

KIC 006510289

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})
006510289-01	OBS	No	419.469085	380.592781	1704.9	18.018	13.0	6.8	0.76	5293	3.23	0.38
006510289-02	OBS	No	410.829683	431.897264	1500.7	8.407	11.4	7.7	0.76	5293	2.98	0.39
006510289-03	OBS	No	414.114189	368.851346	1505.2	5.425	11.5	6.8	0.76	5293	3.61	0.38
006510289-04	OBS	No	440.804890	303.614486	907.7	3.249	9.2	4.4	0.76	5293	2.35	0.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006510289-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006510289-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006510289-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
006510289-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

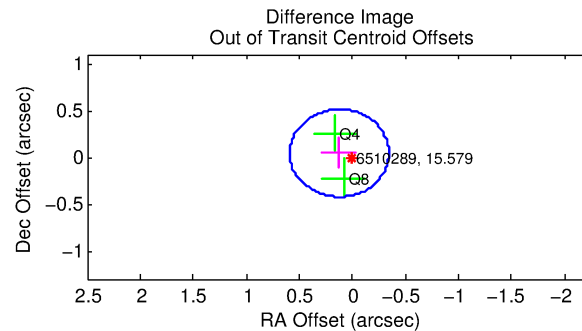
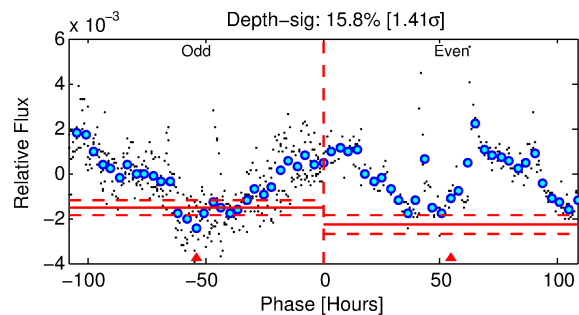
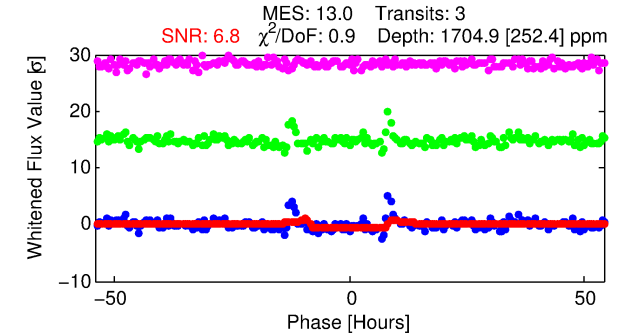
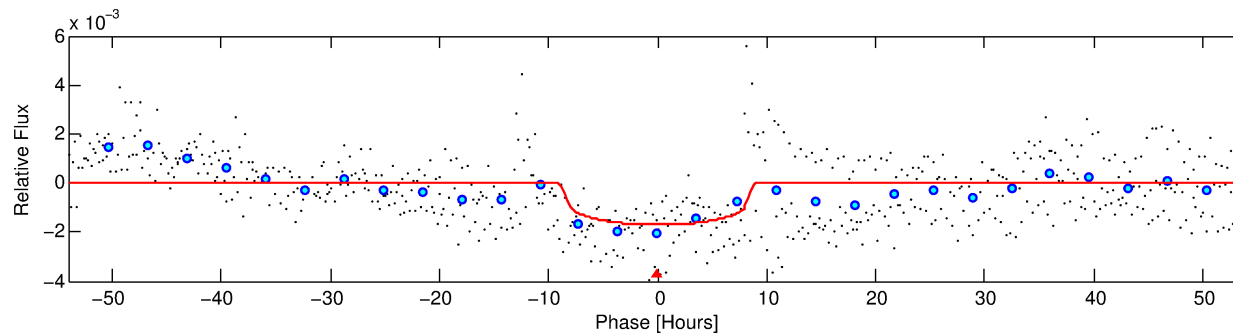
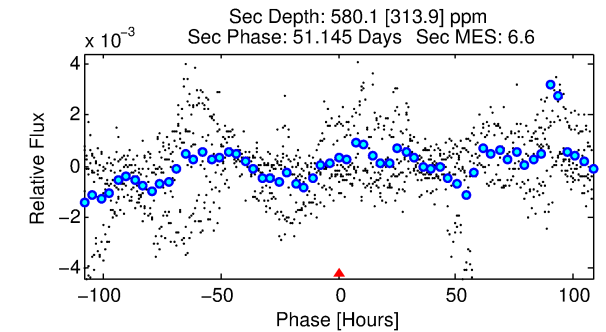
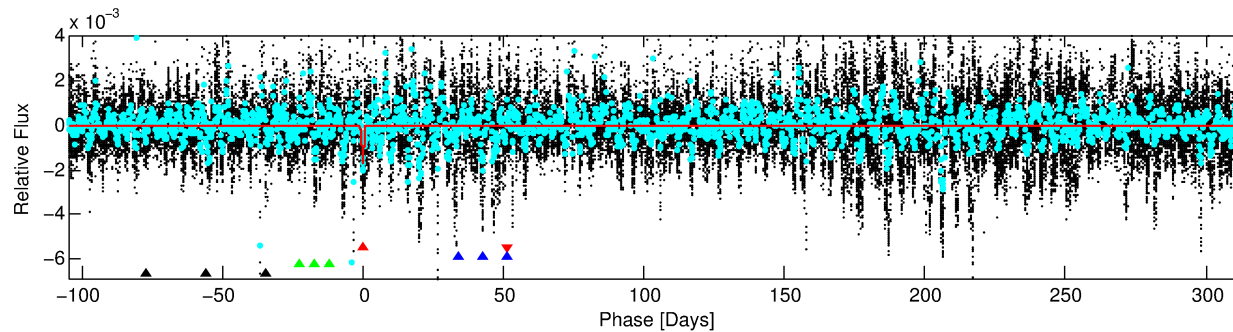
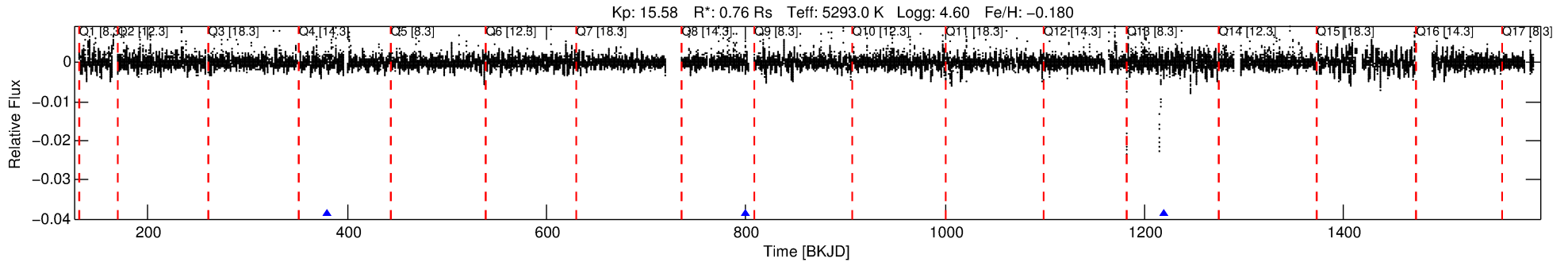
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006510289-01

No Significant Match Found

DV One-Page Summary

KIC: 6510289 Candidate: 1 of 4 Period: 419.469 d



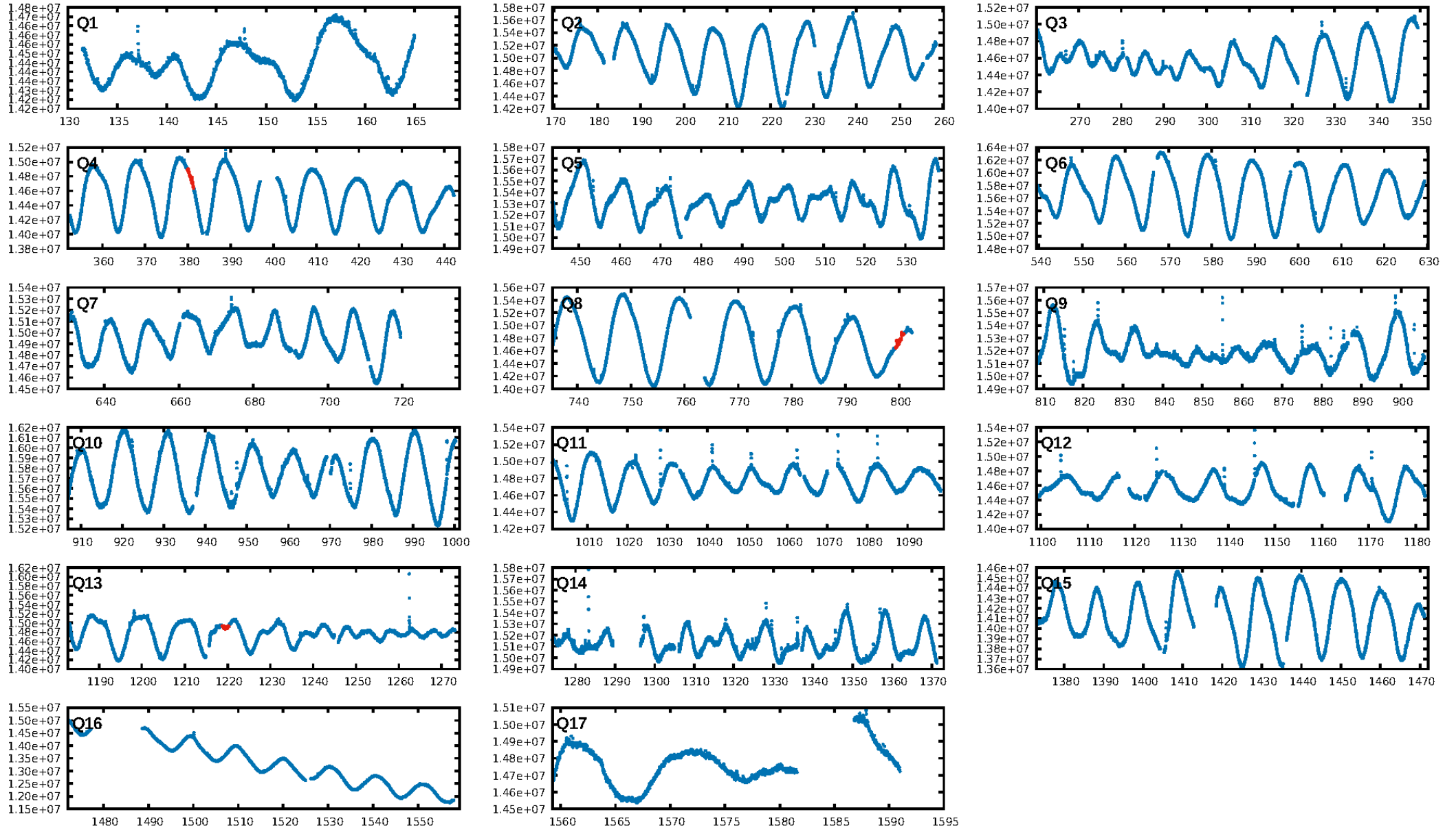
DV Fit Results:

Period = 419.46909 [0.01075] d
Epoch = 380.5928 [0.0115] BKJD
Rp/R* = 0.0392 [0.0055]
a/R* = 150.51 [63.44]
b = 0.60 [0.45]
Seff = 0.38 [0.09]
Teq = 200 [11] K
Rp = 3.24 [0.69] Re
a = 1.0340 [0.1385] AU
Ag = 32600.04 [20858.19] [1.56σ]
Teffp = 4148 [645] K [6.12σ]

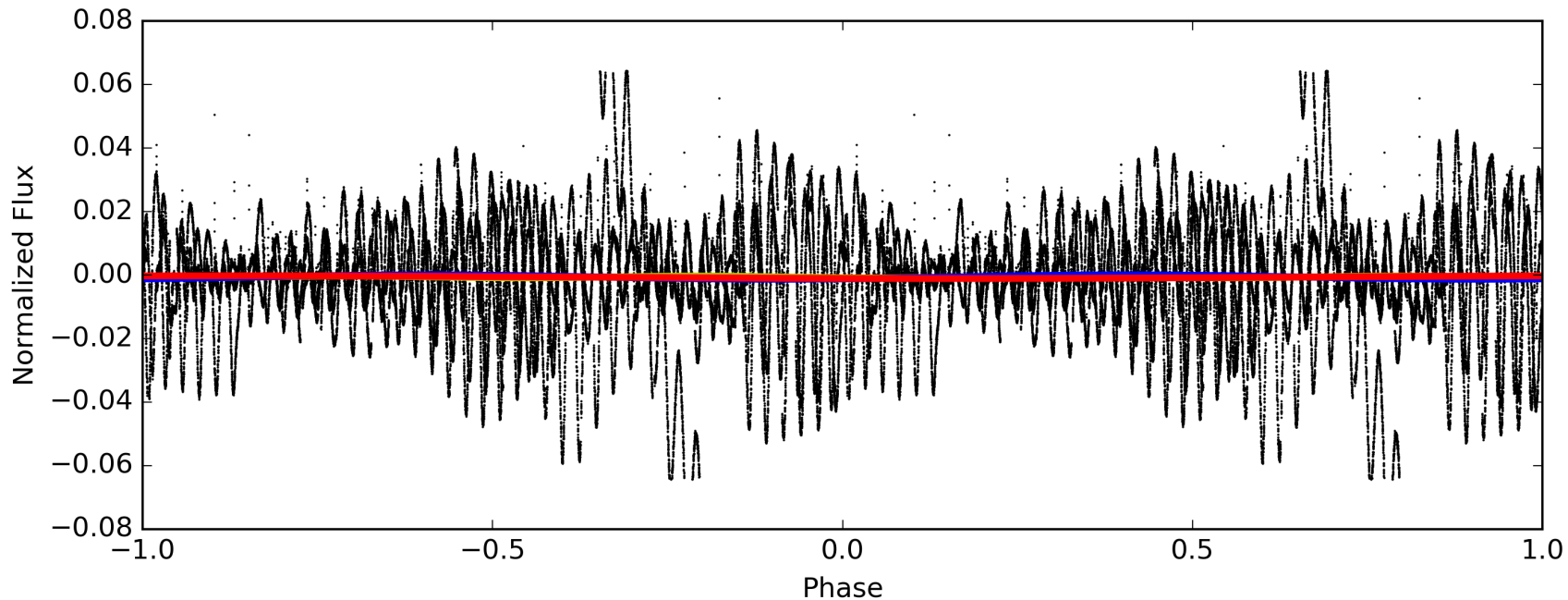
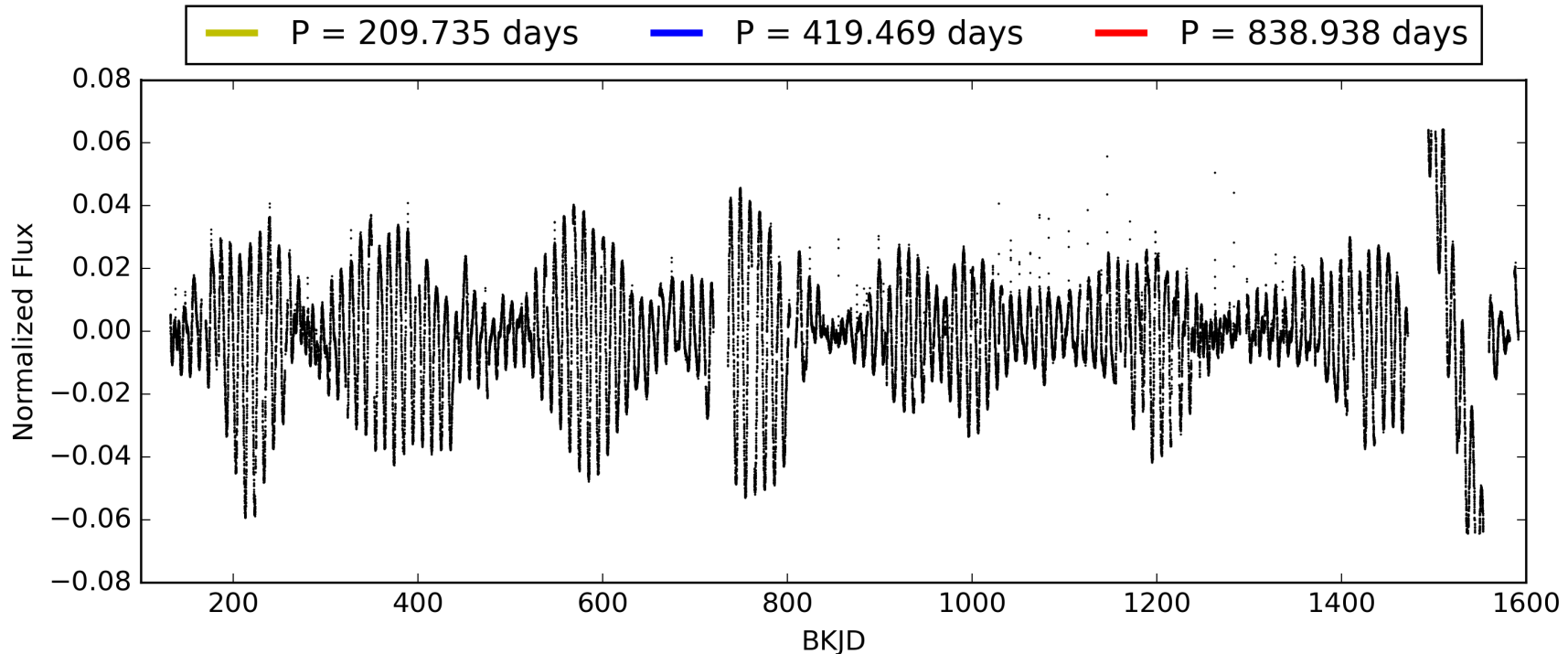
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.83σ]
LongPeriod-sig: 100.0% [27.97σ]
ModelChiSquare2-sig: 63.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.40e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.8483
Centroid-sig: 97.0%
Centroid-so: 0.110 arcsec [0.21σ]
OotOffset-rm: 0.130 arcsec [0.83σ]
KicOffset-rm: 0.231 arcsec [1.07σ]
OotOffset-st: 0/0/2/0 [2]
KicOffset-st: 0/0/2/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [2/2]

TCE 006510289-01, PDC Light Curves

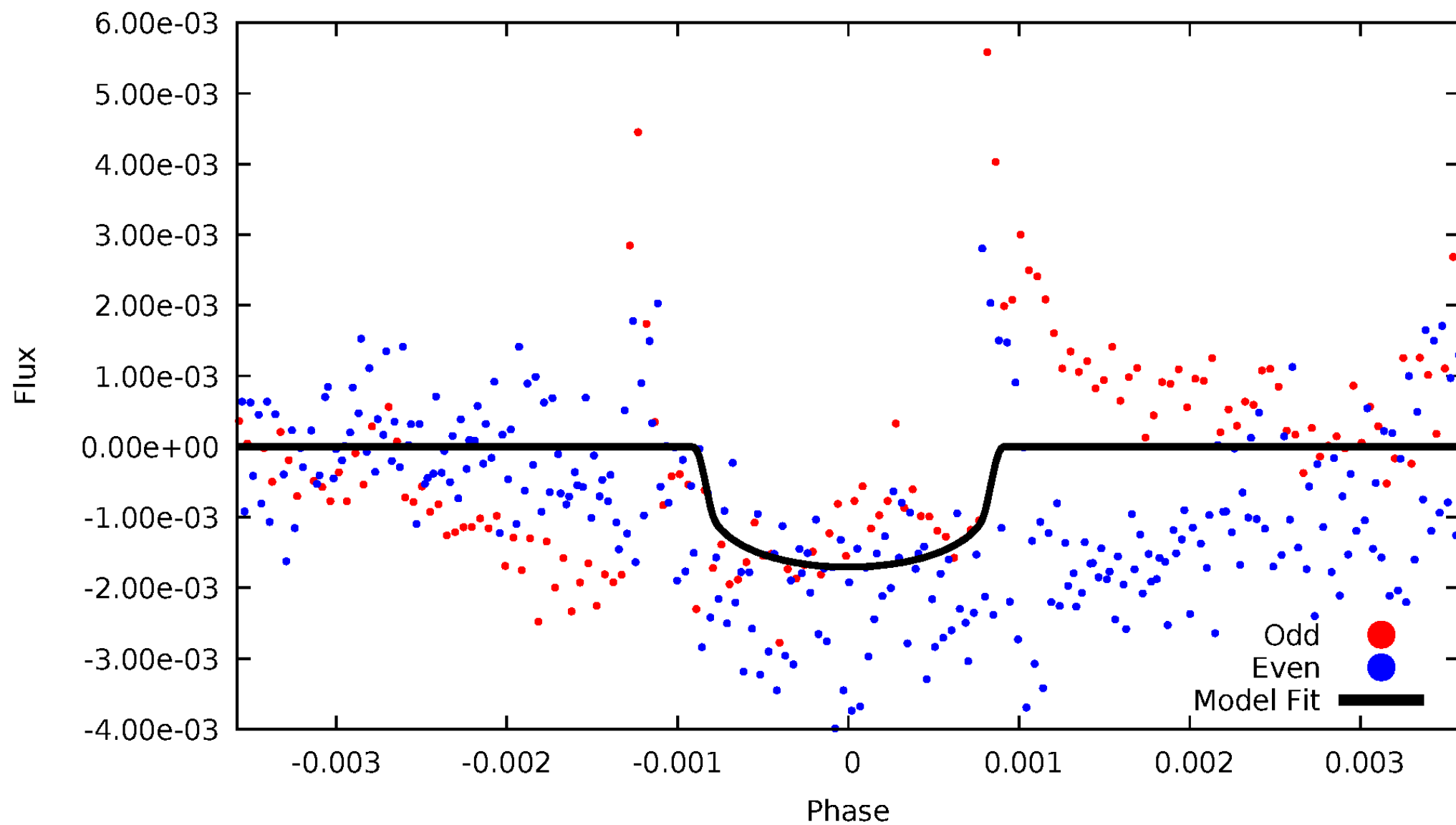


TCE 006510289-01



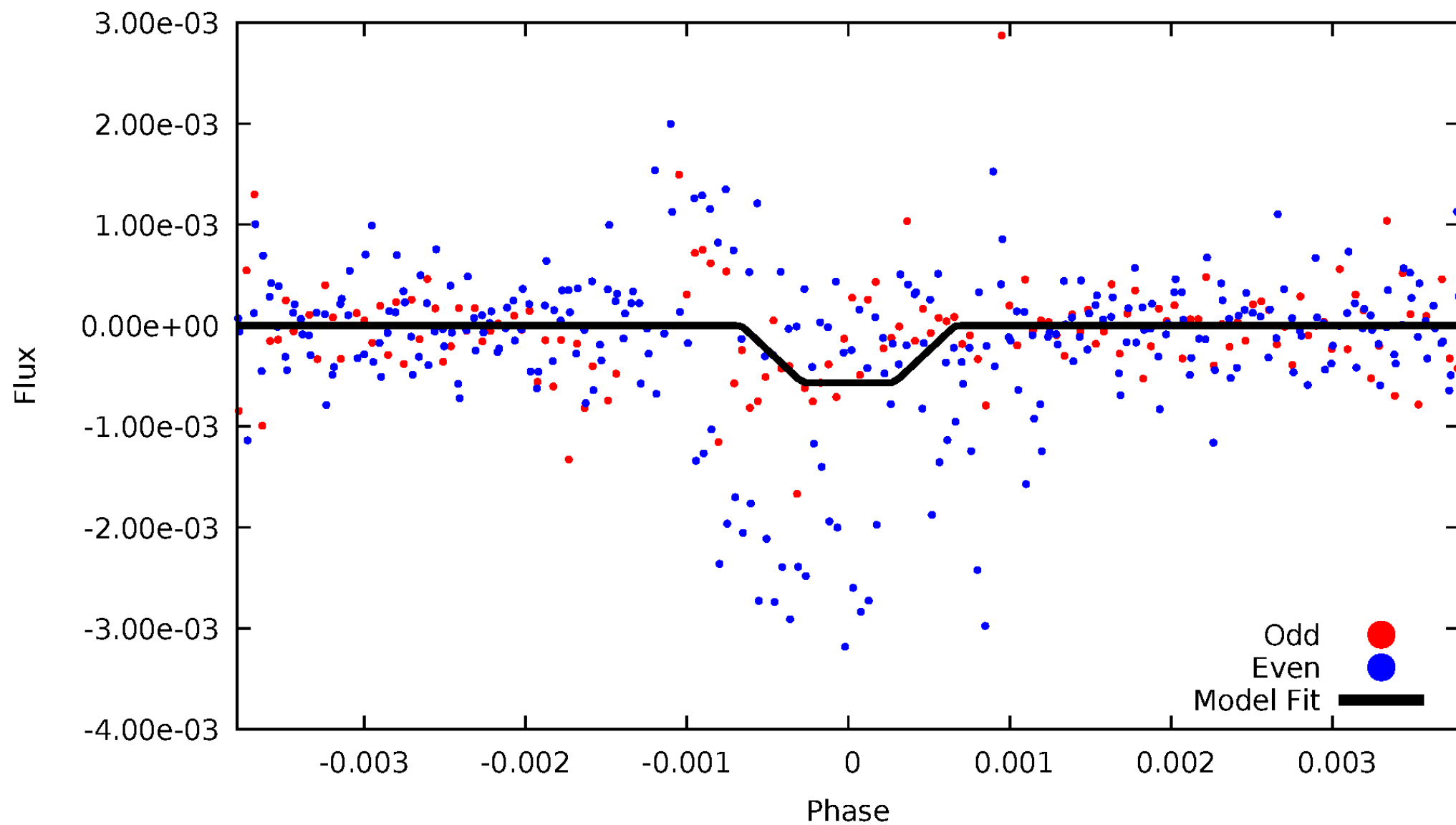
DV Odd/Even

TCE 006510289-01



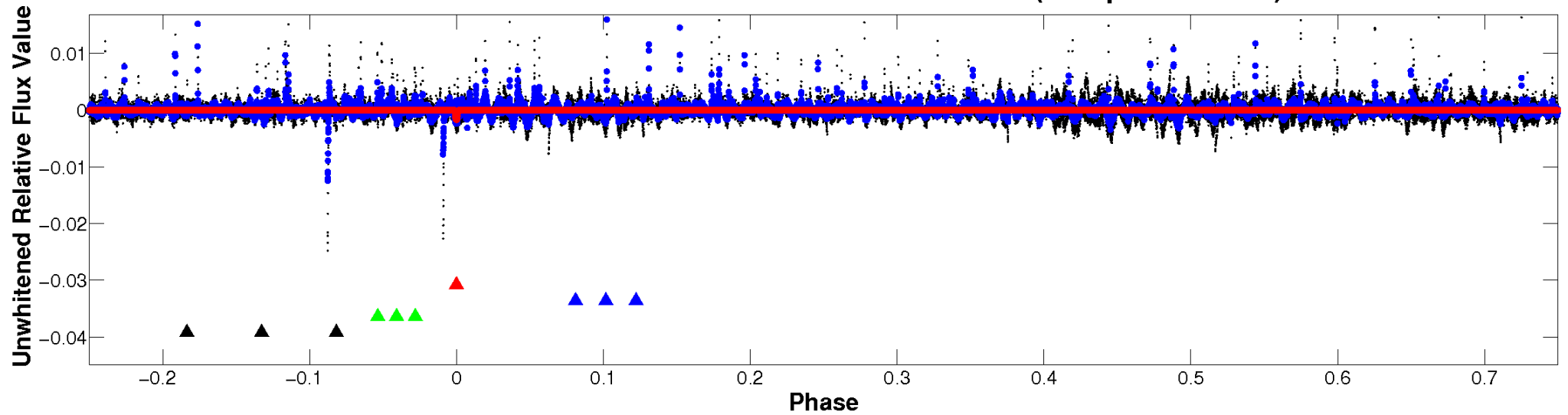
ALT Odd/Even

TCE 006510289-01

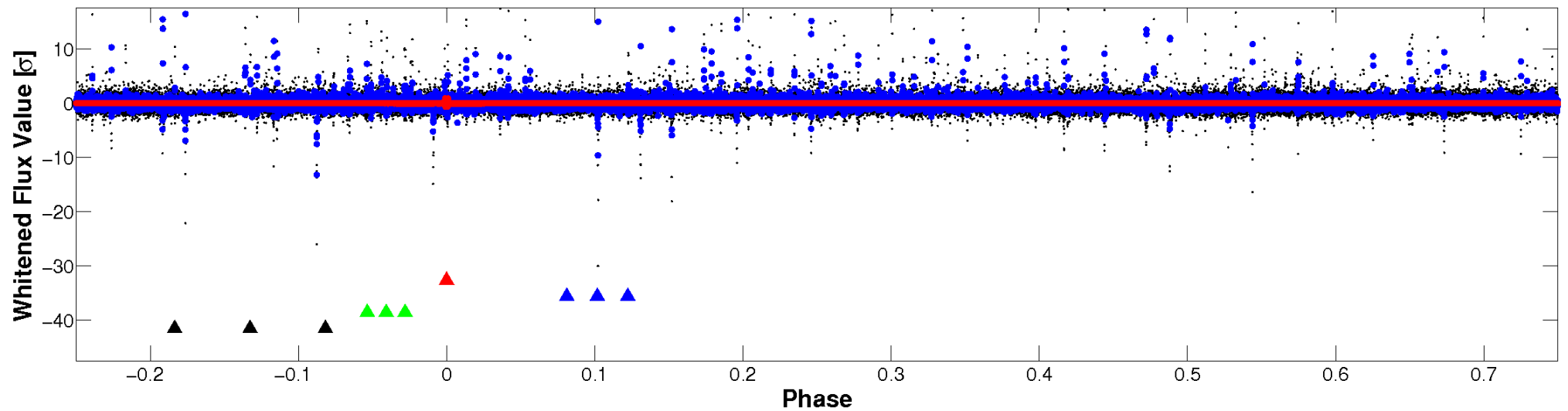


Non-Whitened Vs. Whitened Light Curve

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

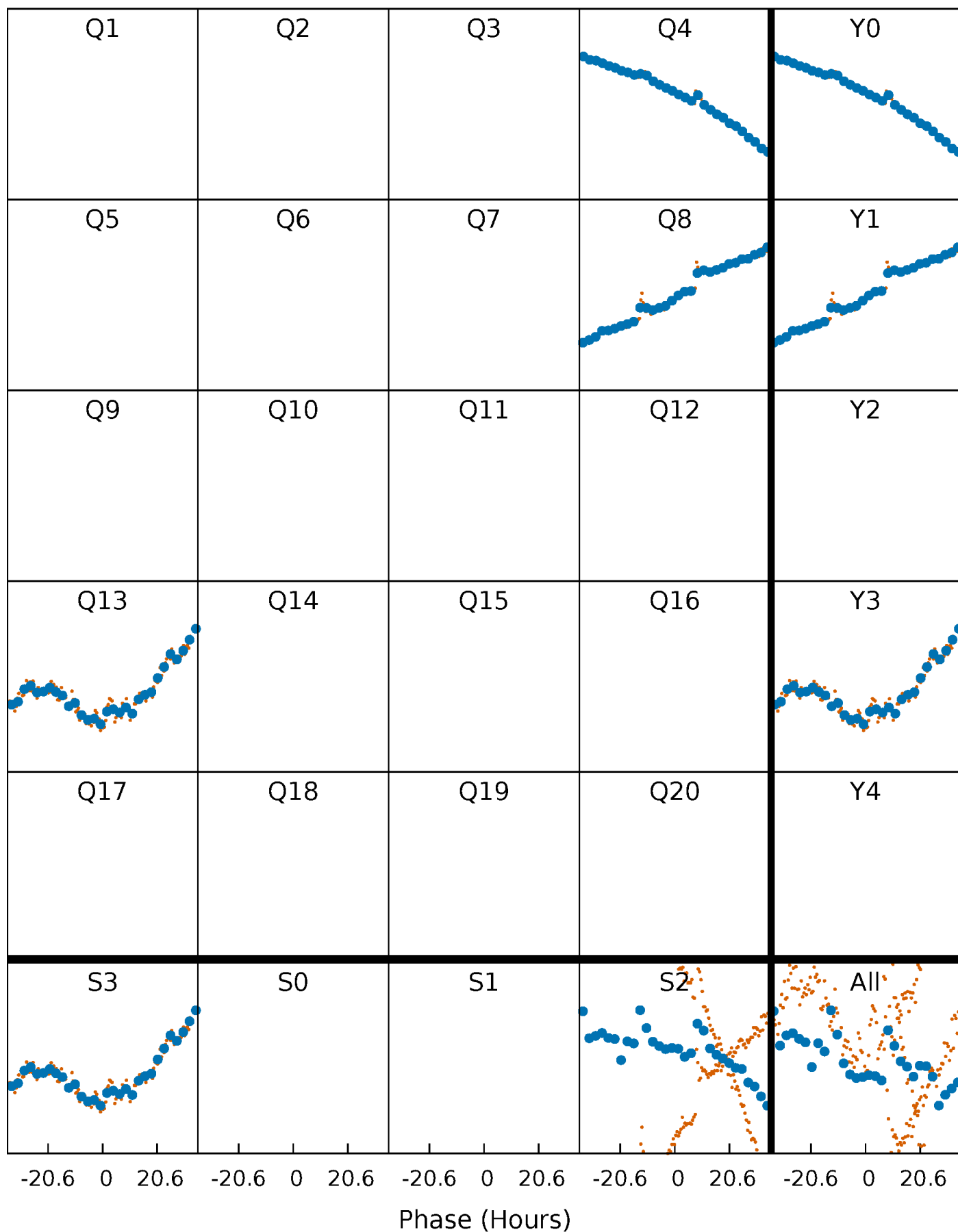


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 006510289-01 P=419.469085 Days $T_0=380.592781$ (BKJD)



