

KIC 009468296

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})
009468296-01	OBS	7176.01	5.748820	132.279533	11470.7	1.910	392.9	314.5	0.75	4961	12.17	96.59
009468296-02	OBS	No	5.748818	135.176764	6313.7	1.898	218.3	203.6	0.75	4961	8.61	96.59
009468296-03	OBS	No	556.221177	459.155108	1371.3	7.996	11.1	6.6	0.75	4961	2.94	0.22
009468296-04	OBS	No	528.044058	498.654389	1499.4	3.500	11.4	-1.0	0.75	4961	2.83	0.23

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009468296-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009468296-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009468296-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009468296-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

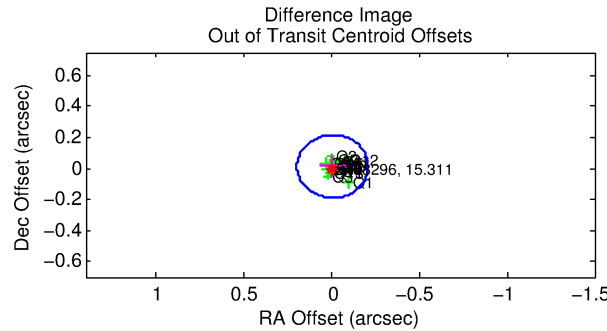
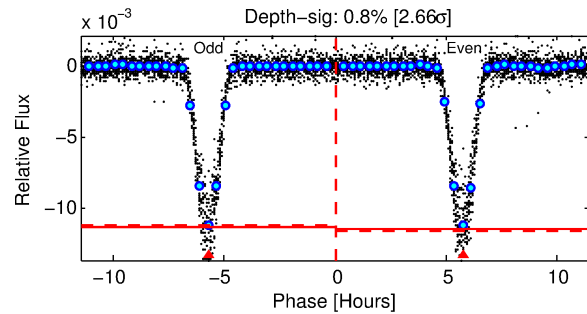
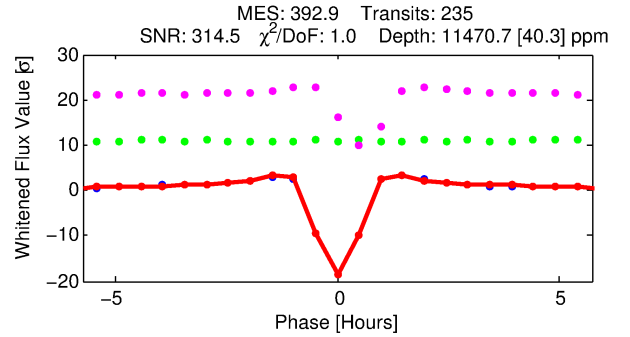
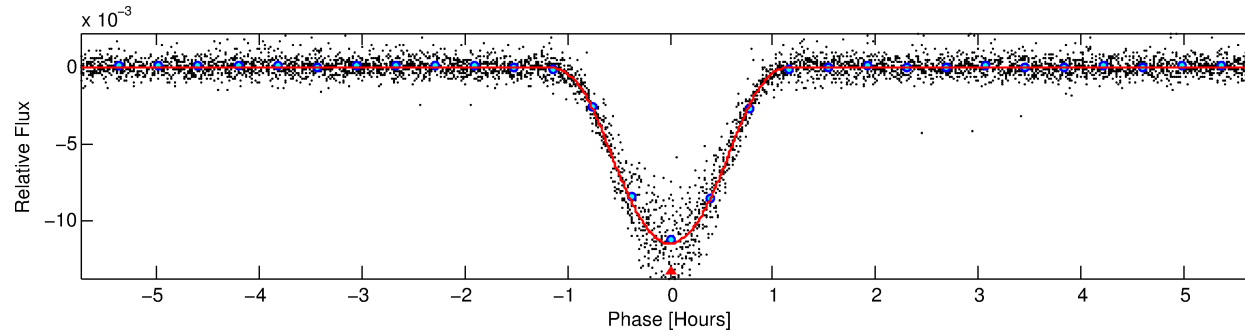
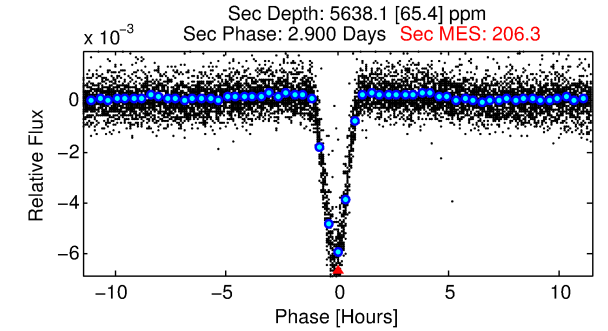
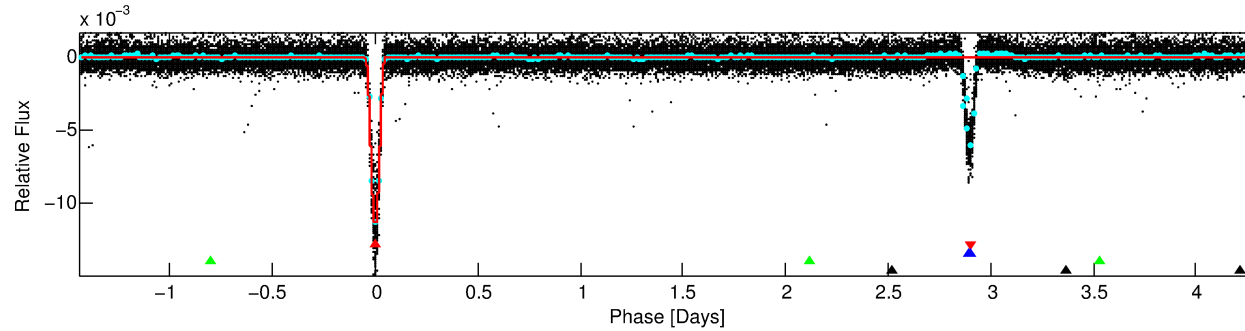
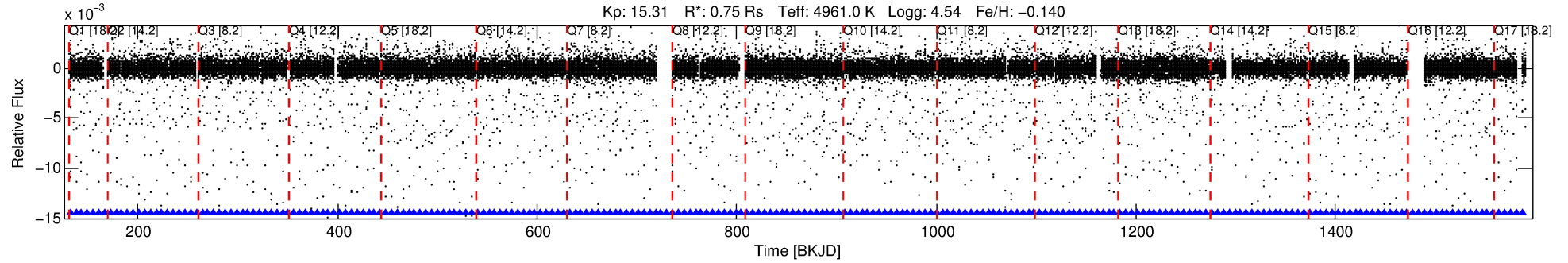
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009468296-01

No Significant Match Found

DV One-Page Summary

KIC: 9468296 Candidate: 1 of 4 Period: 5.749 d
KOI: K07176.01 Corr: 0.996



DV Fit Results:

Period = 5.74882 [0.00000] d
Epoch = 132.2795 [0.0001] BKJD
Rp/R* = 0.1482 [0.0139]
a/R* = 15.04 [0.33]
b = 0.94 [0.02]
Seff = 96.59 [17.82]
Teq = 799 [37] K
Rp = 12.17 [1.72] Re
a = 0.0564 [0.0052] AU
Ag = 66.68 [15.61] [4.21σ]
Teffp = 3532 [198] K [13.56σ]

