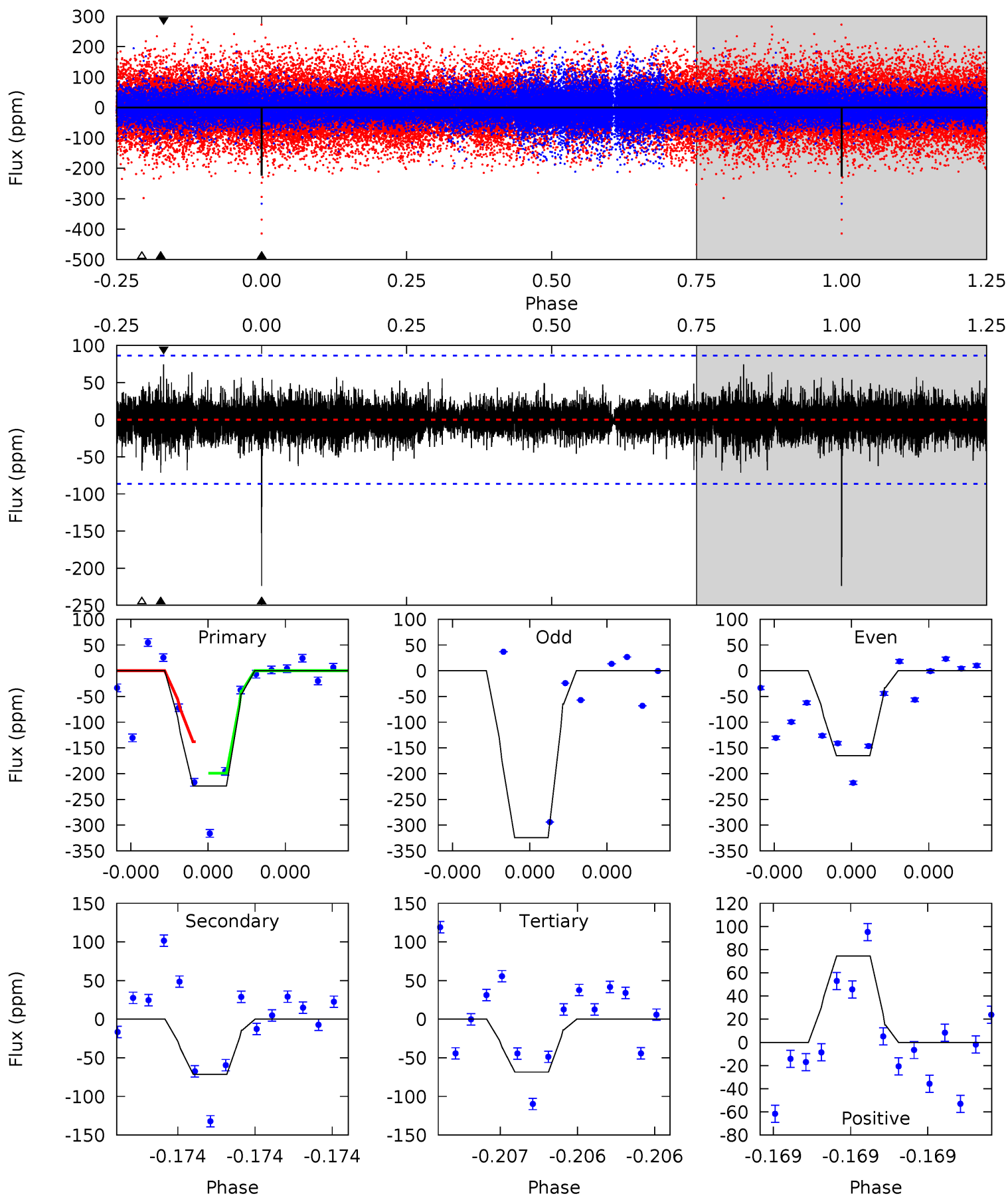
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.85	42.3	22.2	21.2	5.57	3.47	2.01	-17.3	-16.4	20.1	21.1	0.46	0.84	0.33	1.20



Alt Model-Shift Uniqueness Test

004042709-01, P = 445.982881 Days, E = 128.610063 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	4.72	4.52	4.92	5.71	3.68	0.87	10.3	9.86	0.20	-0.20	5.20	0.86	0.25	1.78



Stellar Parameters For KIC 004042709

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3757^{+91}_{-91}	$1.104^{+0.030}_{-0.030}$	$0.240^{+0.150}_{-0.250}$	$61.250^{+2.938}_{-11.017}$	$1.737^{+0.099}_{-0.559}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+62%/-104%	+5%/-18%	+6%/-32%	+25%/-11%
Source	PHO54	AST54	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 004042709-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1219 ± 29	$107.31^{+87.98}_{-68.30}$	1550^{+40}_{-44}	5010^{+3569}_{-1048}	111^{+710}_{-78}
Alt.	-71 ± 15	$108.85^{+85.62}_{-69.75}$	1546^{+45}_{-45}	3037^{+1204}_{-469}	$6.256^{+39.472}_{-4.280}$

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

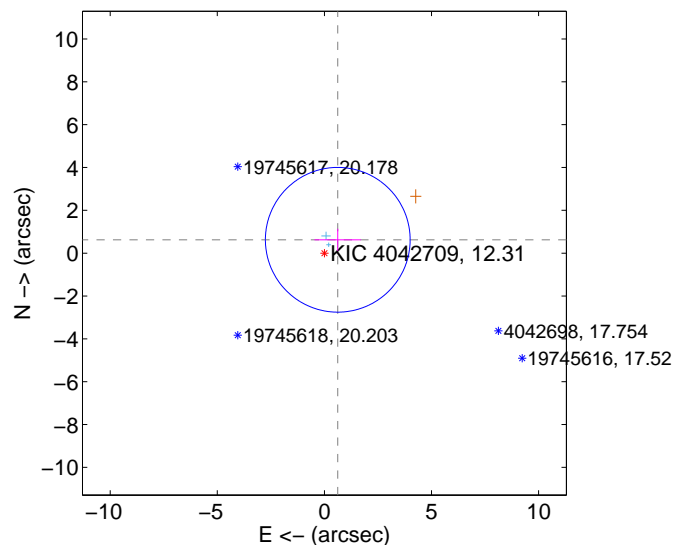
Supplemental centroid analysis for 004042709-01. Kepler magnitude: 12.31. Transit SNR 2.38

There are 2 quarters with good PRF difference image offsets

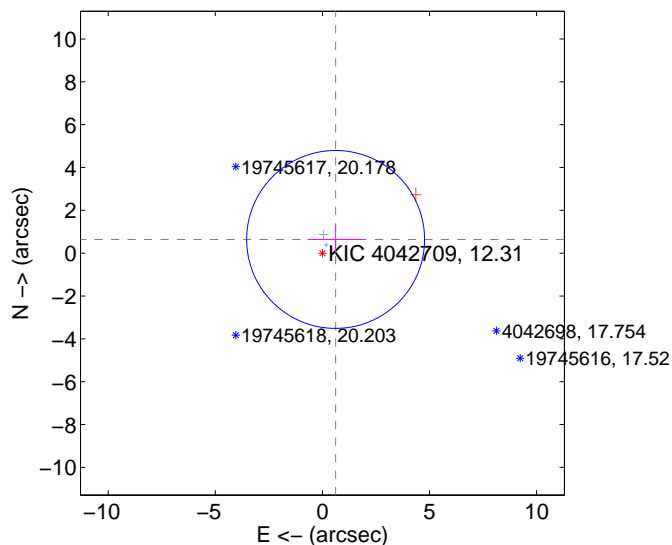
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.883 ± 1.126	0.78	-0.624 ± 1.086	0.624 ± 0.516
PRF-fit source offset from KIC position	0.889 ± 1.384	0.64	-0.616 ± 1.313	0.641 ± 0.664
photometric centroid source offset	1.93 ± 2.49	0.77	-0.46 ± 1.87	-1.88 ± 2.53

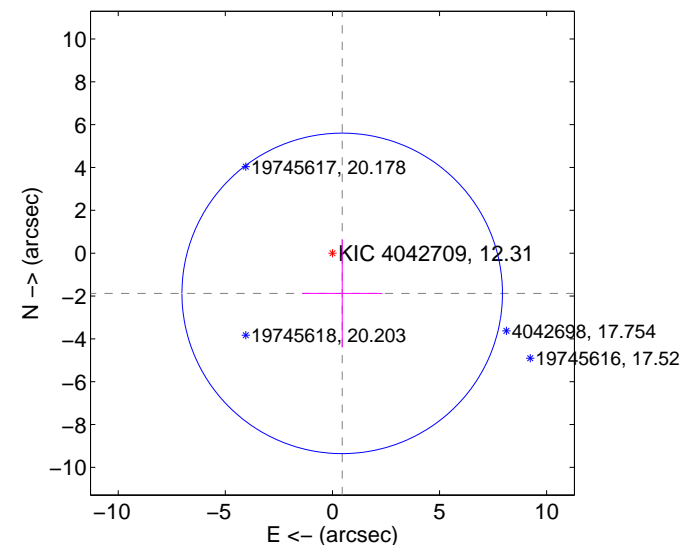
offset from difference PRF-fit to OOT PRF-fit



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.