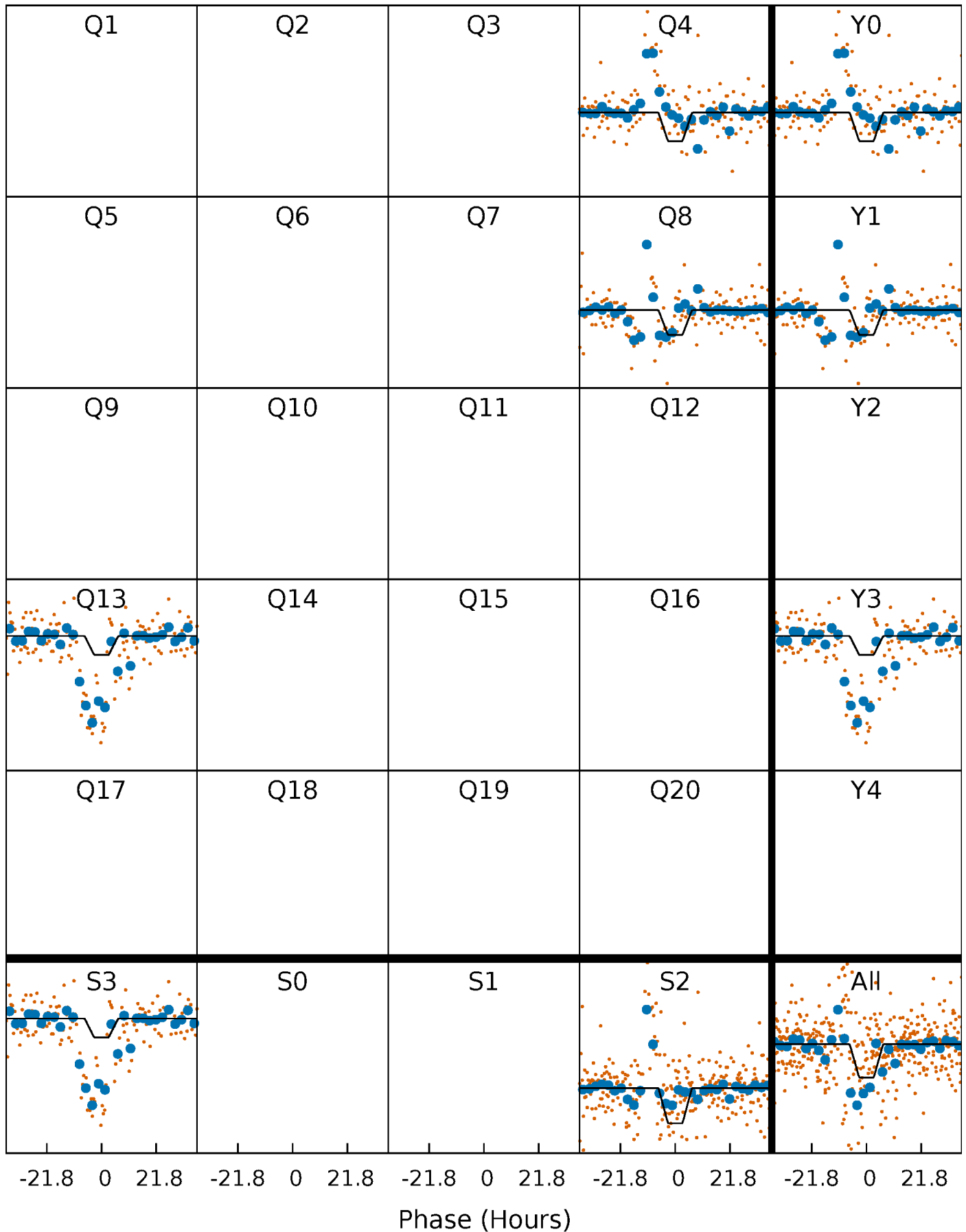
DV Quarter-Phased Transit Curves

TCE 006510289-01 P=419.469085 Days $T_0=380.592781$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

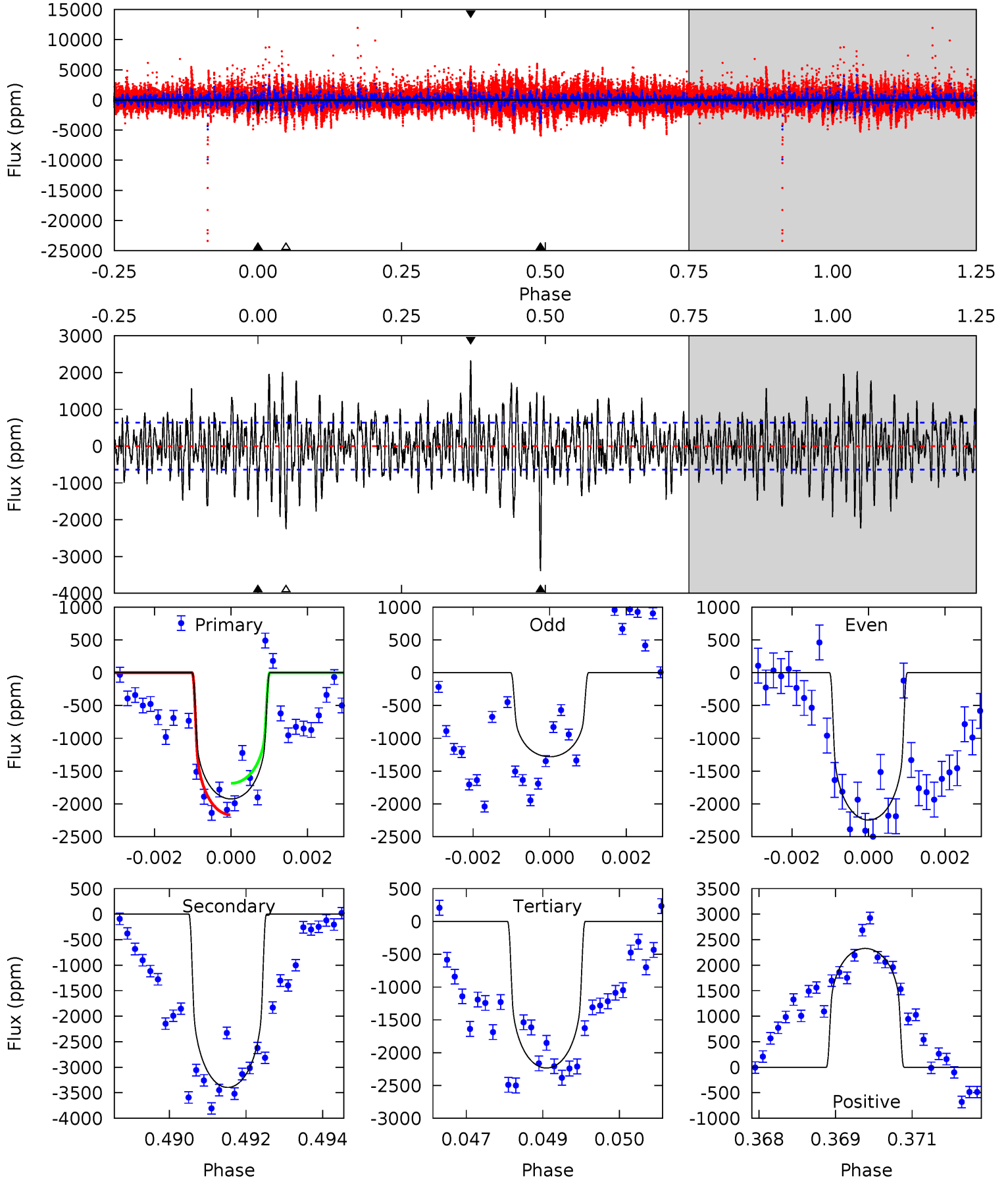
TCE 006510289-01 P=419.480553 Days $T_0=380.545493$ (BKJD)



DV Model-Shift Uniqueness Test

006510289-01, P = 419.469085 Days, E = 380.592781 Days

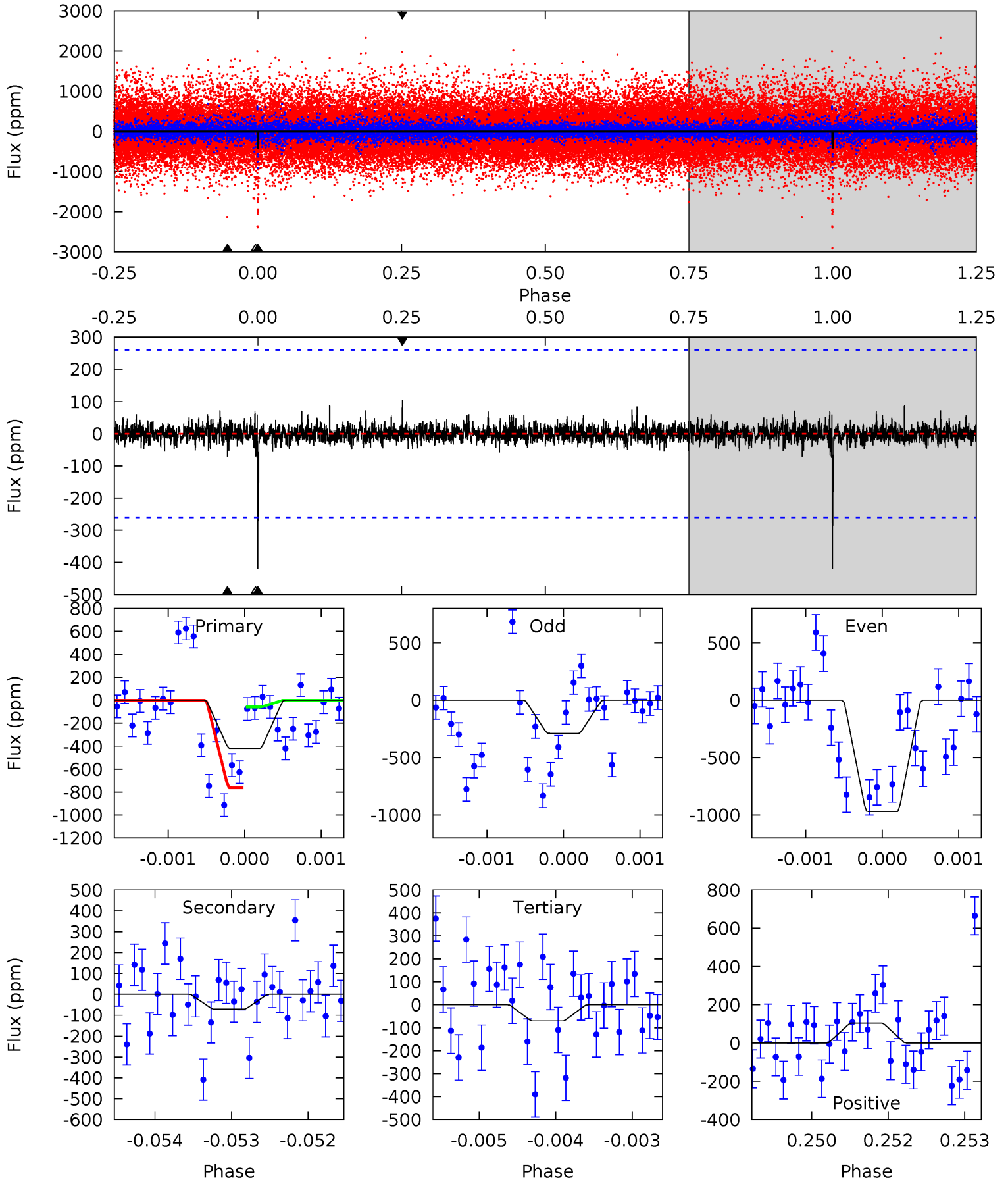
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.1	28.4	18.7	19.5	5.35	3.12	5.02	-2.59	-3.37	9.71	8.93	3.44	1.15	0.41	2.03



Alt Model-Shift Uniqueness Test

006510289-01, P = 419.480553 Days, E = 380.545493 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.69	1.47	1.46	2.16	5.40	3.21	0.36	7.23	6.53	0.01	-0.69	7.13	2.68	0.20	0



Stellar Parameters For KIC 006510289

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5293^{+159}_{-143}	$4.604^{+0.032}_{-0.104}$	$-0.180^{+0.300}_{-0.300}$	$0.756^{+0.122}_{-0.066}$	$0.846^{+0.070}_{-0.096}$	$2.765^{+0.500}_{-0.889}$
	+3%/-3%	+1%/-2%	+167%/-167%	+16%/-9%	+8%/-11%	+18%/-32%
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 006510289-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-3396 ± 120	$3.35^{+0.55}_{-0.54}$	284^{+12}_{-10}	6416^{+581}_{-466}	177987^{+66564}_{-43857}
Alt.	-71 ± 48	$1.99^{+0.51}_{-0.45}$	284^{+12}_{-11}	3586^{+468}_{-583}	9959^{+10959}_{-6915}

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

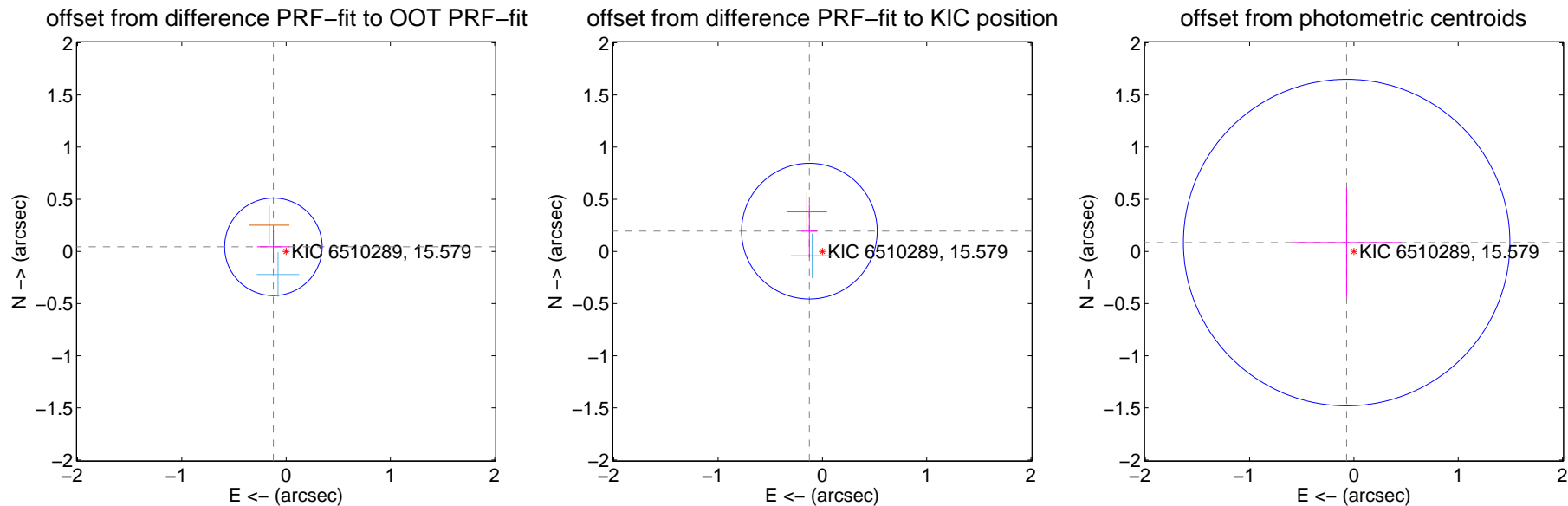
DV Centroid Data

Supplemental centroid analysis for 006510289-01. Kepler magnitude: 15.58. Transit SNR 6.76

There are 1 quarters with good PRF difference image offsets

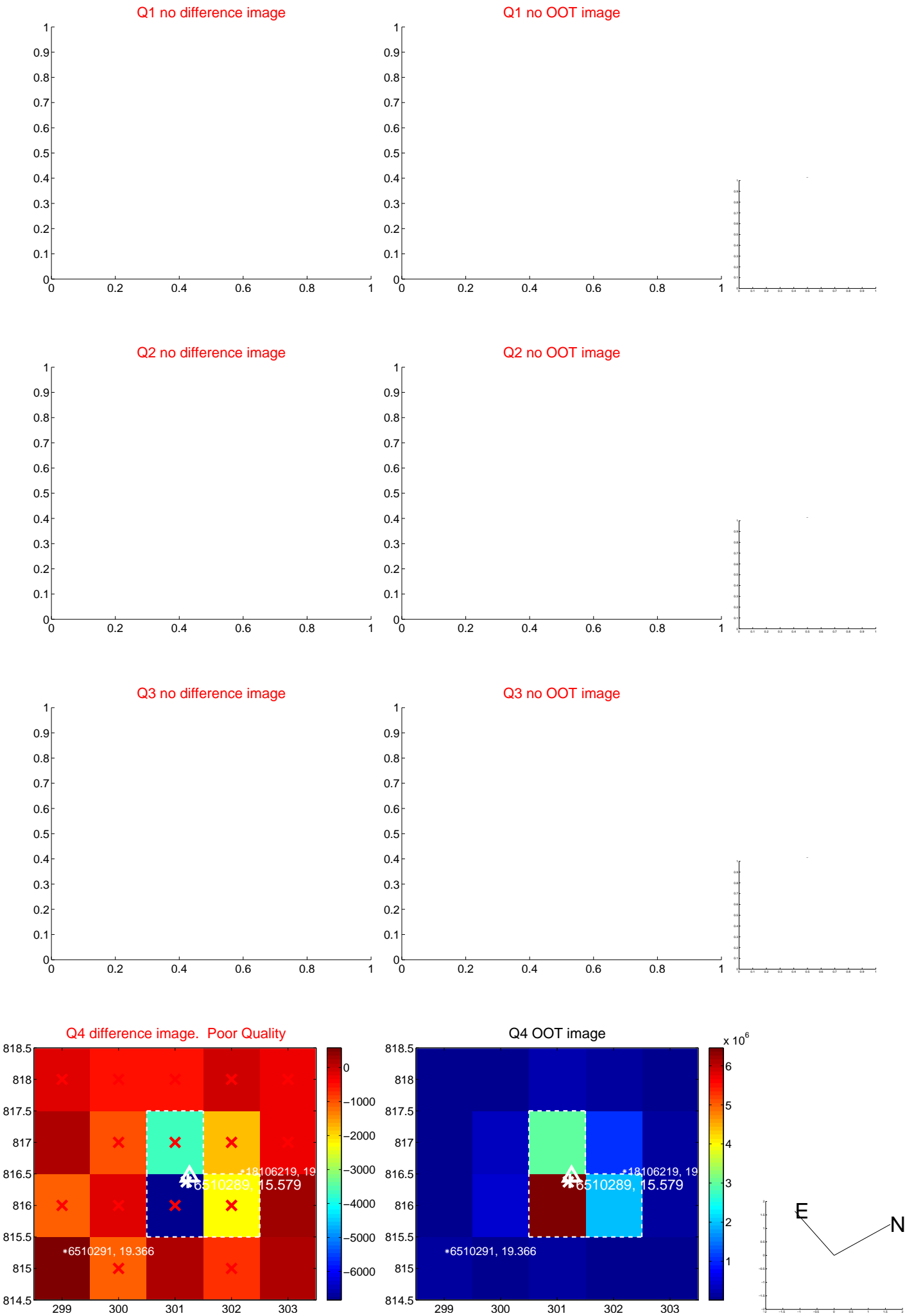
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.130 ± 0.156	0.83	0.122 ± 0.156	0.044 ± 0.157
PRF-fit source offset from KIC position	0.231 ± 0.217	1.07	0.125 ± 0.073	0.194 ± 0.253
photometric centroid source offset	0.11 ± 0.52	0.21	0.07 ± 0.52	0.08 ± 0.52

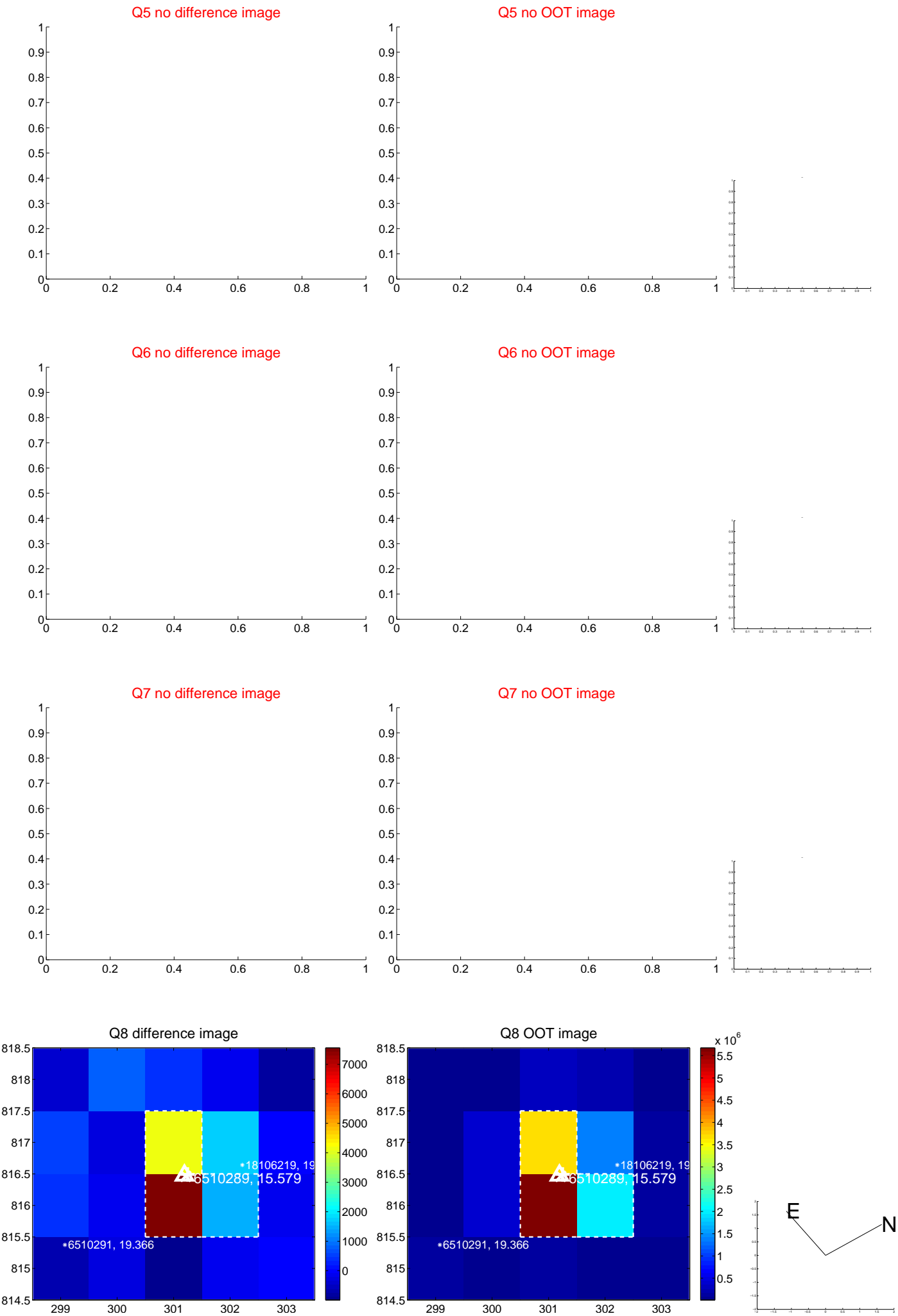


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



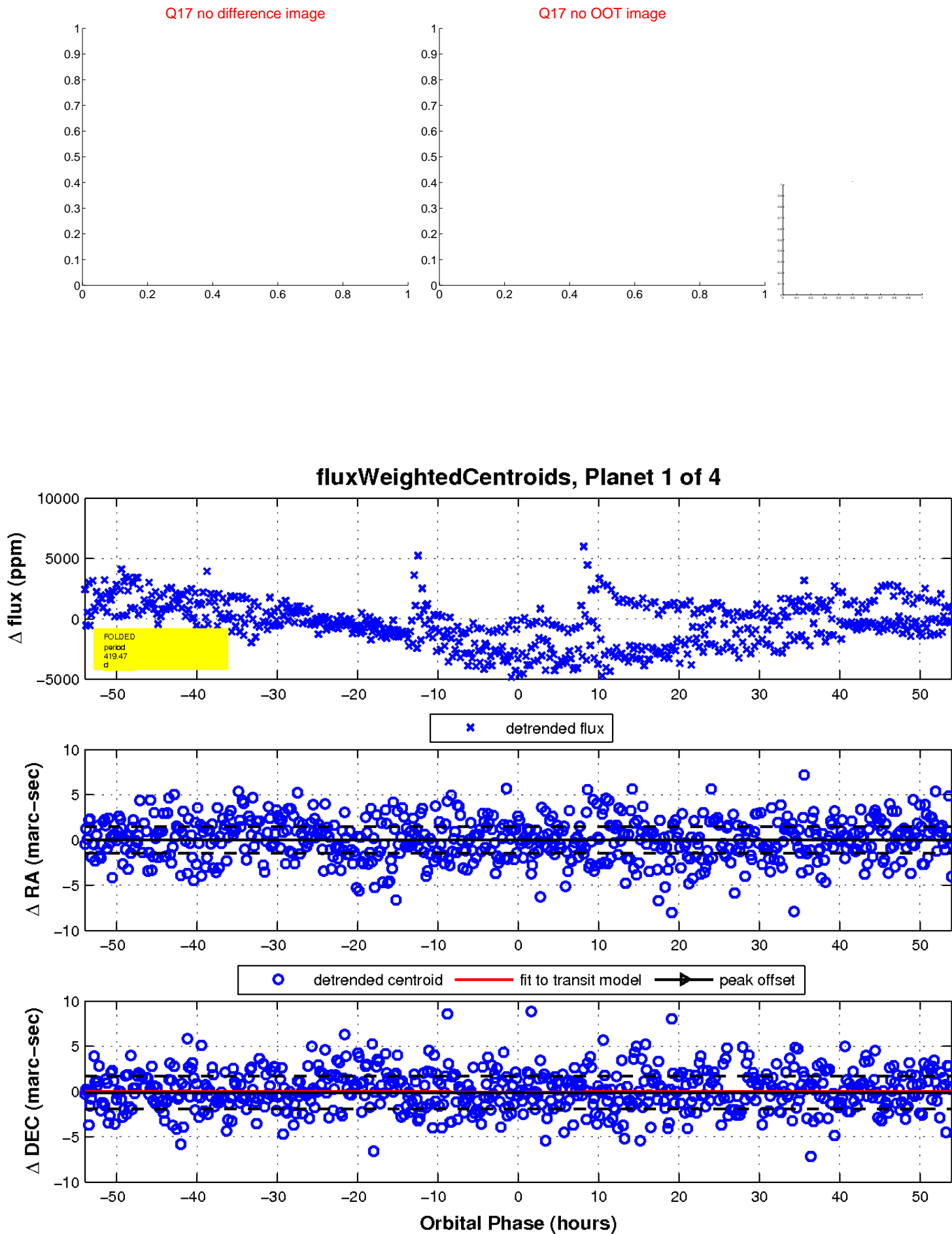
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



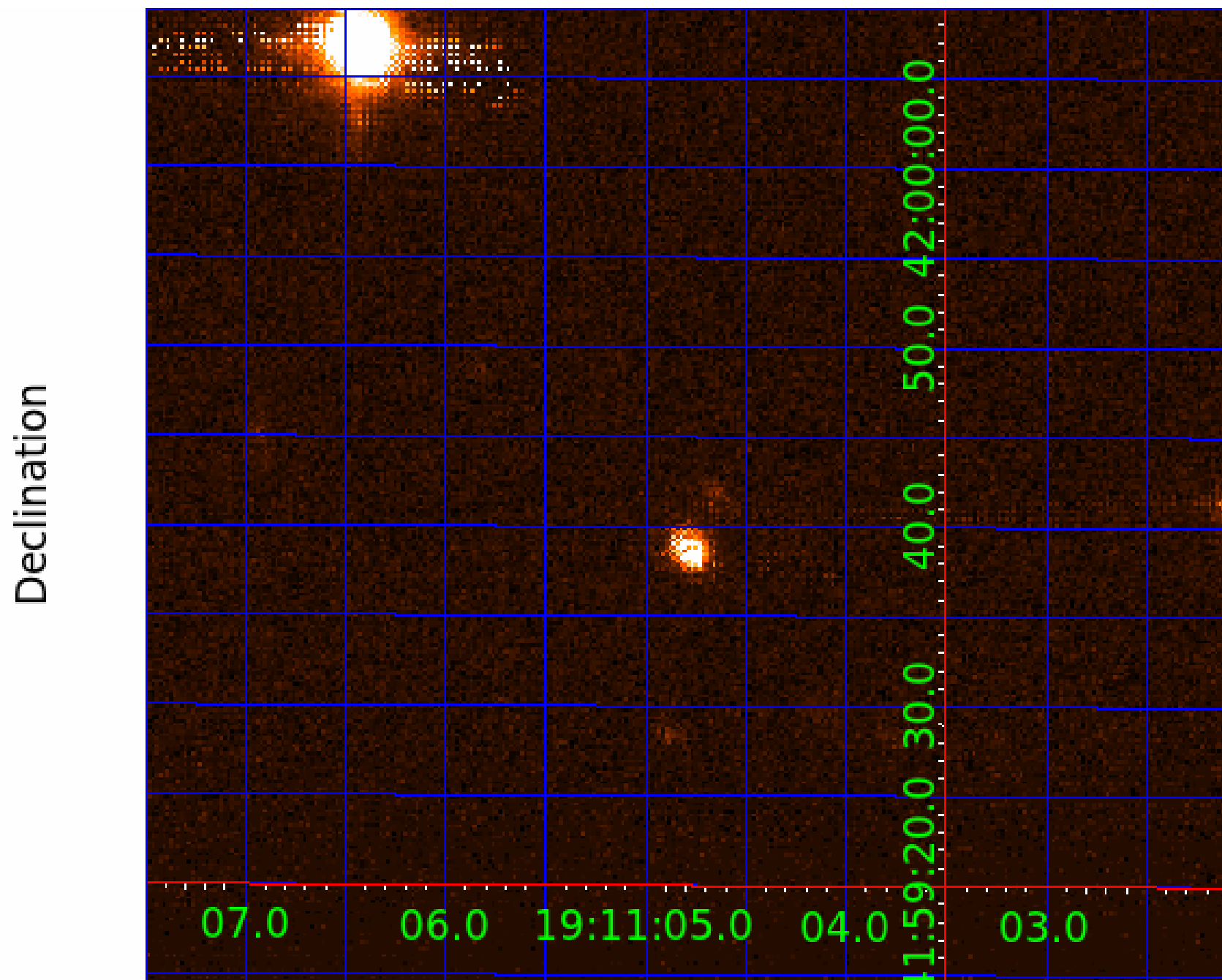
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 006510289

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})
006510289-01	OBS	No	419.469085	380.592781	1704.9	18.018	13.0	6.8	0.76	5293	3.23	0.38
006510289-02	OBS	No	410.829683	431.897264	1500.7	8.407	11.4	7.7	0.76	5293	2.98	0.39
006510289-03	OBS	No	414.114189	368.851346	1505.2	5.425	11.5	6.8	0.76	5293	3.61	0.38
006510289-04	OBS	No	440.804890	303.614486	907.7	3.249	9.2	4.4	0.76	5293	2.35	0.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006510289-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006510289-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006510289-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
006510289-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