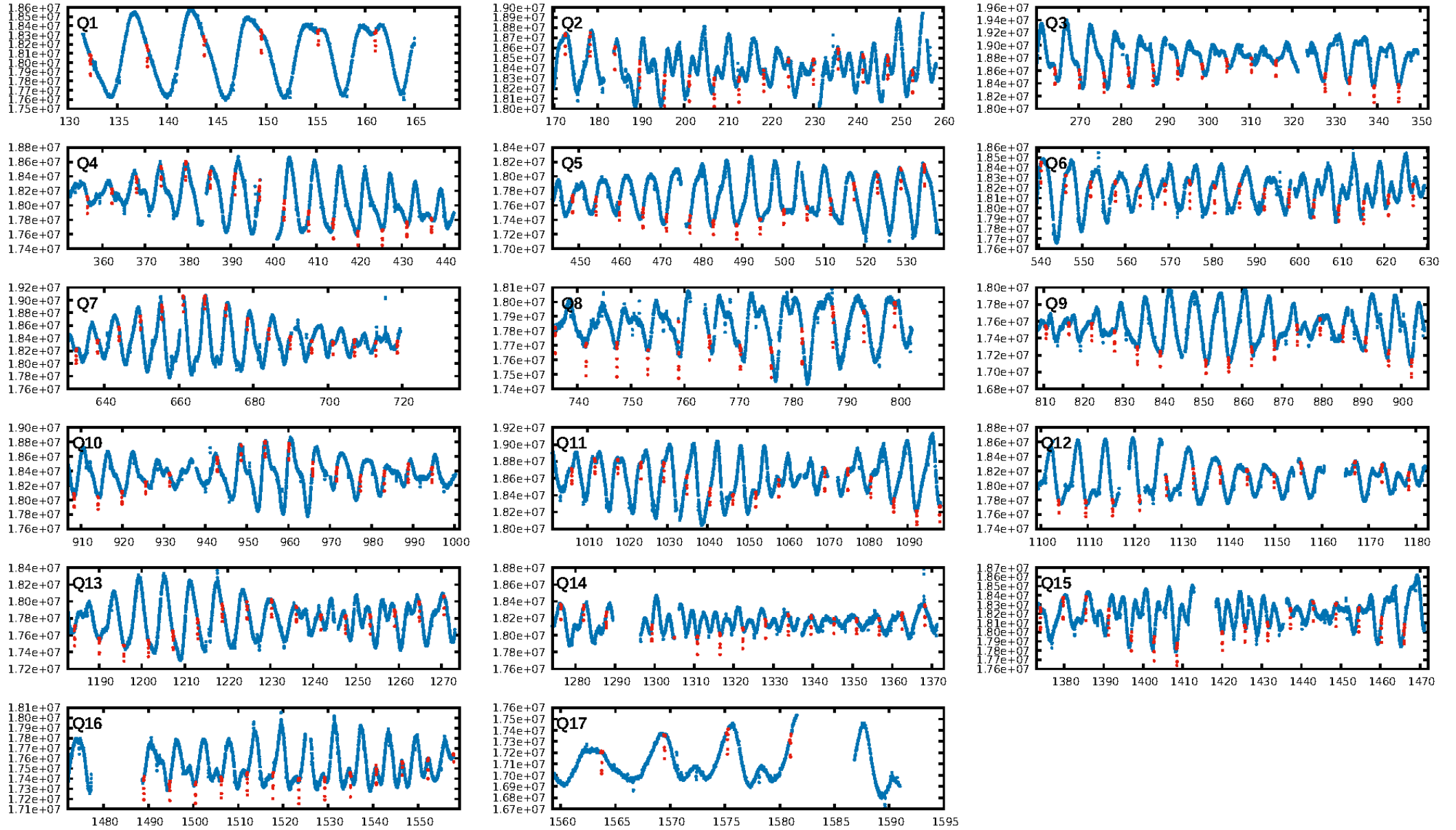
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [3143.89σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [225/225]
GhostDiagnostic-chr: 2.437
Centroid-sig: 0.0%
Centroid-so: 0.109 arcsec [3.86σ]
OotOffset-rm: 0.015 arcsec [0.22σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 0.034 arcsec [0.50σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:54:19 Z

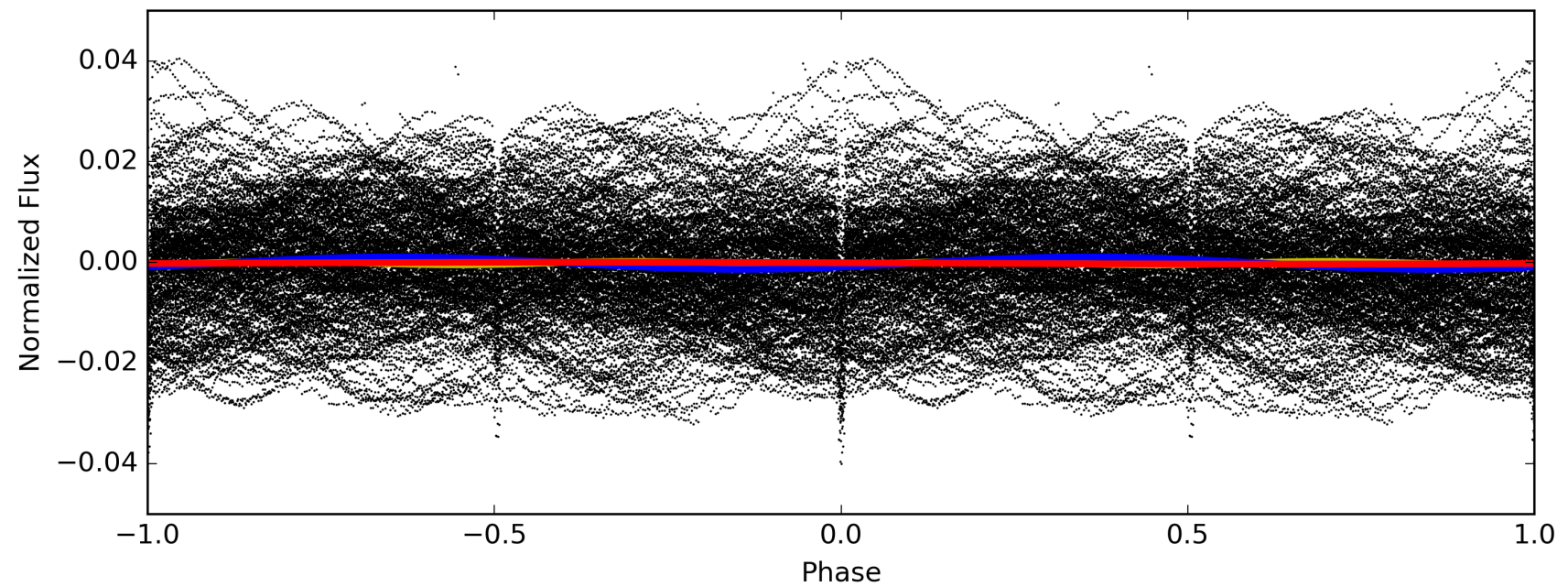
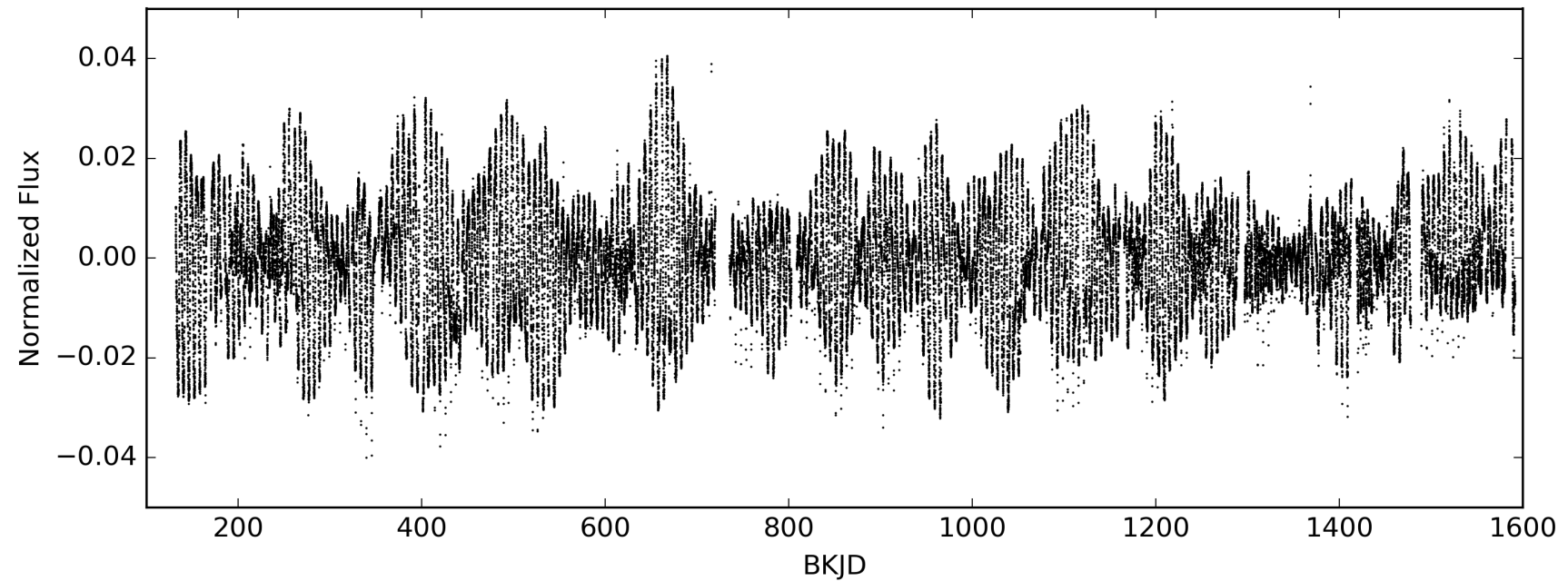
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009468296-01, PDC Light Curves