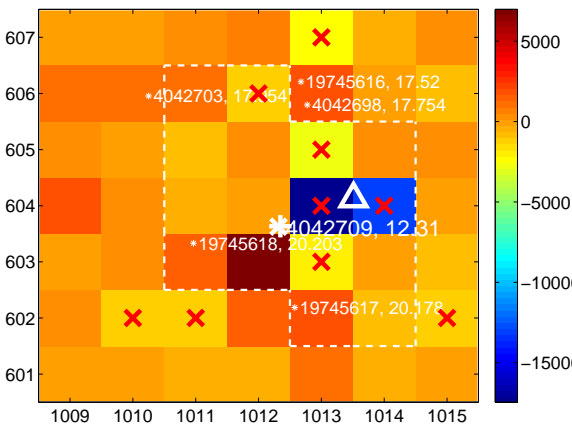
Q5 no difference image



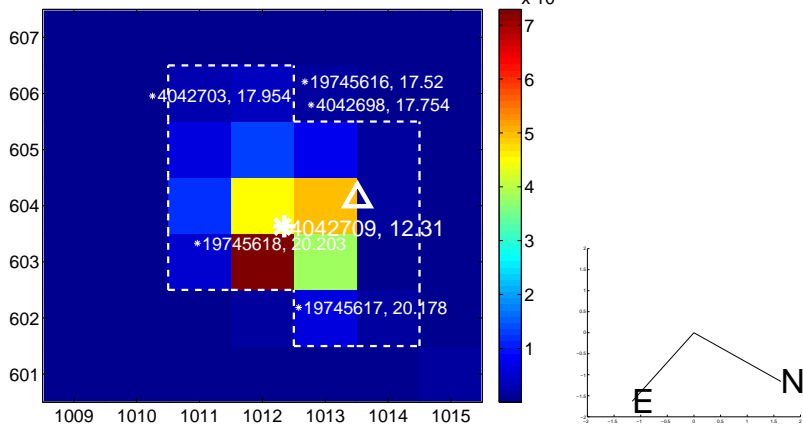
Q5 no OOT image



Q6 difference image. Poor Quality



Q6 OOT image



Q7 no difference image



Q7 no OOT image



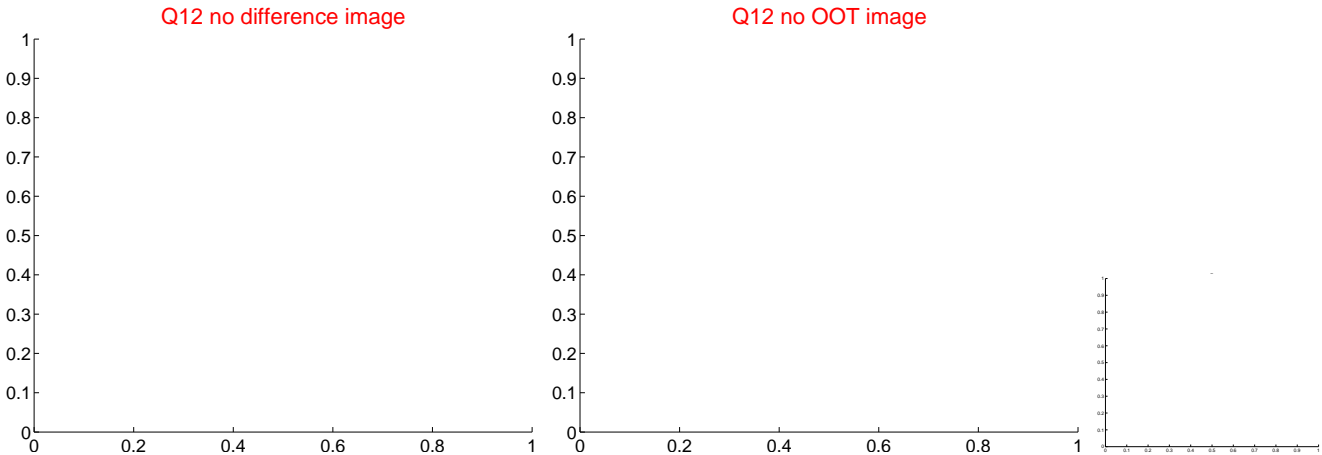
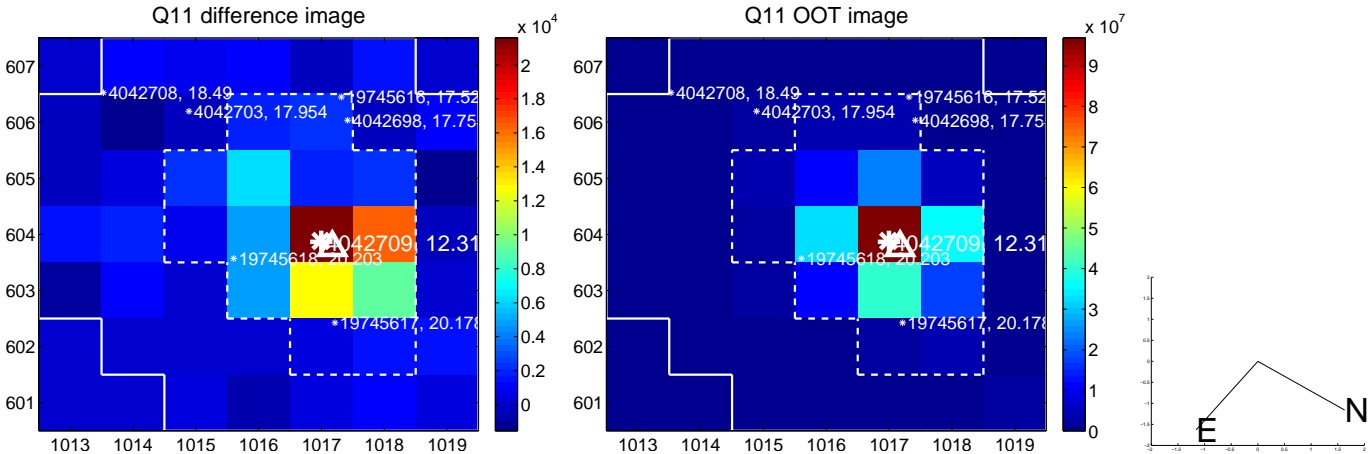
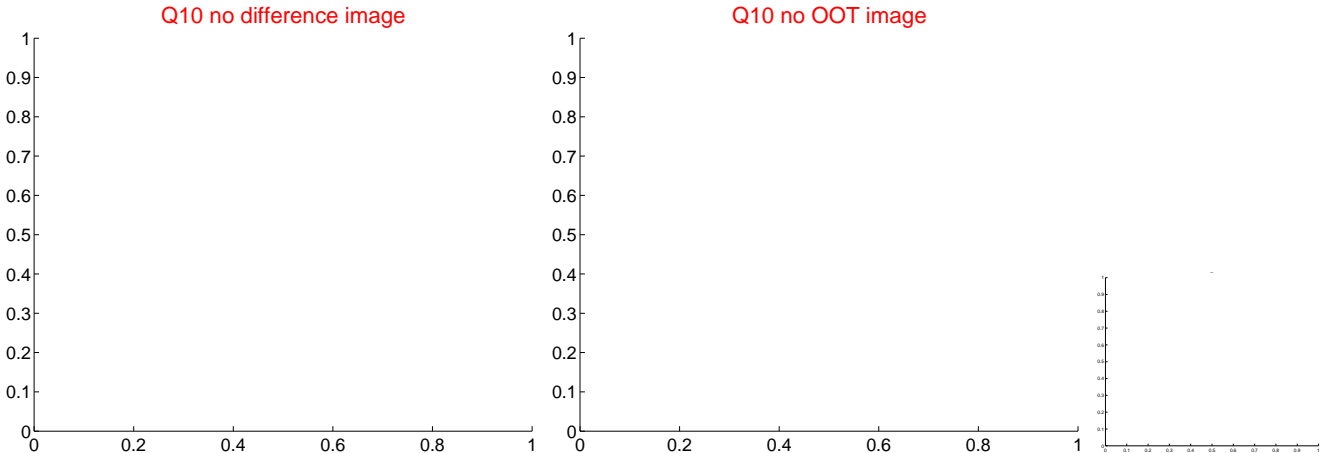
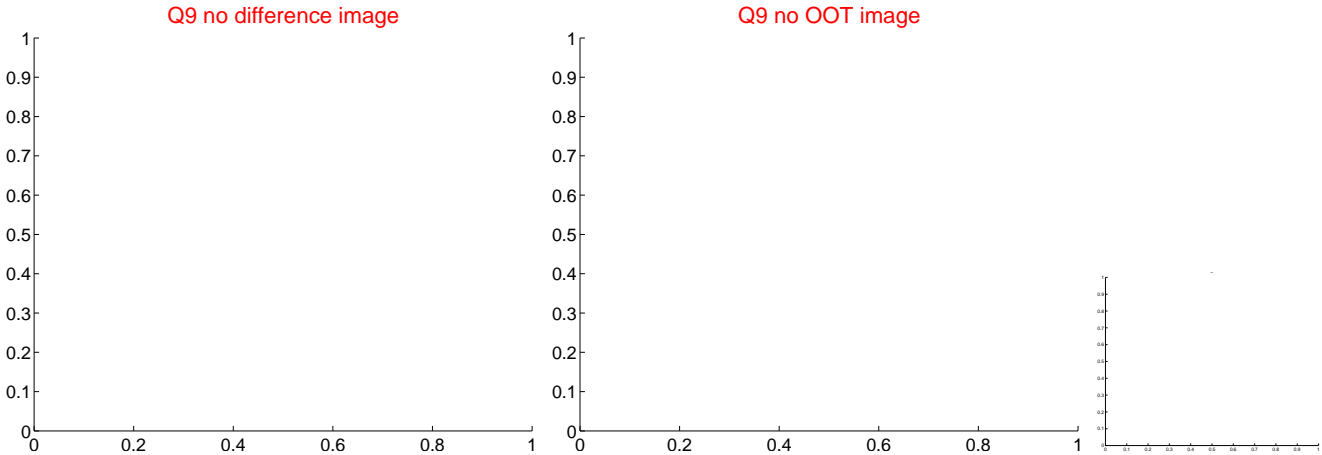
Q8 no difference image



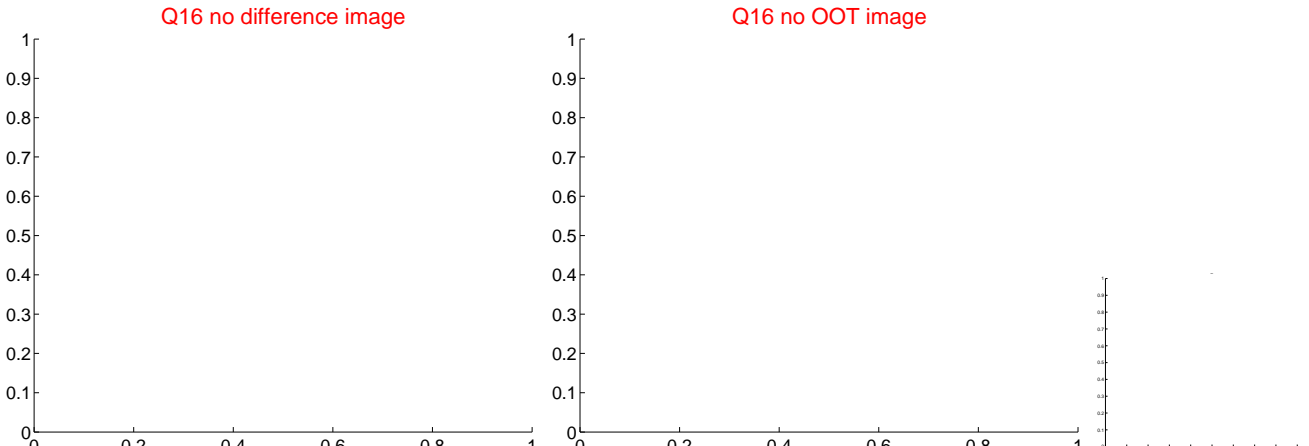
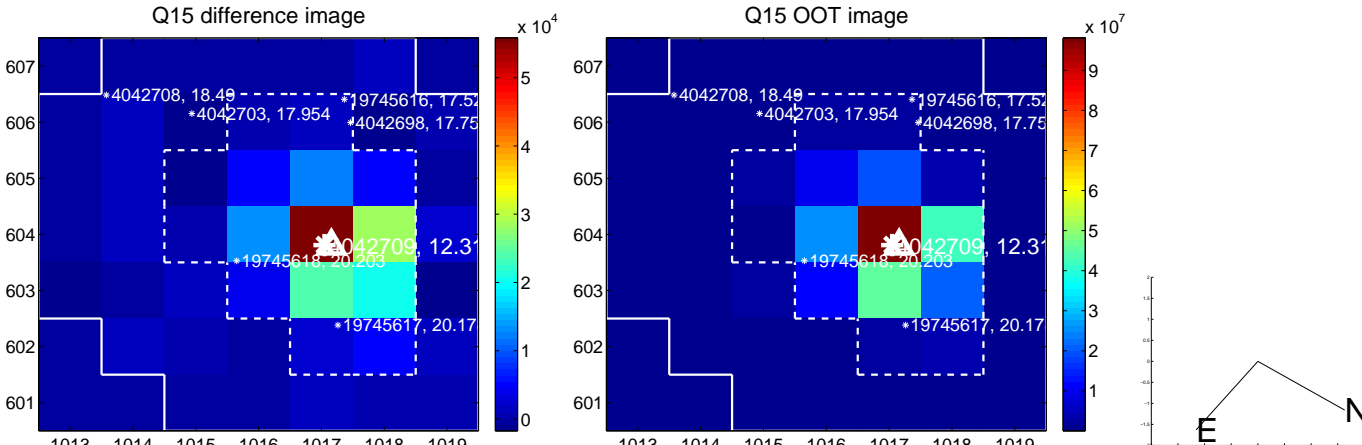
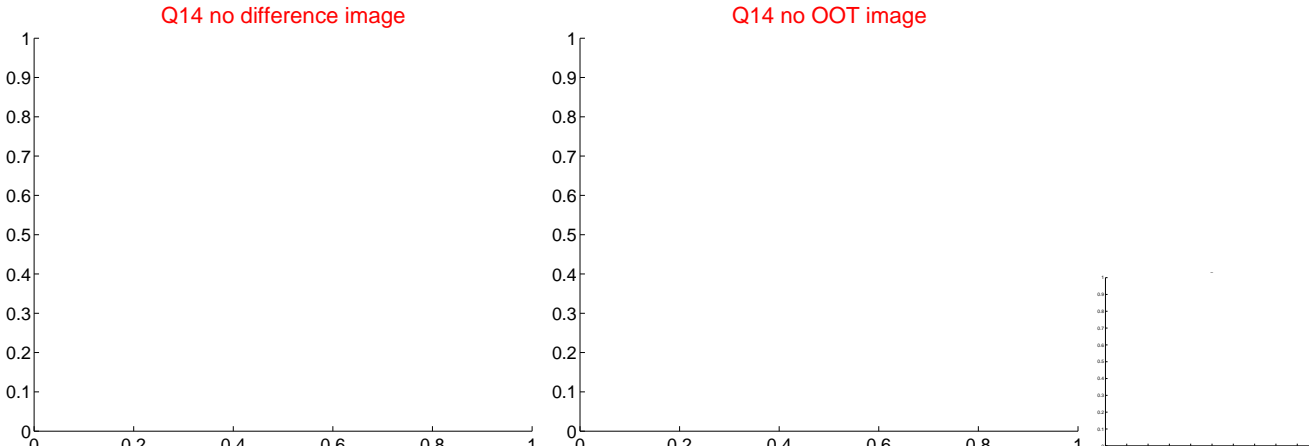
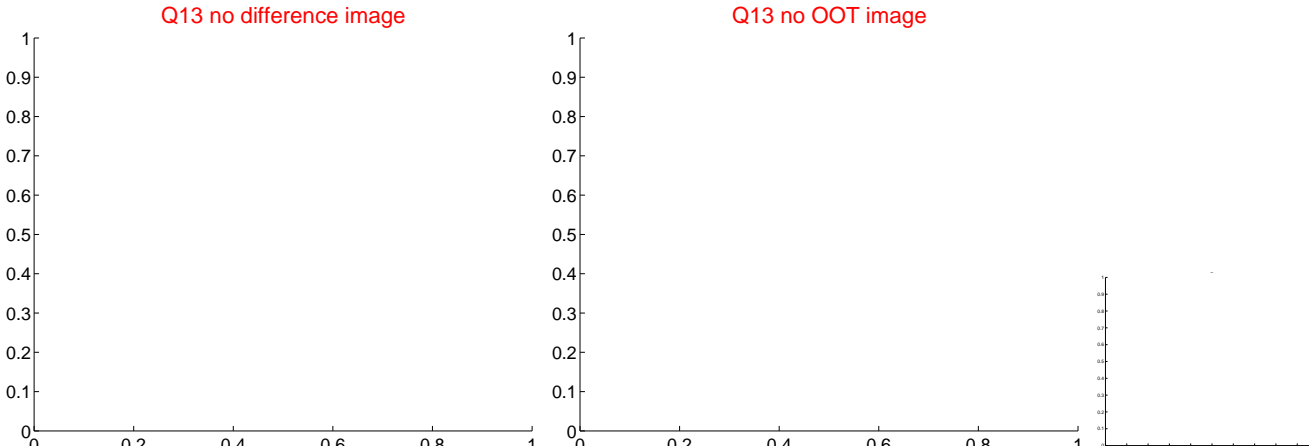
Q8 no OOT image