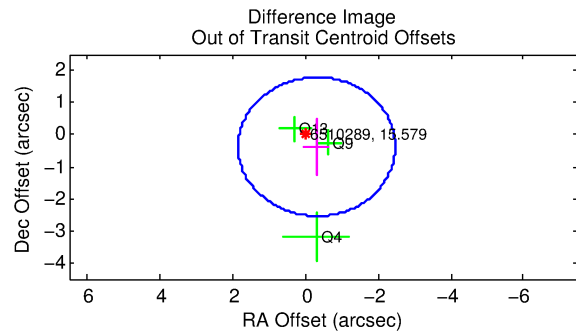
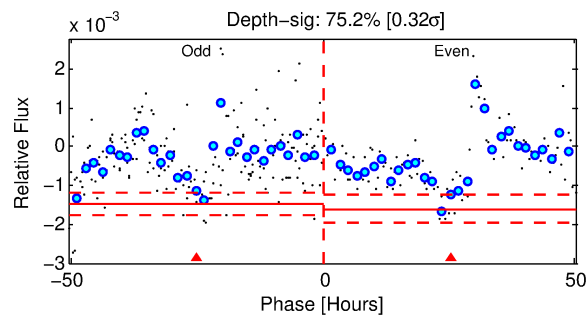
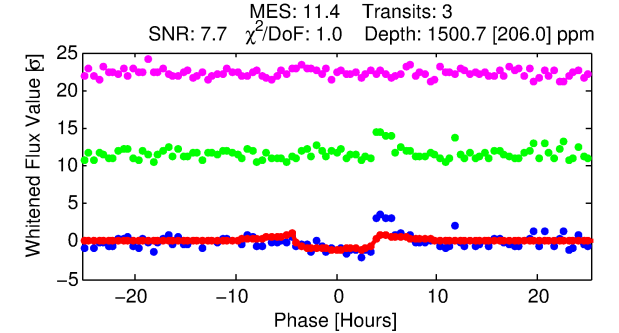
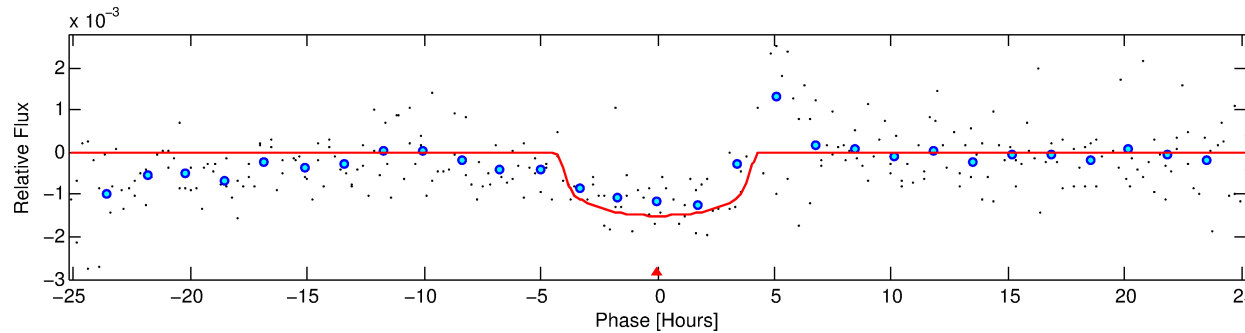
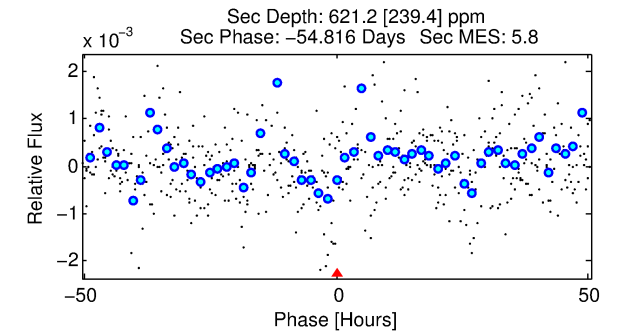
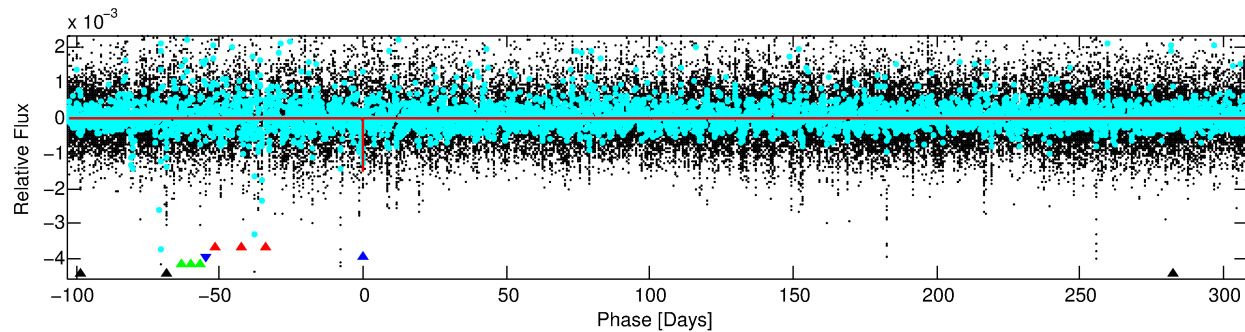
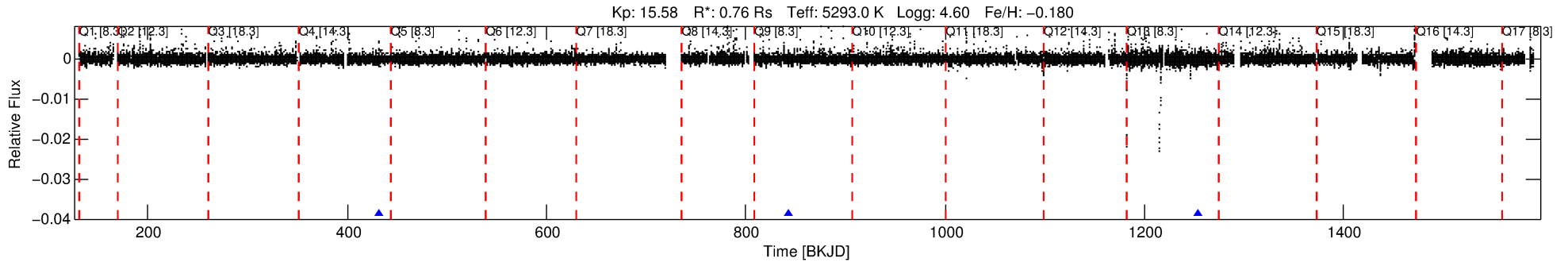
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006510289-02

No Significant Match Found

DV One-Page Summary

KIC: 6510289 Candidate: 2 of 4 Period: 410.830 d



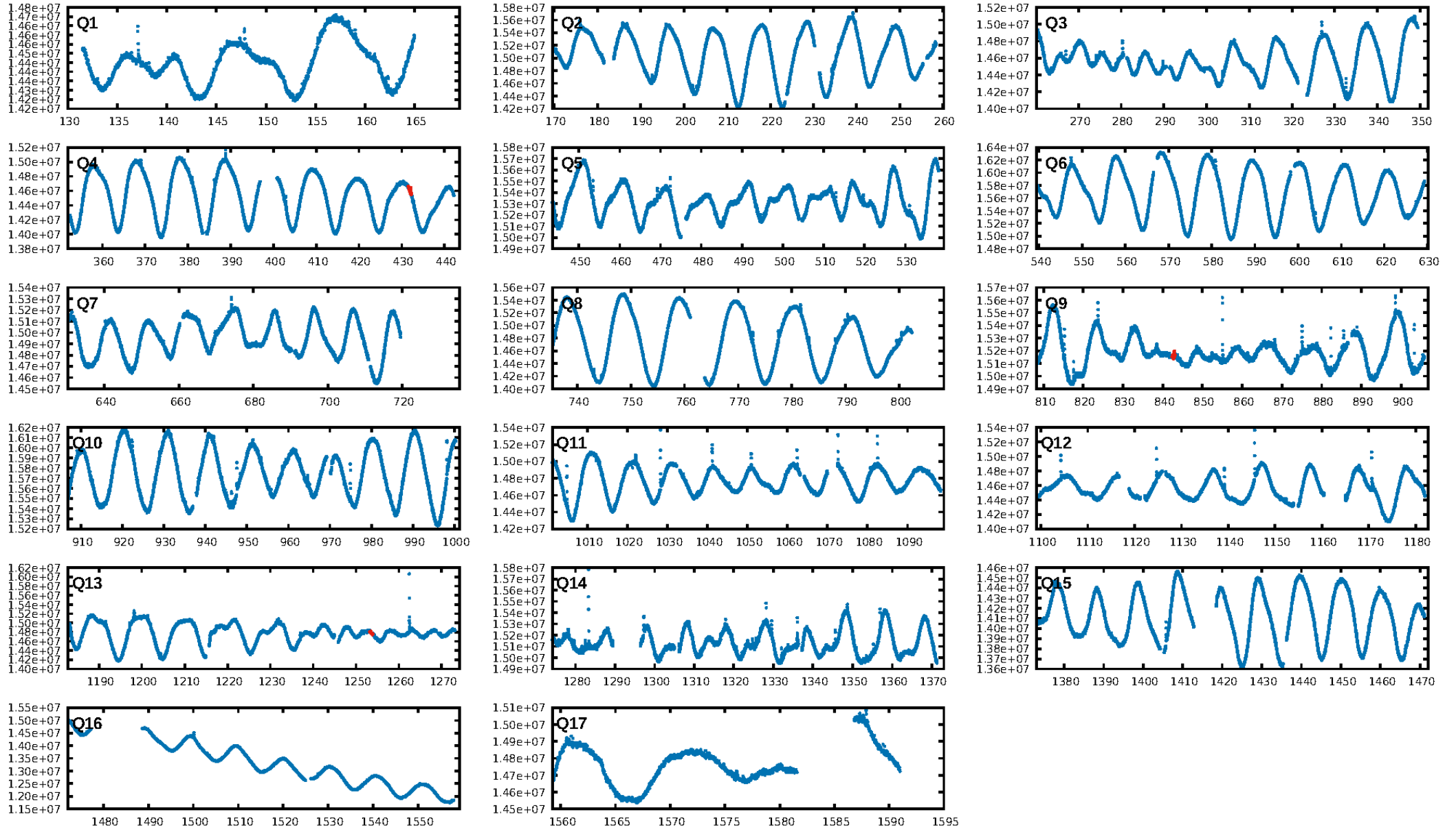
DV Fit Results:

Period = 410.82968 [0.00826] d
Epoch = 431.8973 [0.0096] BKJD
Rp/R* = 0.0361 [0.0177]
a/R* = 334.89 [609.25]
b = 0.52 [2.59]
Seff = 0.39 [0.09]
Teq = 201 [11] K
Rp = 2.98 [1.54] Re
a = 1.0197 [0.1366] AU
Ag = 39976.47 [42787.93] [0.93σ]
Teffp = 4396 [1164] K [3.60σ]

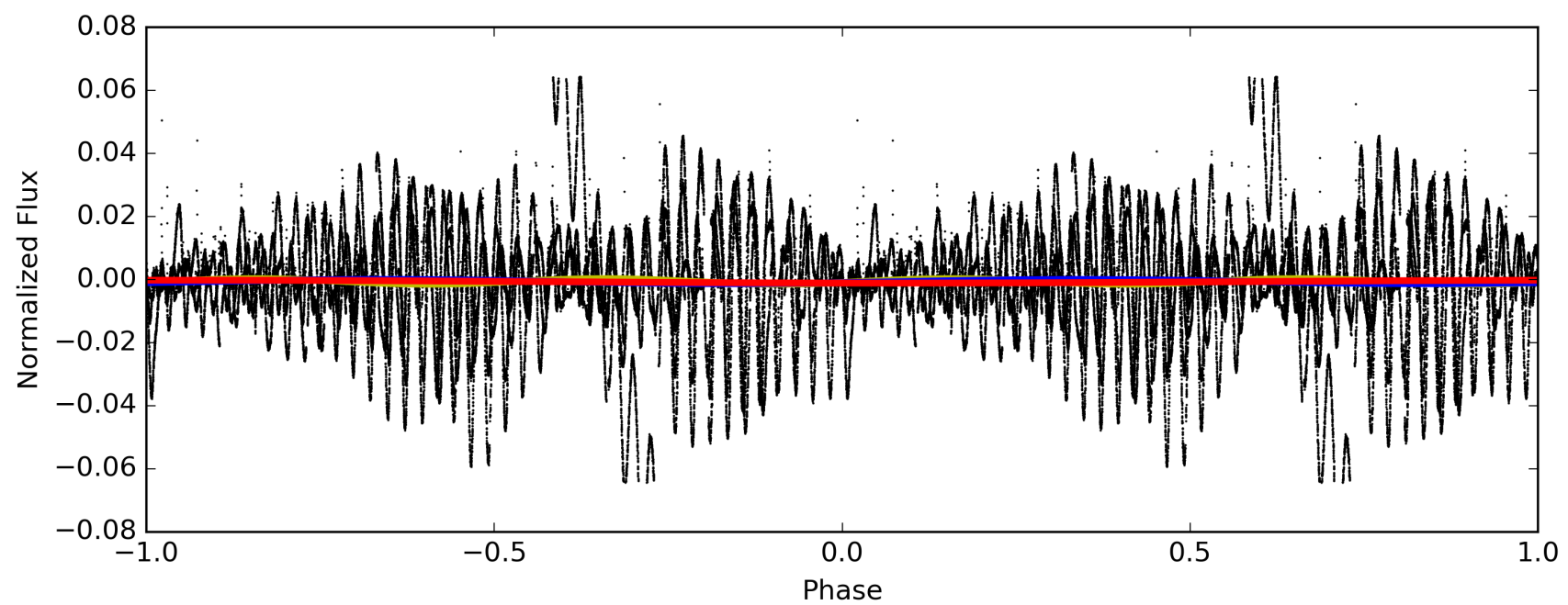
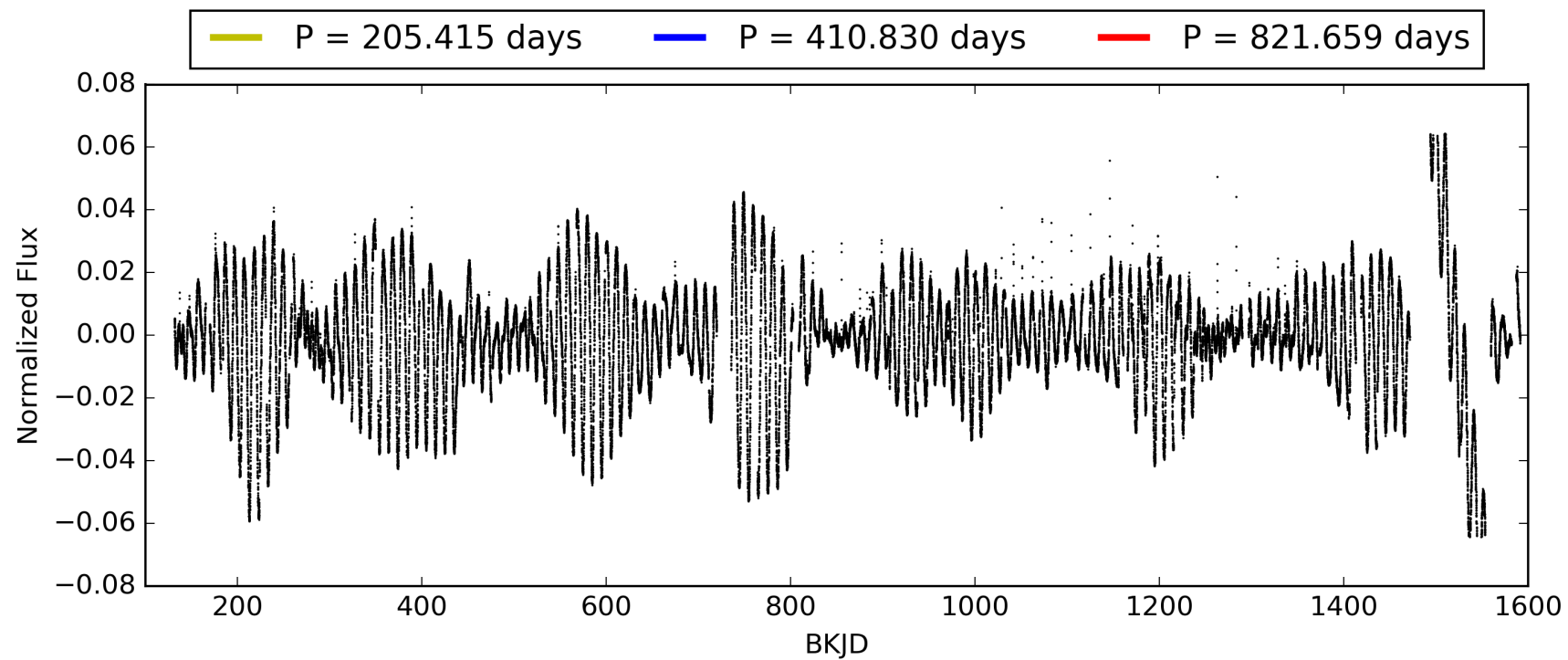
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [7.88σ]
ModelChiSquare2-sig: 48.9%
ModelChiSquareGof-sig: 99.8%
Bootstrap-pfa: 5.72e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.03768
Centroid-sig: 69.1%
Centroid-so: 0.330 arcsec [0.43σ]
OotOffset-rm: 0.490 arcsec [0.68σ]
OotOffset-st: 0/0/1/2 [3]
KicOffset-rm: 0.368 arcsec [0.65σ]
KicOffset-st: 0/0/1/2 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 006510289-02, PDC Light Curves

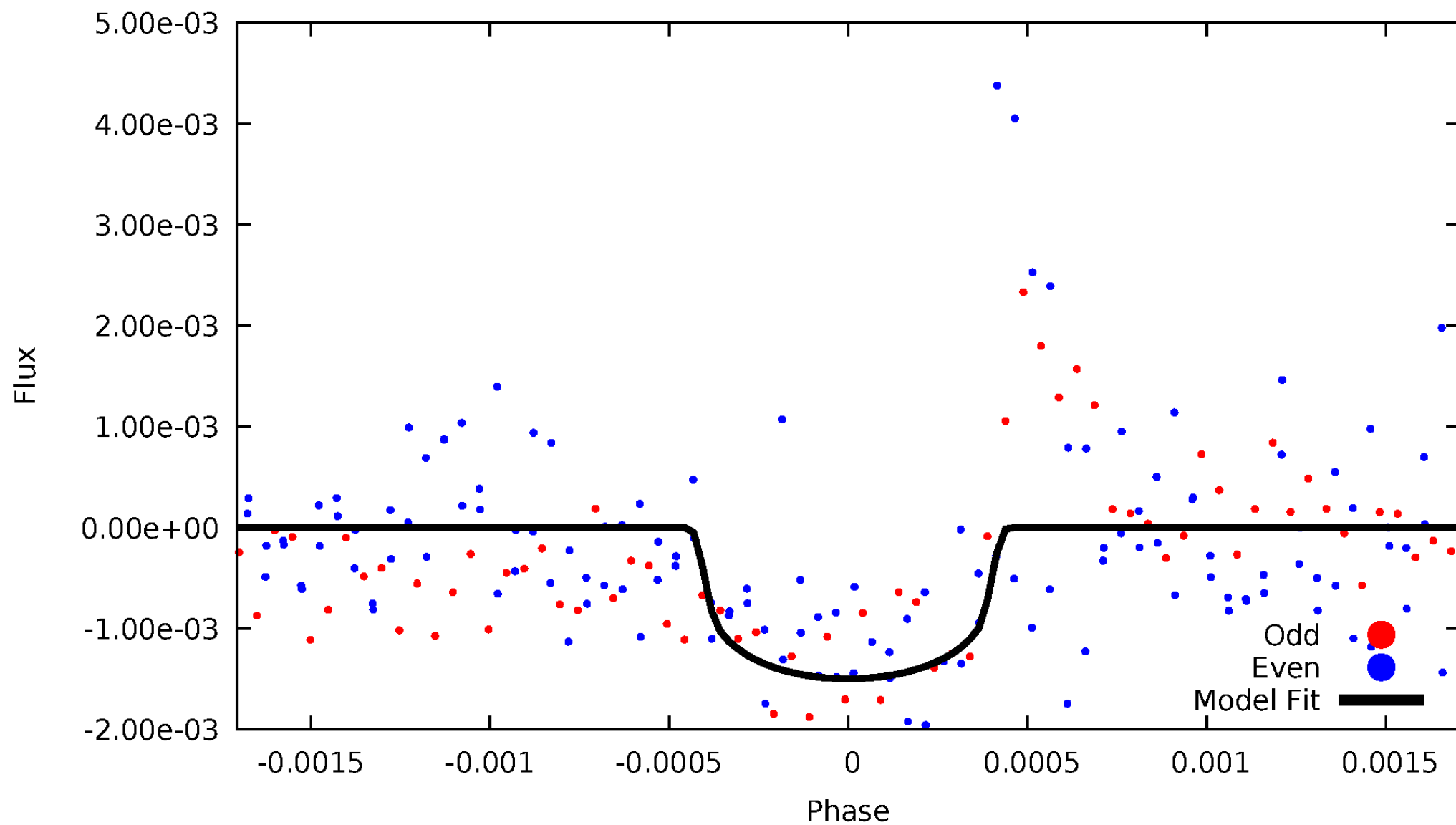


TCE 006510289-02



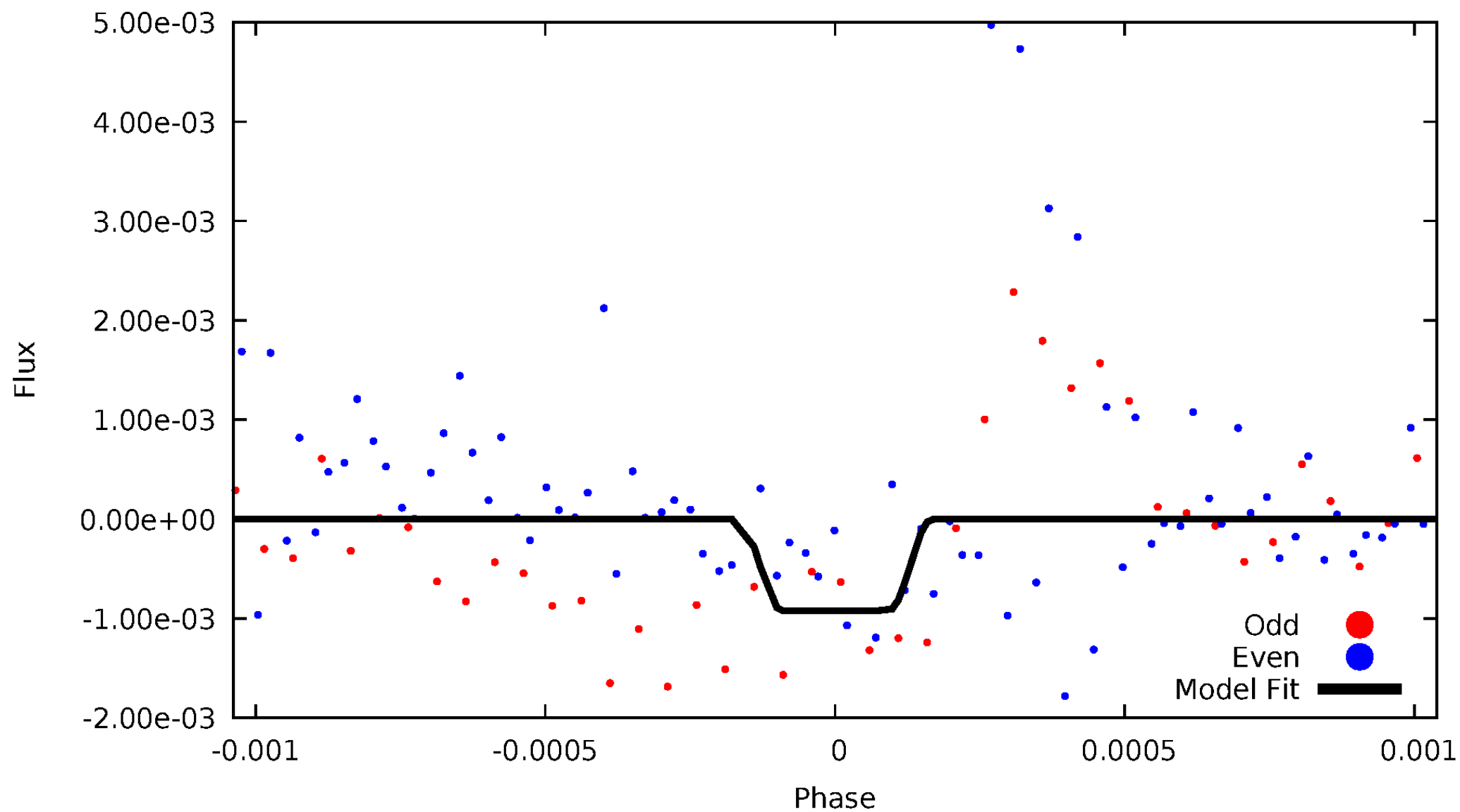
DV Odd/Even

TCE 006510289-02



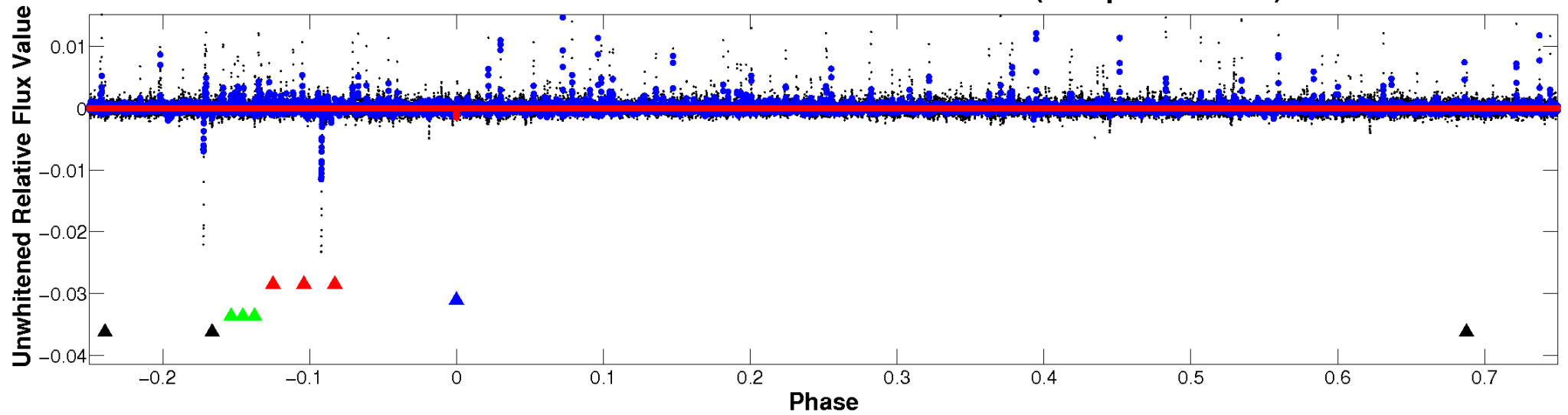
ALT Odd/Even

TCE 006510289-02

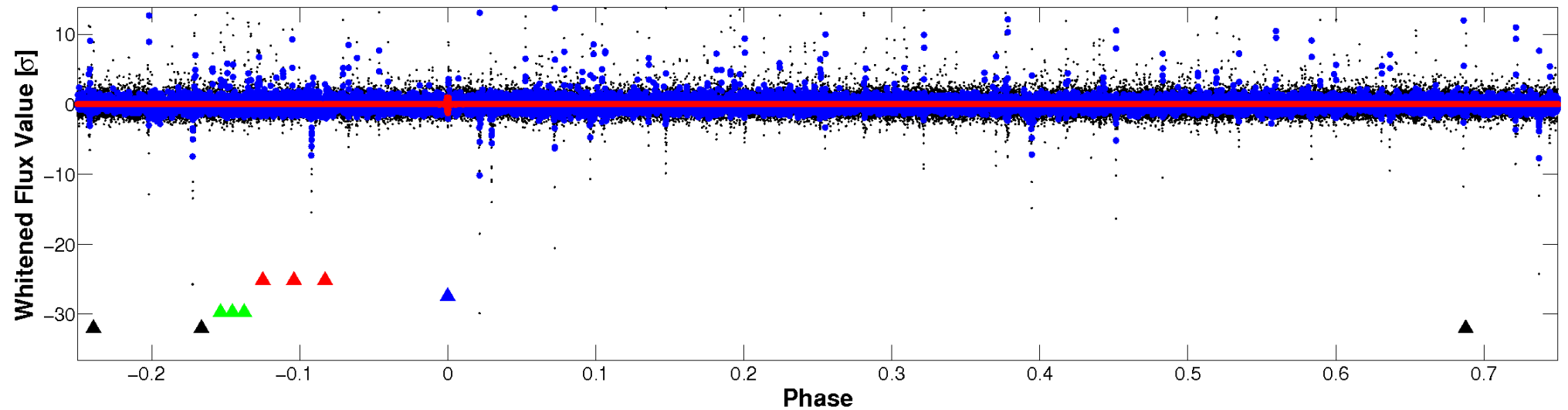


Non-Whitened Vs. Whitened Light Curve

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

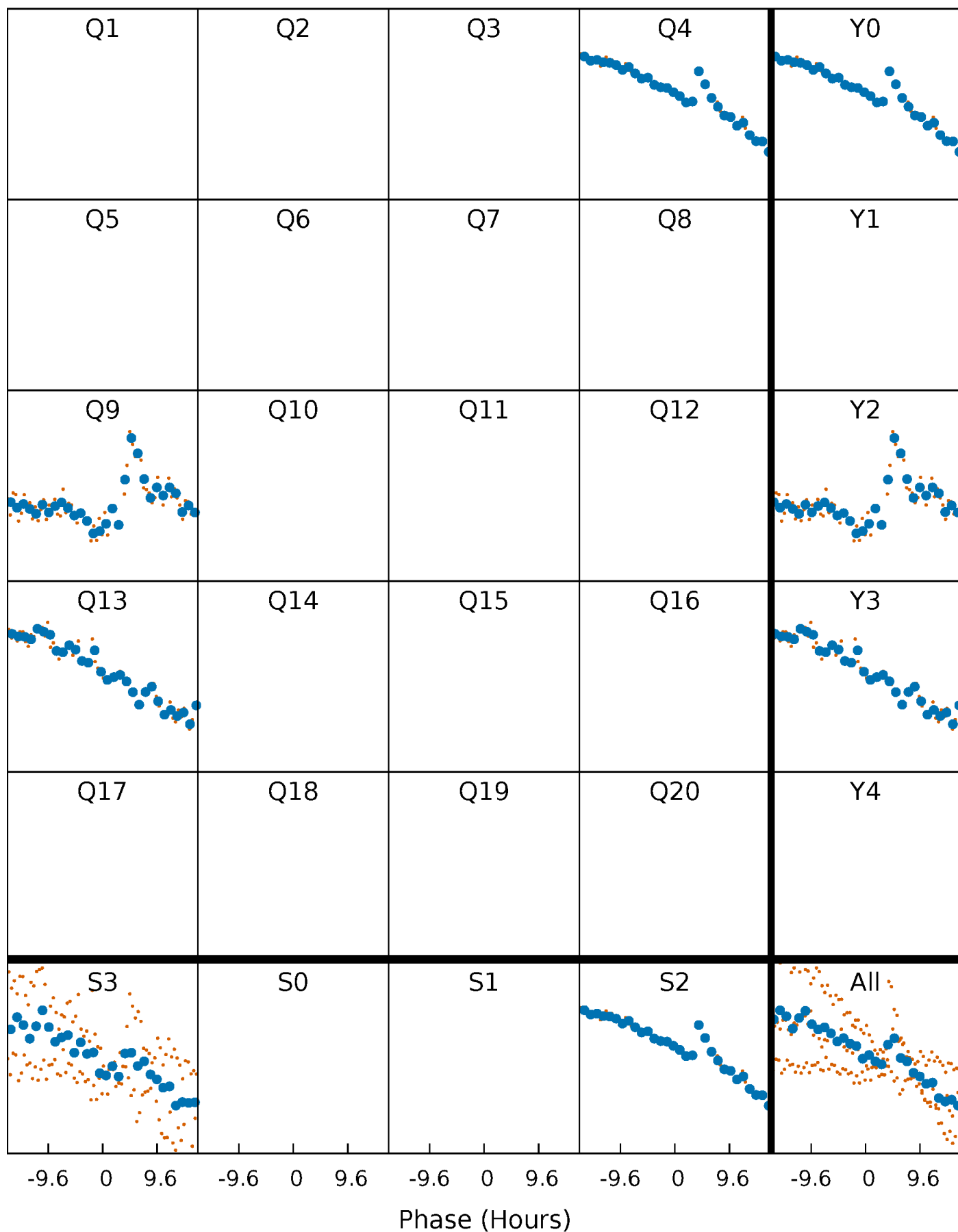


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



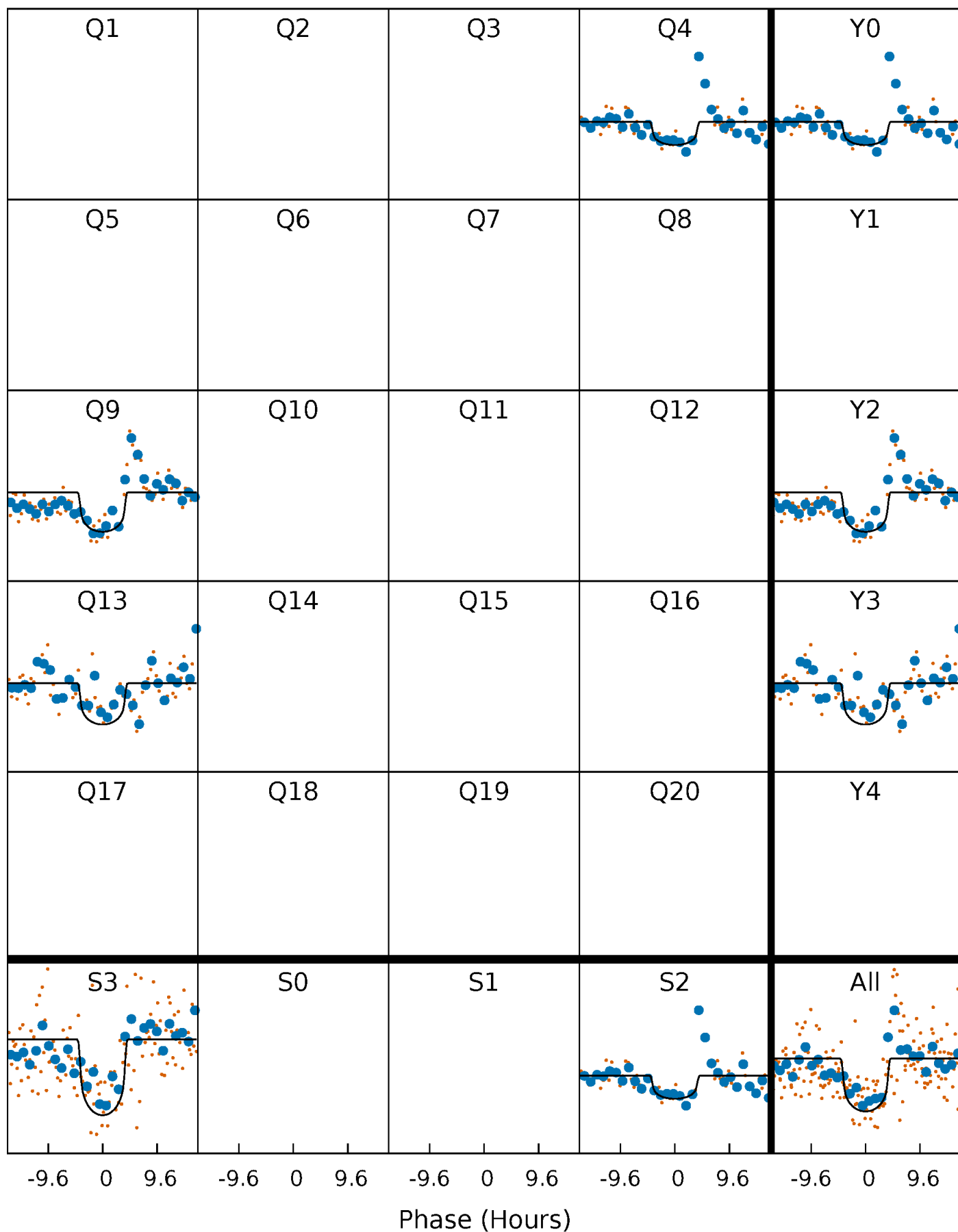
PDC Quarter-Phased Transit Curves

TCE 006510289-02 $P=410.829683$ Days $T_0=431.897264$ (BKJD)