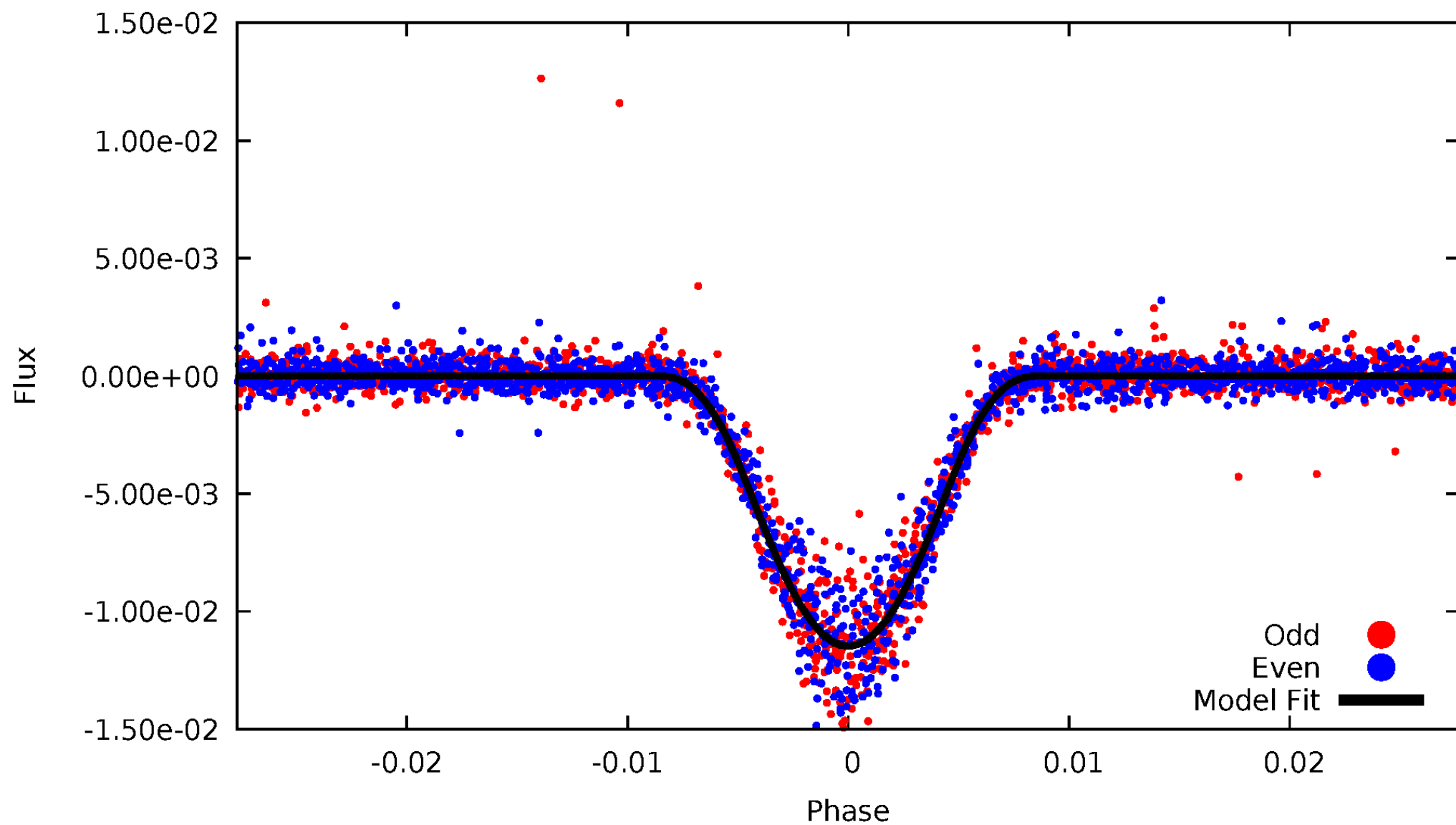
TCE 009468296-01

— P = 2.874 days — P = 5.749 days — P = 11.498 days



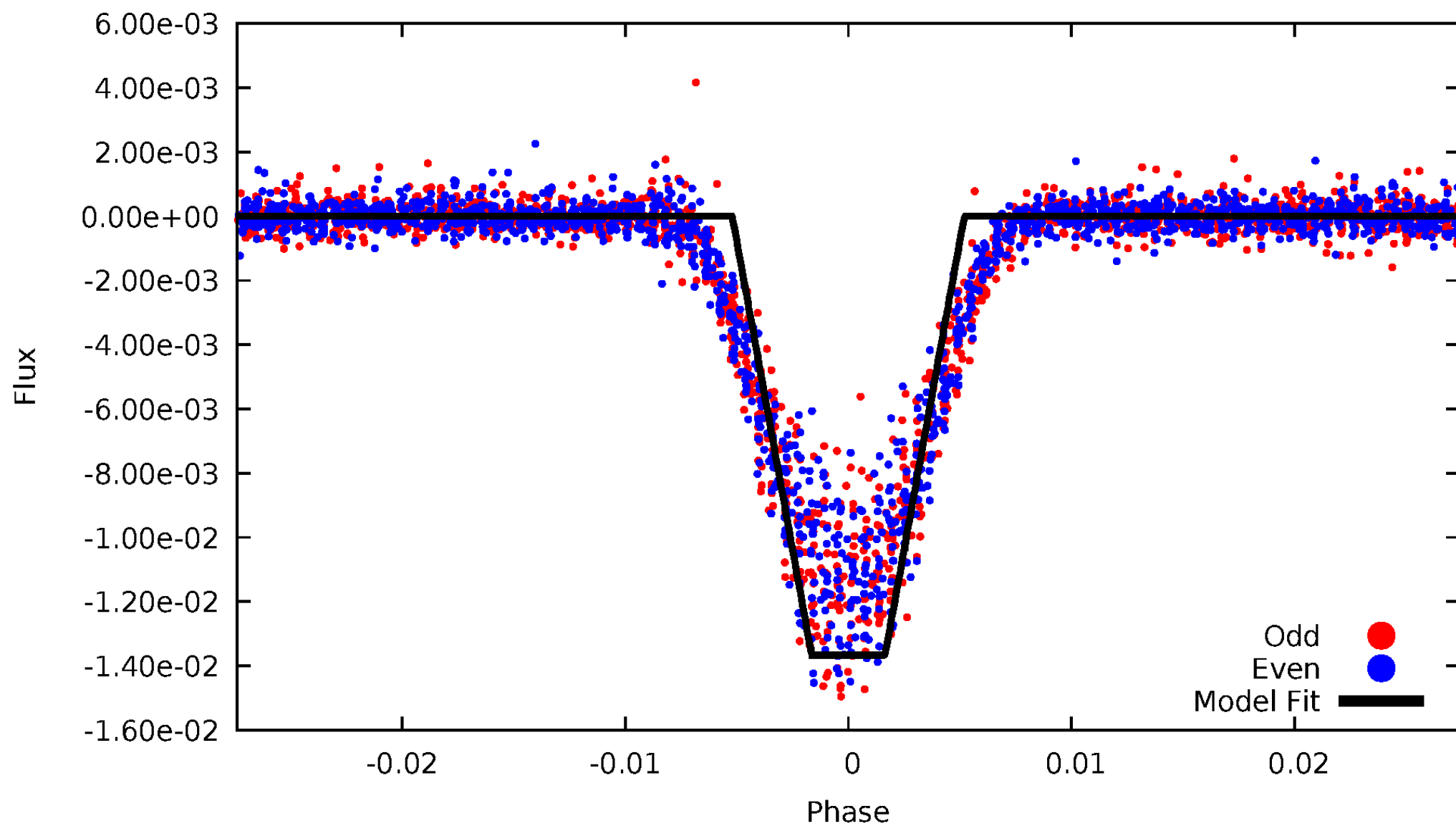
DV Odd/Even

TCE 009468296-01



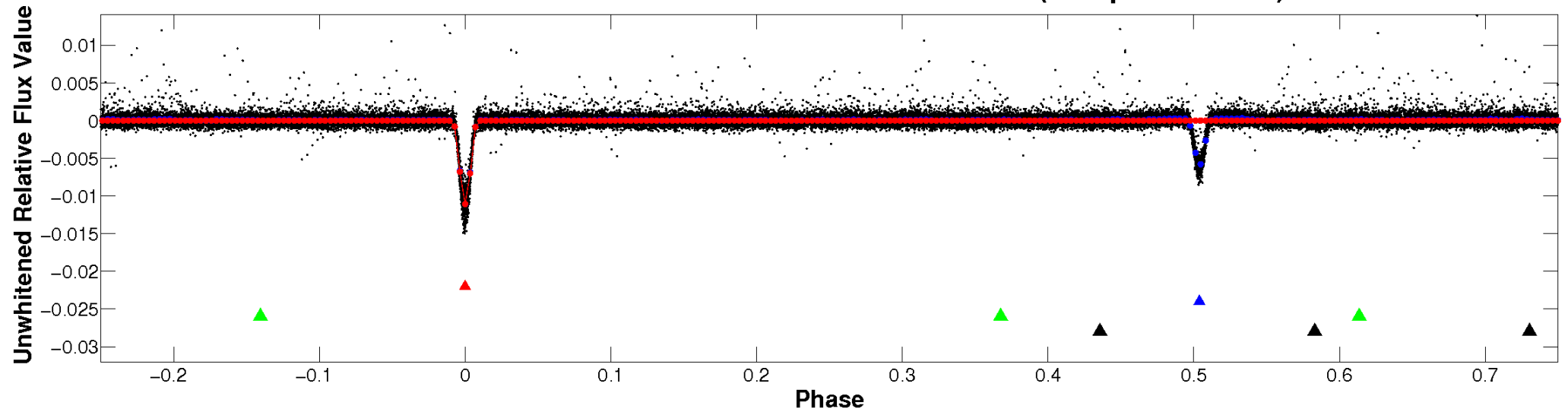
ALT Odd/Even

TCE 009468296-01