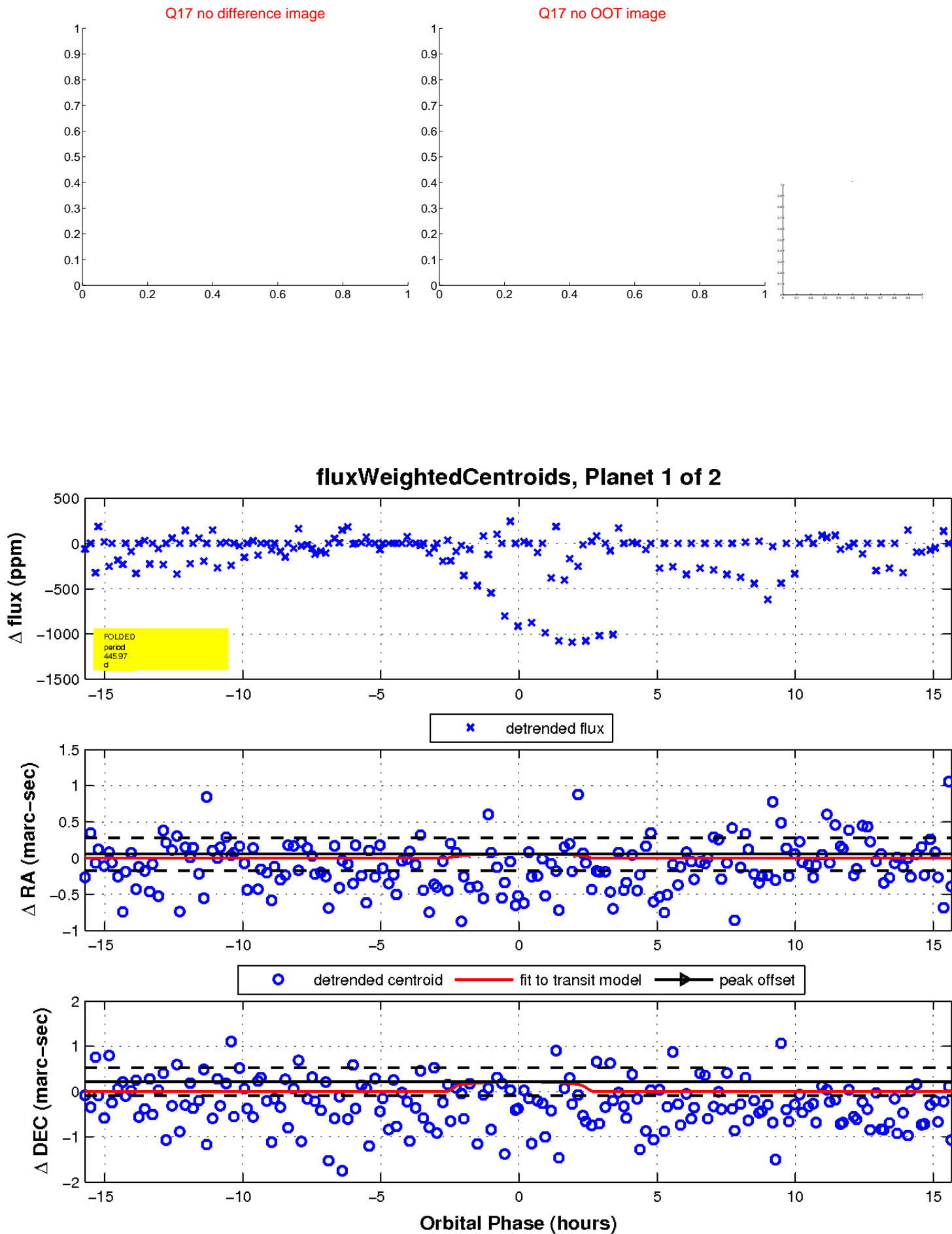
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



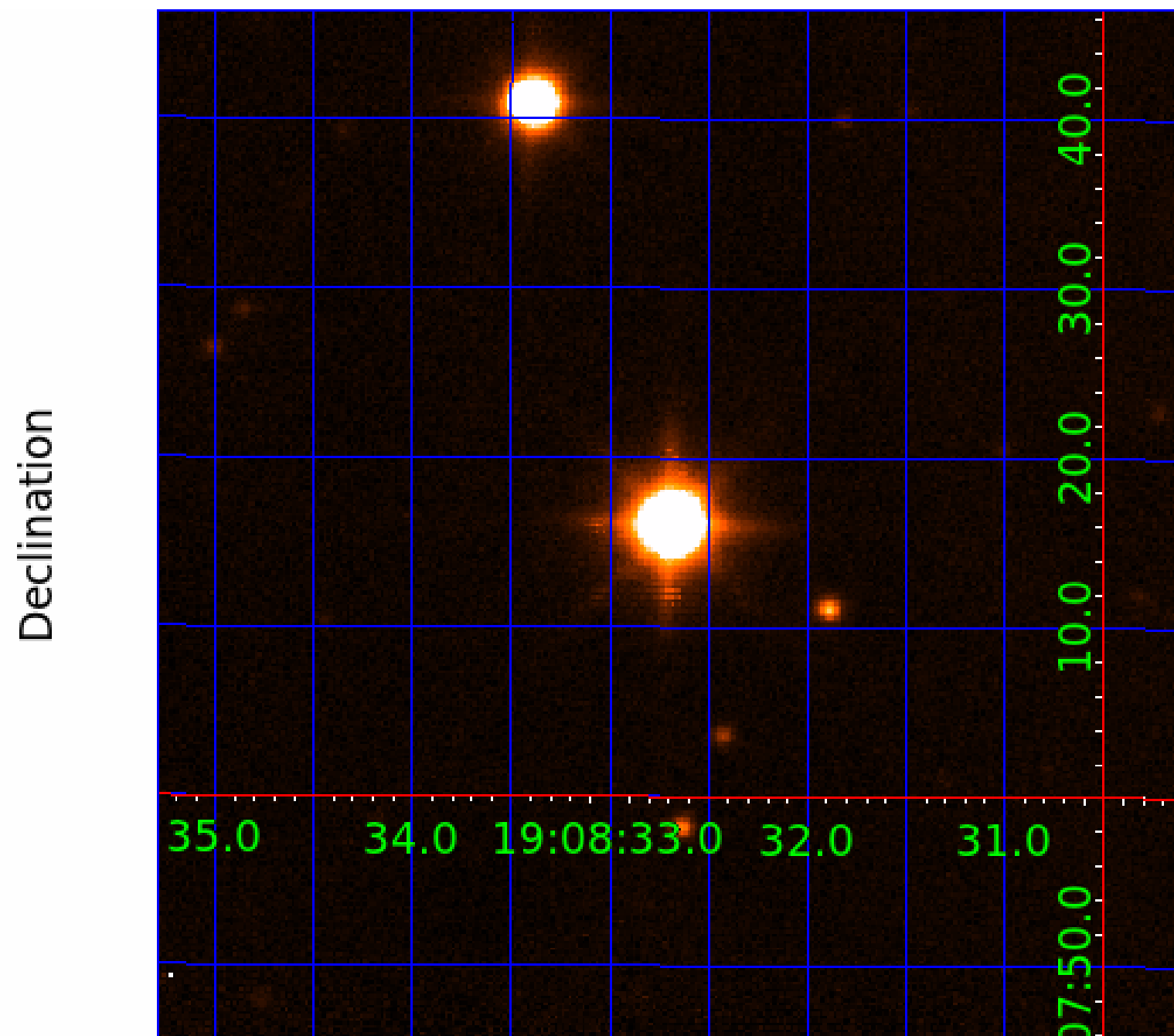
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 004042709

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})
004042709-01	OBS	No	445.968825	574.542430	120.5	5.271	10.8	2.4	61.25	3757	87.43	354.75
004042709-02	OBS	No	478.168370	469.020657	404.5	3.325	7.8	7.4	61.25	3757	137.56	323.26

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004042709-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004042709-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—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.

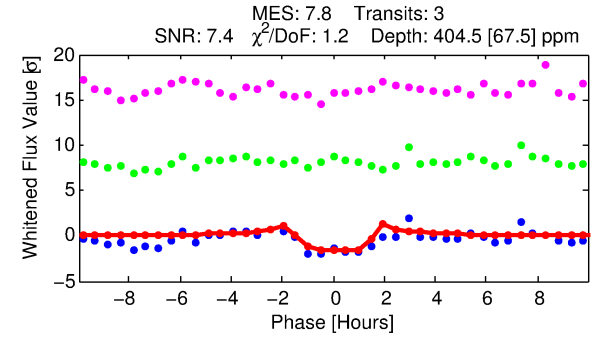
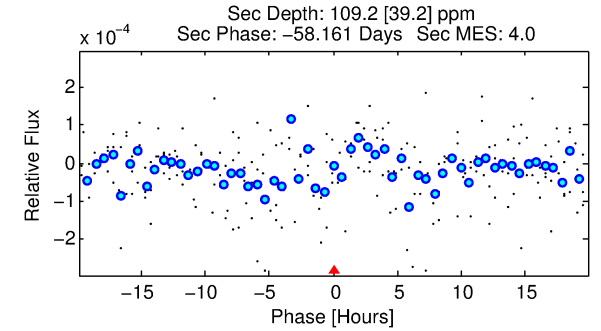
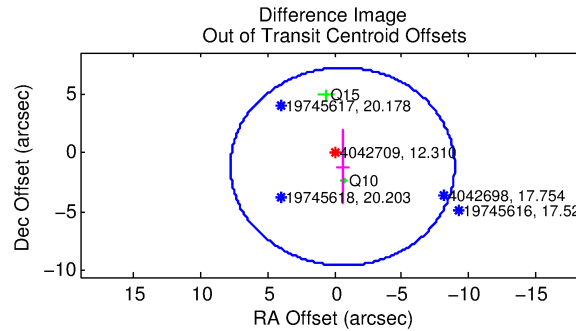
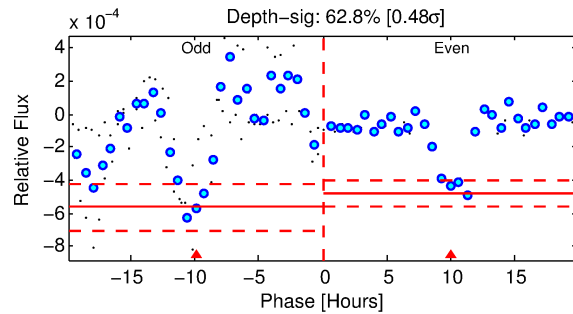
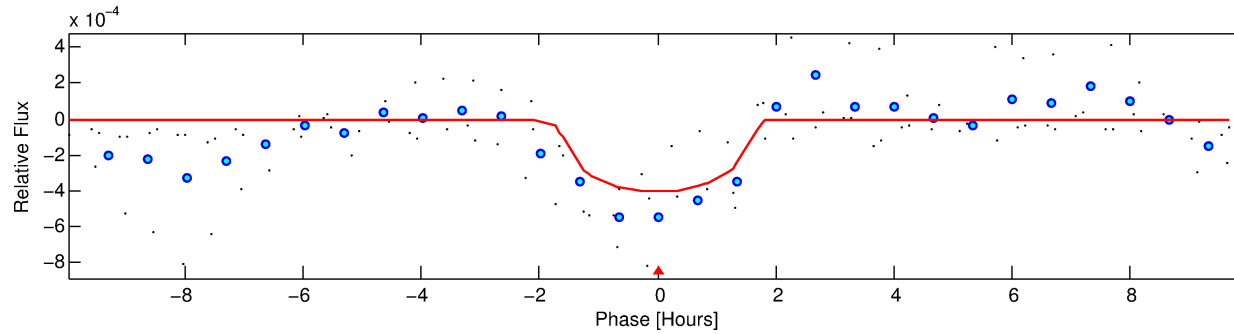
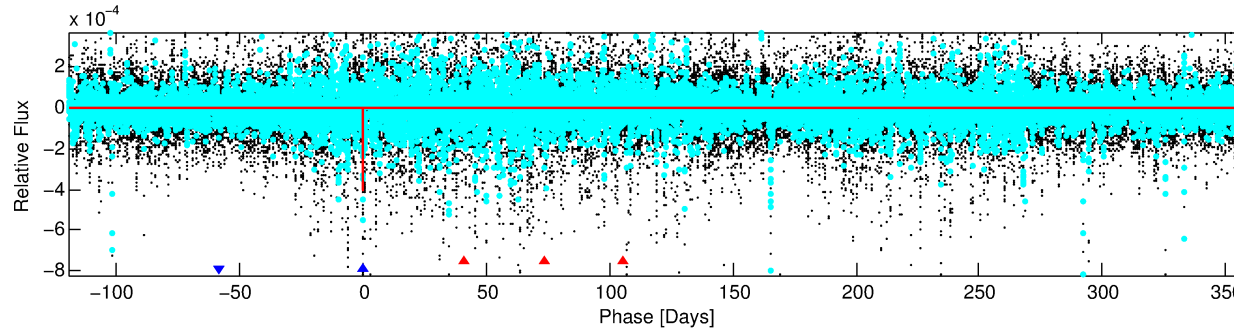
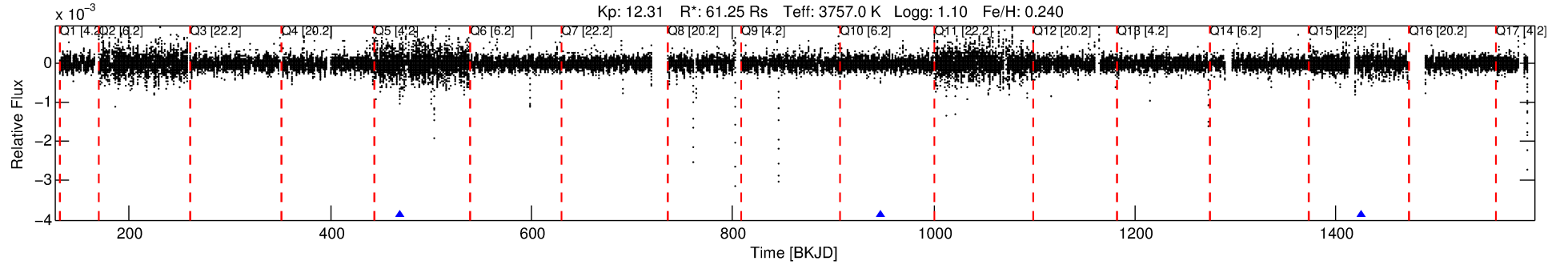
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004042709-02

No Significant Match Found

DV One-Page Summary

KIC: 4042709 Candidate: 2 of 2 Period: 478.168 d



DV Fit Results:

Period = 478.16837 [0.00558] d
Epoch = 469.0207 [0.0074] BKJD
Rp/R* = 0.0206 [0.0148]
a/R* = 741.07 [1370.20]
b = 0.77 [1.03]
Seff = 323.26 [52.01]
Teq = 1081 [43] K
Rp = 137.55 [101.67] Re
a = 1.4393 [0.1757] AU
Ag = 6.58 [9.76] [0.57 σ]
Teffp = 2677 [991] K [1.61 σ]