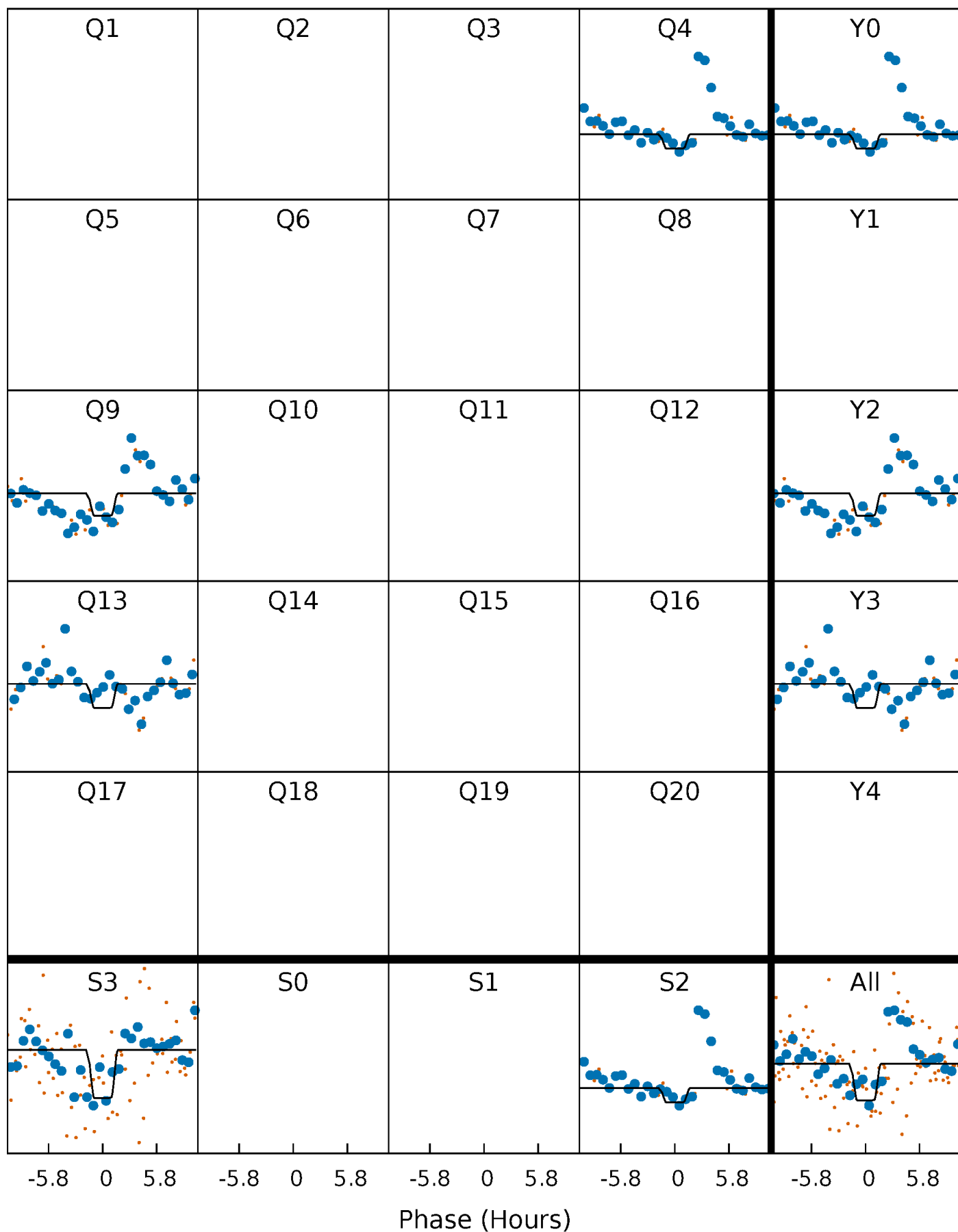
DV Quarter-Phased Transit Curves

TCE 006510289-02 $P=410.829683$ Days $T_0=431.897264$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

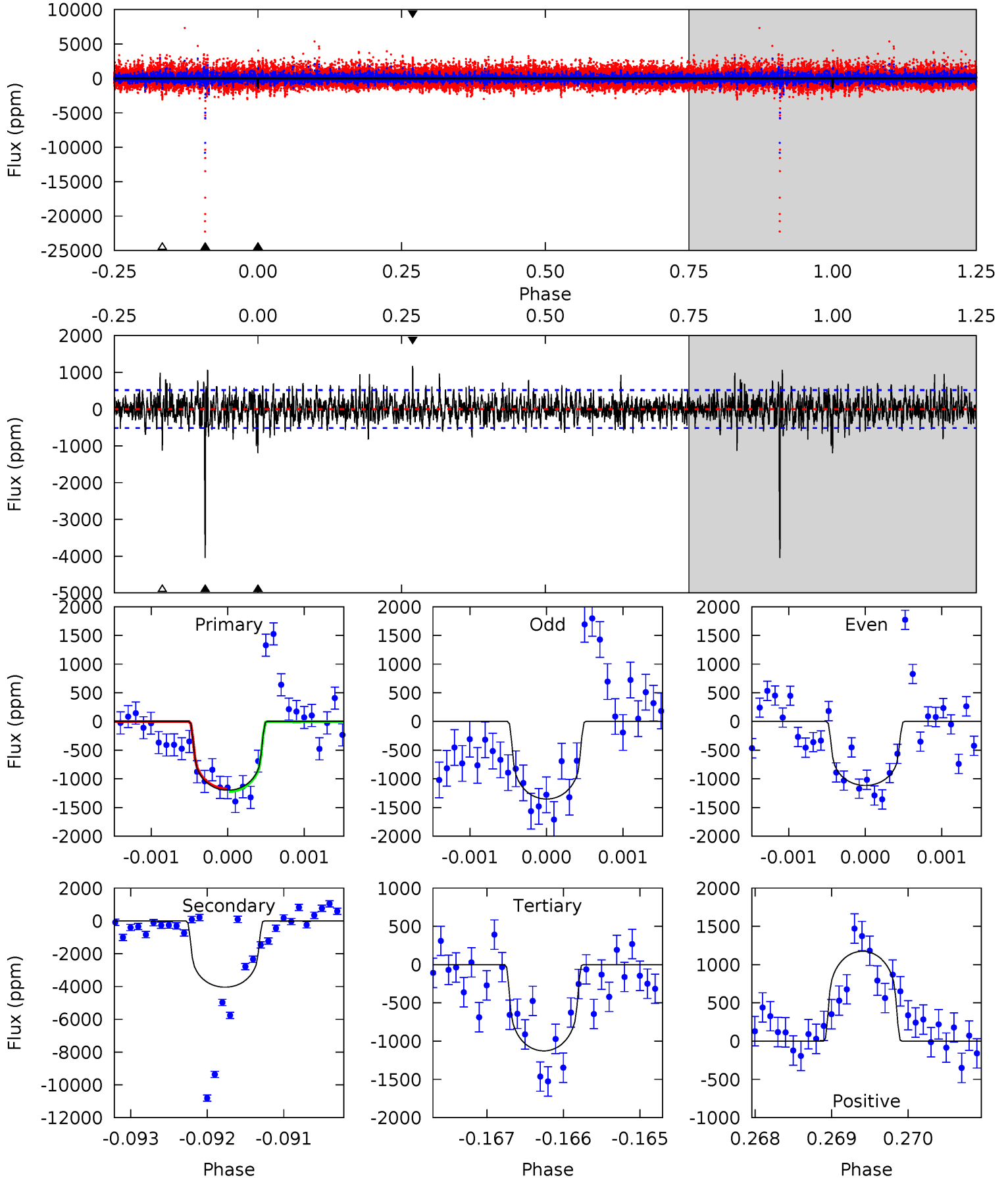
TCE 006510289-02 $P=410.843969$ Days $T_0=431.956970$ (BKJD)



DV Model-Shift Uniqueness Test

006510289-02, P = 410.829683 Days, E = 21.067581 Days

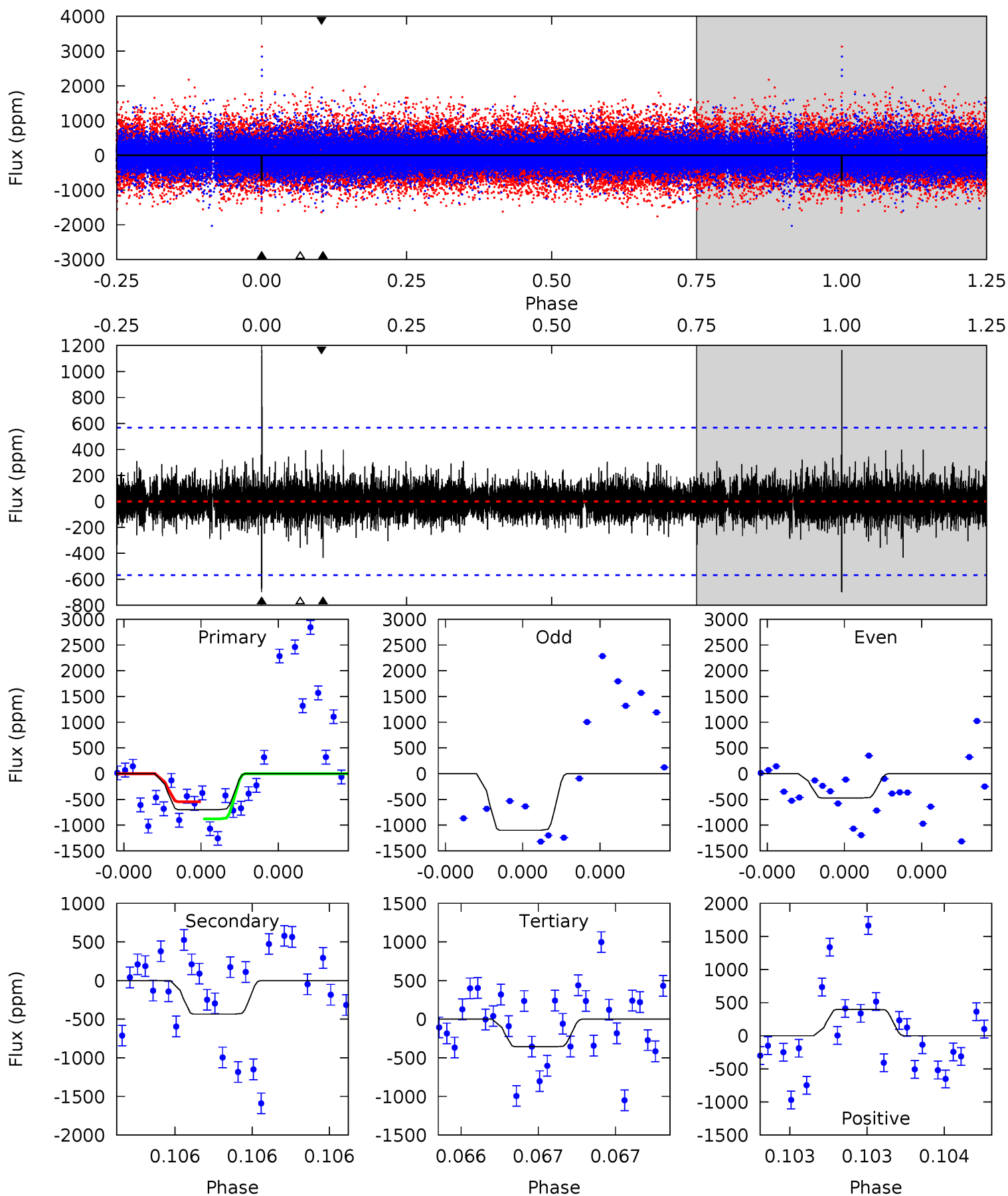
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.7	42.9	12.0	12.5	5.47	3.32	2.62	0.75	0.26	31.0	30.5	1.00	0.86	0.22	0.25



Alt Model-Shift Uniqueness Test

006510289-02, P = 410.843969 Days, E = 21.113001 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.96	4.33	3.56	3.96	5.66	3.62	0.76	3.41	3.00	0.77	0.37	3.04	0.93	0.63	1.67



Stellar Parameters For KIC 006510289

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5293^{+159}_{-143}	$4.604^{+0.032}_{-0.104}$	$-0.180^{+0.300}_{-0.300}$	$0.756^{+0.122}_{-0.066}$	$0.846^{+0.070}_{-0.096}$	$2.765^{+0.500}_{-0.889}$
	+3%/-3%	+1%/-2%	+167%/-167%	+16%/-9%	+8%/-11%	+18%/-32%
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 006510289-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-4044 ± 94	$3.10^{+1.58}_{-1.39}$	285^{+13}_{-11}	7012^{+3432}_{-1330}	$237181^{+559817}_{-132359}$
Alt.	-434 ± 100	$2.69^{+1.59}_{-1.39}$	286^{+12}_{-10}	4456^{+1642}_{-702}	$32975^{+114134}_{-20103}$

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

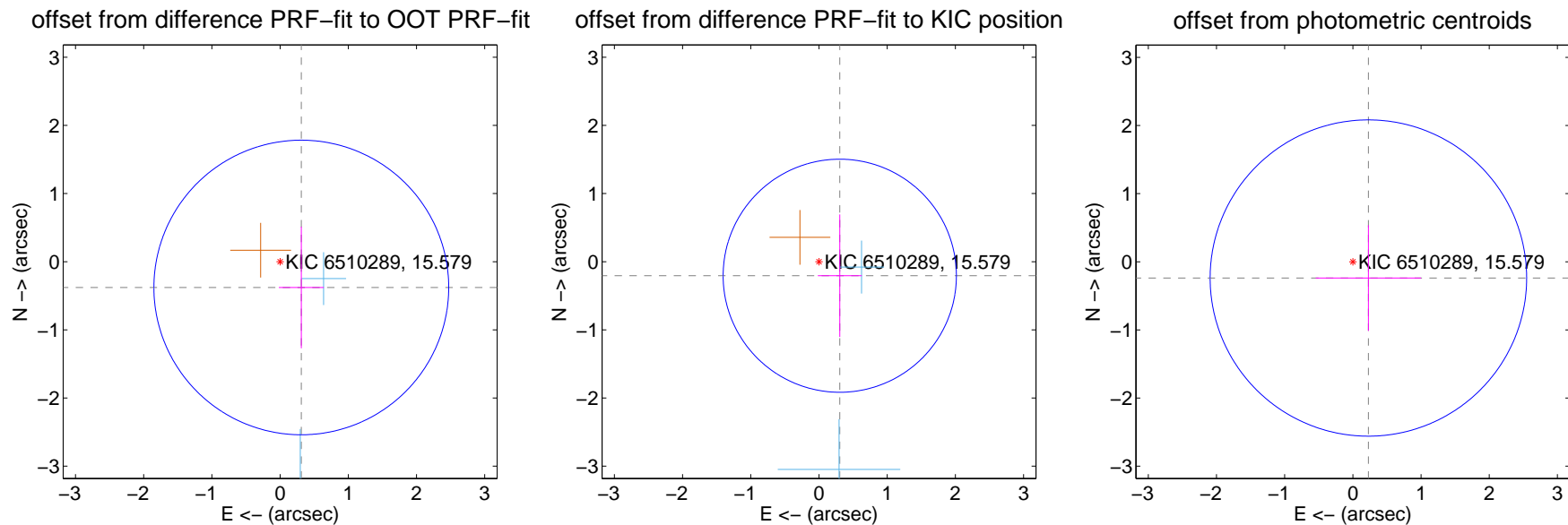
DV Centroid Data

Supplemental centroid analysis for 006510289-02. Kepler magnitude: 15.58. Transit SNR 7.69

There are 2 quarters with good PRF difference image offsets

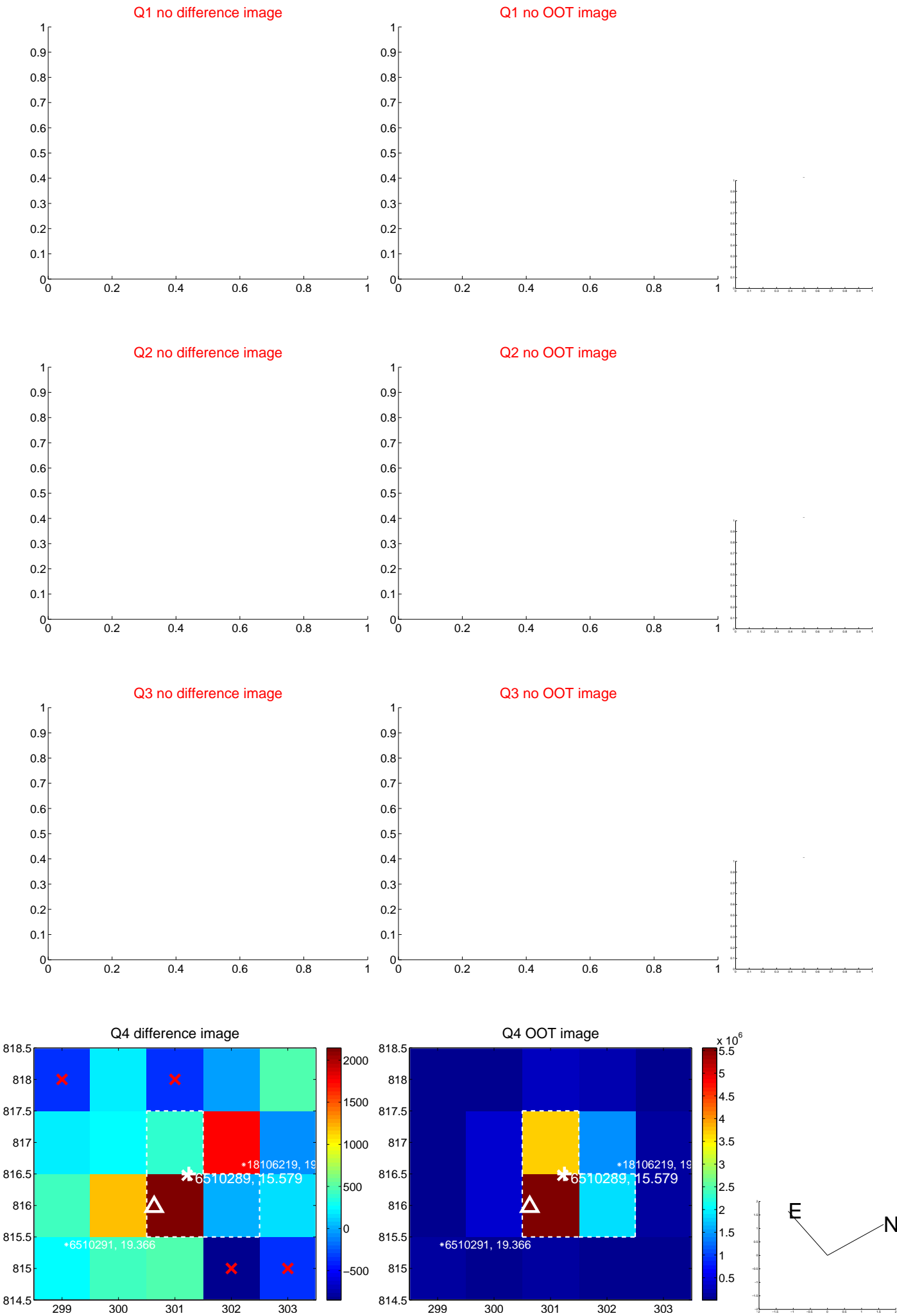
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.490 ± 0.720	0.68	-0.311 ± 0.329	-0.378 ± 0.892
PRF-fit source offset from KIC position	0.368 ± 0.570	0.65	-0.305 ± 0.323	-0.206 ± 0.899
photometric centroid source offset	0.33 ± 0.77	0.43	-0.23 ± 0.77	-0.24 ± 0.78



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.

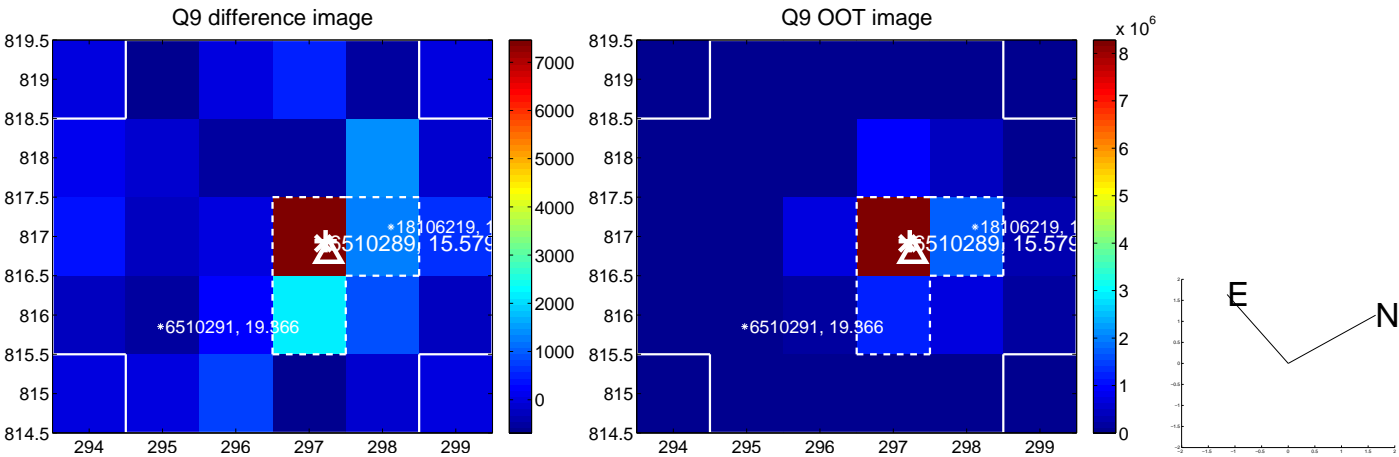
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



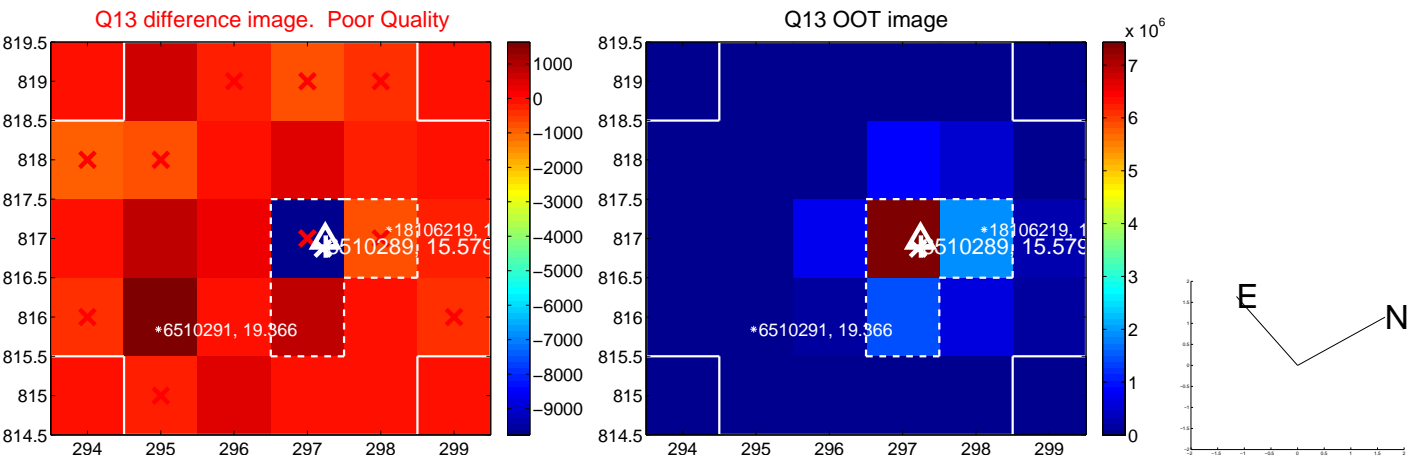
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



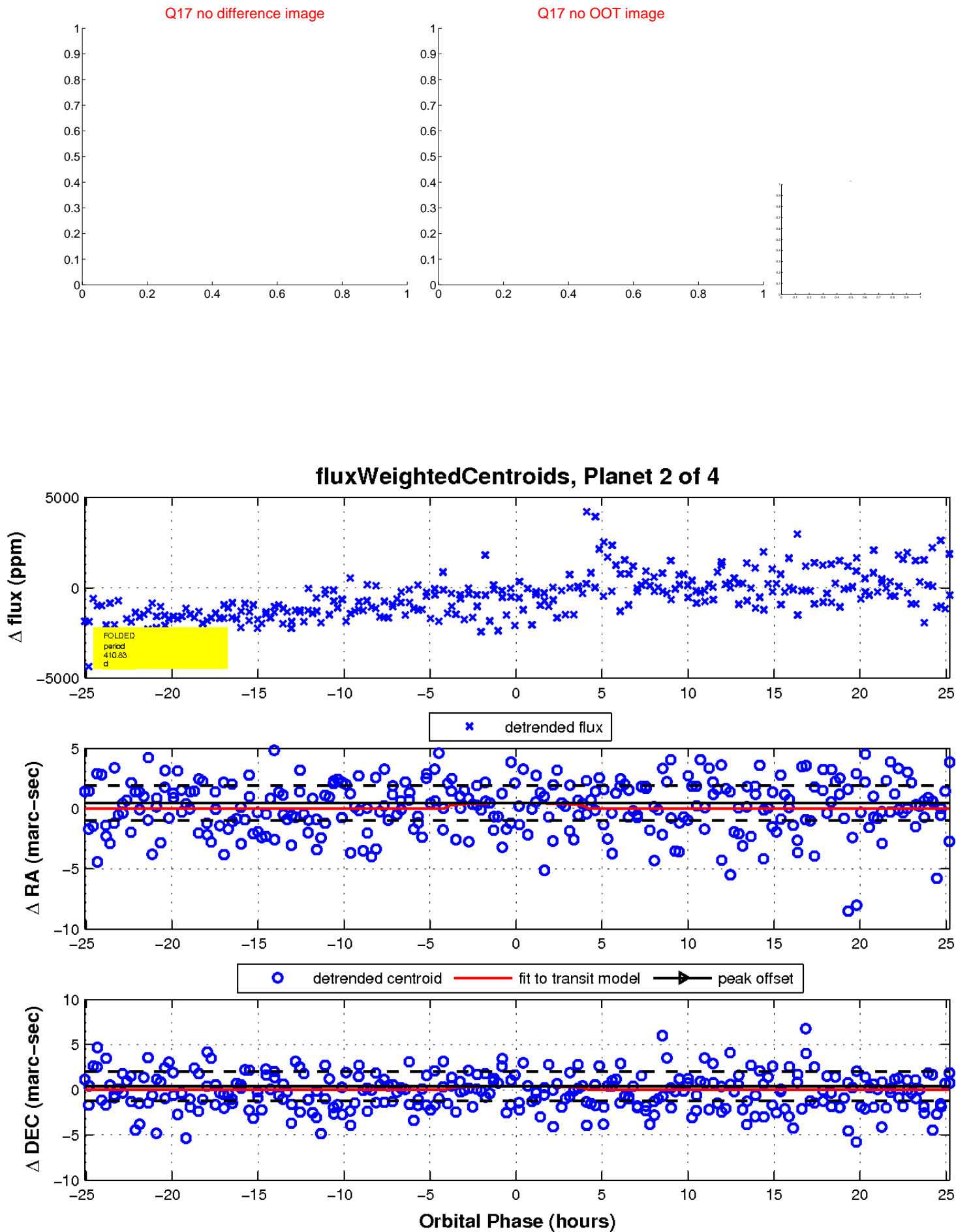
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



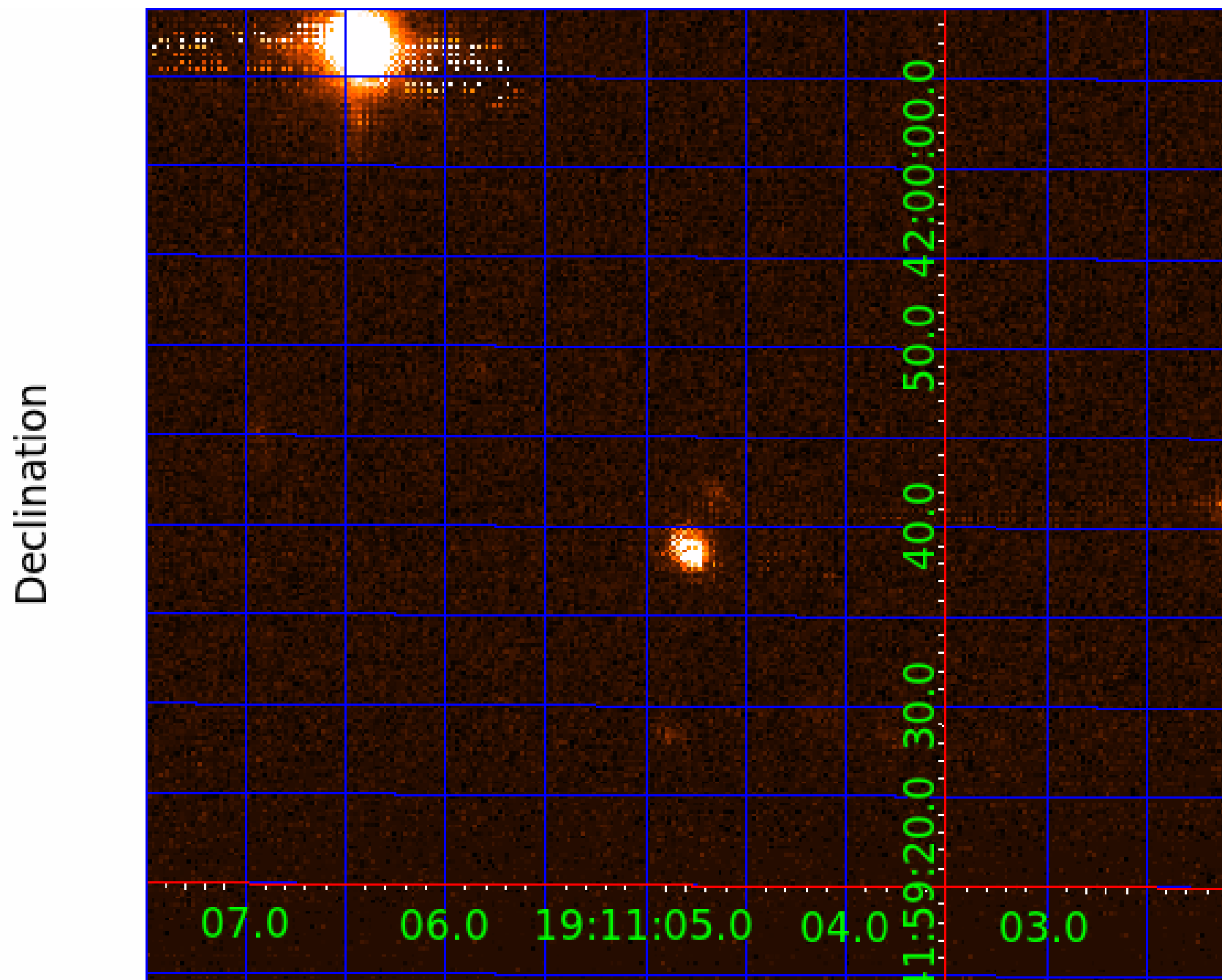
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 006510289