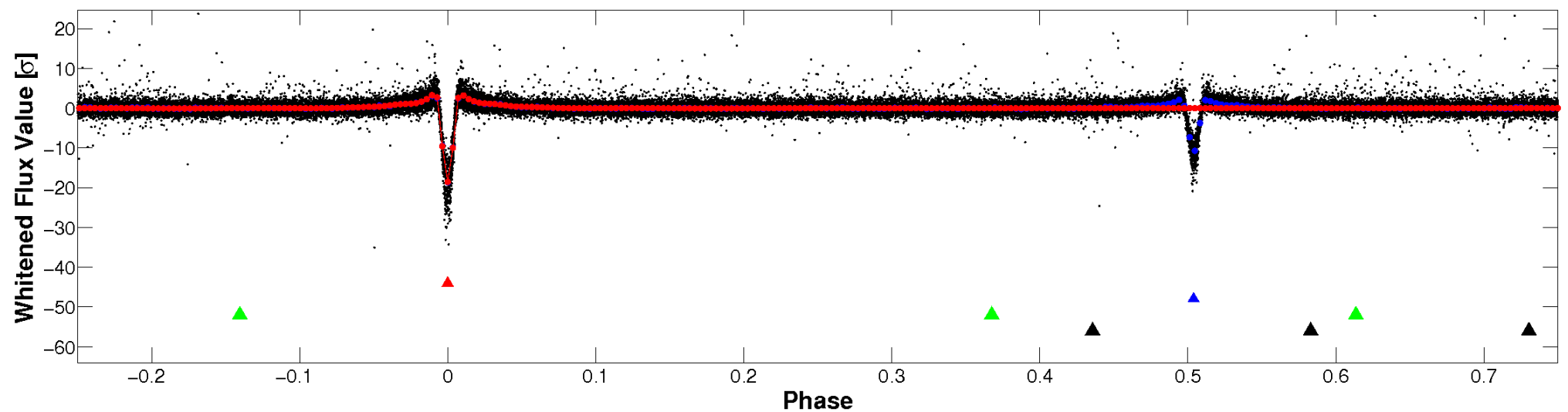


Non-Whitened Vs. Whitened Light Curve

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

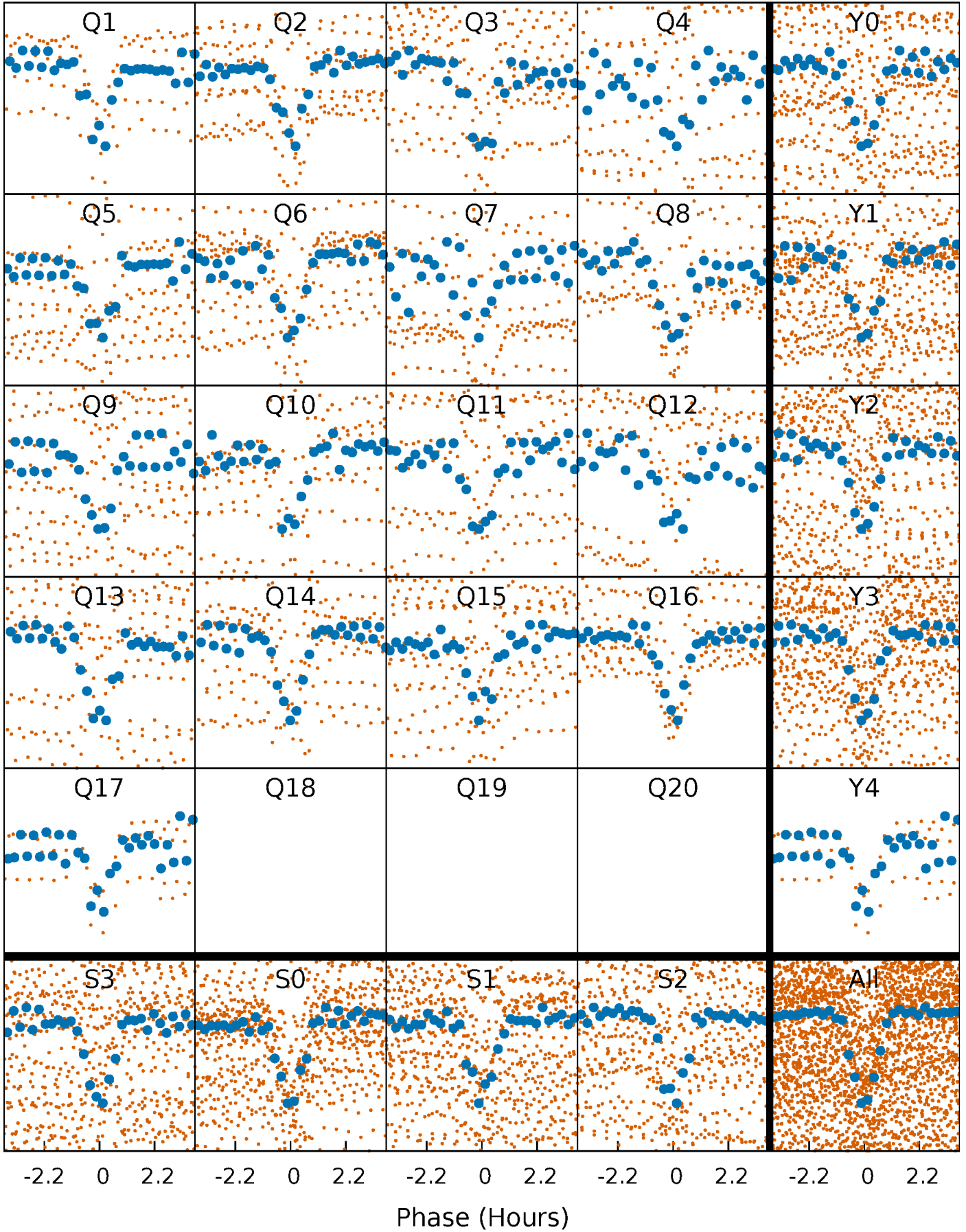


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



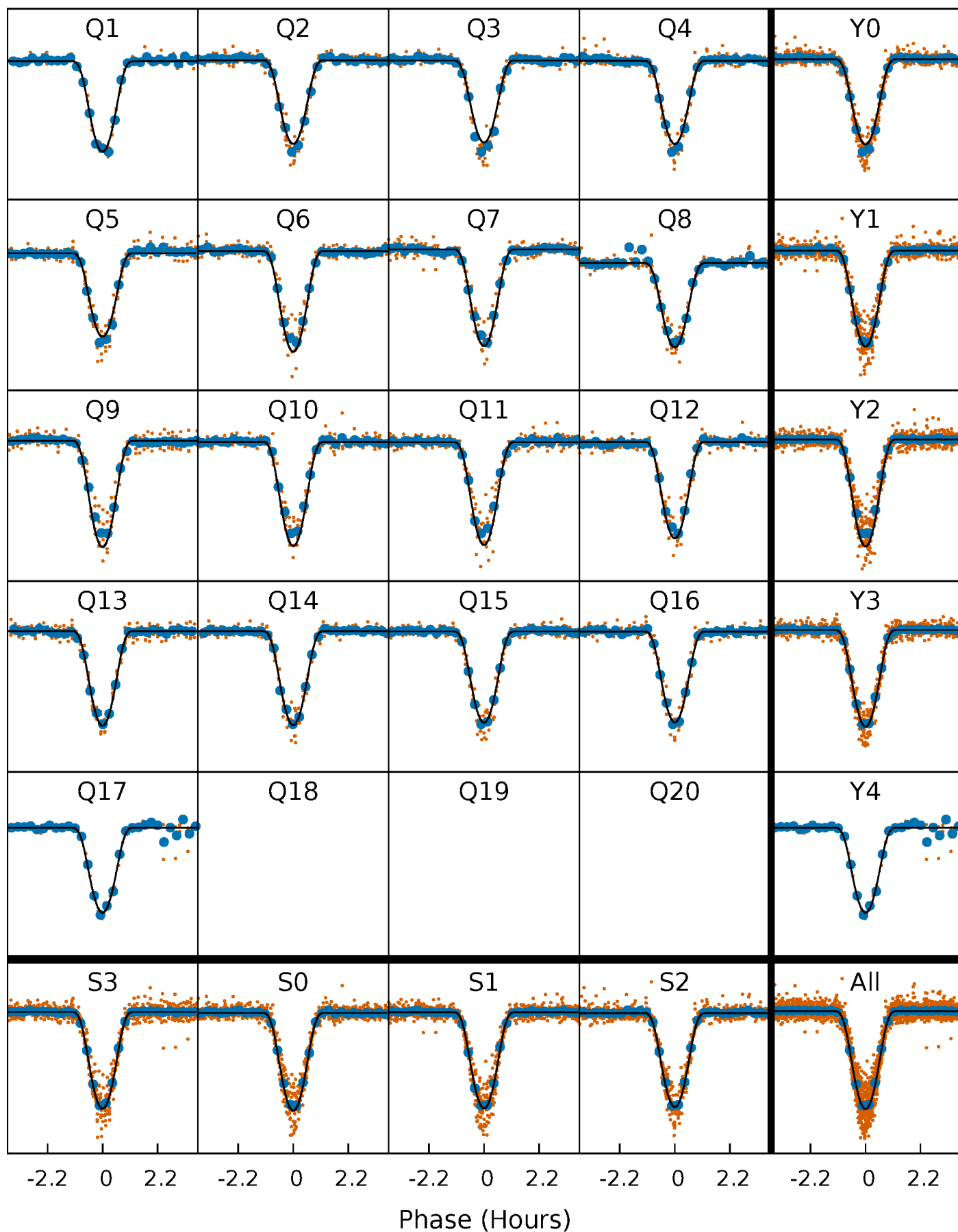