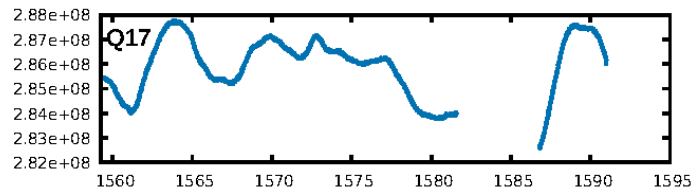
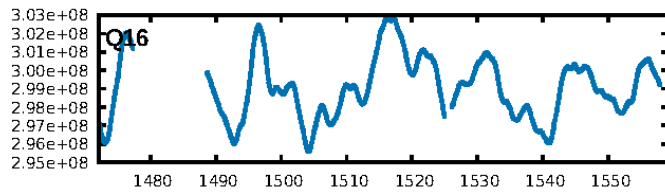
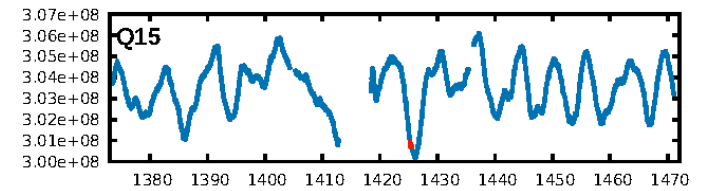
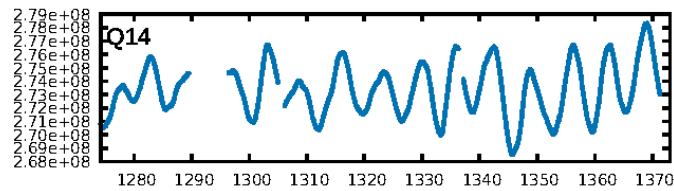
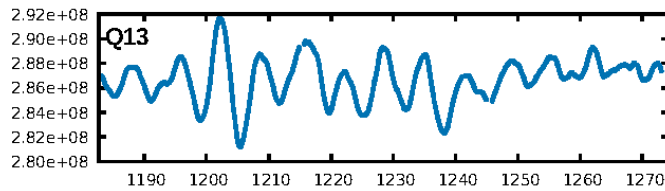
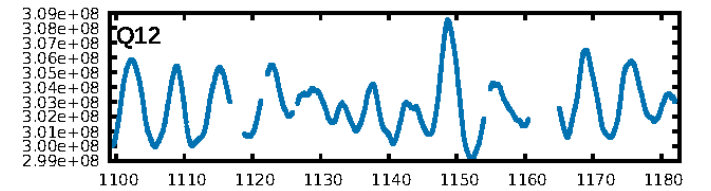
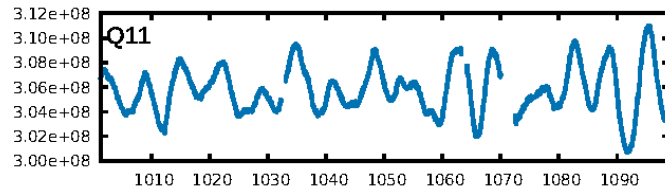
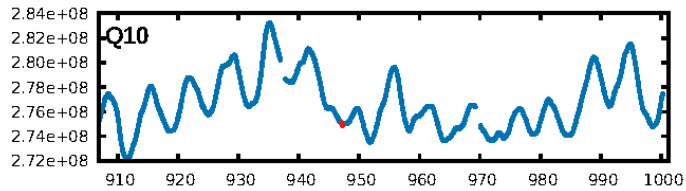
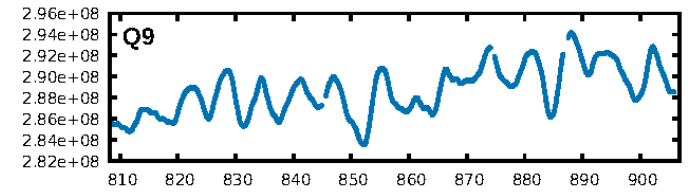
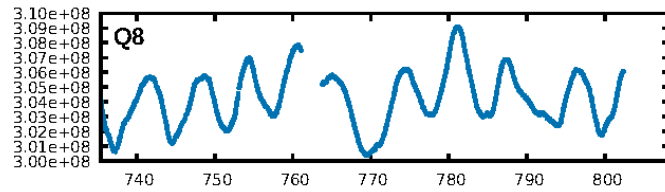
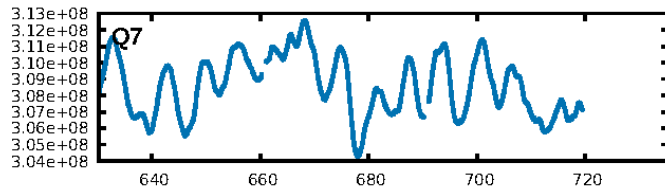
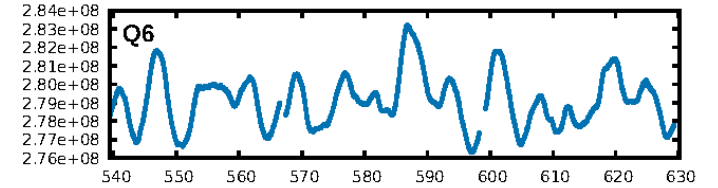
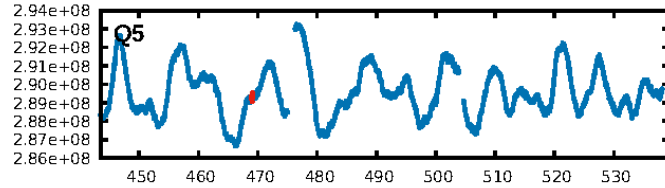
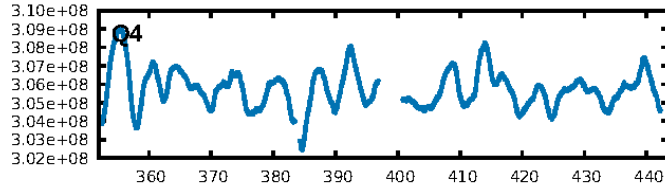
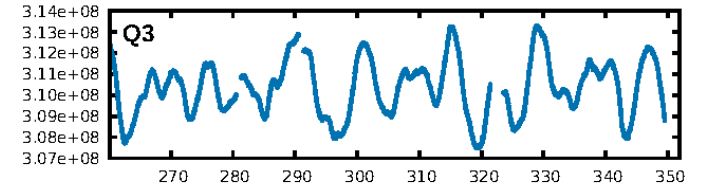
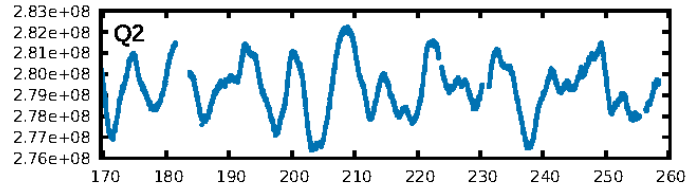
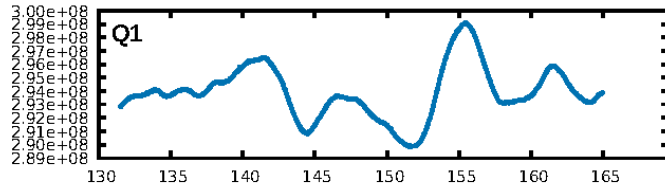
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [124.01 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 35.6%
ModelChiSquareGof-sig: 79.2%
Bootstrap-pfa: 4.98e-05
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.978
Centroid-sig: 0.0%
Centroid-so: 3.076 arcsec [3.18 σ]
OotOffset-rm: 1.310 arcsec [0.47 σ]
KicOffset-rm: 1.305 arcsec [0.50 σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-st: 1/1/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

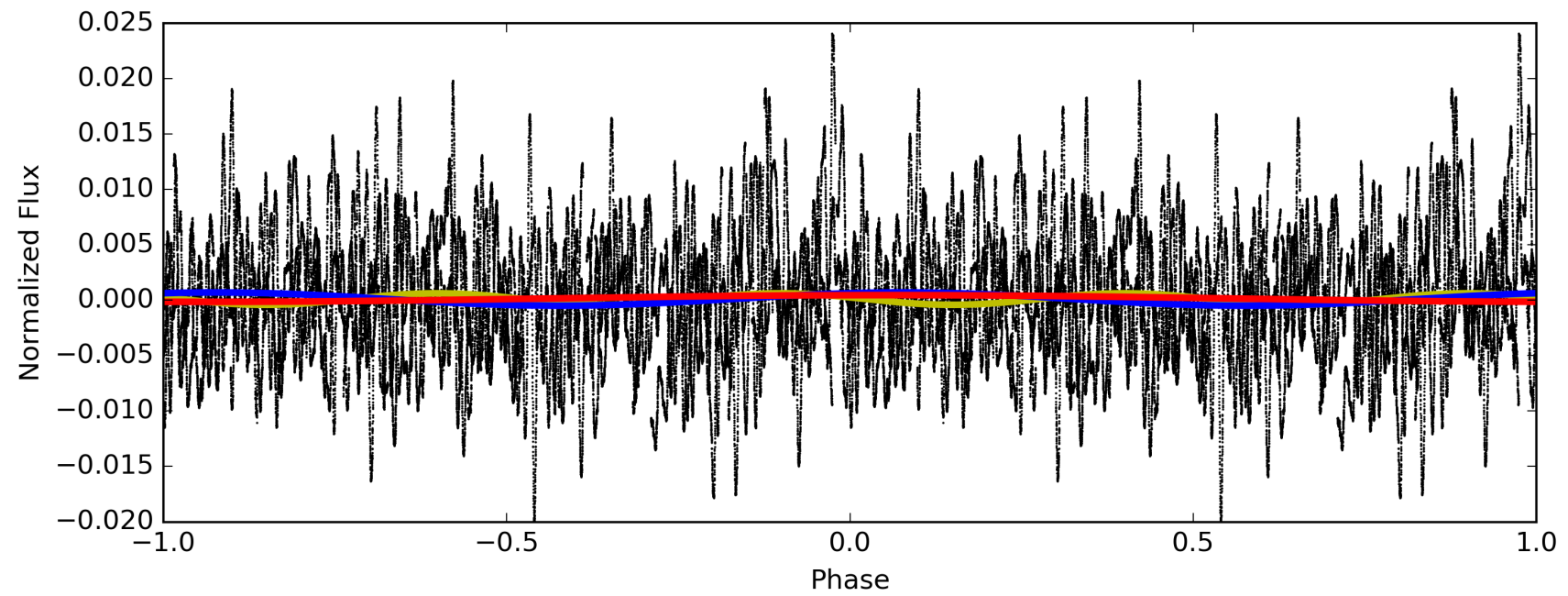
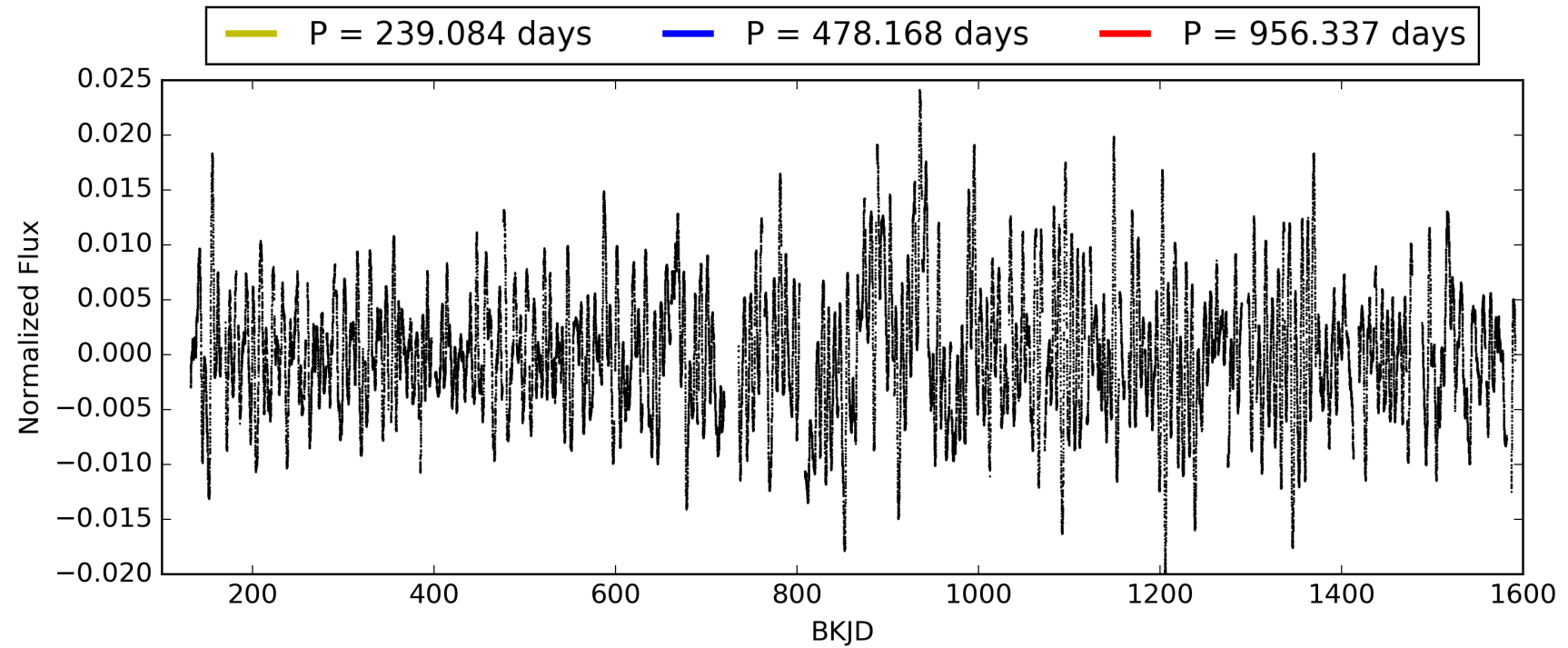
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:52:09 Z