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})
006510289-01	OBS	No	419.469085	380.592781	1704.9	18.018	13.0	6.8	0.76	5293	3.23	0.38
006510289-02	OBS	No	410.829683	431.897264	1500.7	8.407	11.4	7.7	0.76	5293	2.98	0.39
006510289-03	OBS	No	414.114189	368.851346	1505.2	5.425	11.5	6.8	0.76	5293	3.61	0.38
006510289-04	OBS	No	440.804890	303.614486	907.7	3.249	9.2	4.4	0.76	5293	2.35	0.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006510289-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006510289-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006510289-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
006510289-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

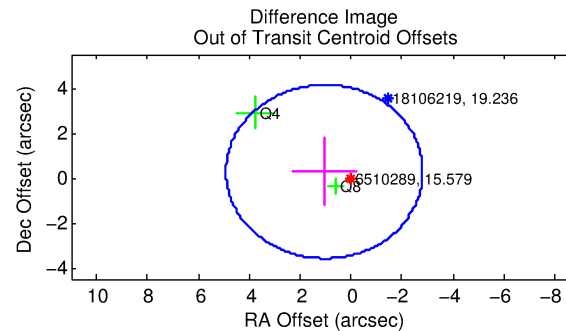
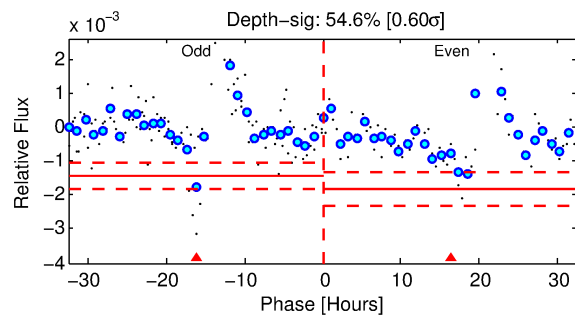
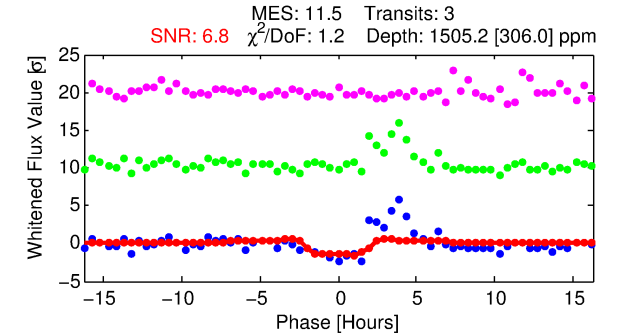
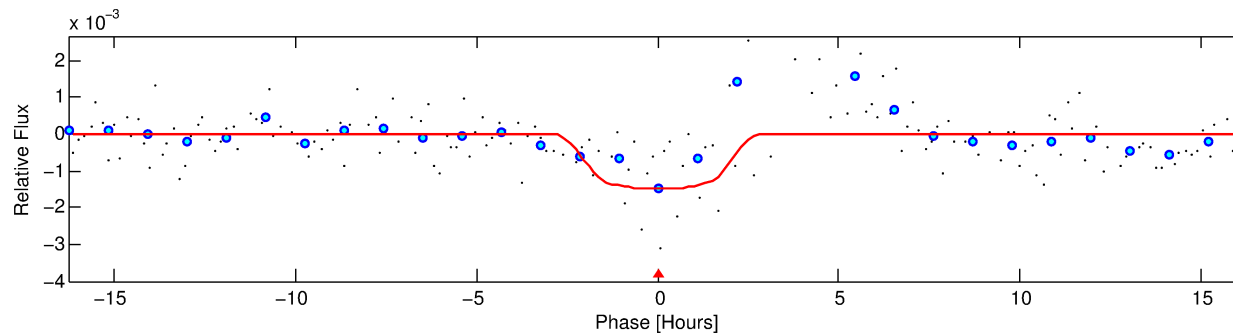
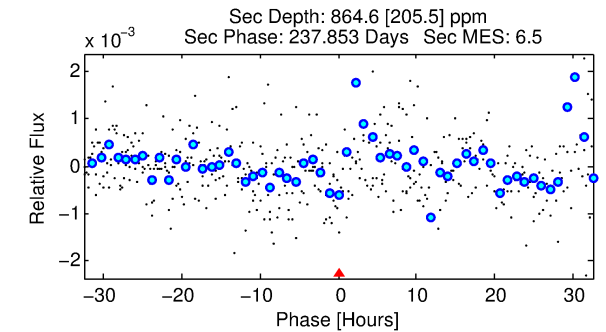
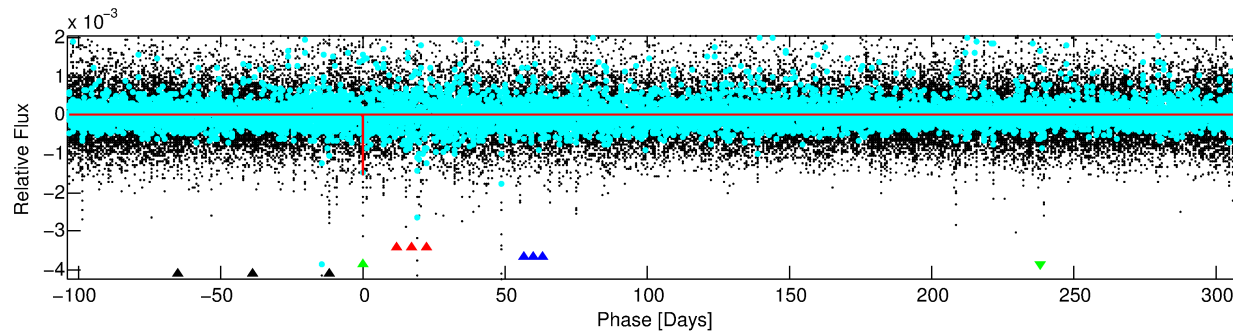
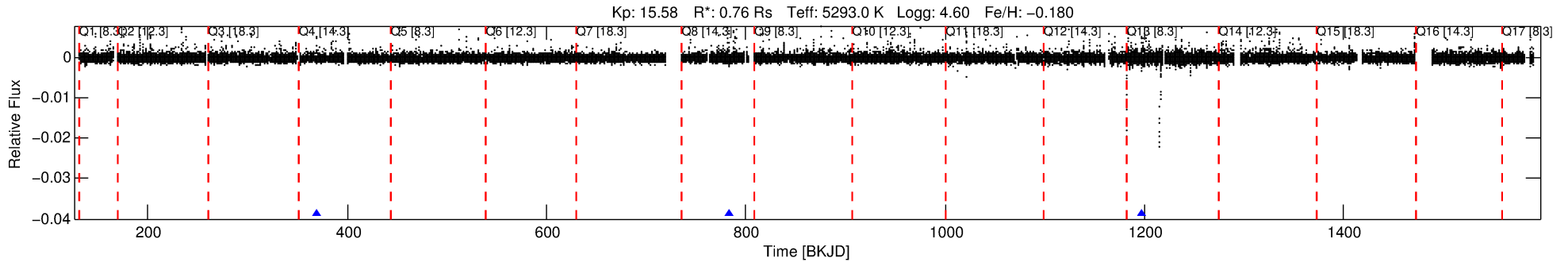
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006510289-03

No Significant Match Found

DV One-Page Summary

KIC: 6510289 Candidate: 3 of 4 Period: 414.114 d



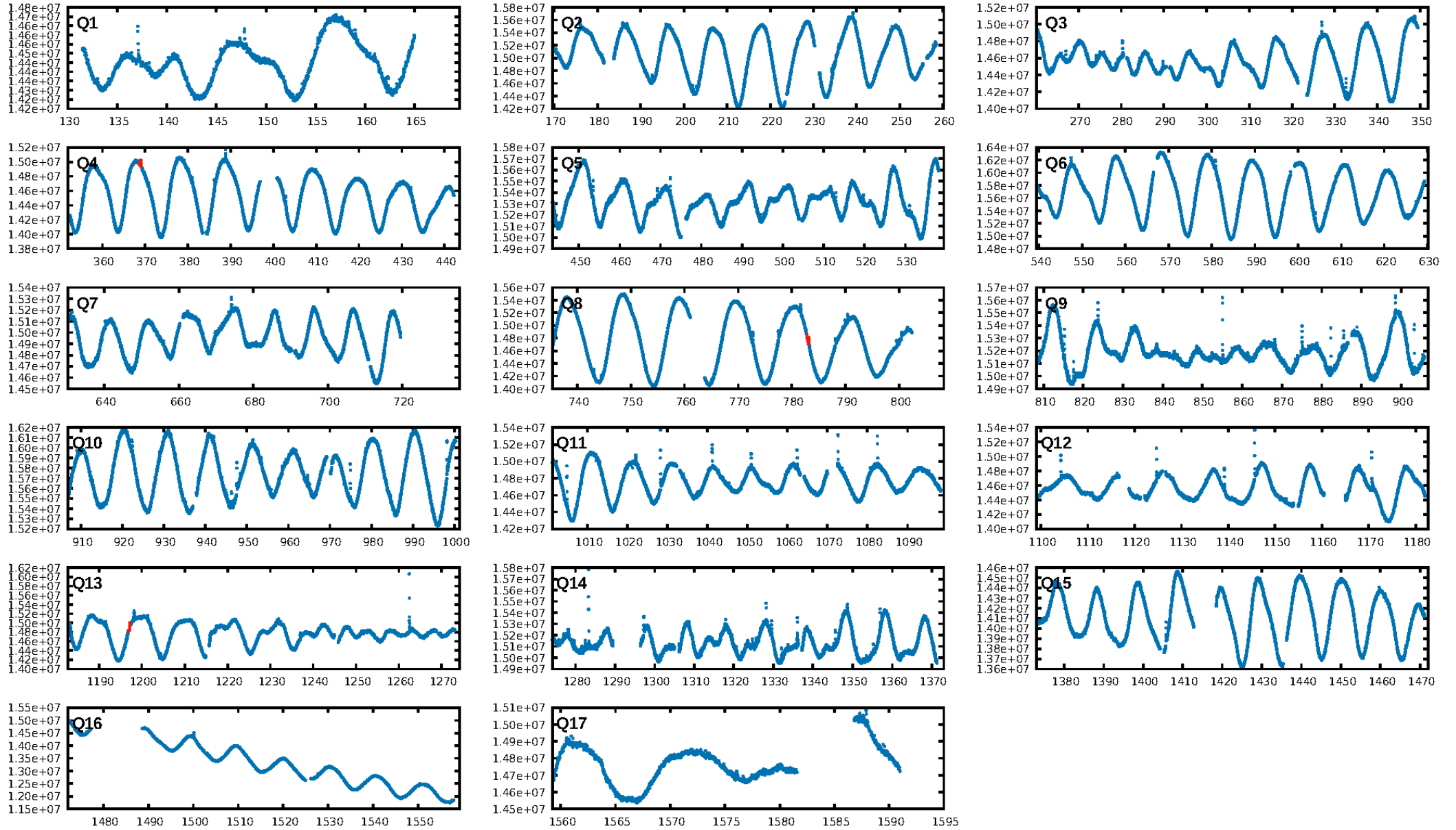
DV Fit Results:

Period = 414.11419 [0.01215] d
Epoch = 368.8513 [0.0122] BKJD
Rp/R* = 0.0437 [0.0071]
a/R* = 291.60 [127.32]
b = 0.92 [0.08]
Seff = 0.38 [0.09]
Teq = 201 [11] K
Rp = 3.61 [0.83] Re
a = 1.0252 [0.1373] AU
Ag = 38431.34 [17156.12] [2.24σ]
Teffp = 4341 [456] K [9.07σ]

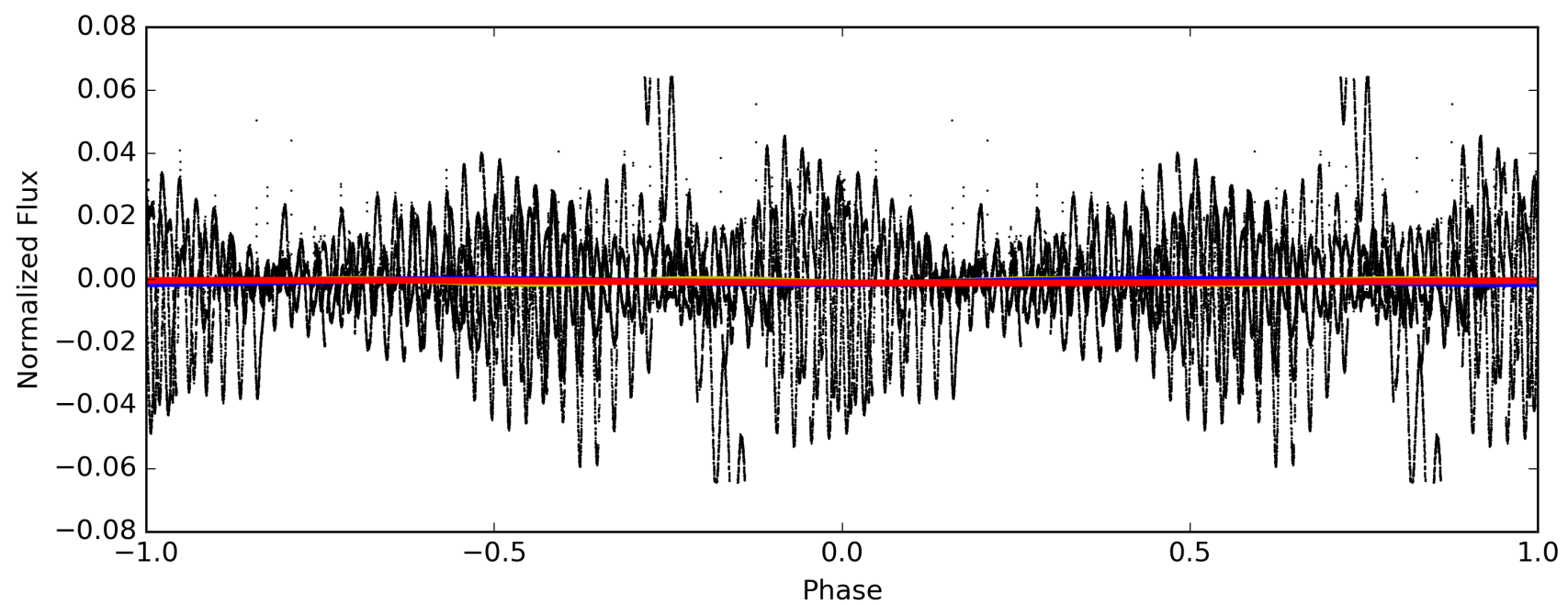
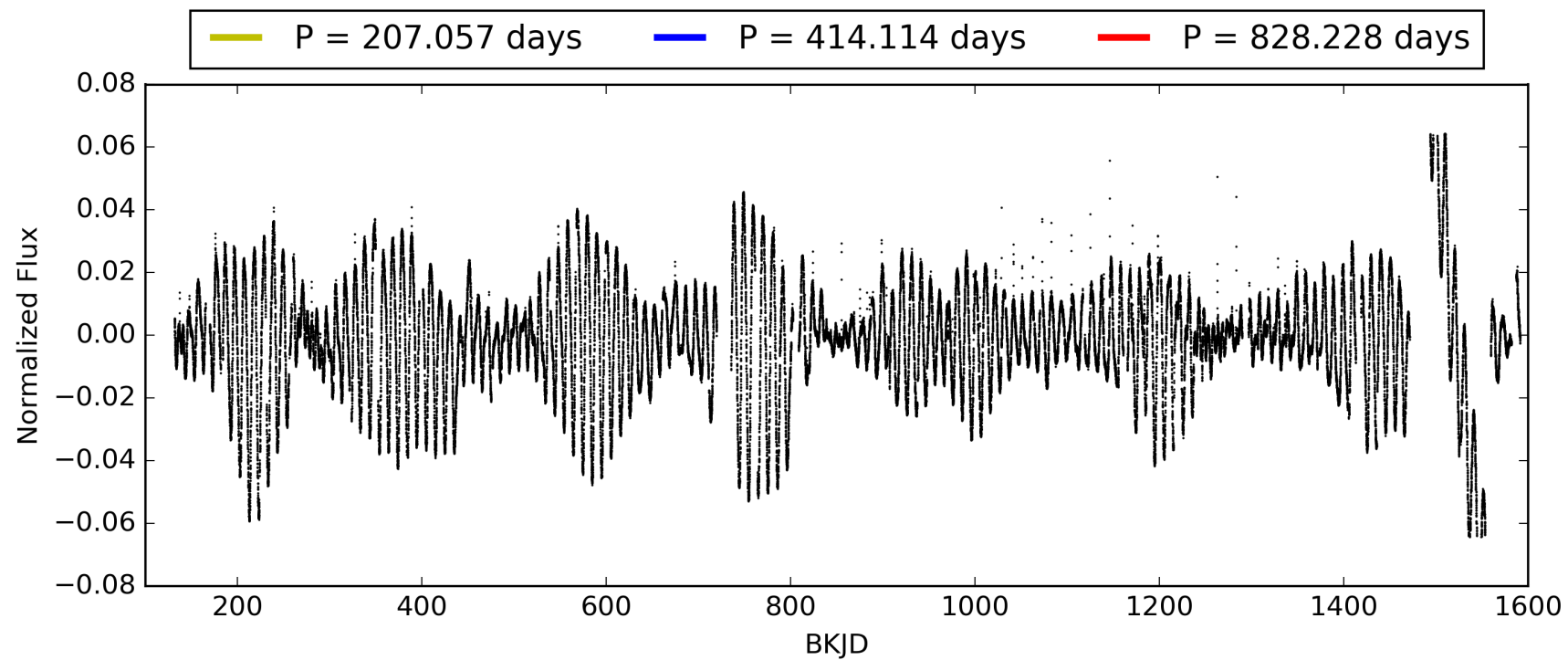
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.88σ]
LongPeriod-sig: 100.0% [6.83σ]
ModelChiSquare2-sig: 13.7%
ModelChiSquareGof-sig: 81.4%
Bootstrap-pfa: 4.51e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -2.612
Centroid-sig: 0.2%
Centroid-so: 1.865 arcsec [1.76σ]
OotOffset-rm: 1.082 arcsec [0.84σ]
KicOffset-rm: 1.144 arcsec [0.88σ]
OotOffset-st: 0/0/2/0 [2]
KicOffset-st: 0/0/2/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [2/2]