PDC Quarter-Phased Transit Curves

TCE 009468296-01 P= 5.748820 Days $T_0=132.279533$ (BKJD)



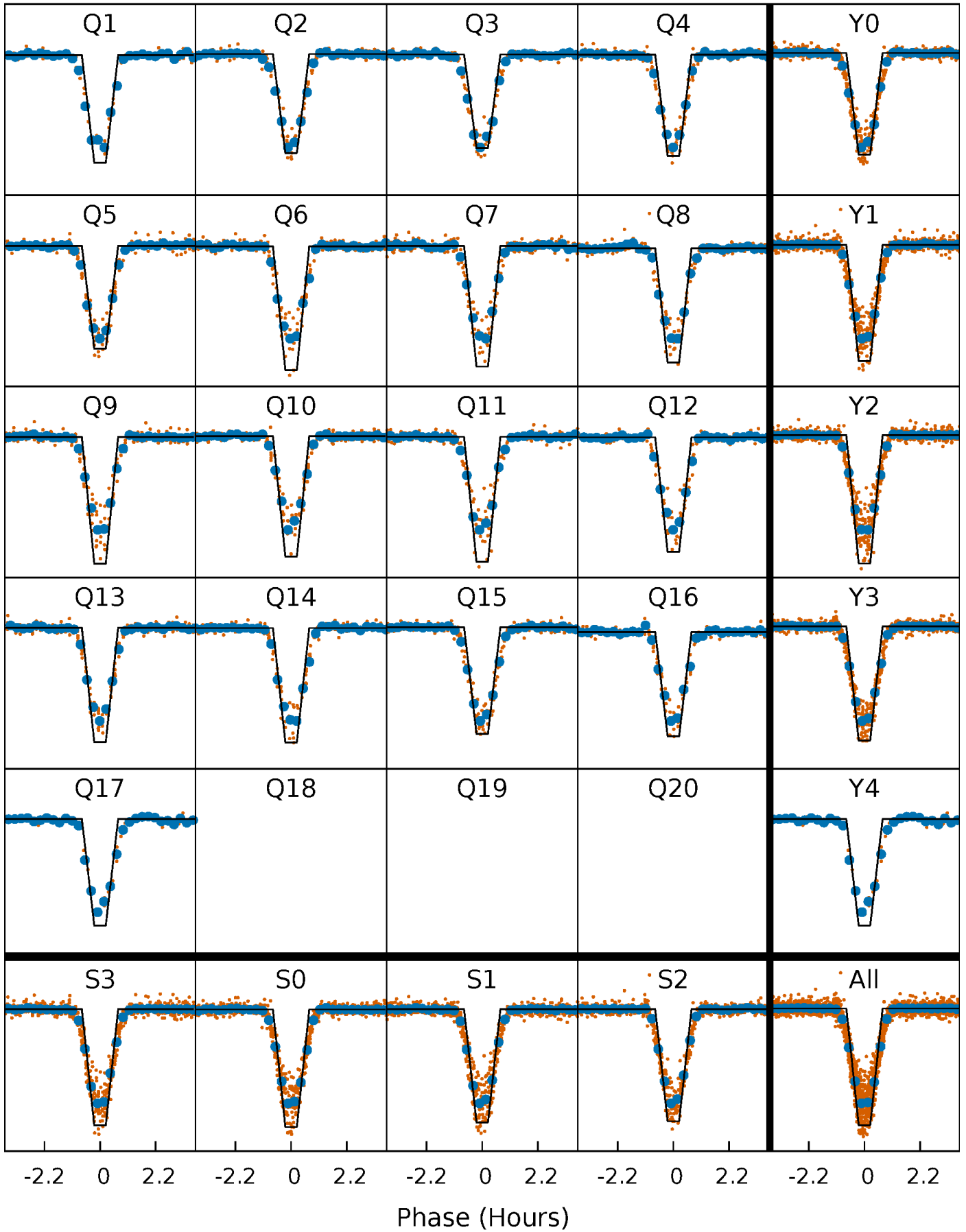
DV Quarter-Phased Transit Curves

TCE 009468296-01 P= 5.748820 Days $T_0=132.279533$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