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

TCE 004042709-02, PDC Light Curves

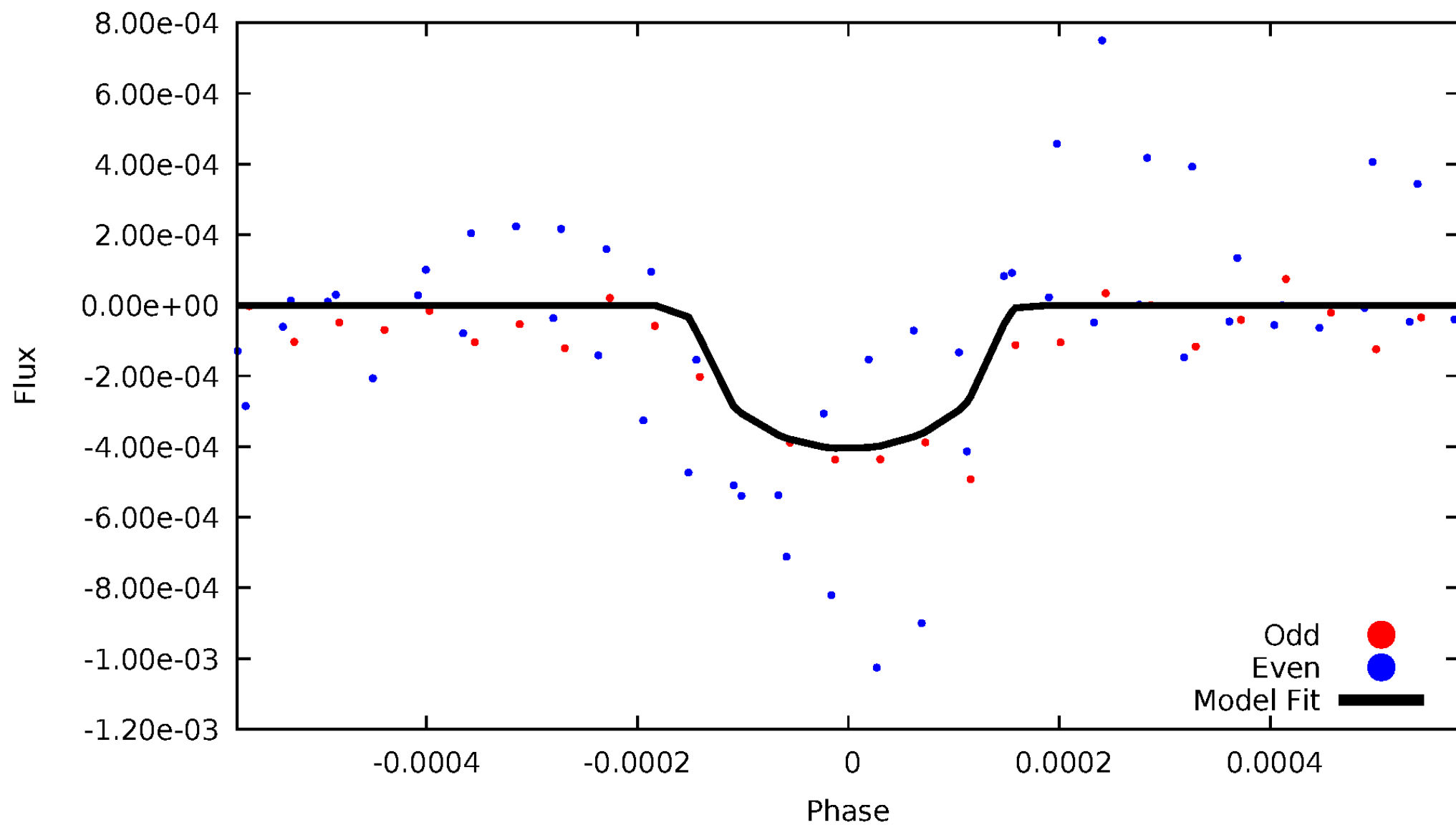


TCE 004042709-02



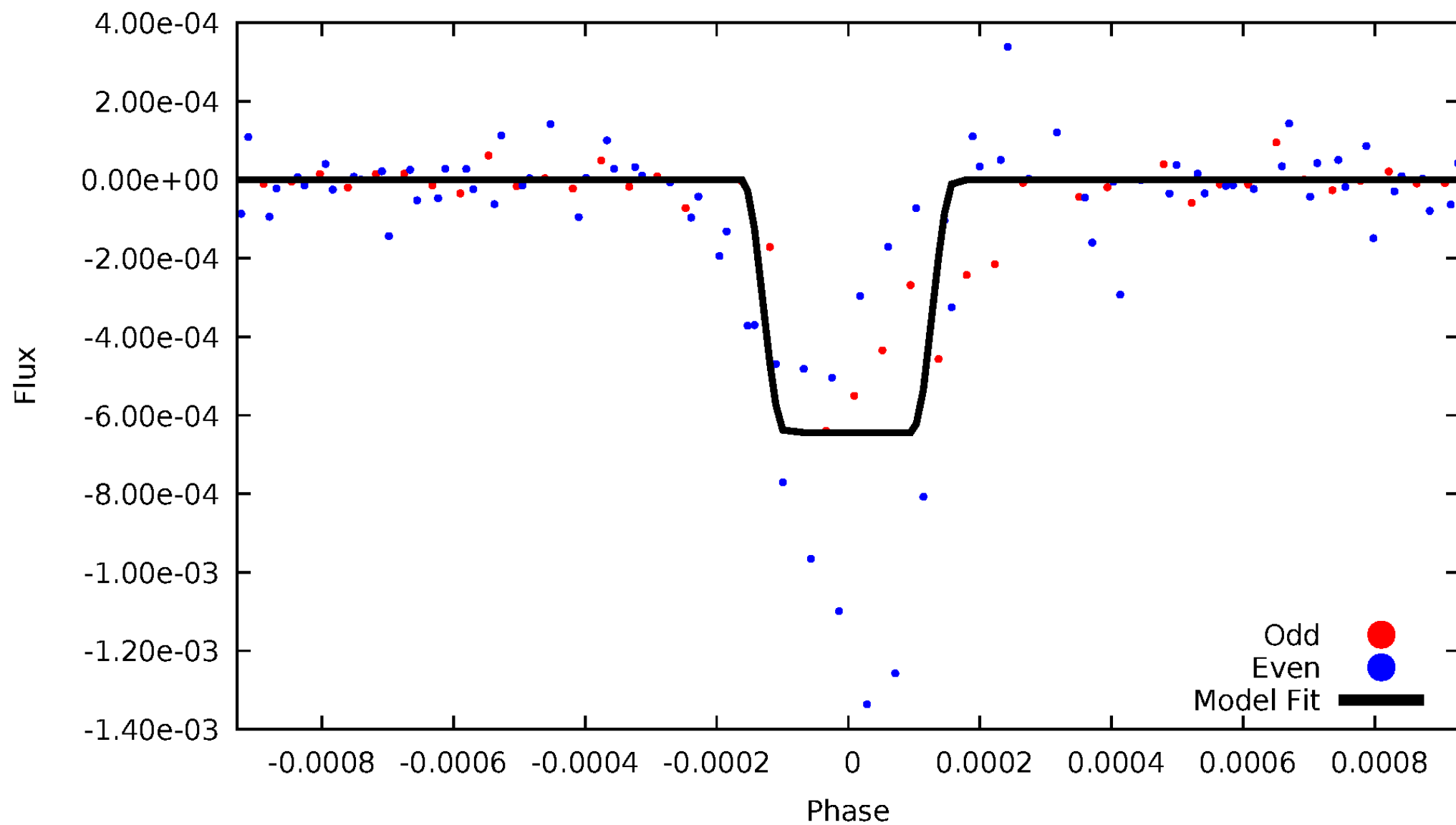
DV Odd/Even

TCE 004042709-02



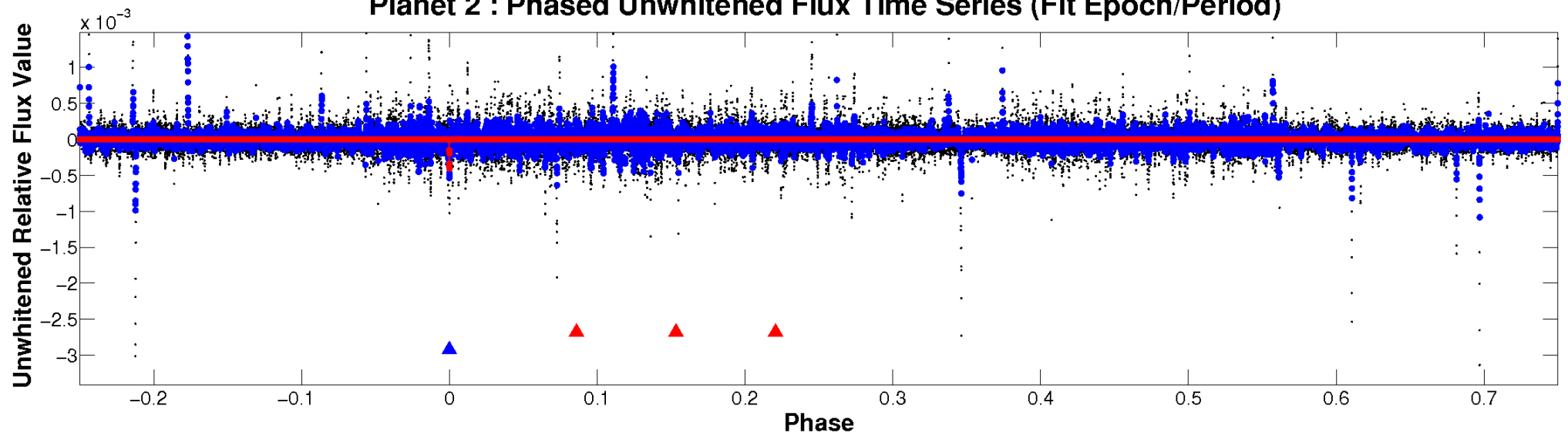
ALT Odd/Even

TCE 004042709-02

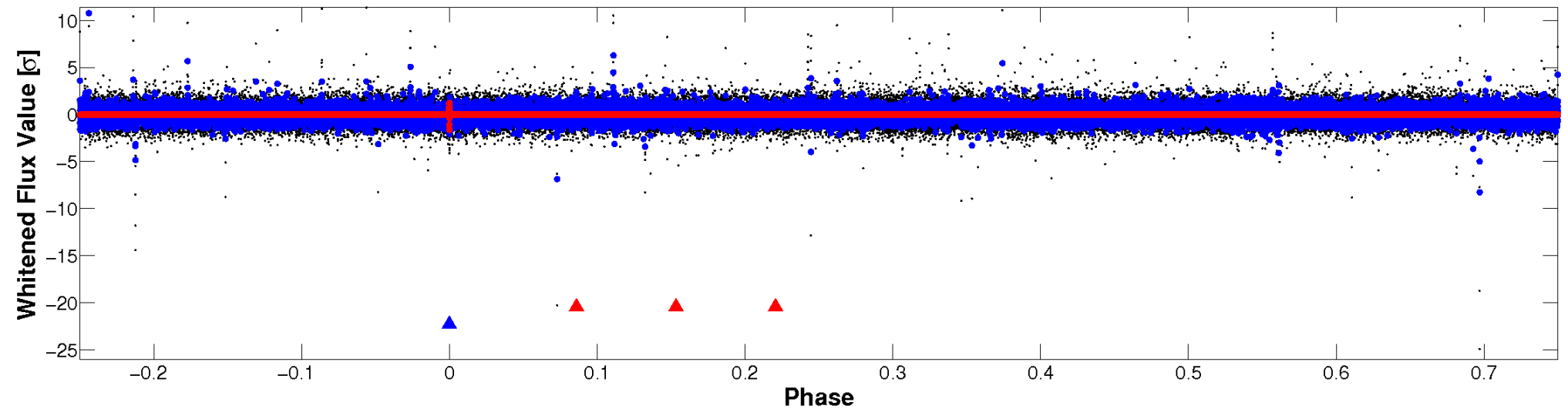


Non-Whitened Vs. Whitened Light Curve

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

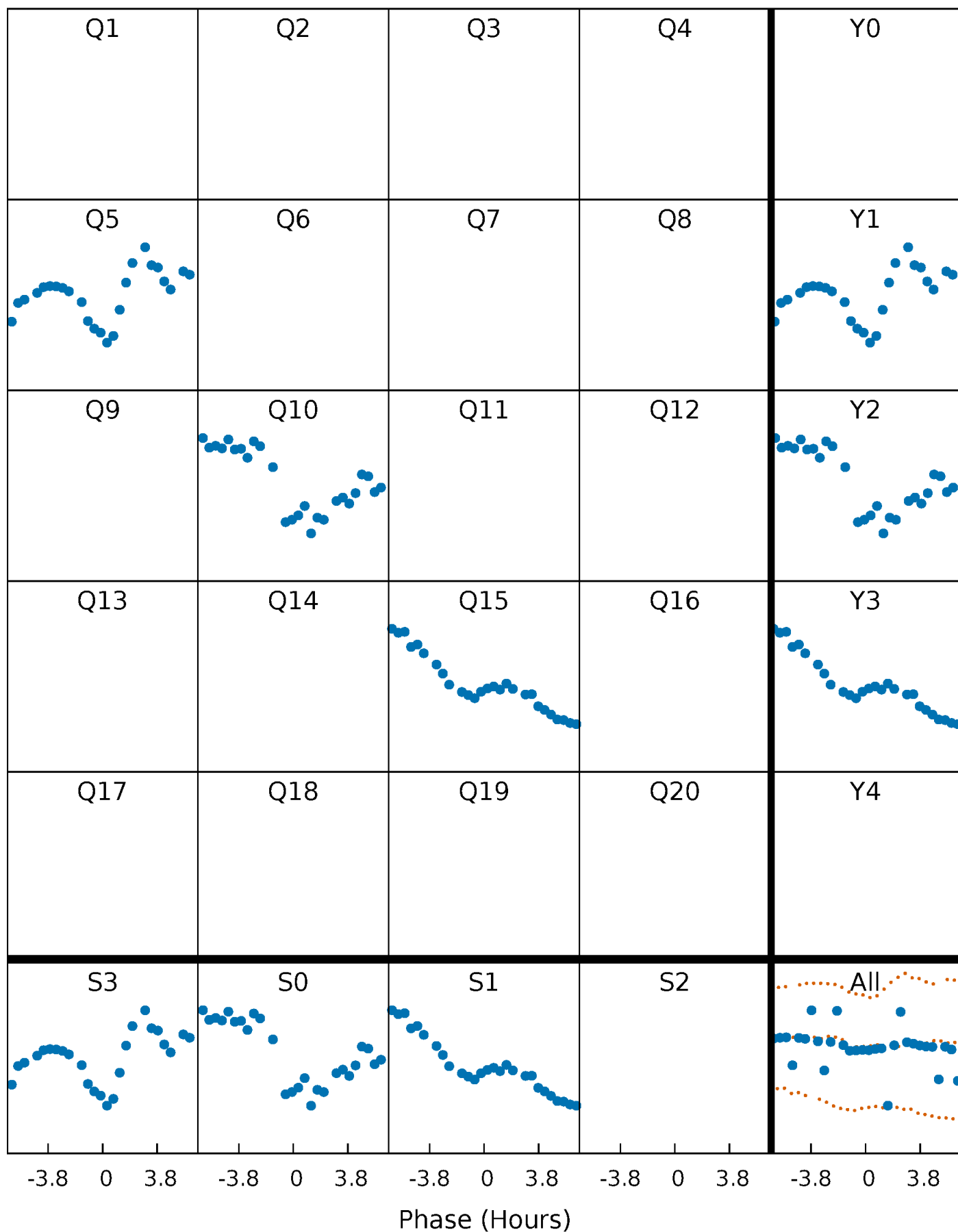