TCE 006510289-03, PDC Light Curves

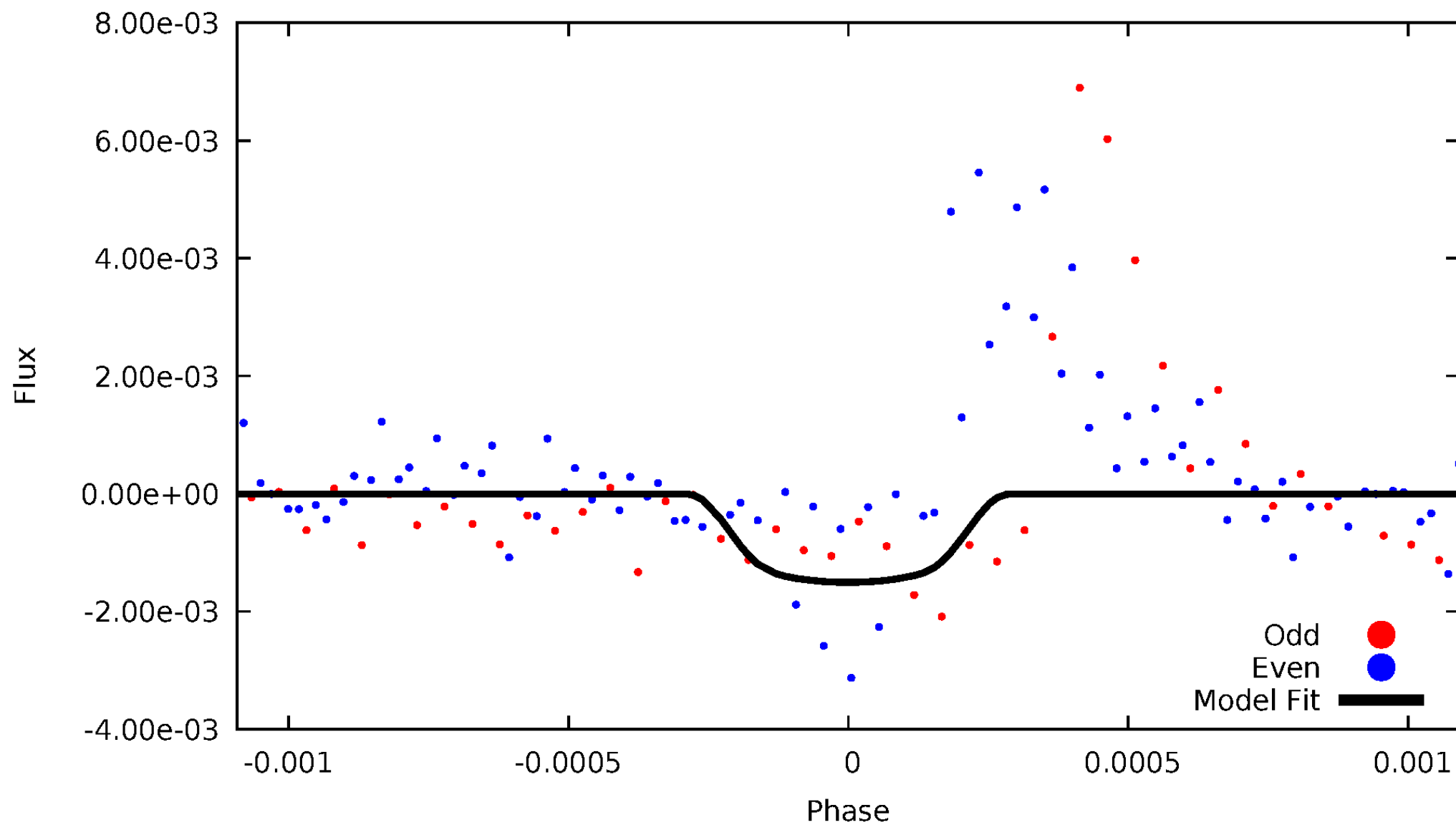


TCE 006510289-03



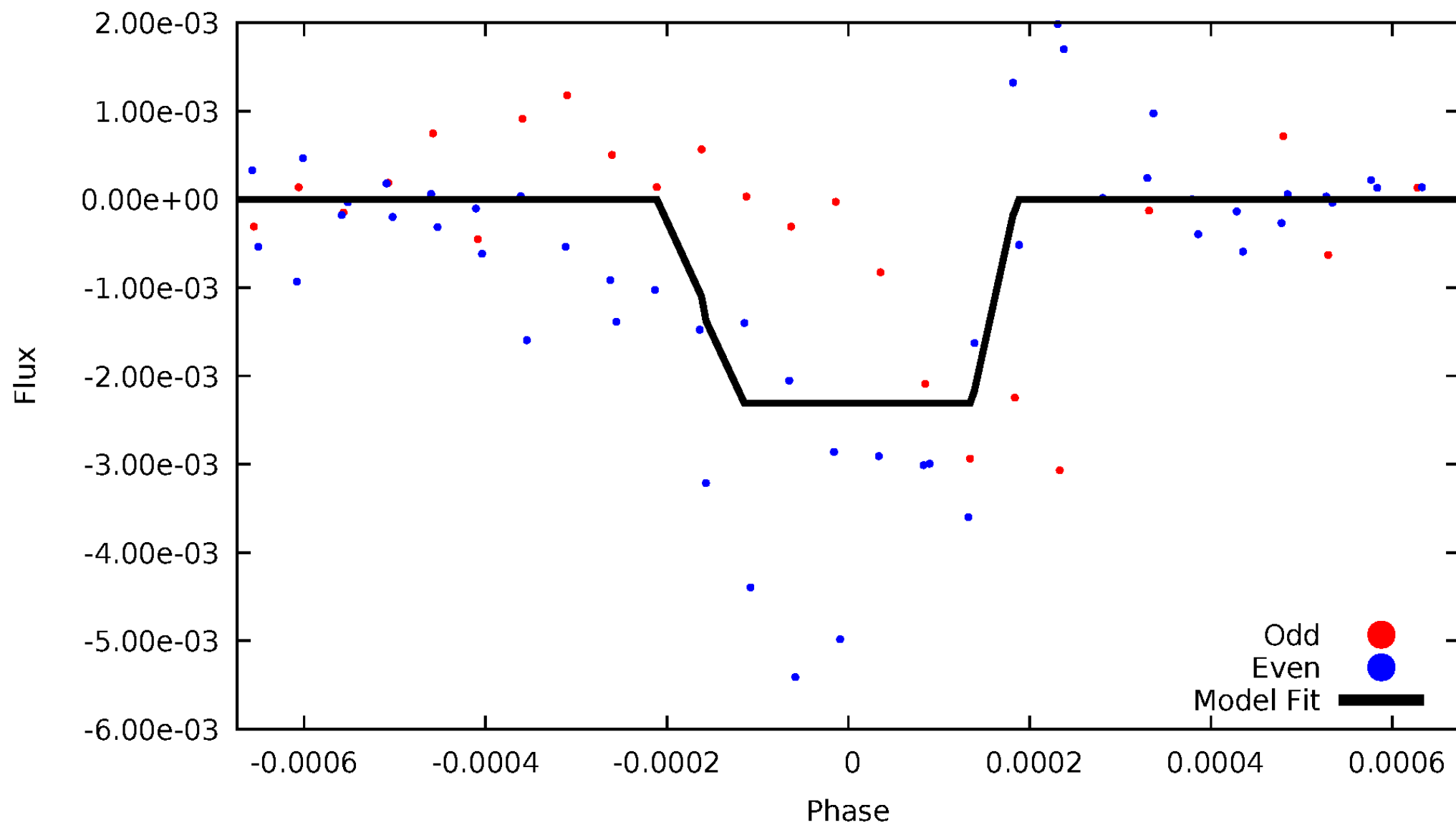
DV Odd/Even

TCE 006510289-03



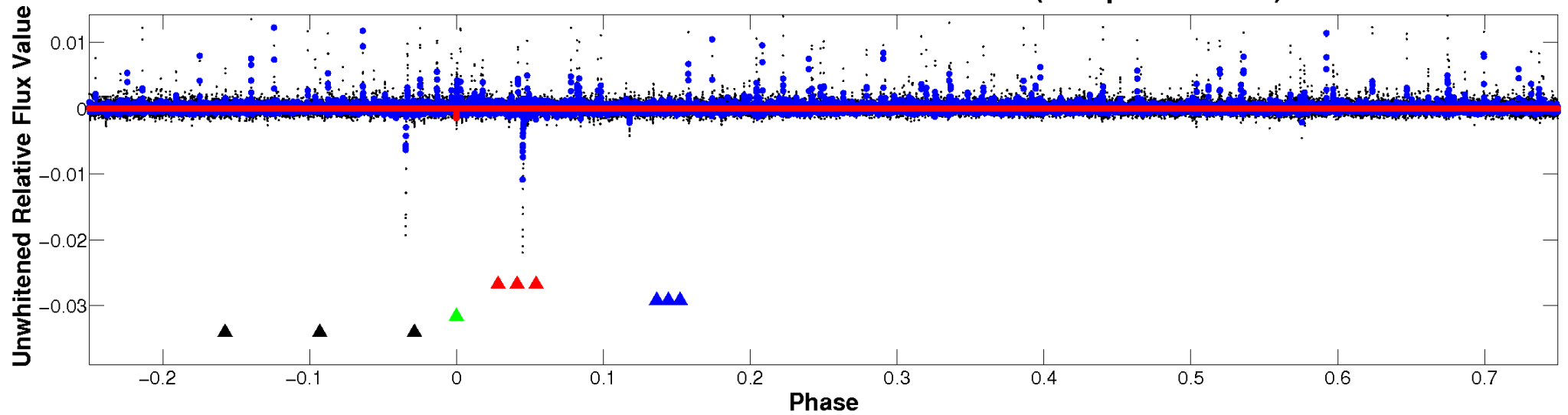
ALT Odd/Even

TCE 006510289-03

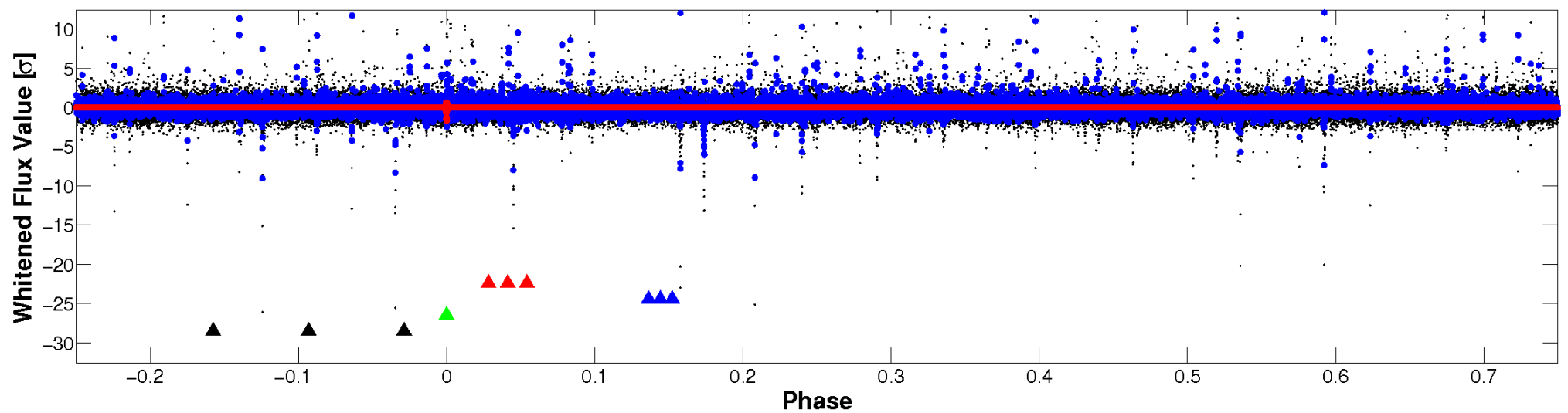


Non-Whitened Vs. Whitened Light Curve

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

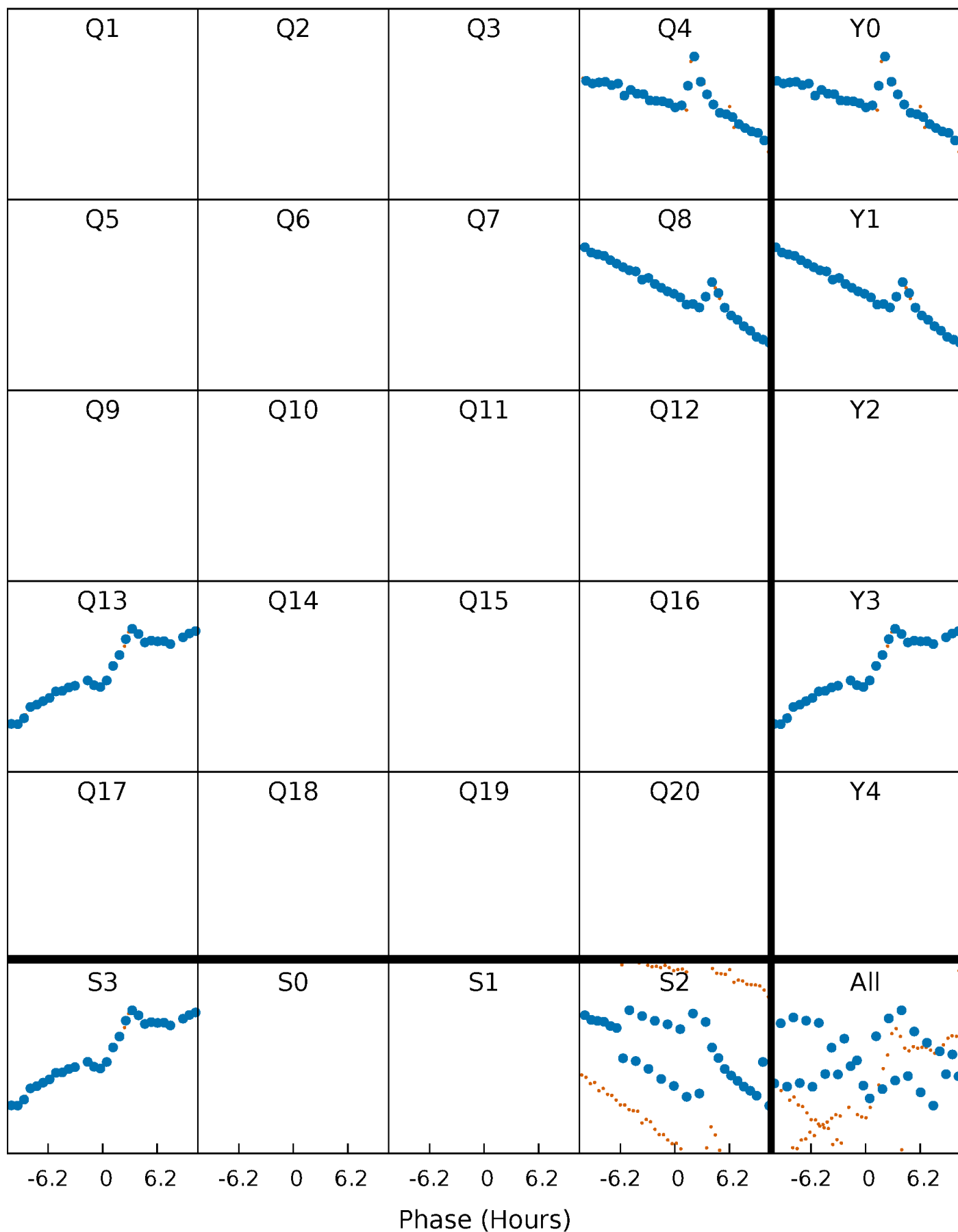


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



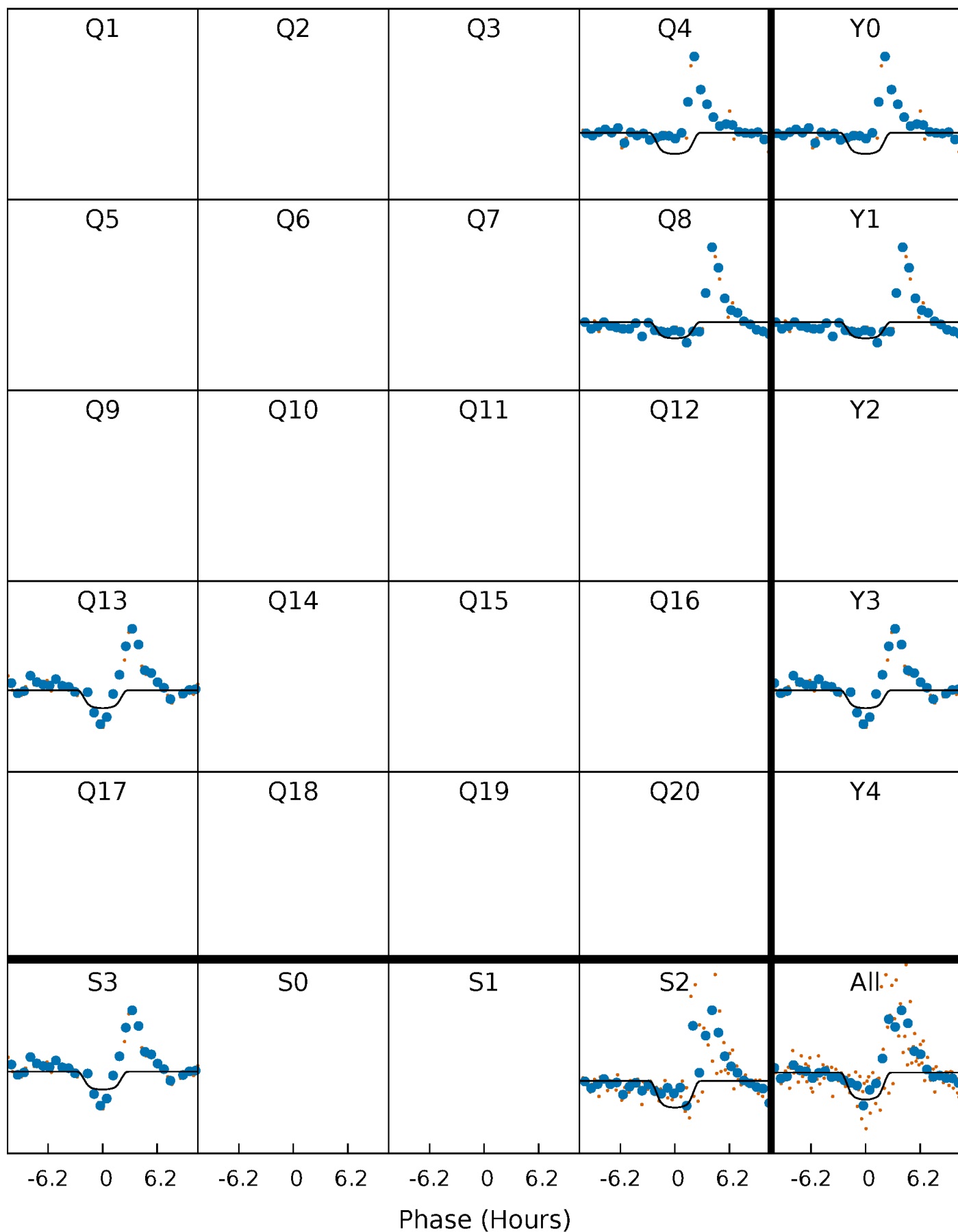
PDC Quarter-Phased Transit Curves

TCE 006510289-03 $P=414.114189$ Days $T_0=368.851346$ (BKJD)



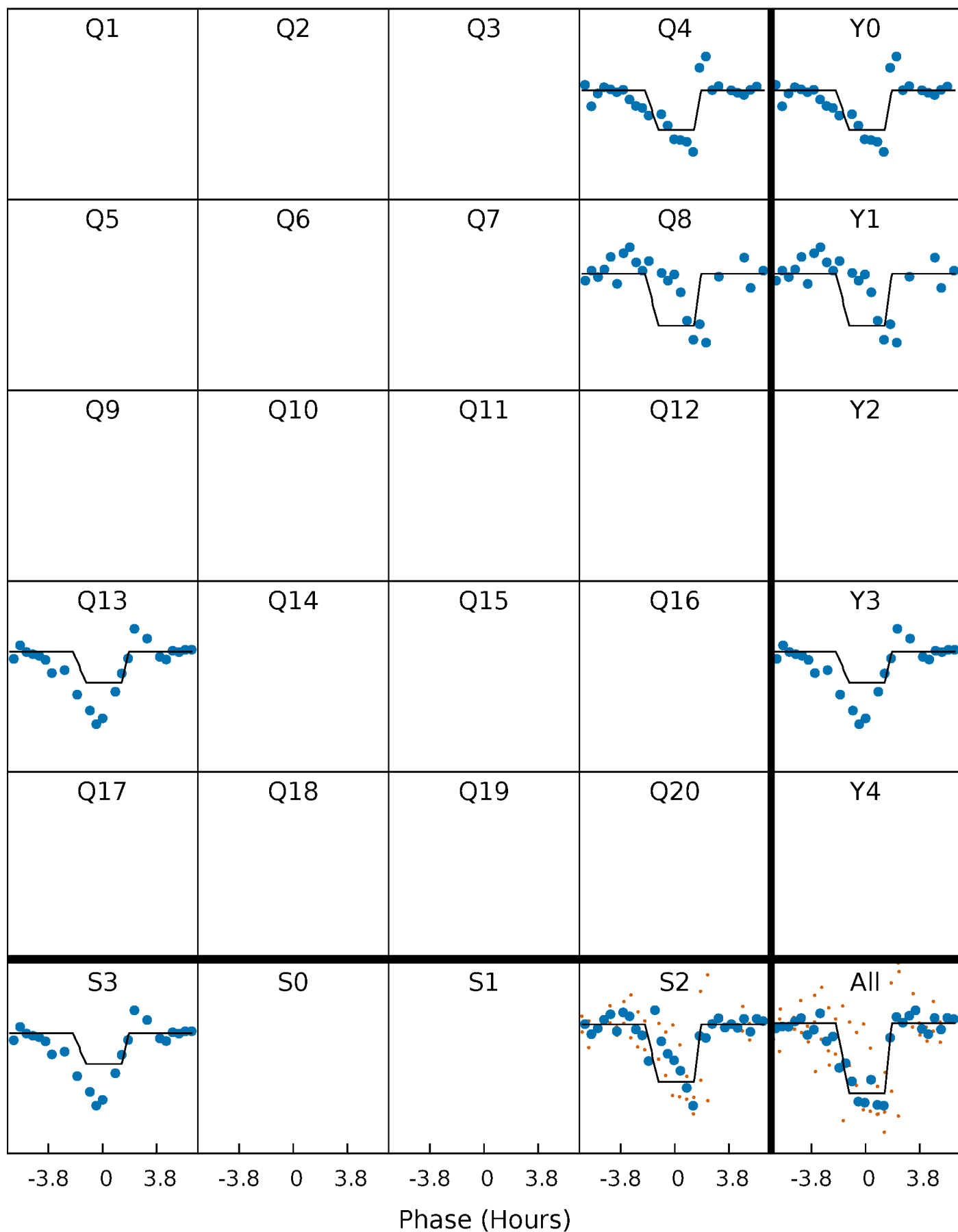
DV Quarter-Phased Transit Curves

TCE 006510289-03 $P=414.114189$ Days $T_0=368.851346$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

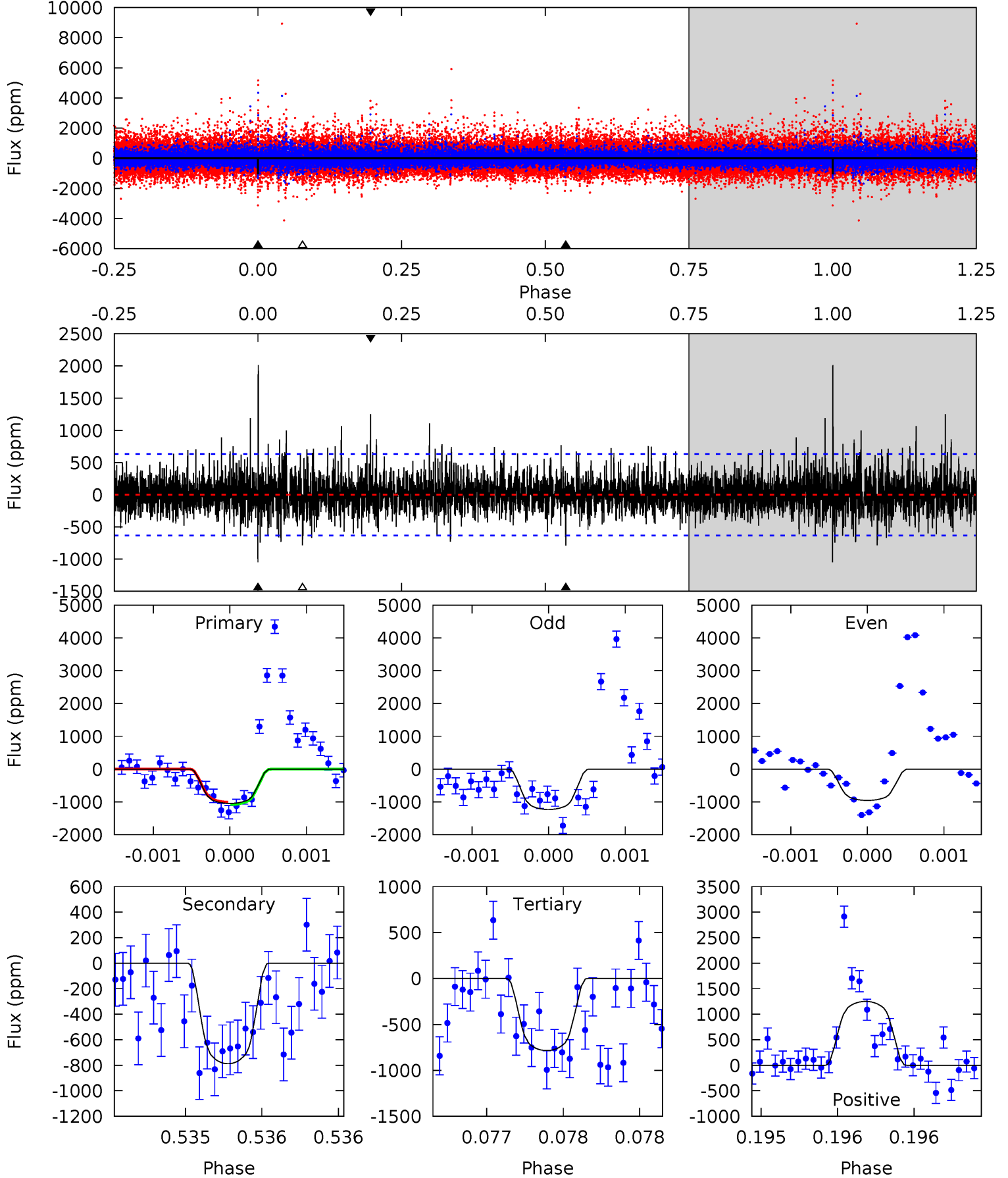
TCE 006510289-03 $P=414.126960$ Days $T_0=368.852130$ (BKJD)



DV Model-Shift Uniqueness Test

006510289-03, P = 414.114189 Days, E = 368.851346 Days

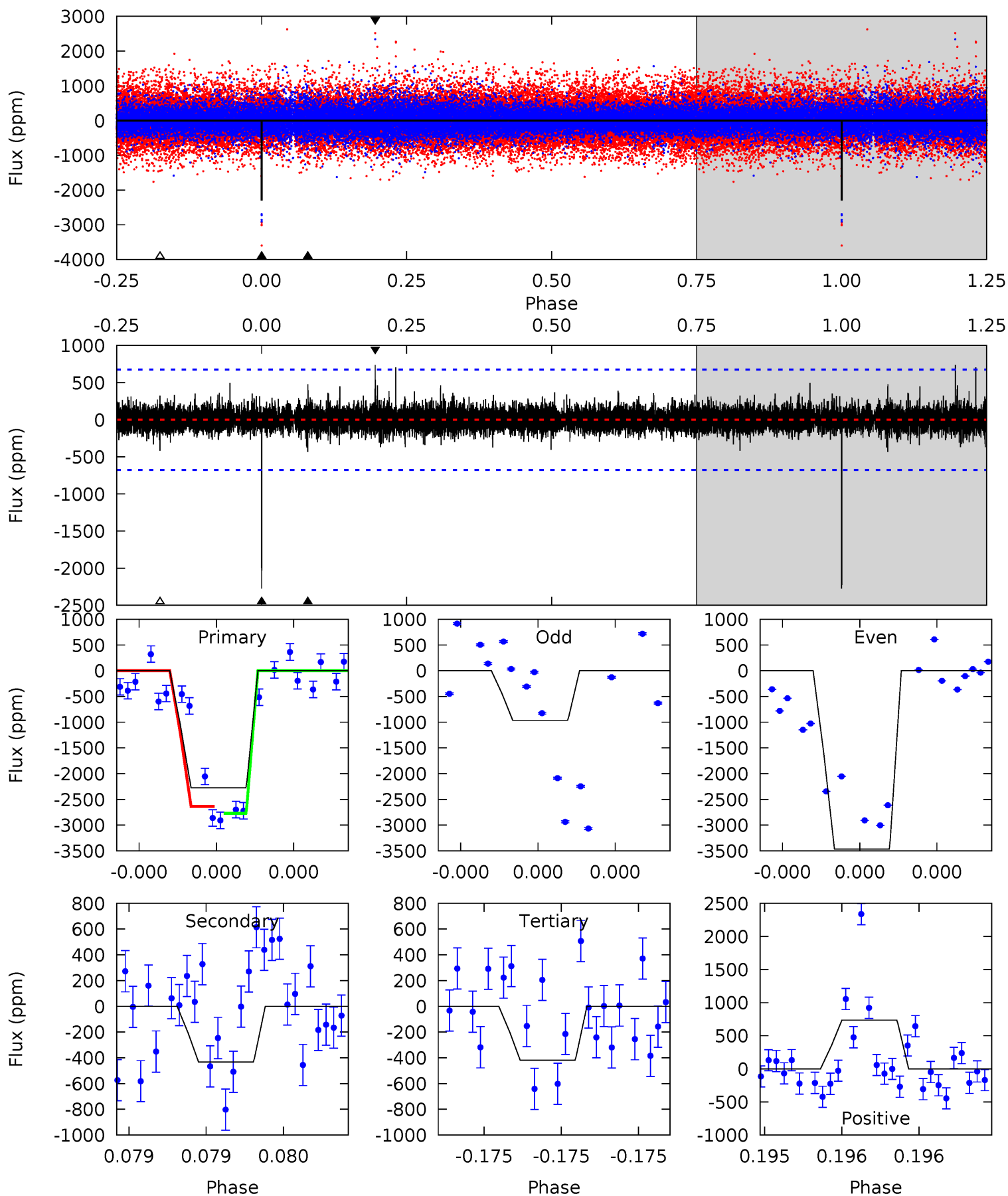
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.17	6.91	6.88	11.0	5.55	3.45	1.79	2.29	-1.79	0.03	-4.06	1.03	0.71	0.66	0.30



Alt Model-Shift Uniqueness Test

006510289-03, P = 414.126960 Days, E = 368.852130 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.0	3.60	3.49	6.14	5.63	3.58	0.74	15.5	12.8	0.11	-2.53	13.1	0.97	0.24	0.54



Stellar Parameters For KIC 006510289

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5293^{+159}_{-143}	$4.604^{+0.032}_{-0.104}$	$-0.180^{+0.300}_{-0.300}$	$0.756^{+0.122}_{-0.066}$	$0.846^{+0.070}_{-0.096}$	$2.765^{+0.500}_{-0.889}$
	+3%/-3%	+1%/-2%	+167%/-167%	+16%/-9%	+8%/-11%	+18%/-32%
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 006510289-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-788 ± 114	$3.71^{+0.64}_{-0.63}$	284^{+12}_{-11}	4417^{+329}_{-285}	32591^{+16308}_{-9723}
Alt.	-432 ± 120	$4.10^{+0.66}_{-0.67}$	285^{+12}_{-11}	3830^{+307}_{-273}	14976^{+7963}_{-5619}

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

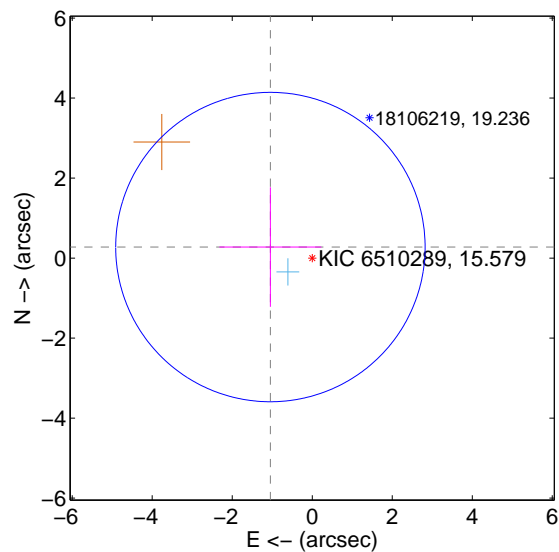
Supplemental centroid analysis for 006510289-03. Kepler magnitude: 15.58. Transit SNR 6.82

There are 1 quarters with good PRF difference image offsets

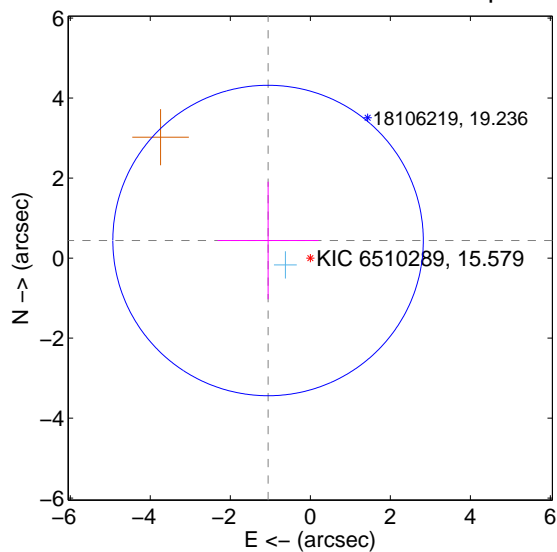
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.082 ± 1.289	0.84	1.046 ± 1.274	0.276 ± 1.494
PRF-fit source offset from KIC position	1.144 ± 1.294	0.88	1.056 ± 1.261	0.440 ± 1.469
photometric centroid source offset	1.86 ± 1.06	1.76	-0.18 ± 1.08	-1.86 ± 1.06

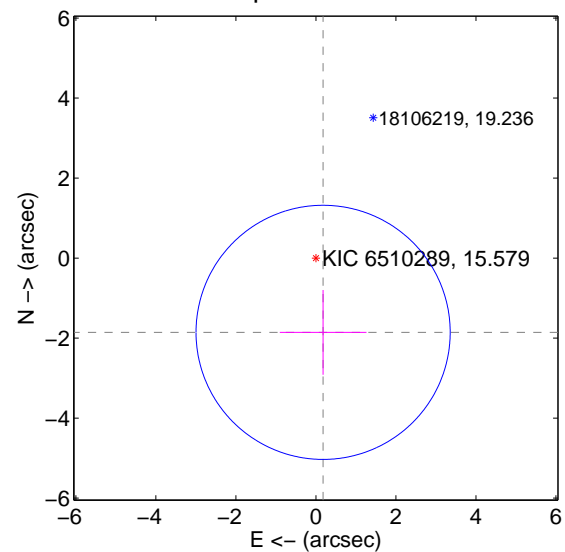
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

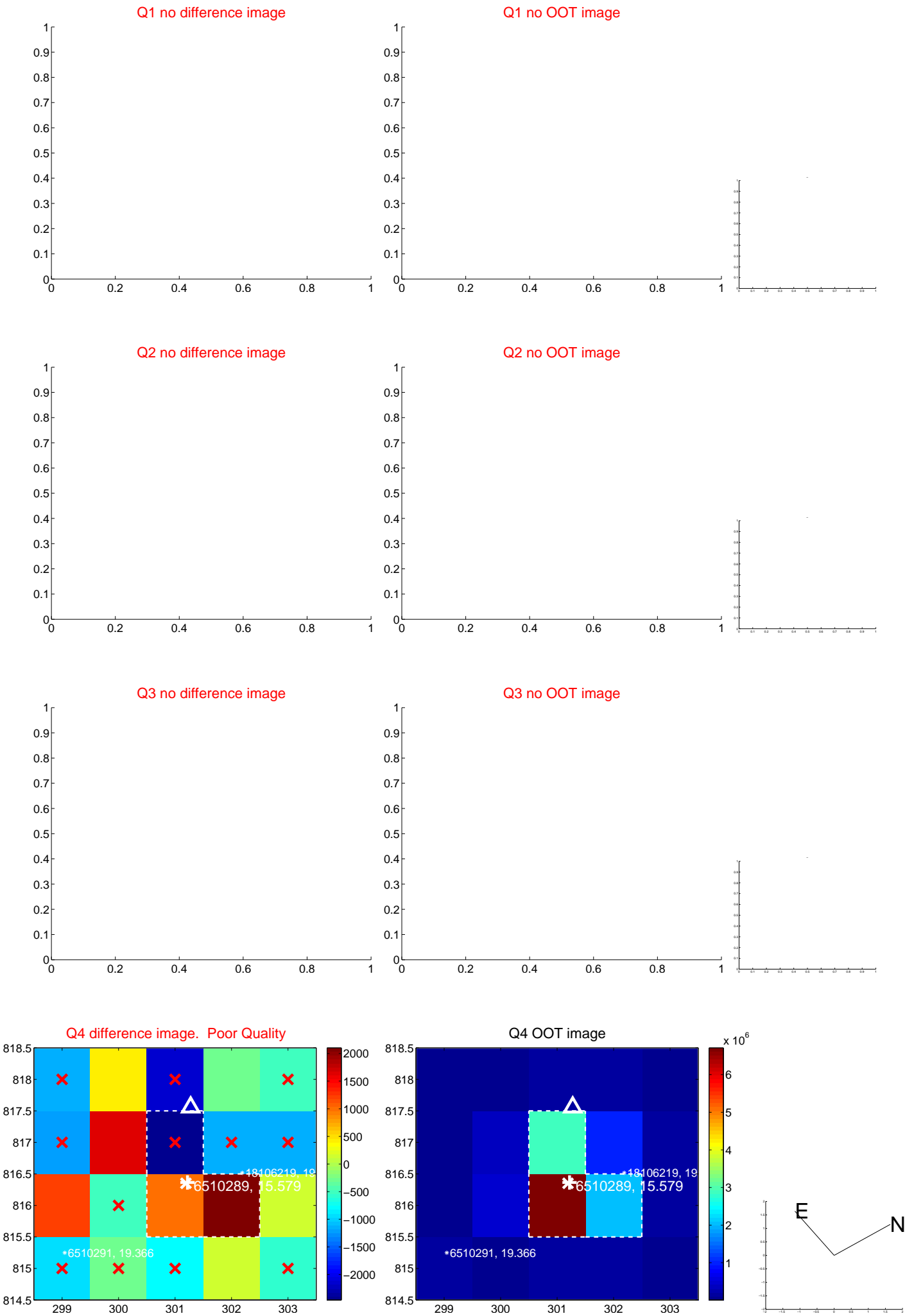


offset from photometric centroids

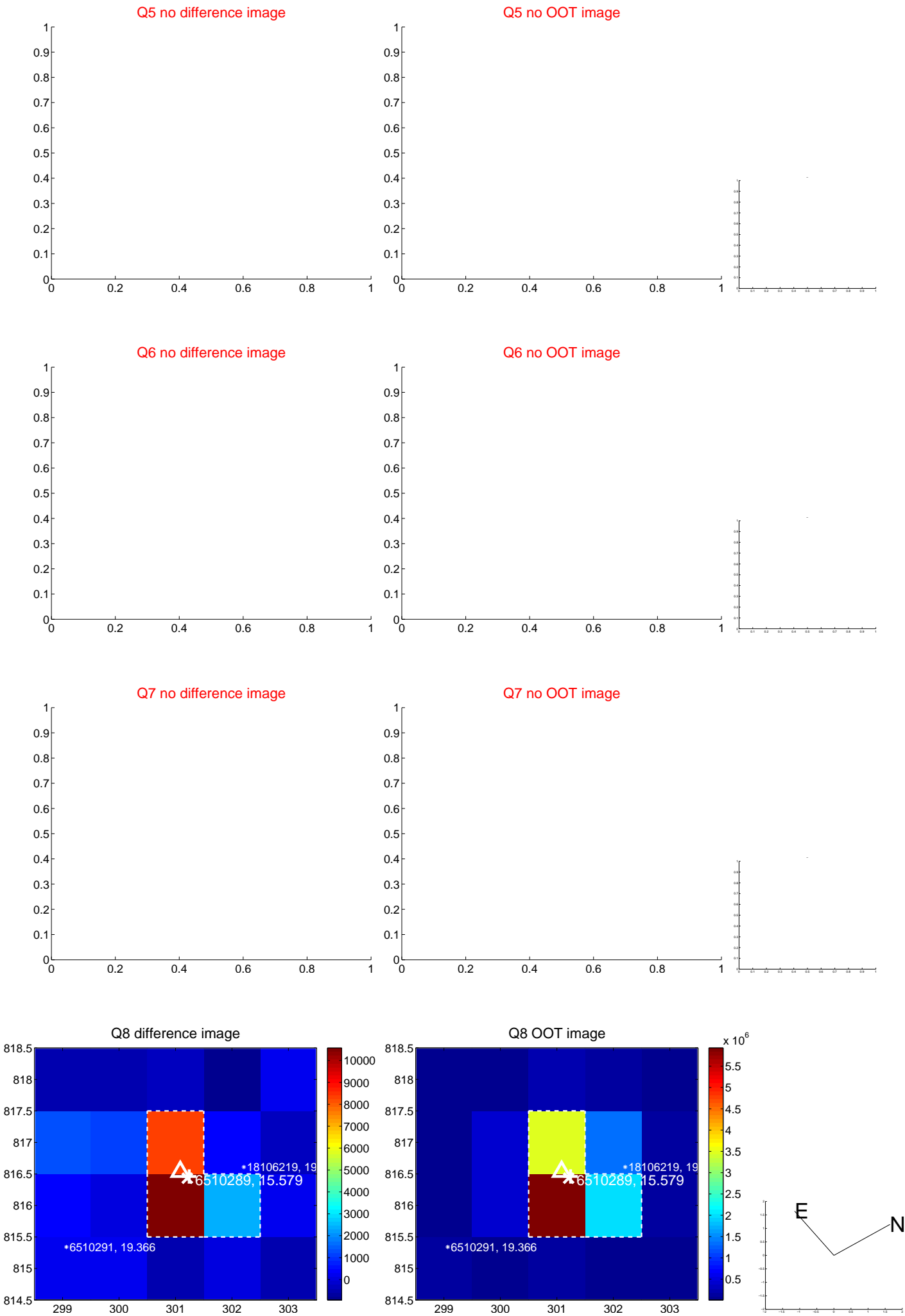


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



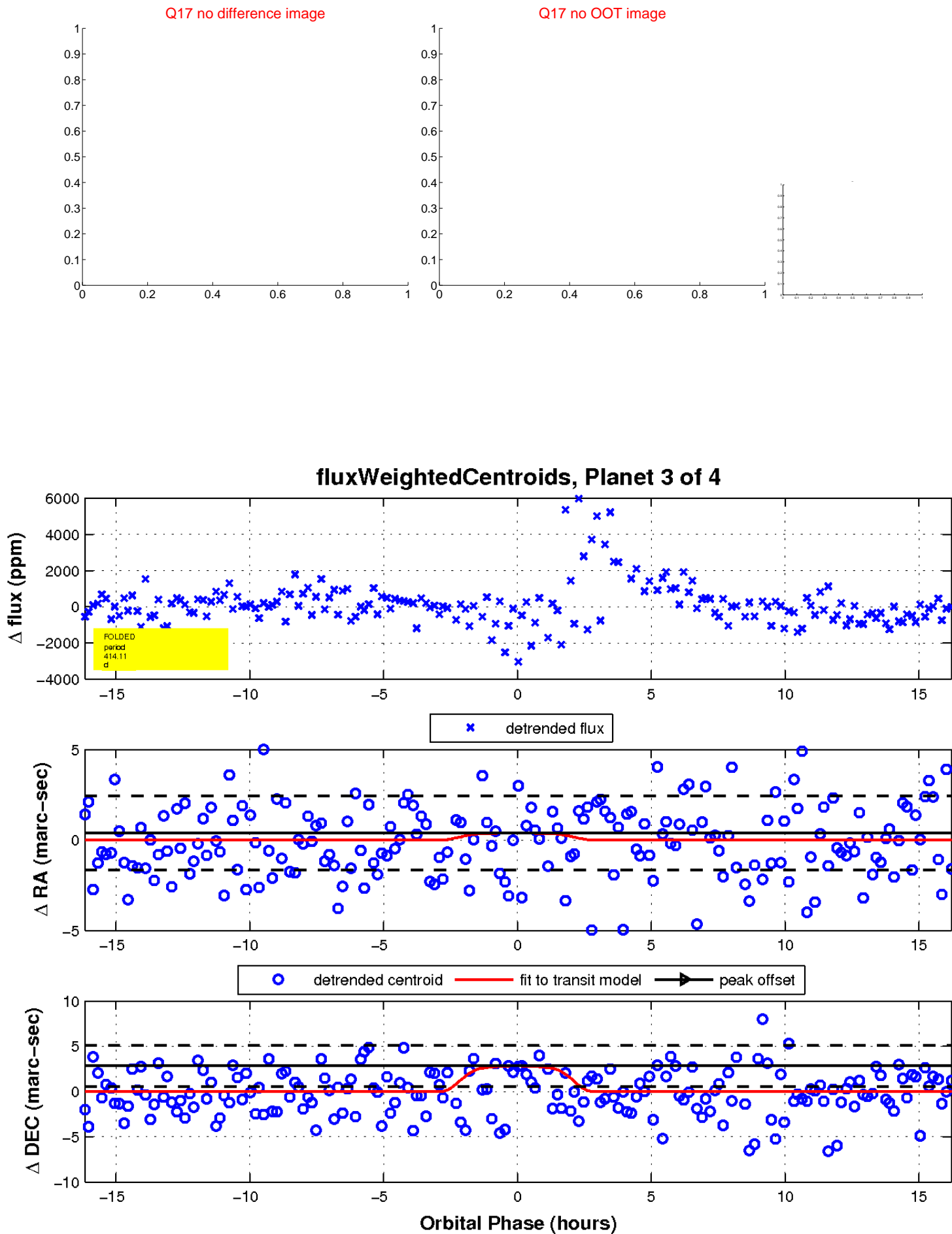
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