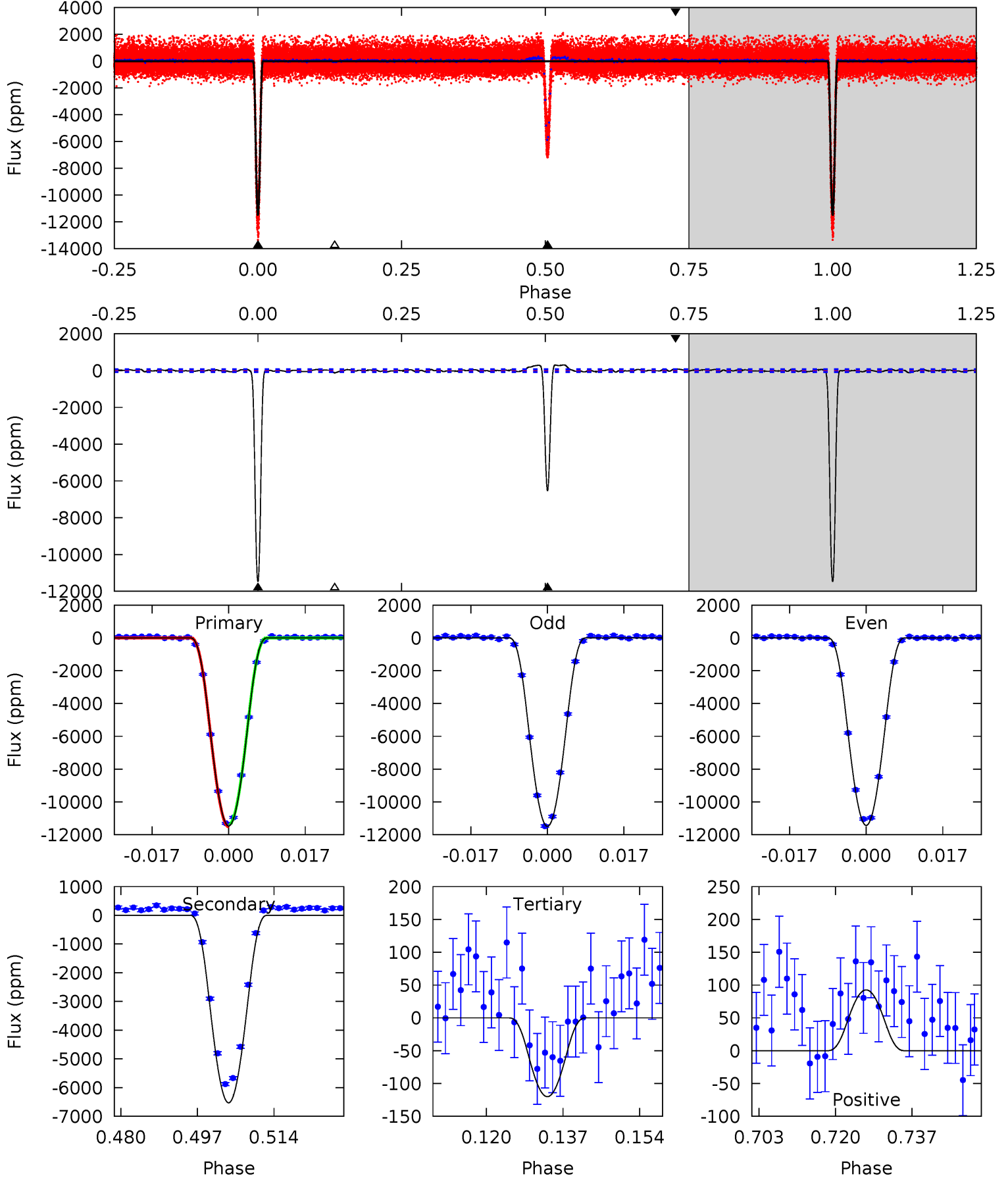
TCE 009468296-01 P= 5.748811 Days $T_0=132.280719$ (BKJD)



DV Model-Shift Uniqueness Test

009468296-01, P = 5.748820 Days, E = 126.530713 Days

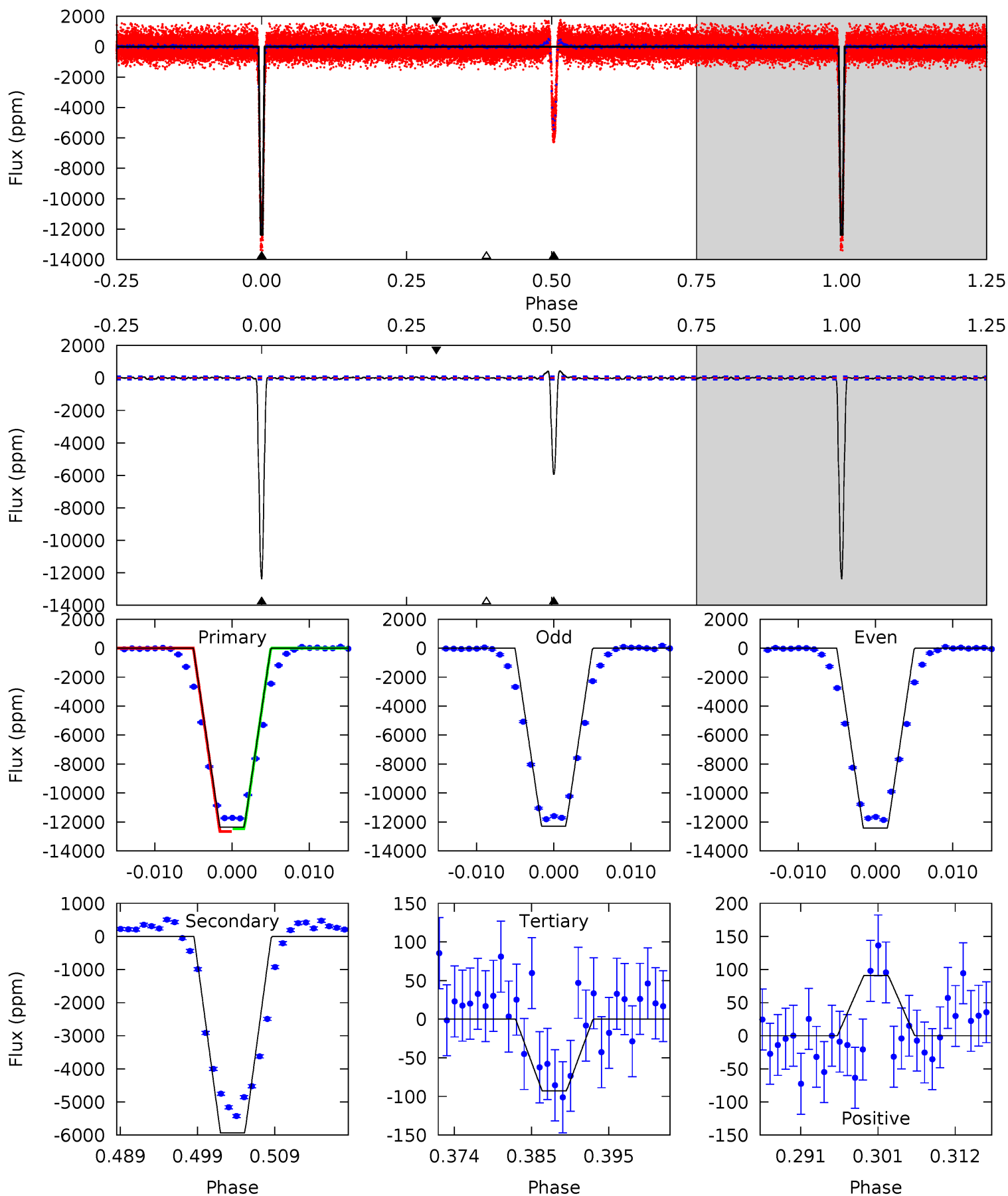
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
736.0	419.0	7.71	5.94	4.92	2.38	3.92	728.3	730.1	411.3	413.1	2.02	1.00	0.03	0