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



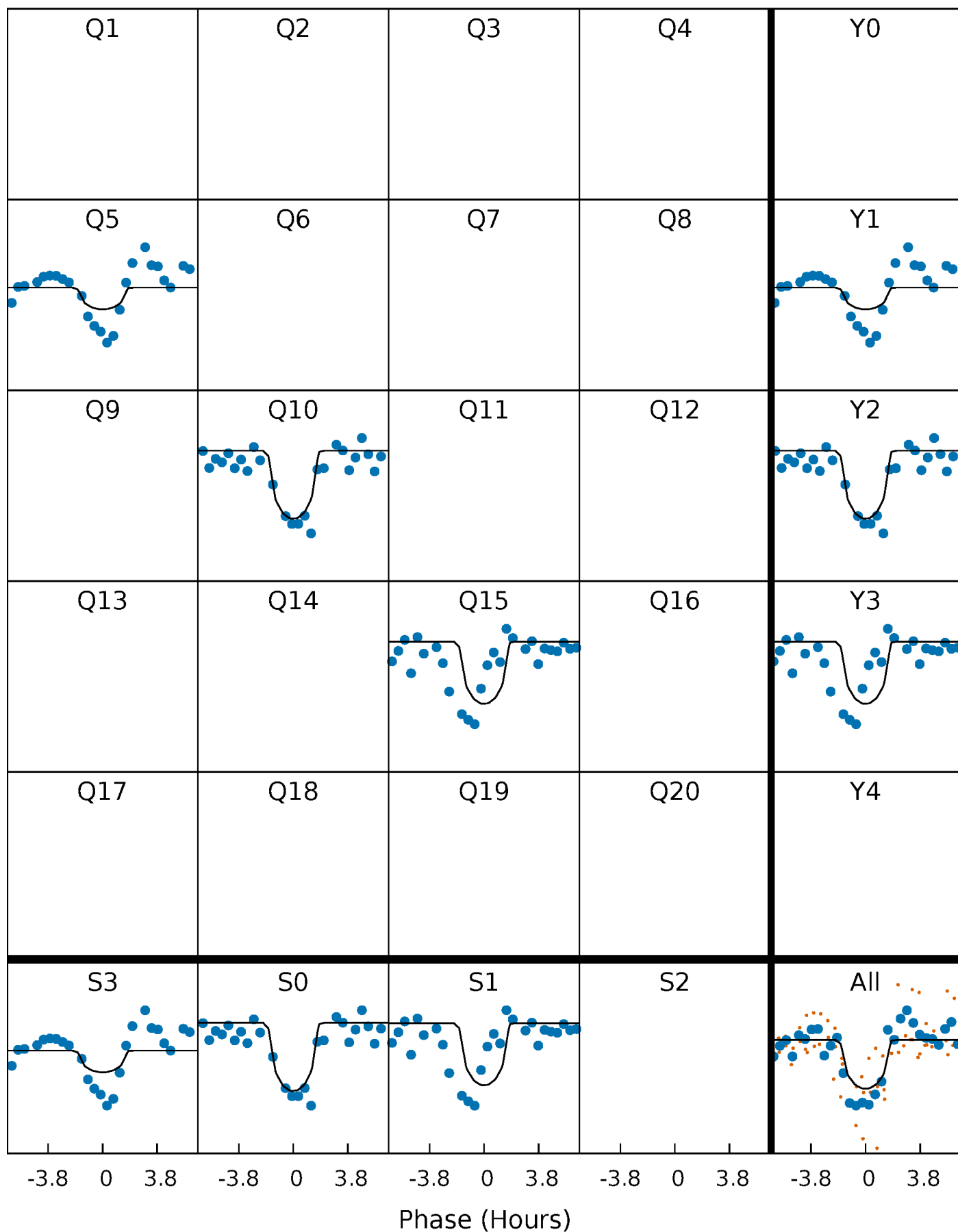
PDC Quarter-Phased Transit Curves

TCE 004042709-02 P=478.168370 Days $T_0=469.020656$ (BKJD)



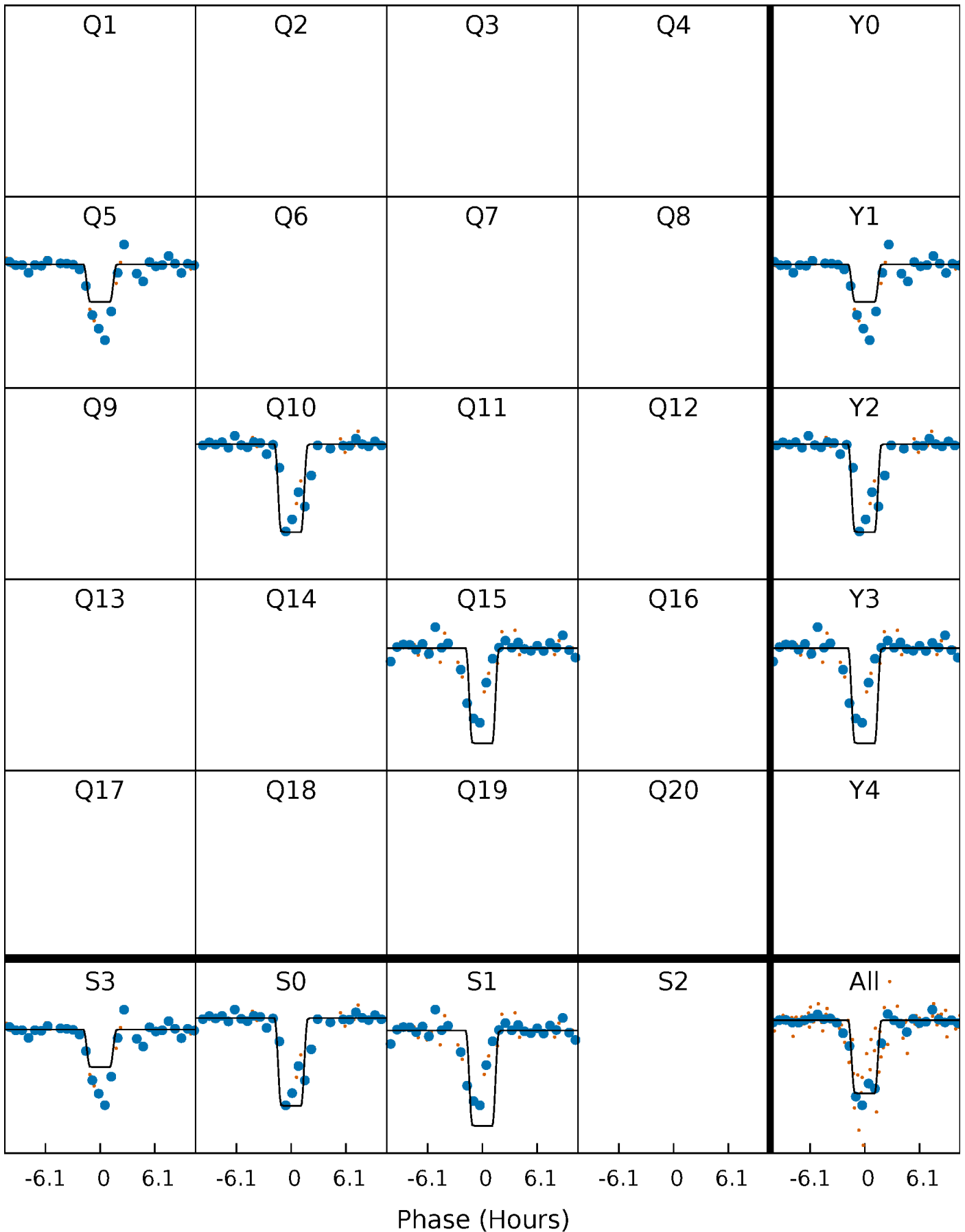
DV Quarter-Phased Transit Curves

TCE 004042709-02 P=478.168370 Days $T_0=469.020656$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

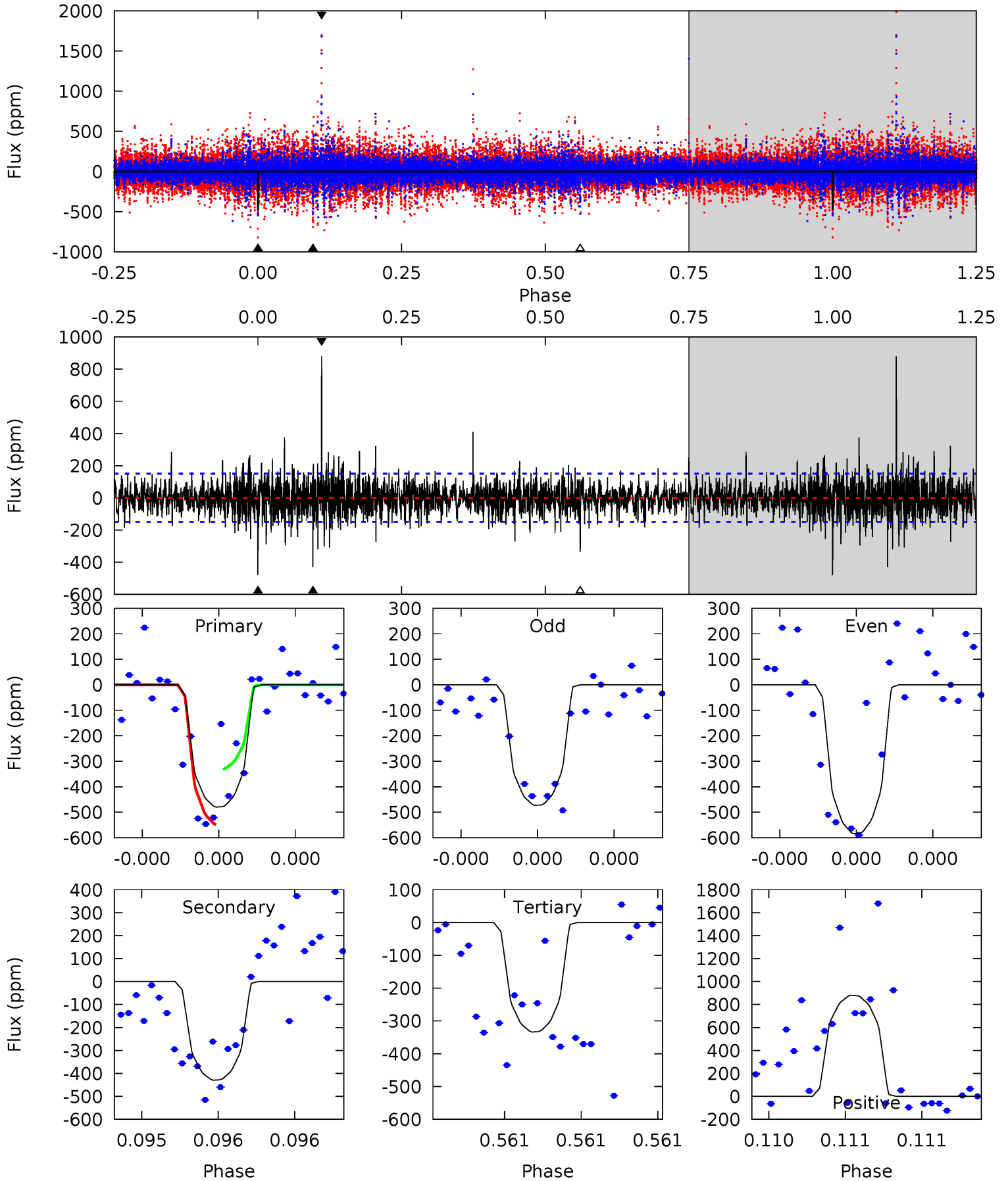
TCE 004042709-02 $P=478.158926$ Days $T_0=469.019843$ (BKJD)