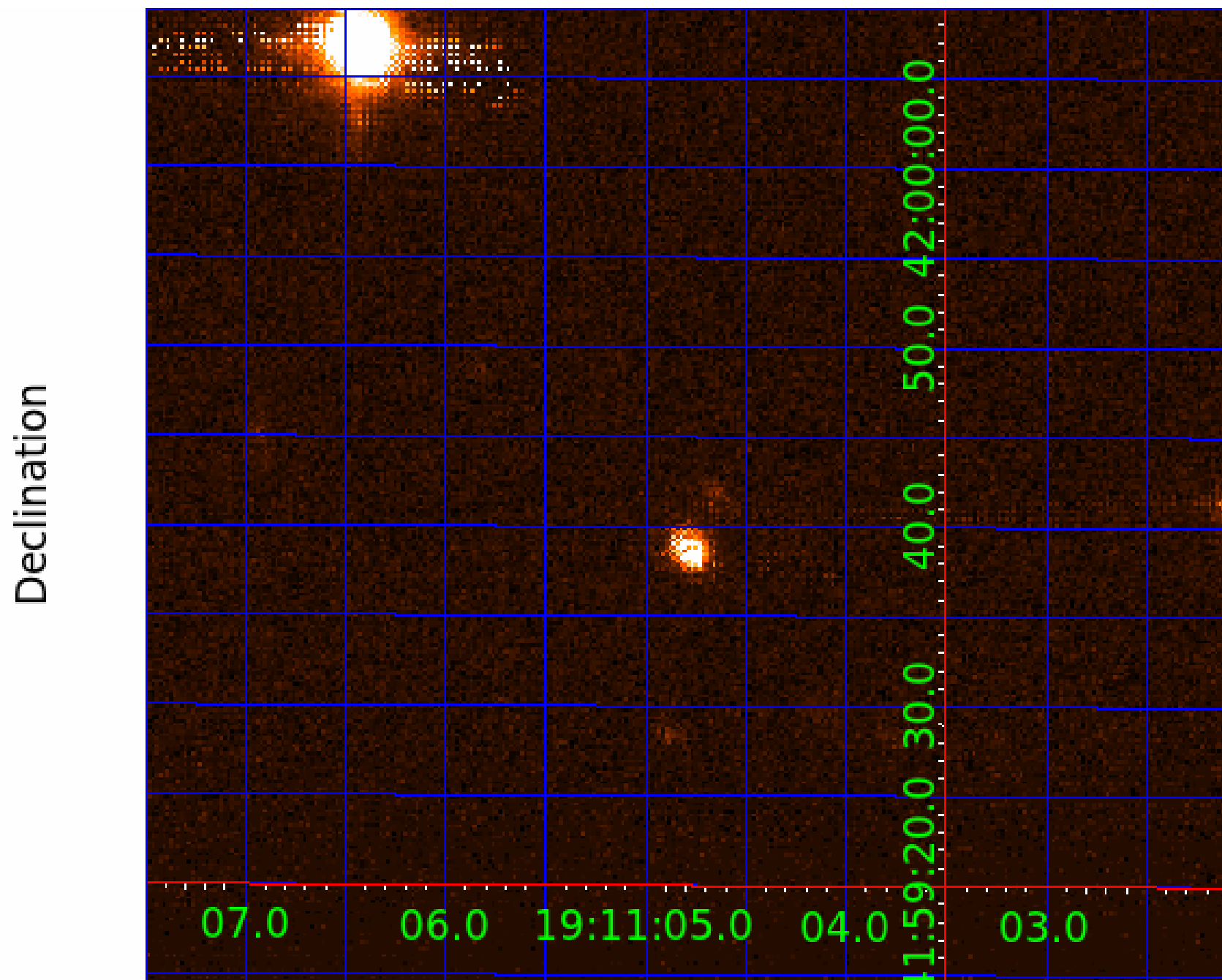
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 006510289

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})
006510289-01	OBS	No	419.469085	380.592781	1704.9	18.018	13.0	6.8	0.76	5293	3.23	0.38
006510289-02	OBS	No	410.829683	431.897264	1500.7	8.407	11.4	7.7	0.76	5293	2.98	0.39
006510289-03	OBS	No	414.114189	368.851346	1505.2	5.425	11.5	6.8	0.76	5293	3.61	0.38
006510289-04	OBS	No	440.804890	303.614486	907.7	3.249	9.2	4.4	0.76	5293	2.35	0.35

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006510289-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
006510289-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006510289-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
006510289-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

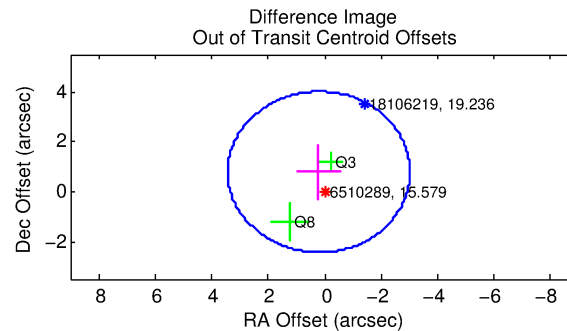
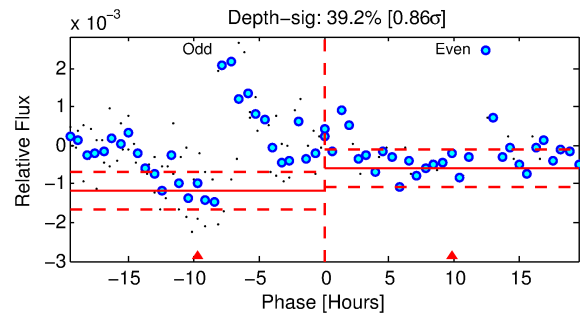
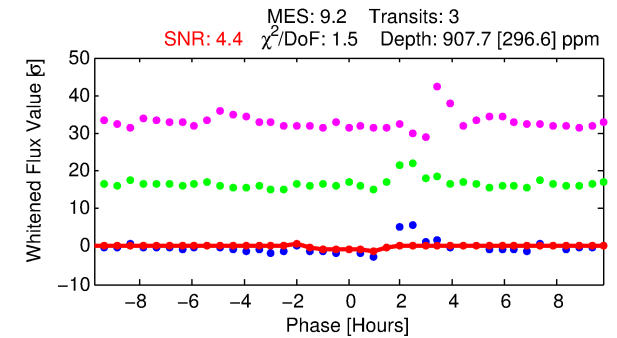
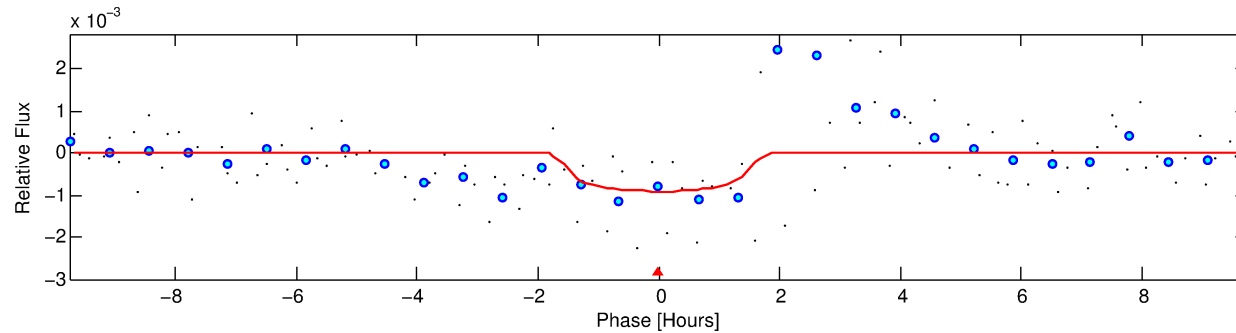
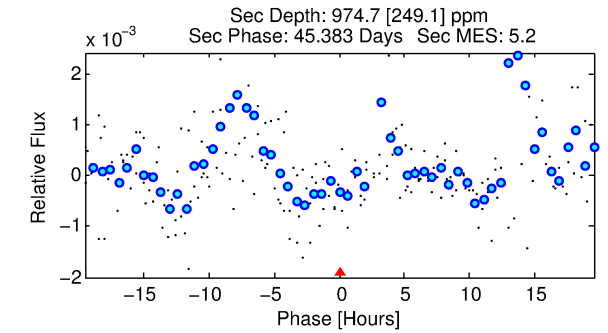
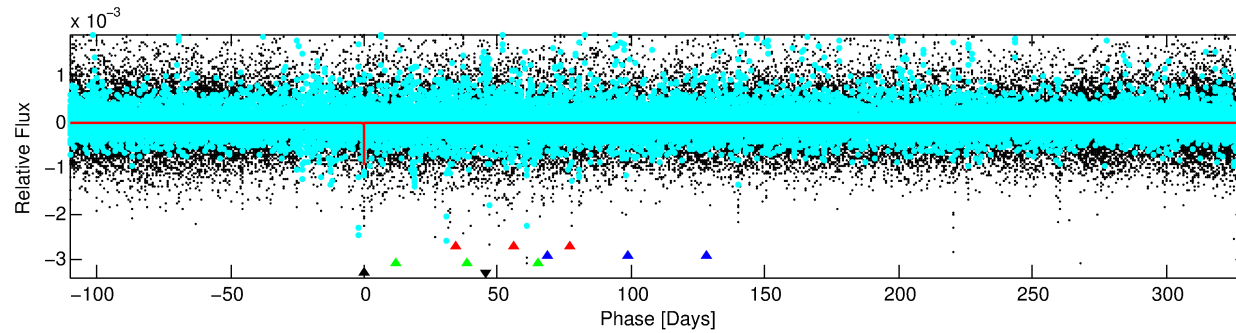
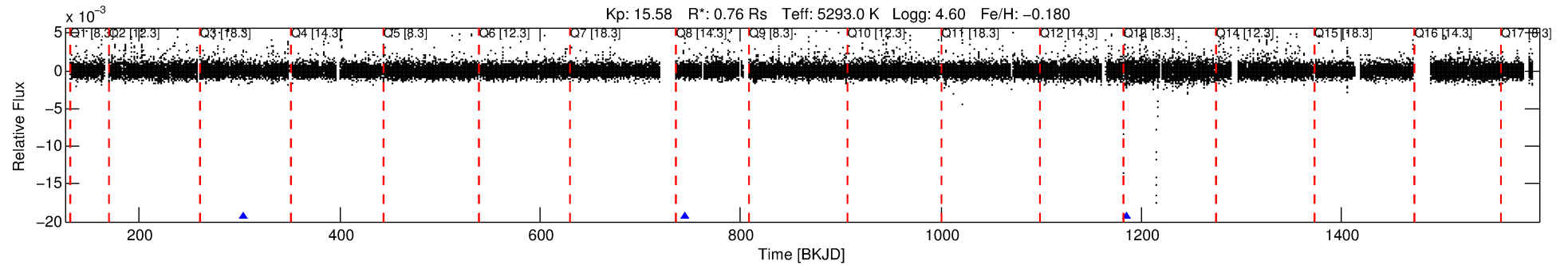
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006510289-04

No Significant Match Found

DV One-Page Summary

KIC: 6510289 Candidate: 4 of 4 Period: 440.805 d



DV Fit Results:

Period = 440.80489 [0.01316] d
Epoch = 303.6145 [0.0170] BKJD
Rp/R* = 0.0285 [0.1108]
a/R* = 877.71 [12976.74]
b = 0.58 [16.97]
Seff = 0.35 [0.08]
Teq = 196 [11] K
Rp = 2.35 [9.15] Re
a = 1.0687 [0.1432] AU
Ag = 110598.99 [860218.57] [0.13 σ]
Teff = 5537 [10765] K [0.50 σ]

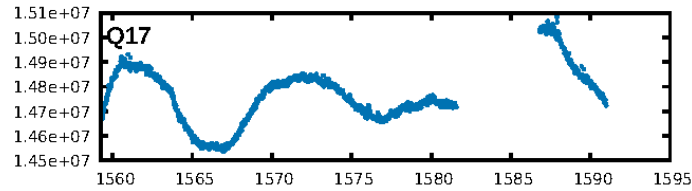
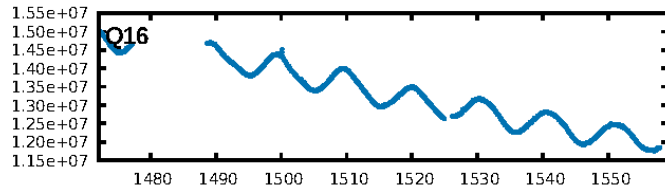
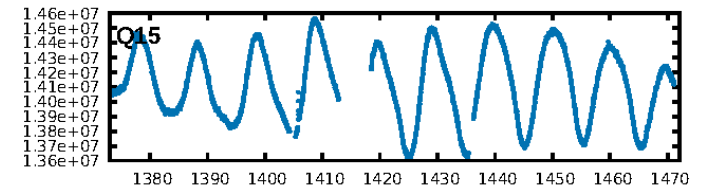
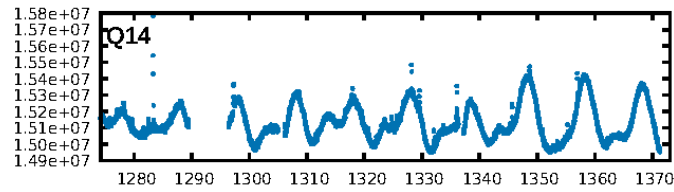
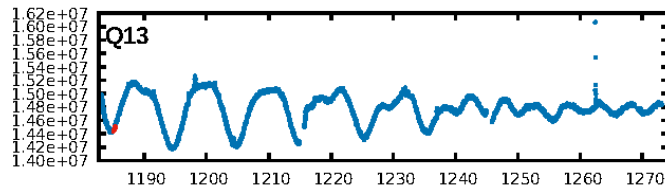
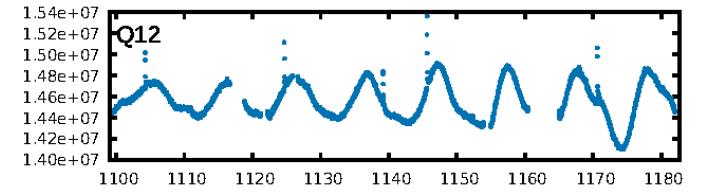
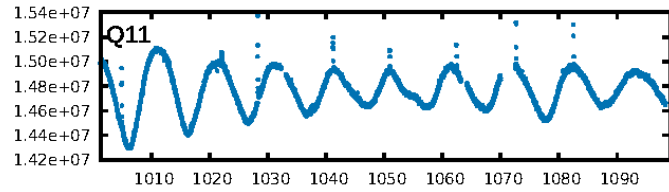
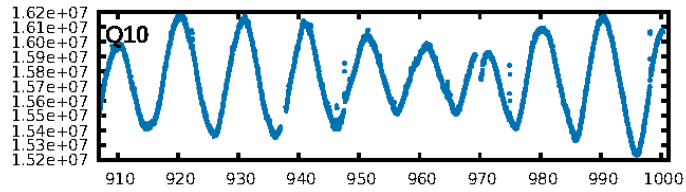
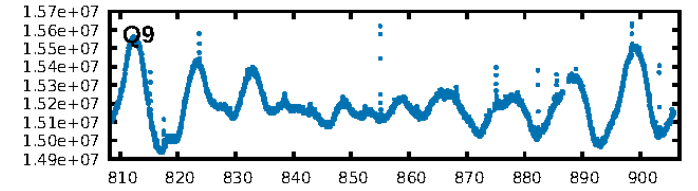
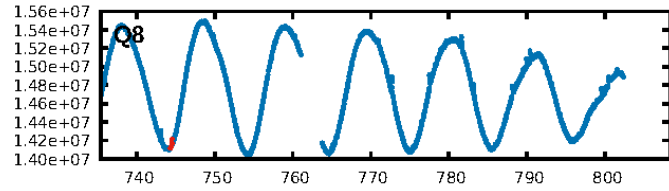
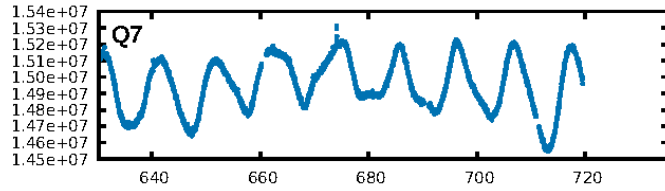
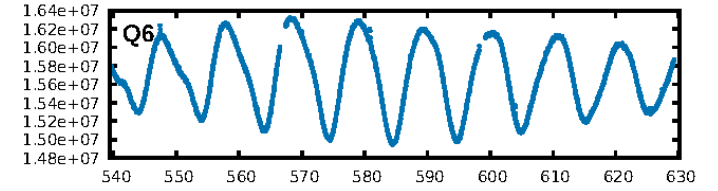
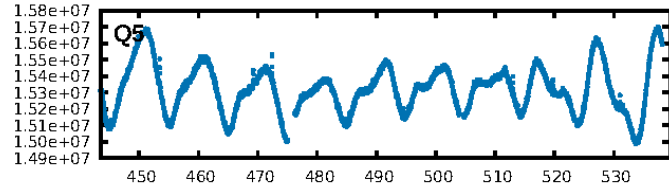
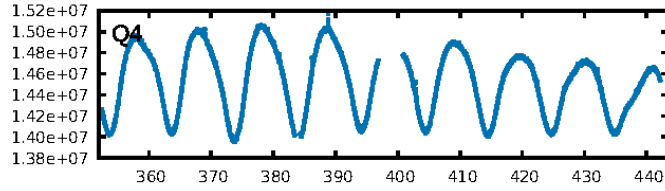
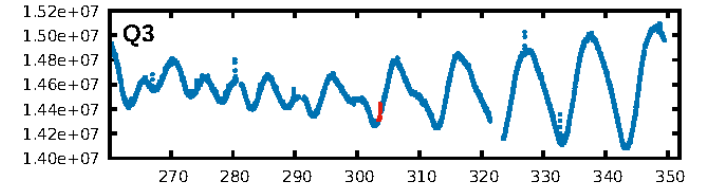
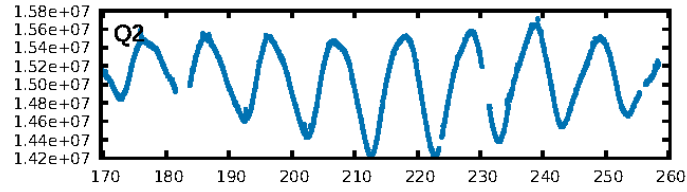
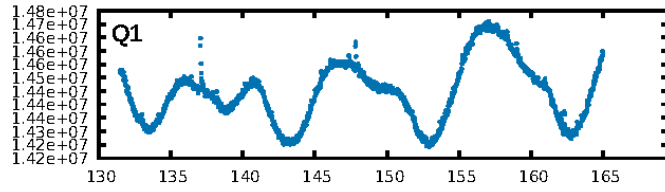
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.97 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 25.0%
ModelChiSquareGof-sig: 89.3%
Bootstrap-pfa: 3.63e-07
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.008866
Centroid-sig: 46.3%
Centroid-so: 1.713 arcsec [0.82 σ]
OotOffset-rm: 0.812 arcsec [0.76 σ]
OotOffset-st: 0/1/1/0 [2]
KicOffset-rm: 0.921 arcsec [0.87 σ]
KicOffset-st: 0/1/1/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

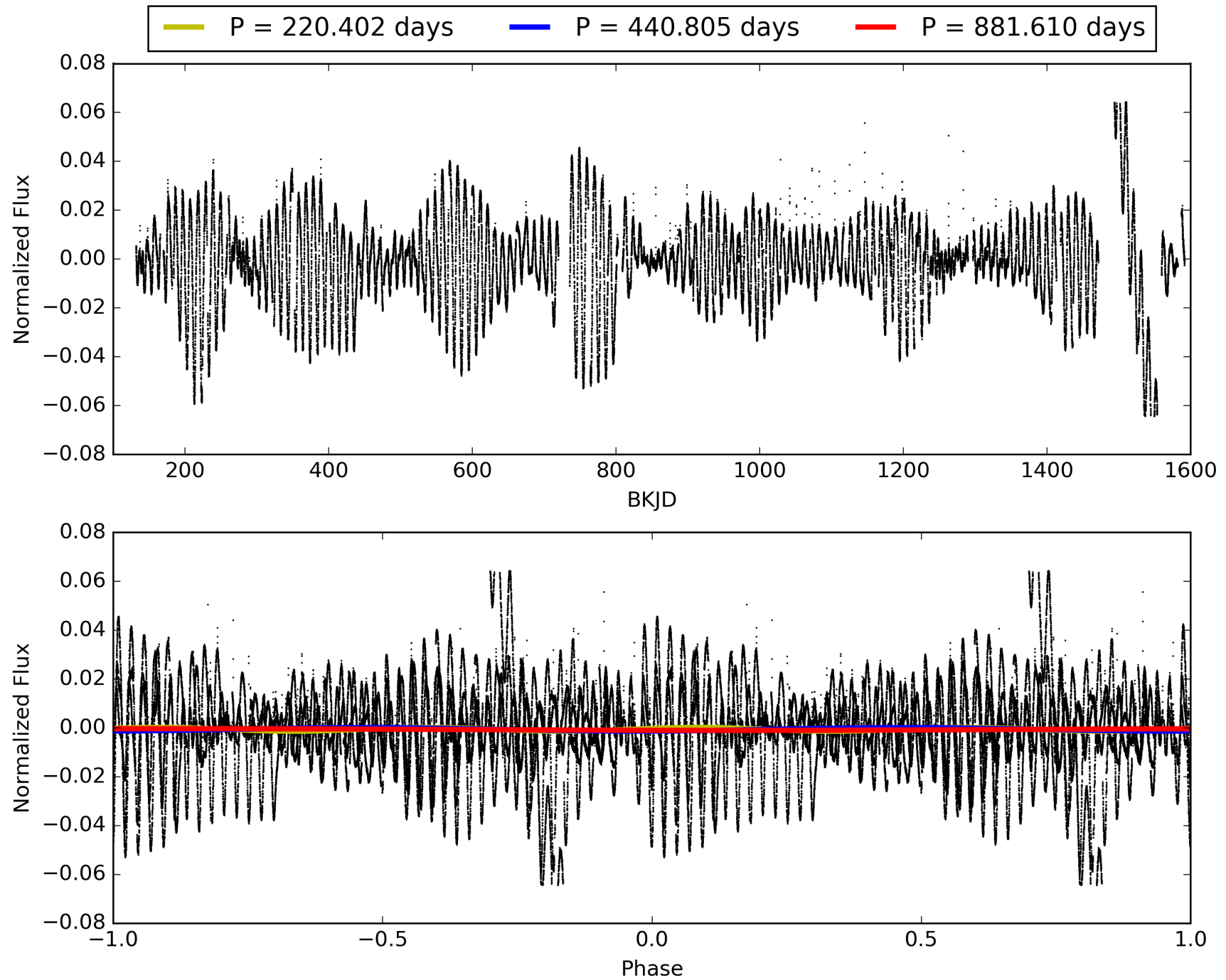
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 21:54:14 Z