Alt Model-Shift Uniqueness Test

009468296-01, P = 5.748811 Days, E = 126.531908 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
626.2	300.6	4.69	4.60	5.02	2.56	2.55	621.5	621.6	295.9	296.0	3.41	1.00	0.03	0



Stellar Parameters For KIC 009468296

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4961^{+151}_{-136}	$4.545^{+0.078}_{-0.058}$	$-0.140^{+0.300}_{-0.300}$	$0.753^{+0.071}_{-0.079}$	$0.725^{+0.093}_{-0.057}$	$2.395^{+0.729}_{-0.421}$
	+3%/-3%	+2%/-1%	+214%/-214%	+9%/-10%	+13%/-8%	+30%/-18%
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 009468296-01 / KOI 7176.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-6528 ± 16	$12.10^{+1.39}_{-1.26}$	1116^{+43}_{-42}	3951^{+170}_{-163}	79^{+20}_{-15}
Alt.	-5934 ± 20	$9.52^{+1.40}_{-1.26}$	1117^{+42}_{-46}	4230^{+228}_{-197}	116^{+38}_{-26}

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

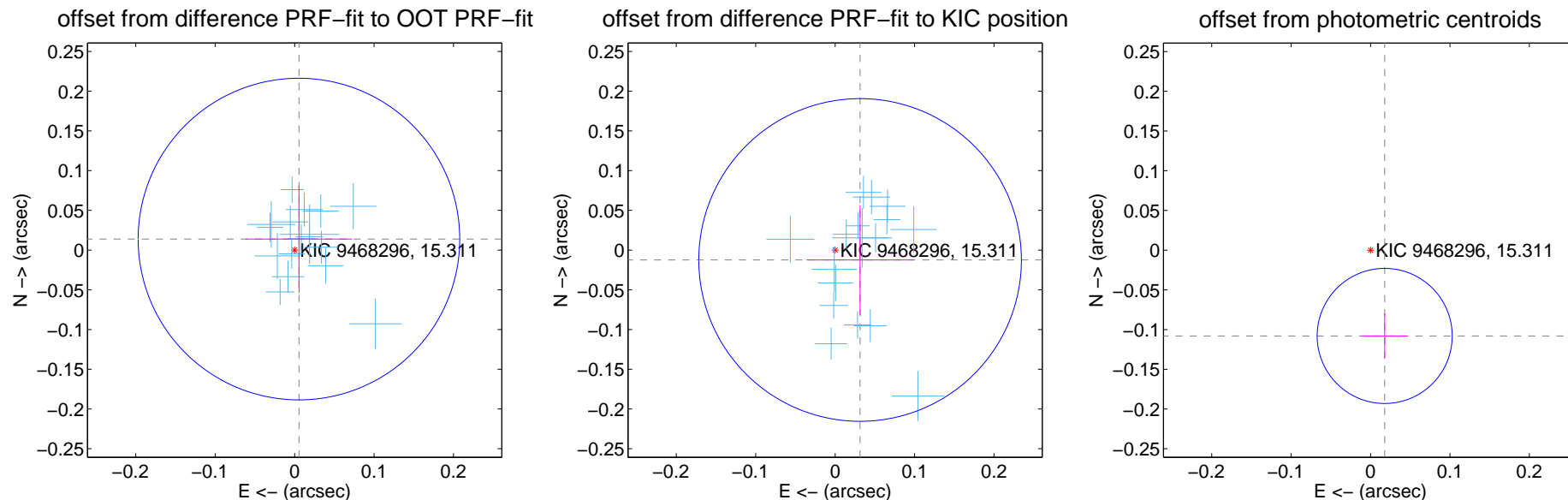
DV Centroid Data

Supplemental centroid analysis for 009468296-01. Kepler magnitude: 15.31. Transit SNR 314.47

There are 17 quarters with good PRF difference image offsets

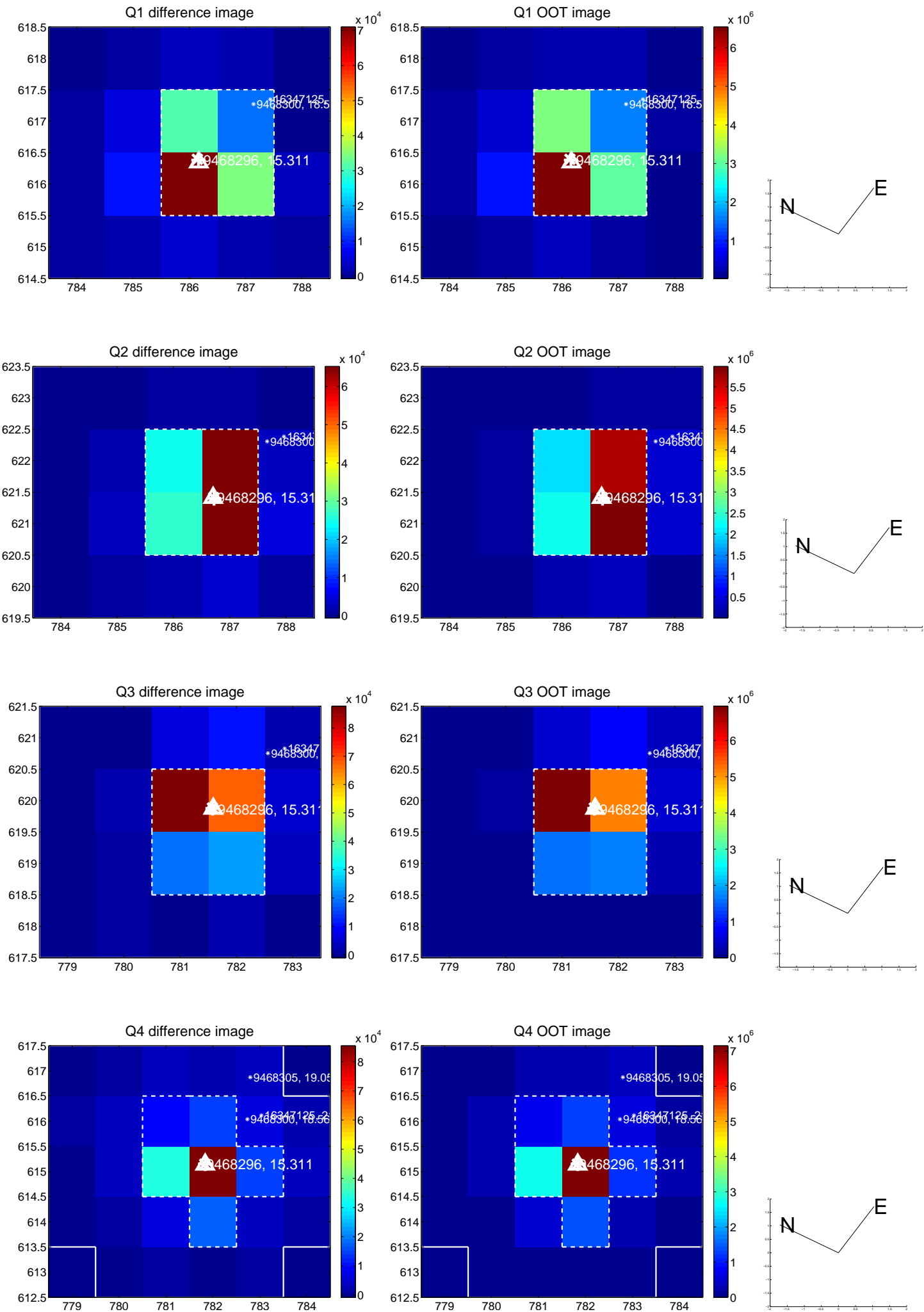
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.015 ± 0.067	0.22	-0.005 ± 0.067	0.014 ± 0.068
PRF-fit source offset from KIC position	0.034 ± 0.068	0.50	-0.031 ± 0.067	-0.012 ± 0.069
photometric centroid source offset	0.11 ± 0.03	3.86	-0.02 ± 0.03	-0.11 ± 0.03