DV Model-Shift Uniqueness Test

004042709-02, P = 478.168370 Days, E = 469.020656 Days

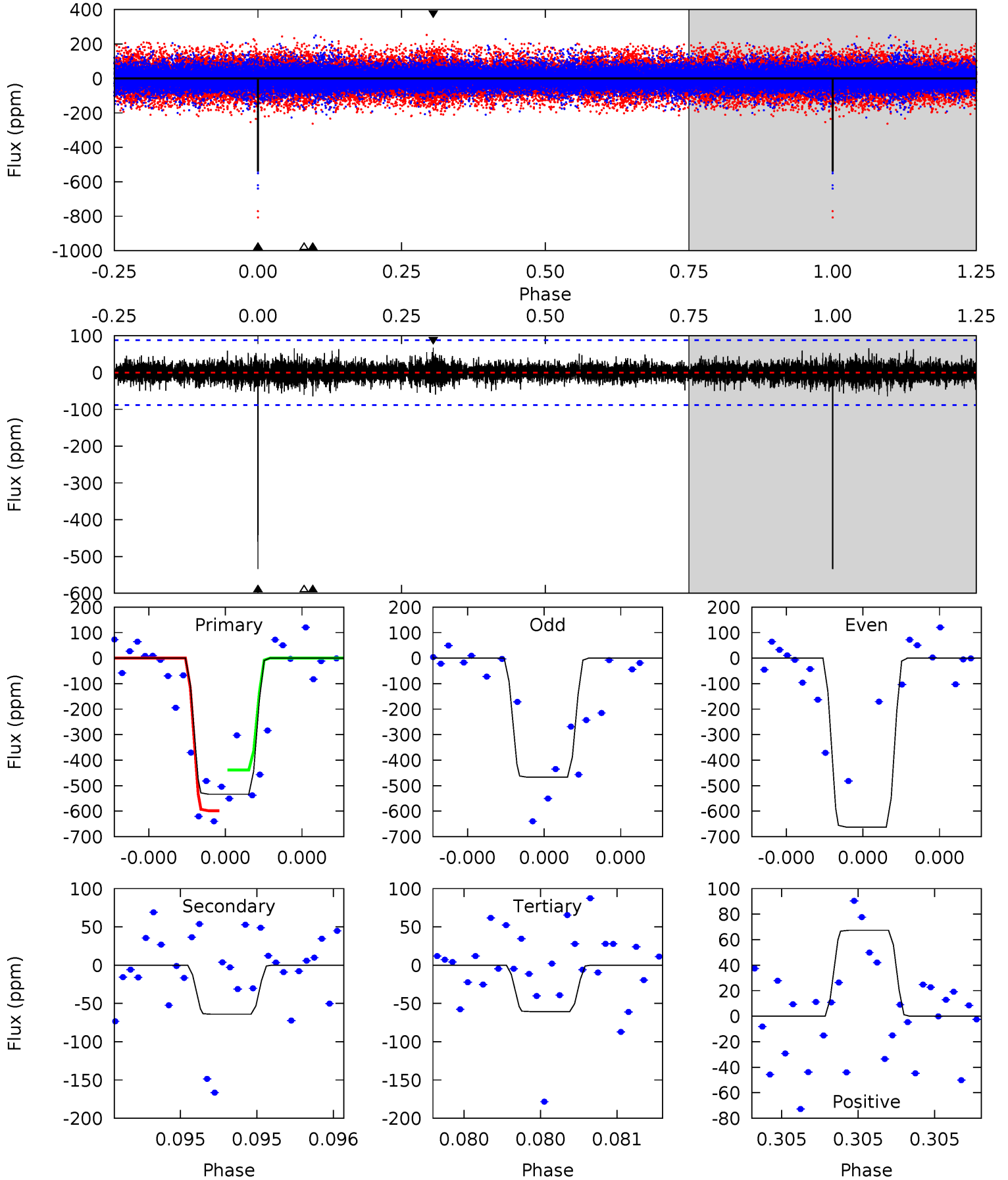
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.0	16.1	12.6	33.1	5.64	3.58	2.31	5.47	-15.1	3.60	-16.9	1.66	1.16	0.65	4.01



Alt Model-Shift Uniqueness Test

004042709-02, P = 478.158926 Days, E = 469.019843 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
34.2	4.11	3.89	4.32	5.66	3.61	0.81	30.3	29.9	0.22	-0.21	6.70	1.35	0.11	0



Stellar Parameters For KIC 004042709

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	3757^{+91}_{-91}	$1.104^{+0.030}_{-0.030}$	$0.240^{+0.150}_{-0.250}$	$61.250^{+2.938}_{-11.017}$	$1.737^{+0.099}_{-0.559}$	$0.000^{+0.000}_{-0.000}$
	+2%/-2%	+3%/-3%	+62%/-104%	+5%/-18%	+6%/-32%	+25%/-11%
Source	PHO54	AST54	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 004042709-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-430 ± 27	$150.51^{+92.42}_{-86.44}$	1514^{+40}_{-45}	3664^{+1377}_{-538}	22^{+101}_{-14}
Alt.	-64 ± 16	$174.45^{+105.02}_{-89.79}$	1516^{+39}_{-45}	2612^{+638}_{-376}	$2.342^{+7.704}_{-1.469}$

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 $A_{obs} \gg 1.0$

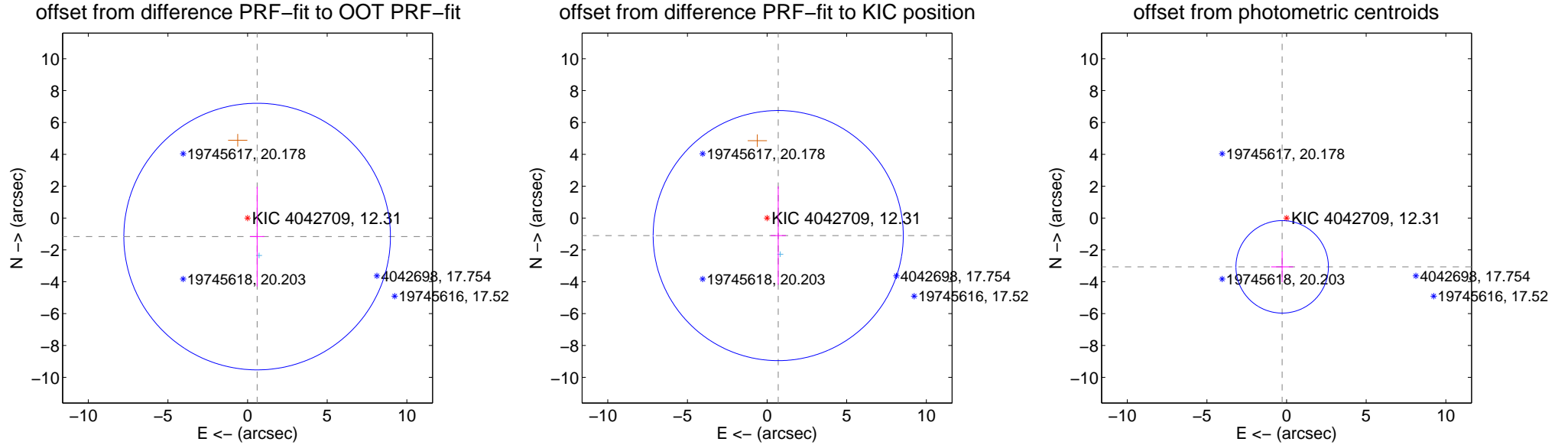
DV Centroid Data

Supplemental centroid analysis for 004042709-02. Kepler magnitude: 12.31. Transit SNR 7.44

There are 1 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	1.310 ± 2.790	0.47	-0.601 ± 0.451	-1.164 ± 3.131
PRF-fit source offset from KIC position	1.305 ± 2.617	0.50	-0.700 ± 0.485	-1.101 ± 3.086
photometric centroid source offset	3.08 ± 0.97	3.18	0.27 ± 0.70	-3.06 ± 0.97

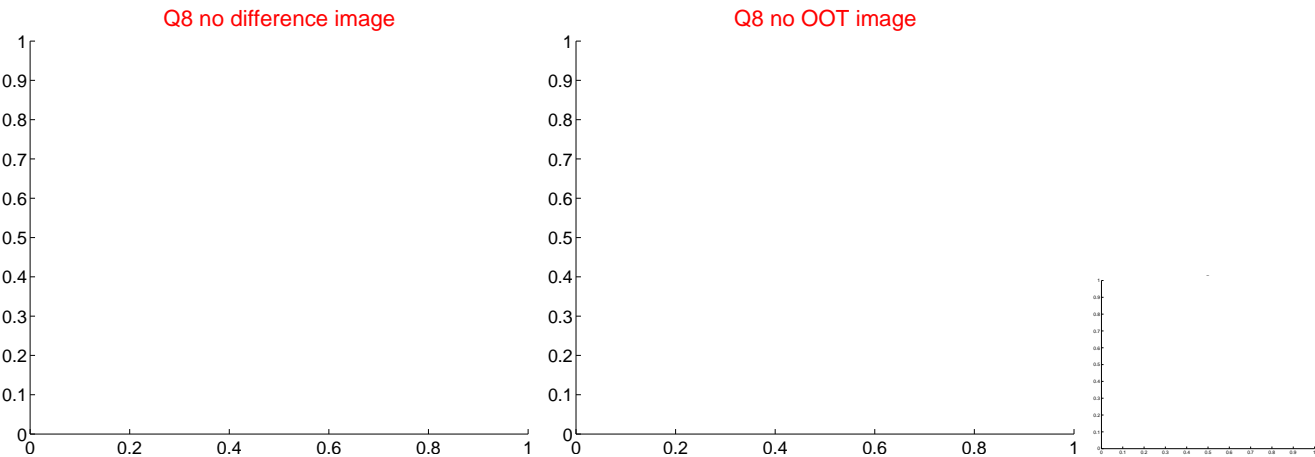
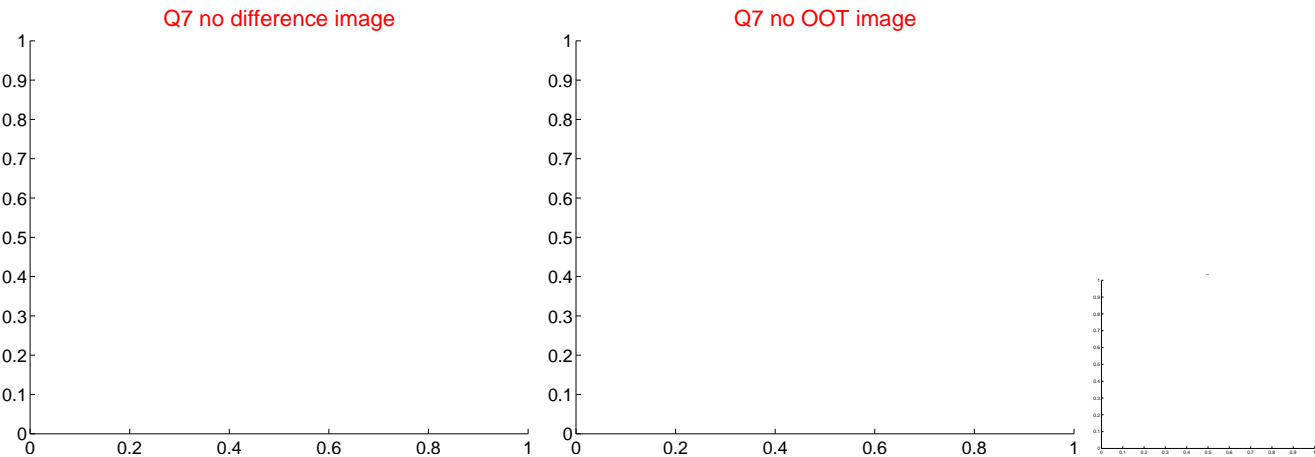
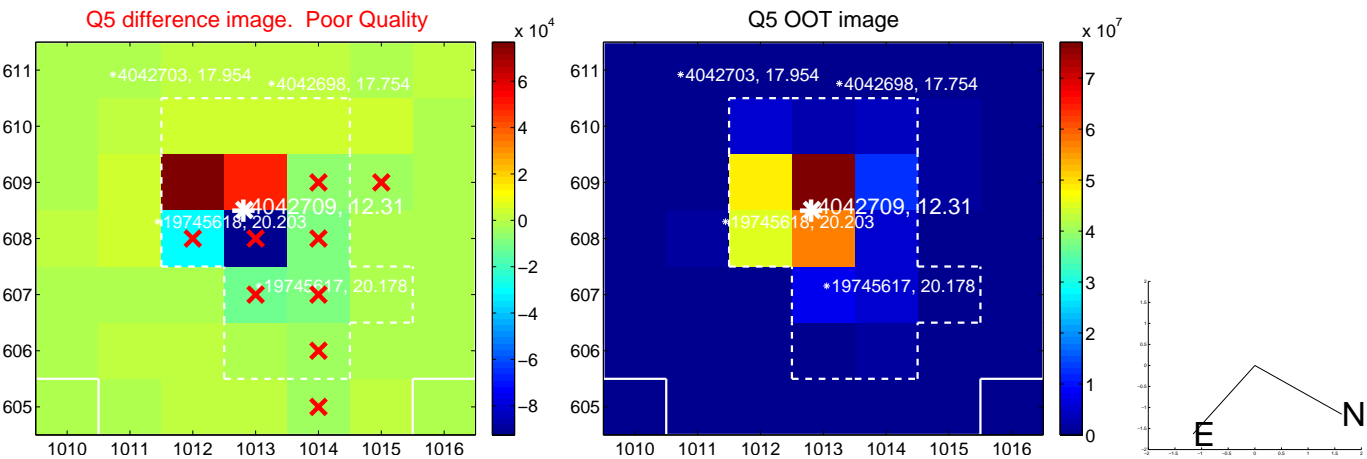