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

TCE 006510289-04, PDC Light Curves

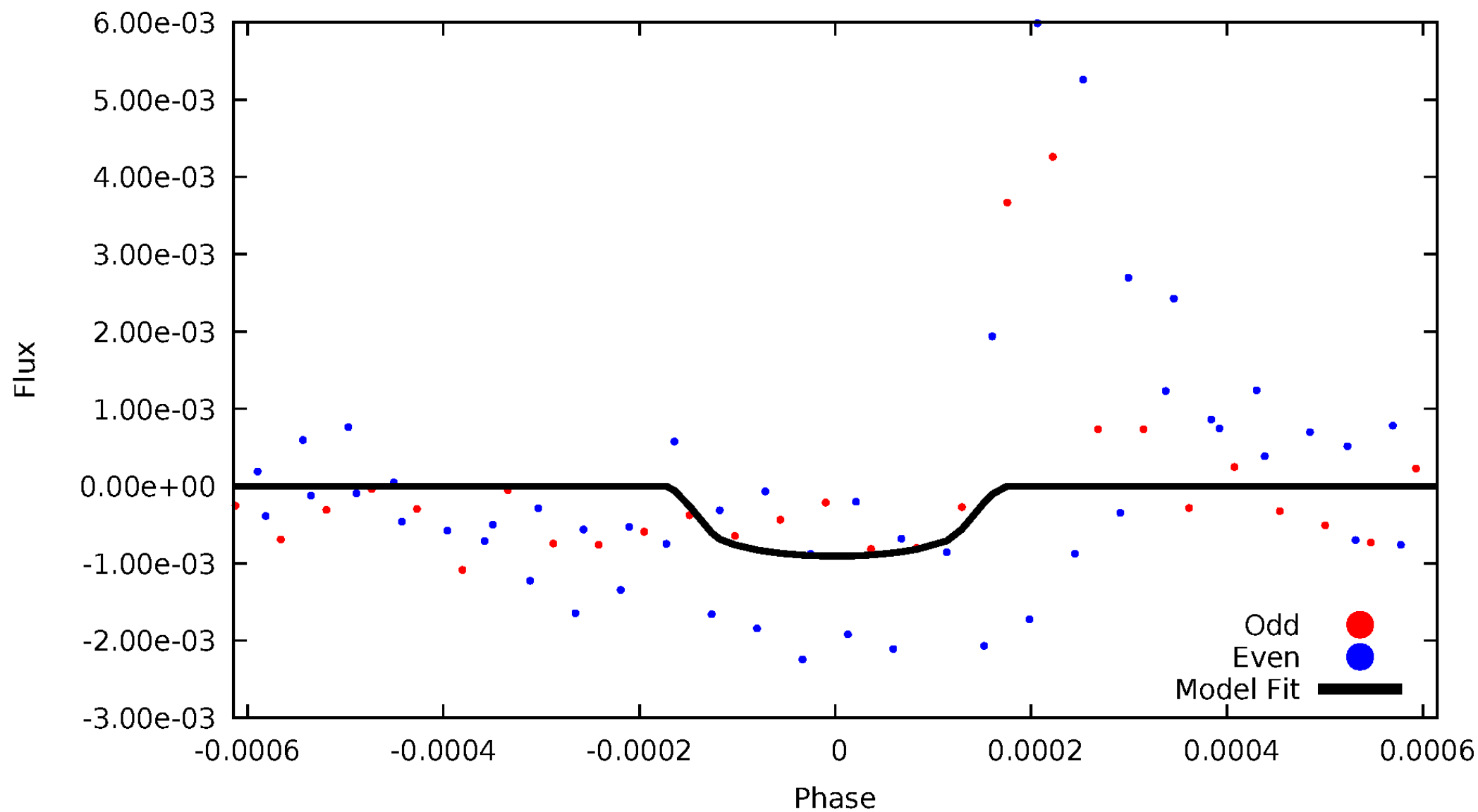


TCE 006510289-04



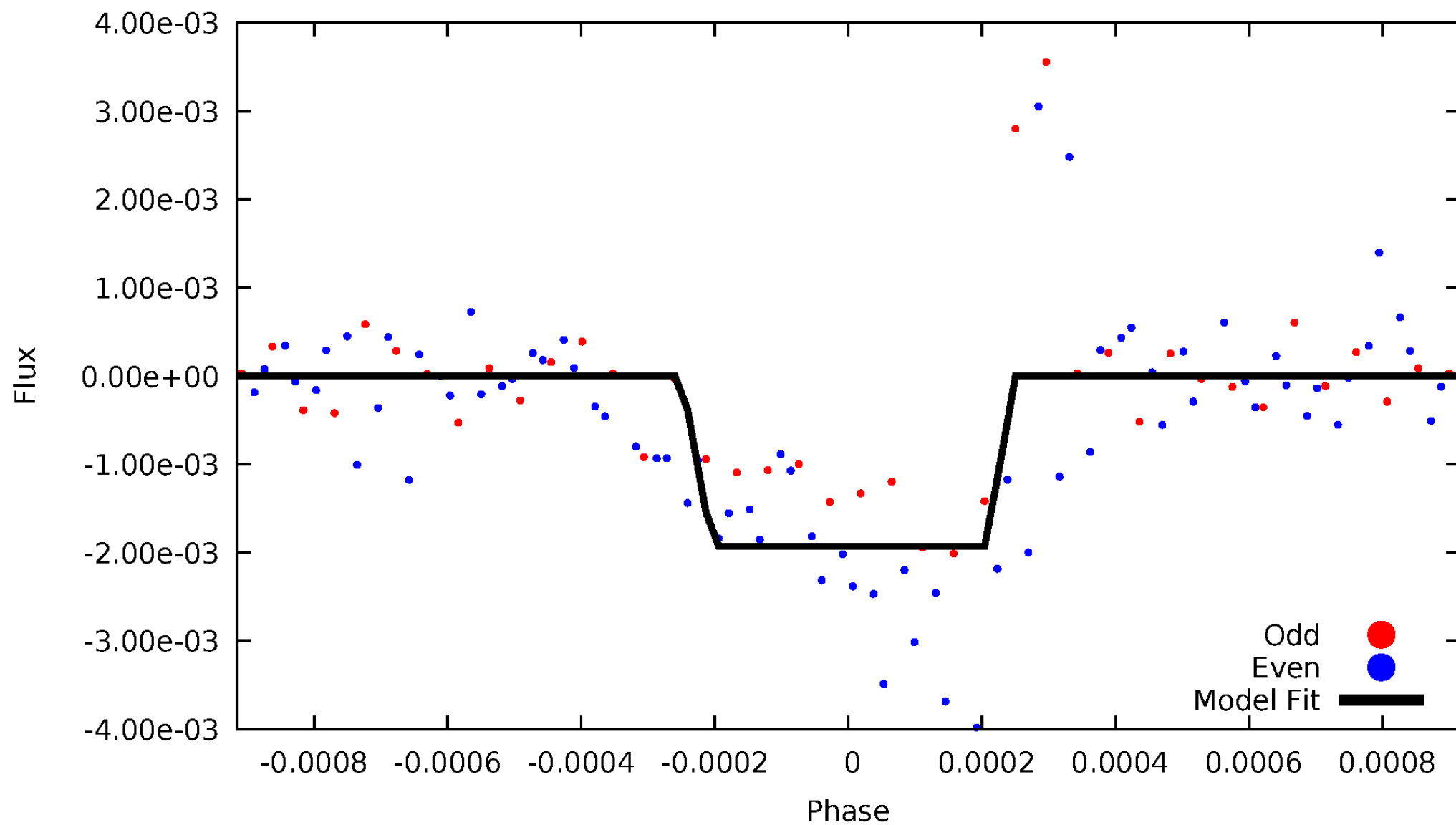
DV Odd/Even

TCE 006510289-04



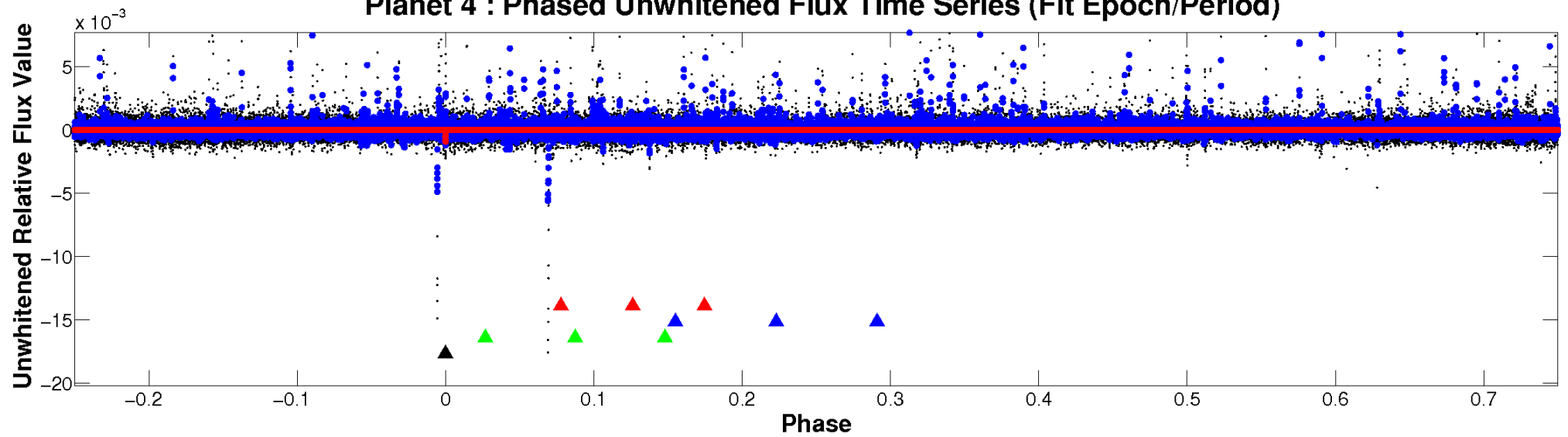
ALT Odd/Even

TCE 006510289-04

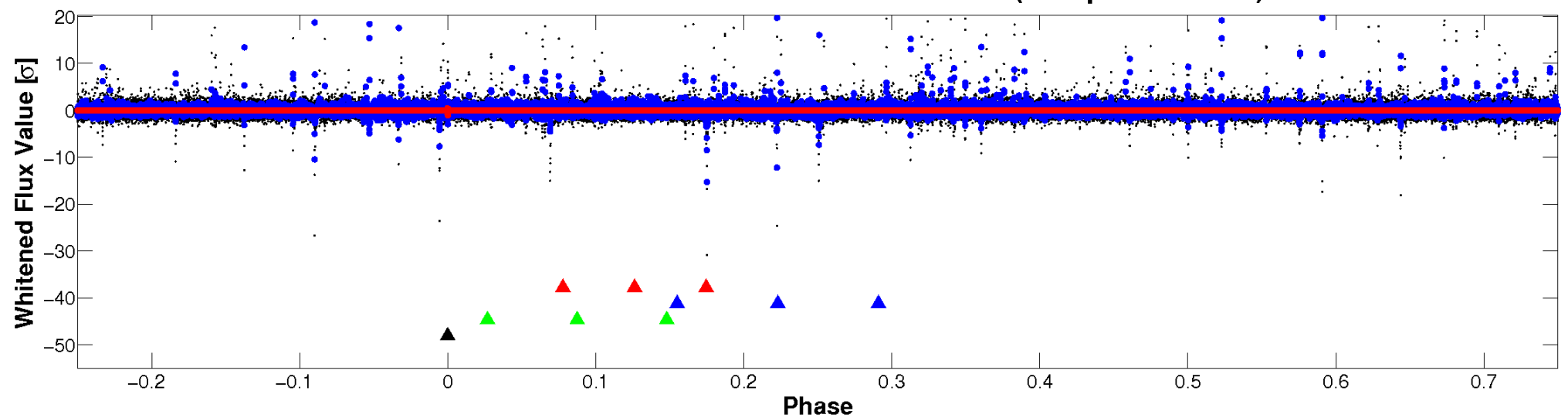


Non-Whitened Vs. Whitened Light Curve

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

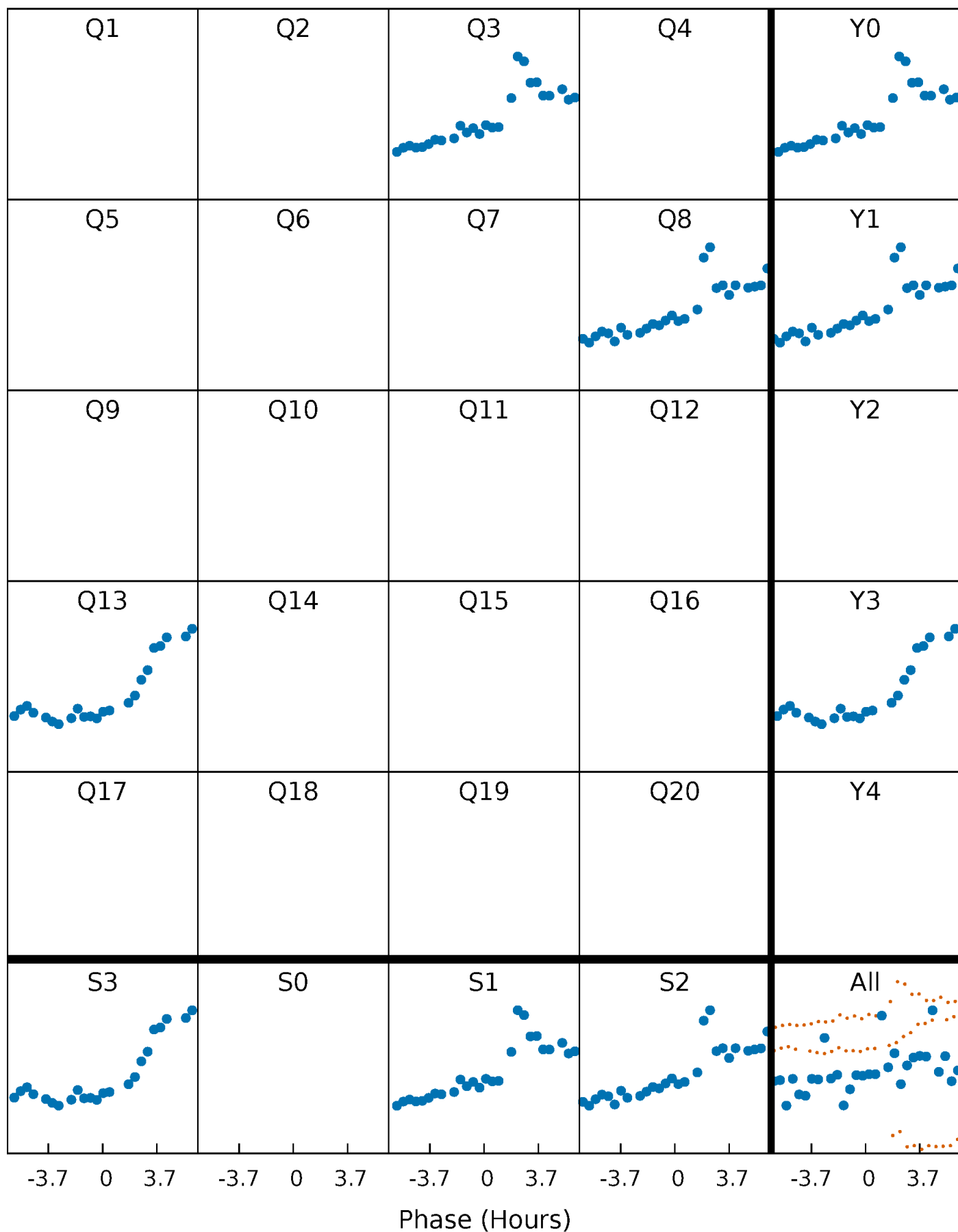


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 006510289-04 $P=440.804890$ Days $T_0=303.614486$ (BKJD)



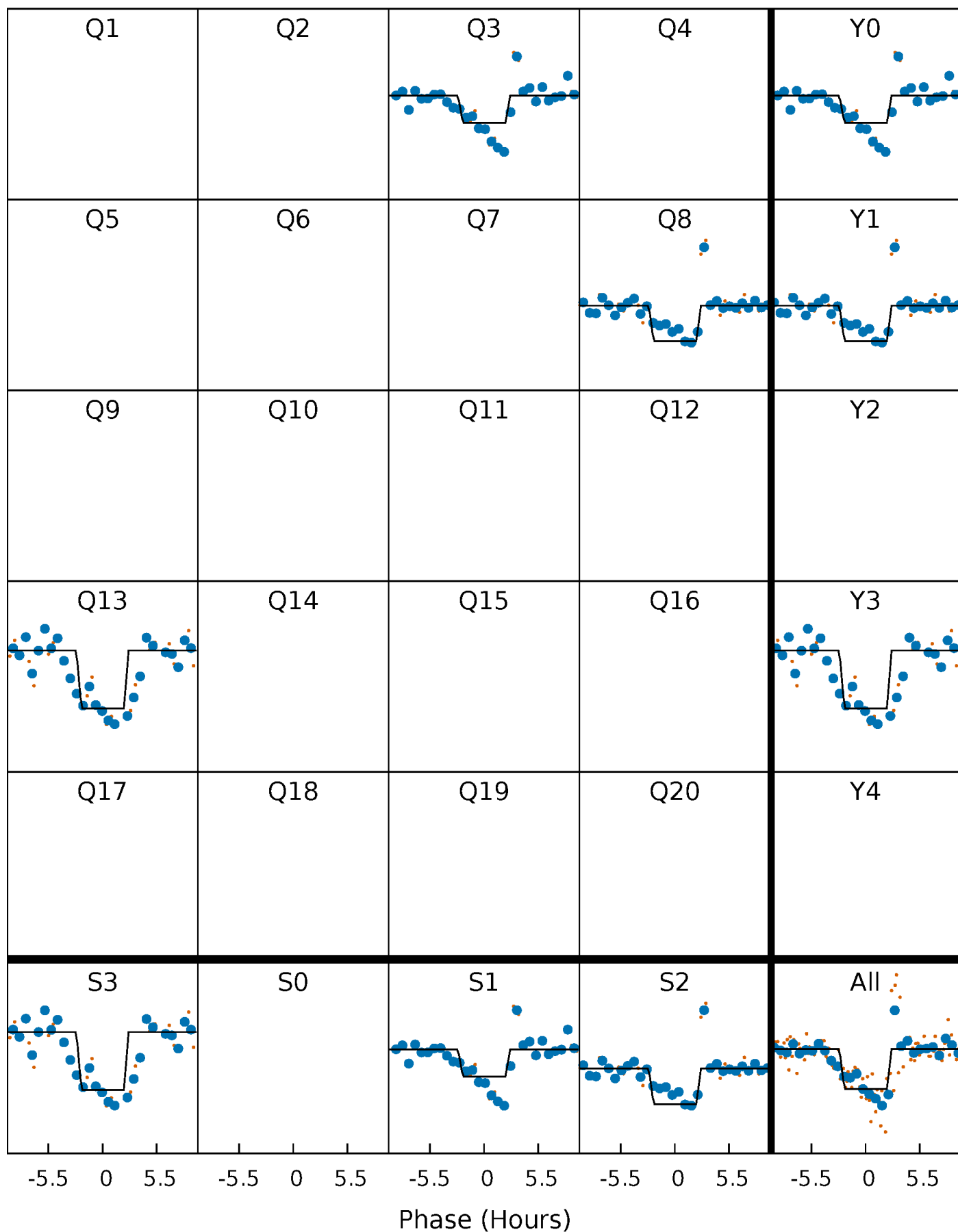
DV Quarter-Phased Transit Curves

TCE 006510289-04 $P=440.804890$ Days $T_0=303.614486$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

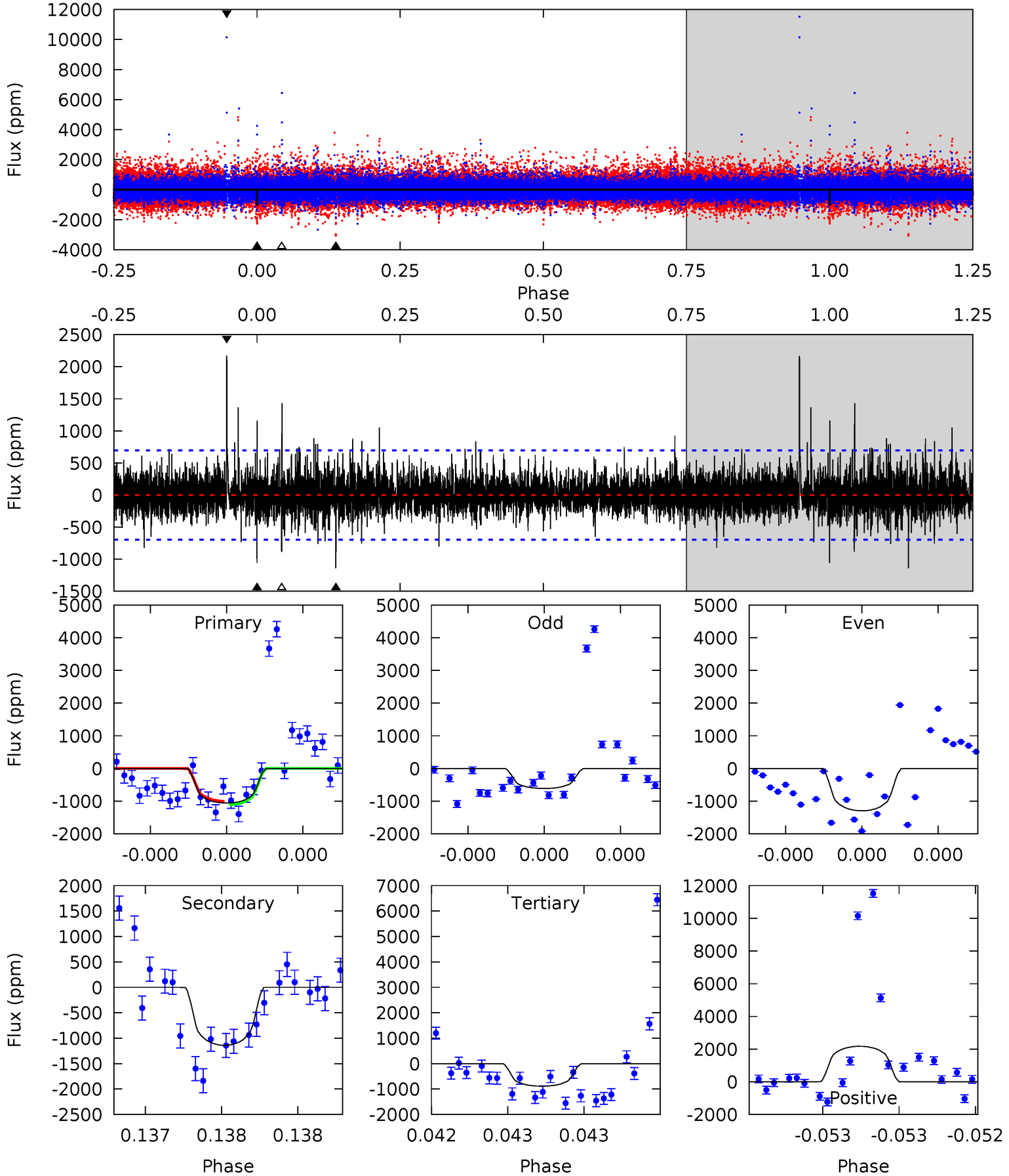
TCE 006510289-04 $P=440.806379$ Days $T_0=303.580101$ (BKJD)



DV Model-Shift Uniqueness Test

006510289-04, P = 440.804890 Days, E = 303.614486 Days

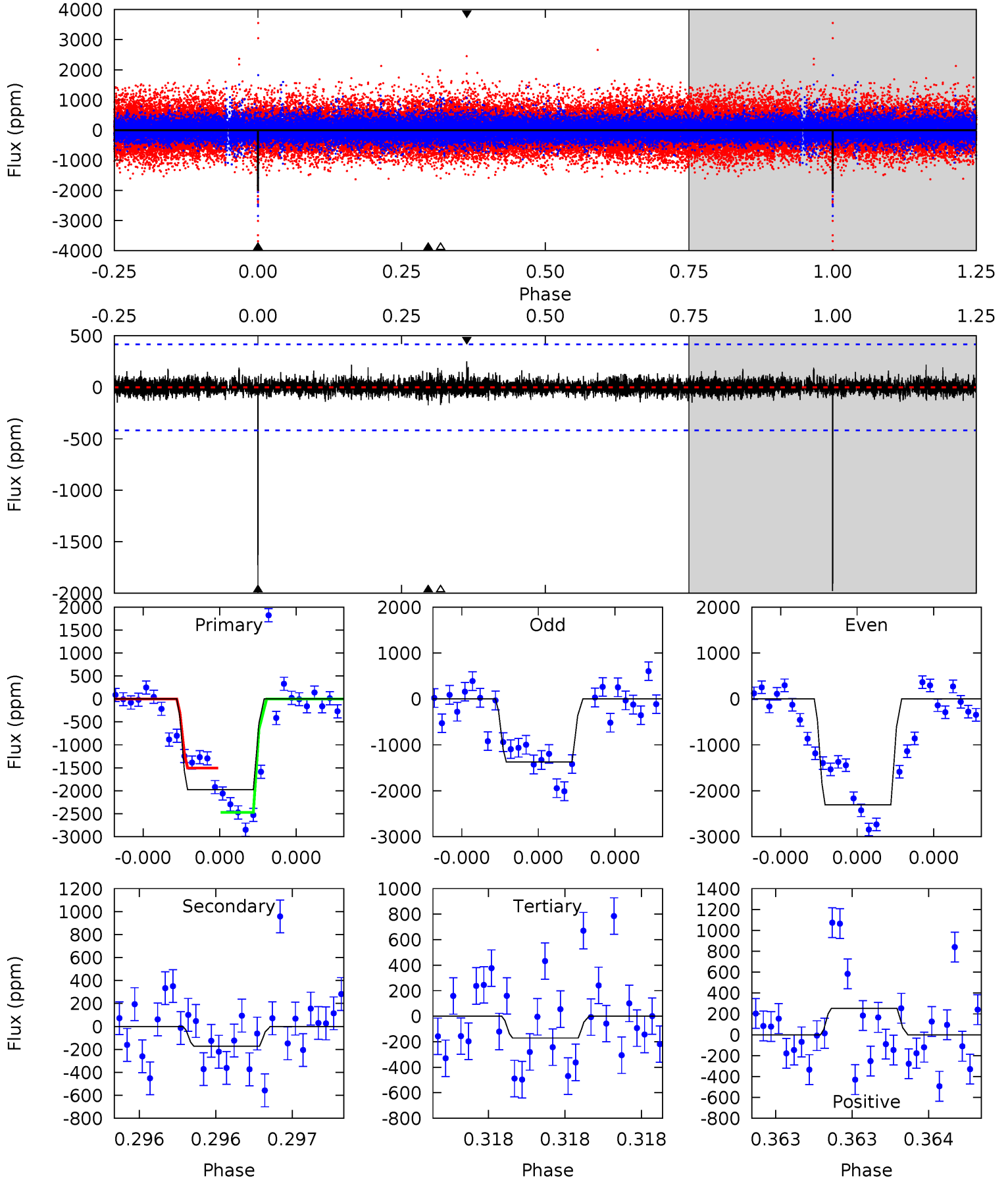
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.57	9.22	7.18	17.6	5.64	3.58	1.56	1.38	-9.01	2.04	-8.36	2.09	1.82	0.66	0.44



Alt Model-Shift Uniqueness Test

006510289-04, P = 440.806379 Days, E = 303.580101 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.5	2.31	2.29	3.37	5.59	3.50	0.53	24.2	23.1	0.02	-1.06	6.00	0.99	0.11	6.50



Stellar Parameters For KIC 006510289

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5293^{+159}_{-143}	$4.604^{+0.032}_{-0.104}$	$-0.180^{+0.300}_{-0.300}$	$0.756^{+0.122}_{-0.066}$	$0.846^{+0.070}_{-0.096}$	$2.765^{+0.500}_{-0.889}$
	+3%/-3%	+1%/-2%	+167%/-167%	+16%/-9%	+8%/-11%	+18%/-32%
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 006510289-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1139 ± 123	$7.63^{+7.91}_{-5.26}$	278^{+13}_{-10}	3635^{+2080}_{-667}	$12283^{+115732}_{-9256}$
Alt.	-172 ± 75	$7.93^{+7.47}_{-5.27}$	279^{+12}_{-10}	2708^{+983}_{-456}	1555^{+11135}_{-1210}

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

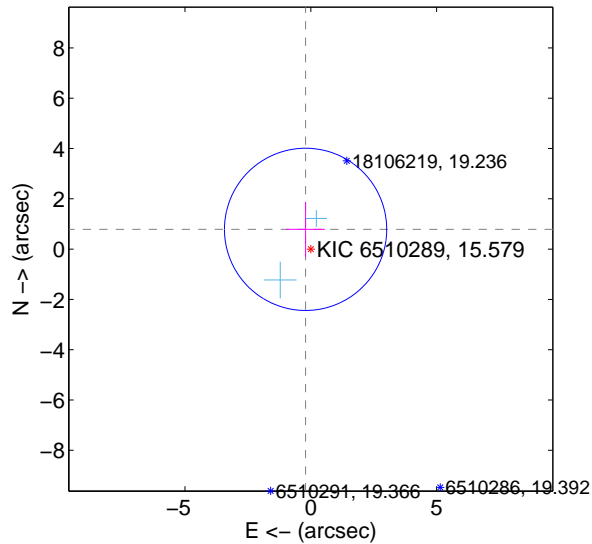
Supplemental centroid analysis for 006510289-04. Kepler magnitude: 15.58. Transit SNR 4.44

There are 2 quarters with good PRF difference image offsets

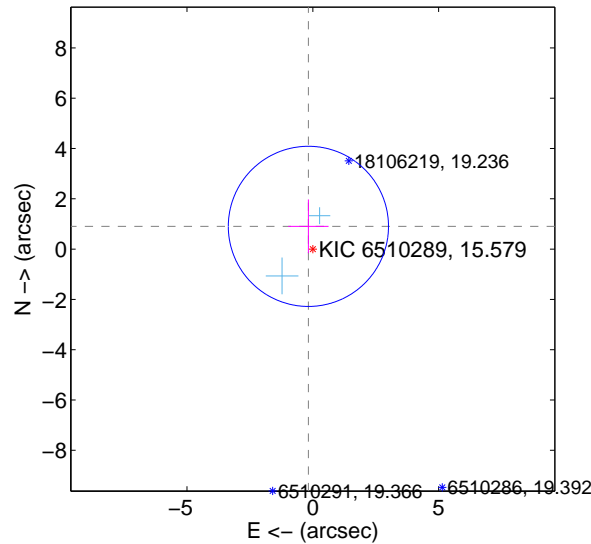
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.812 ± 1.075	0.76	0.206 ± 0.770	0.785 ± 1.093
PRF-fit source offset from KIC position	0.921 ± 1.061	0.87	0.175 ± 0.800	0.904 ± 1.070
photometric centroid source offset	1.71 ± 2.10	0.82	-1.61 ± 2.11	0.60 ± 2.07

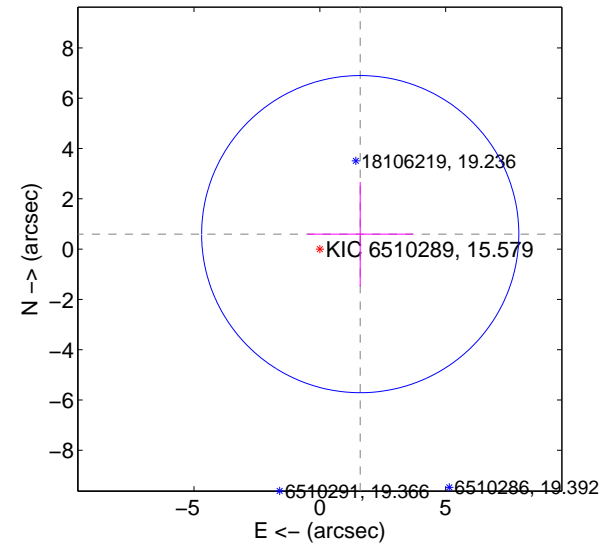
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

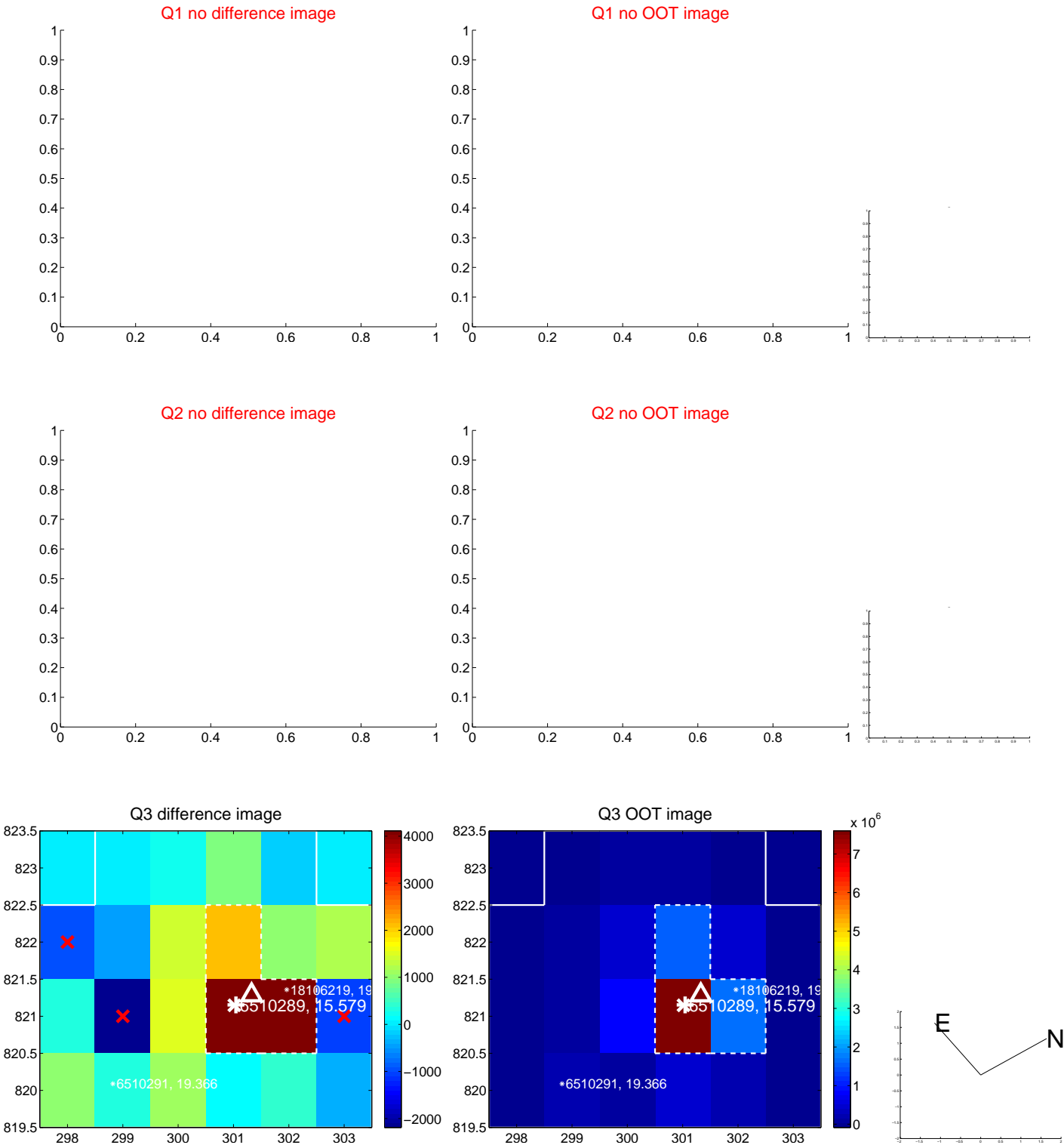


offset from photometric centroids

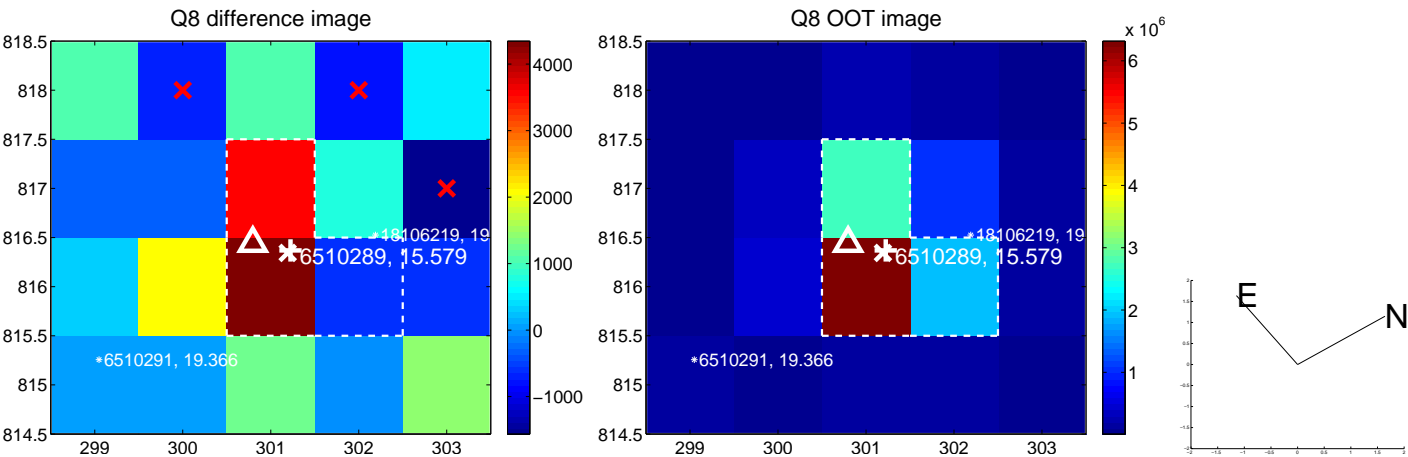


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



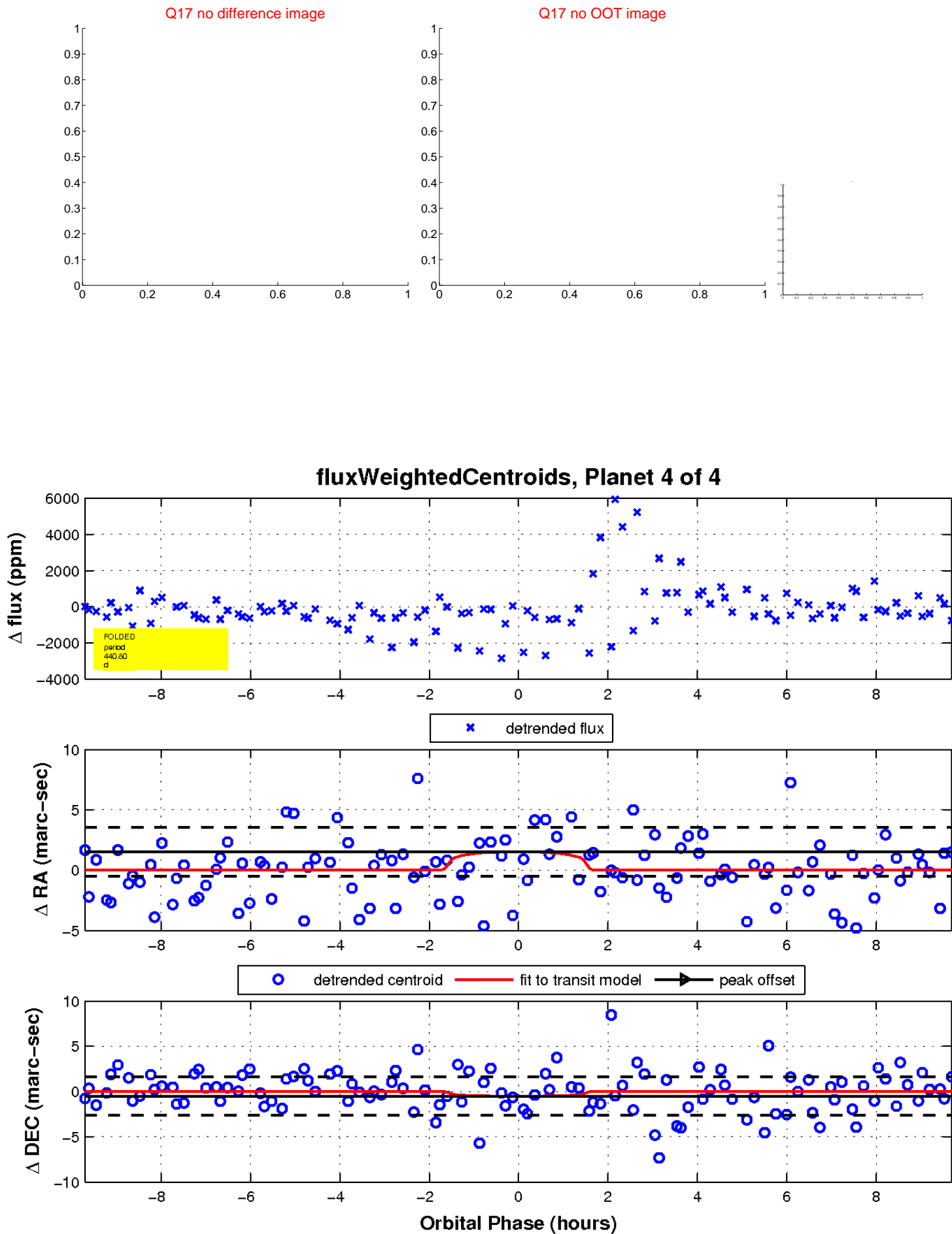
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