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

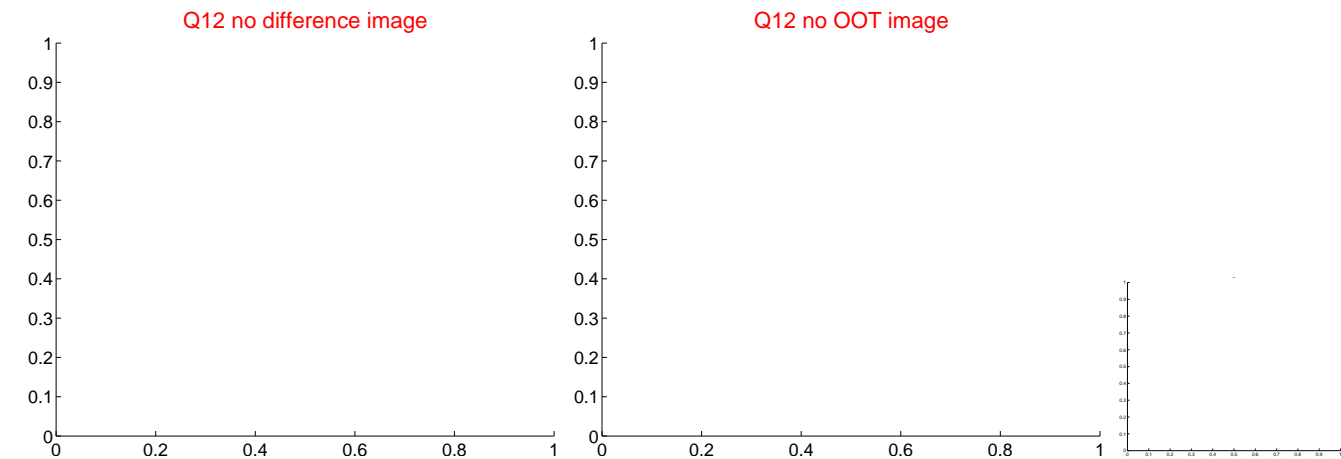
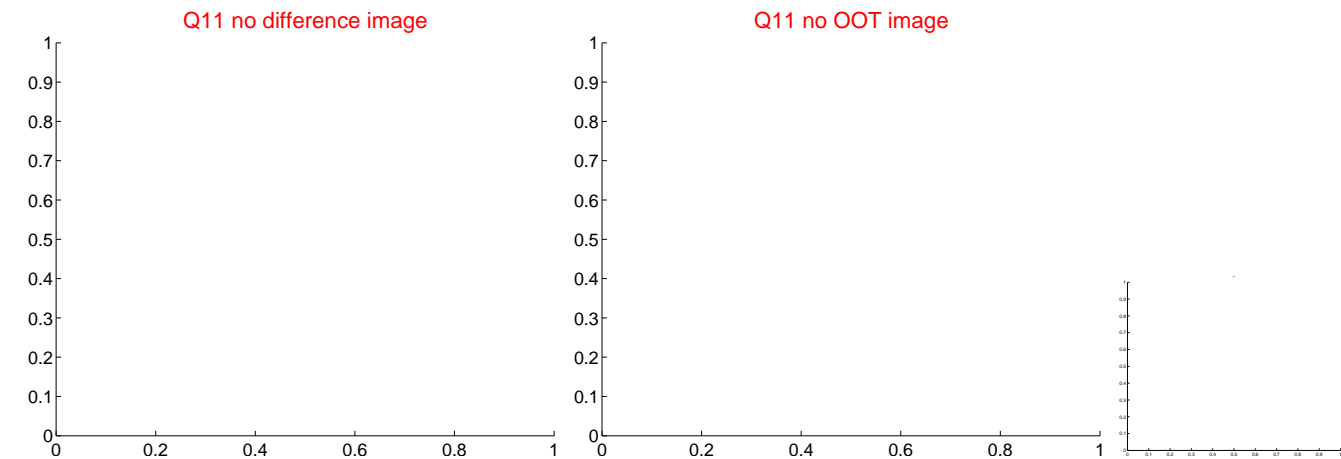
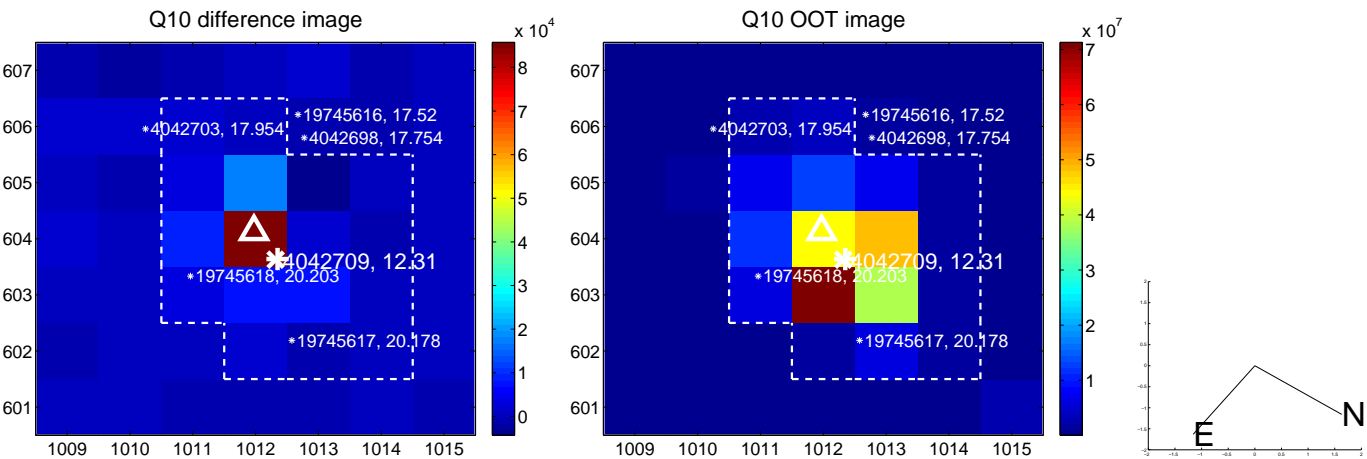
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



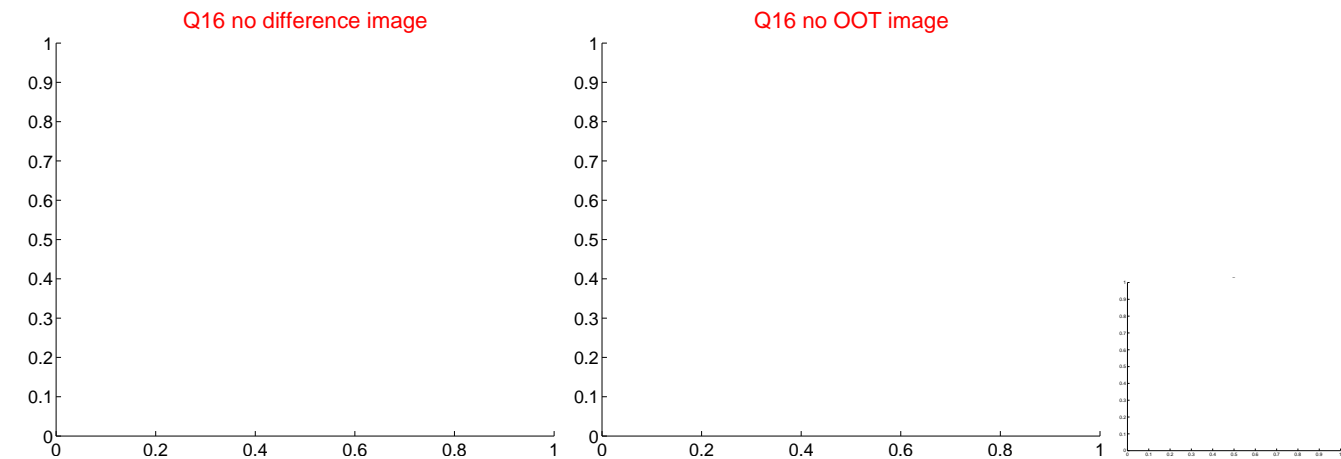
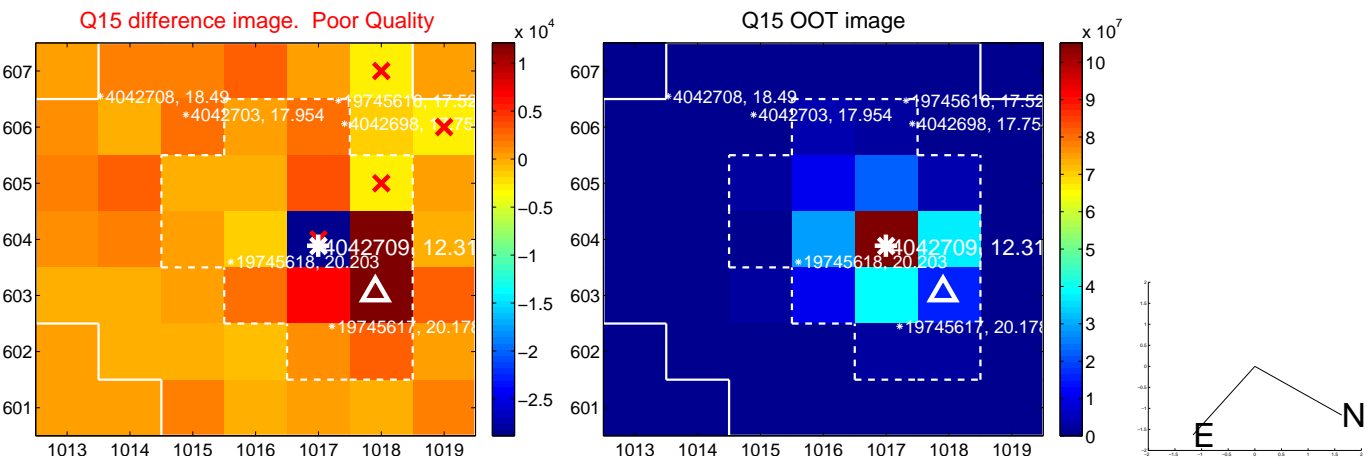
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



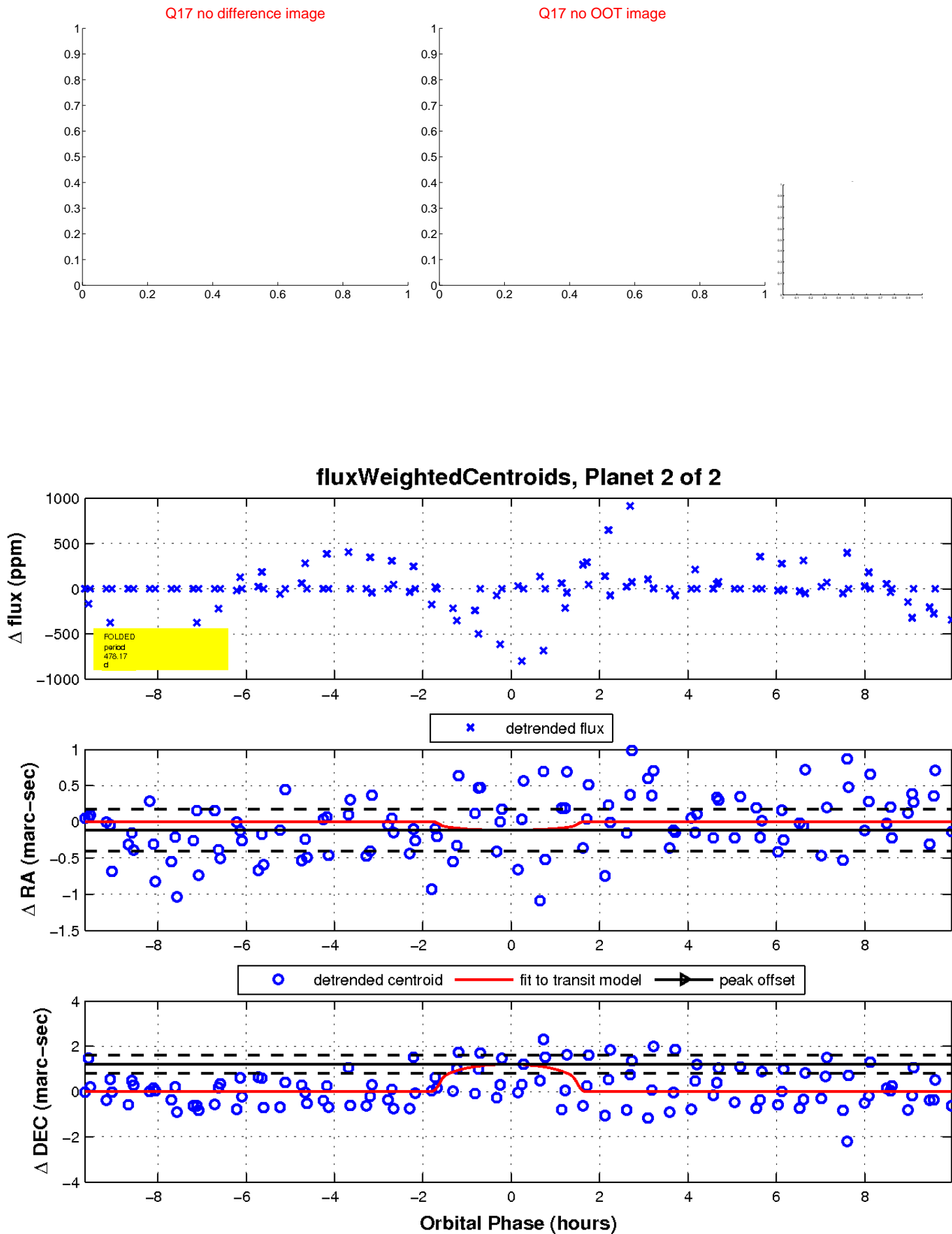
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