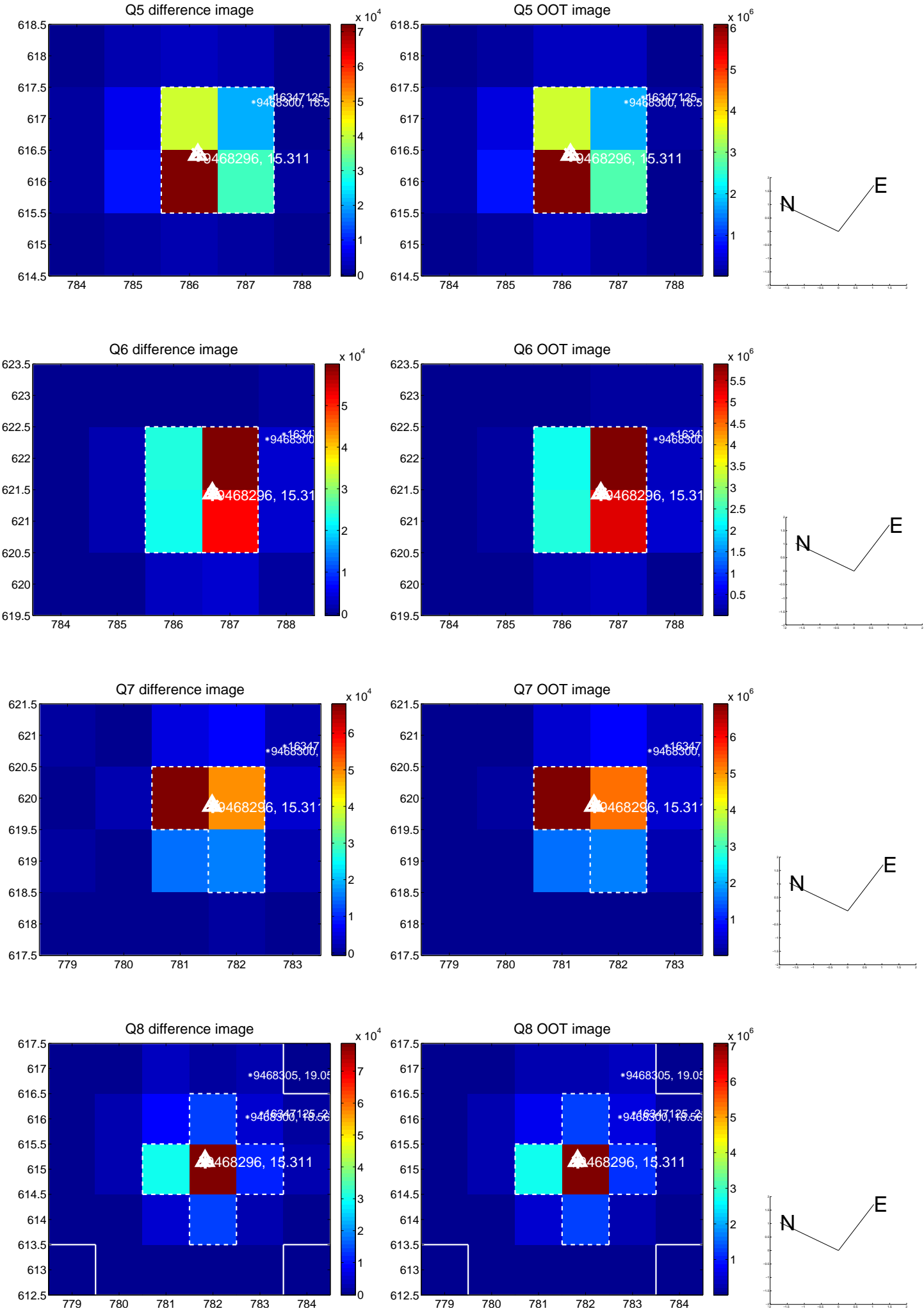


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

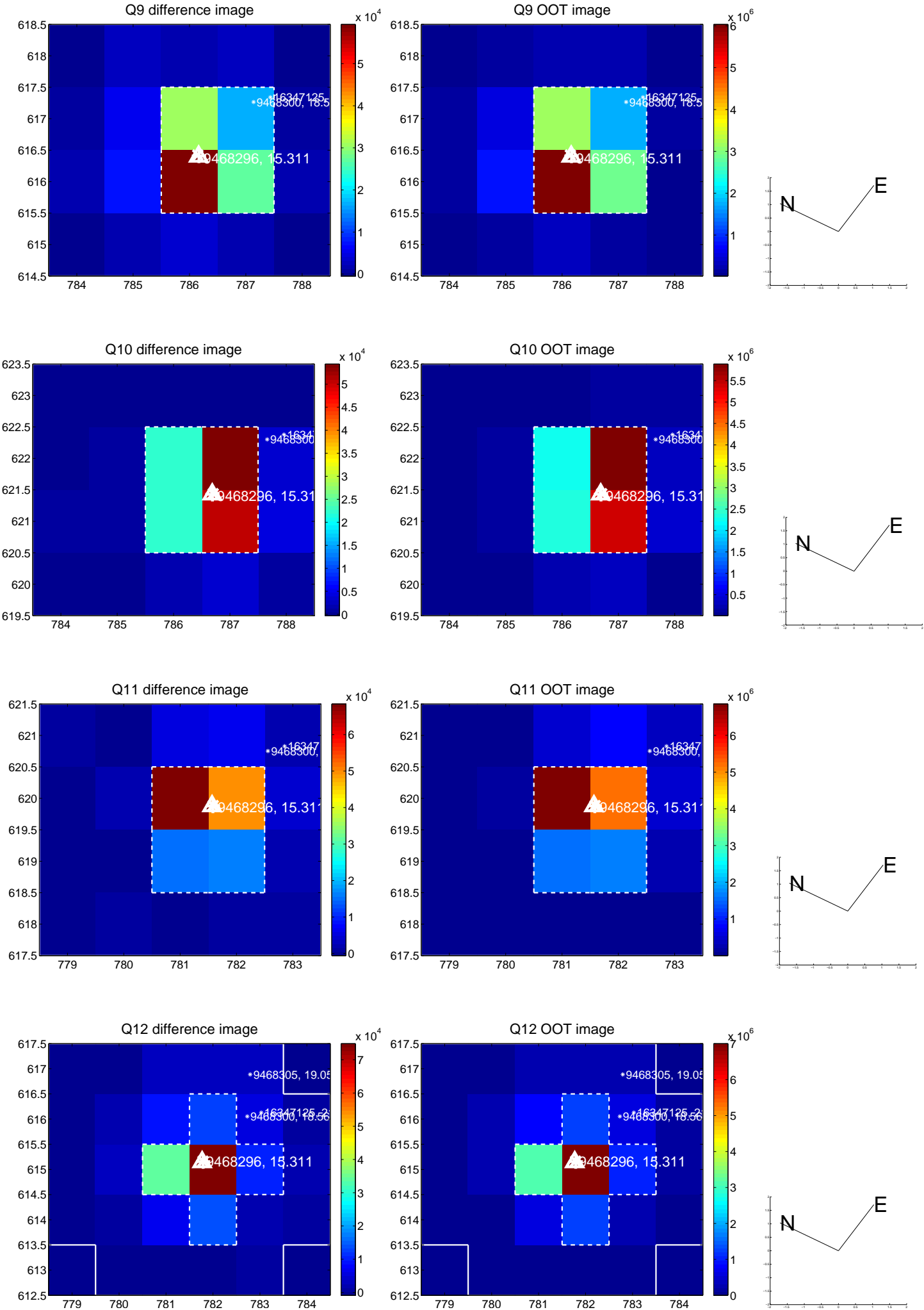
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



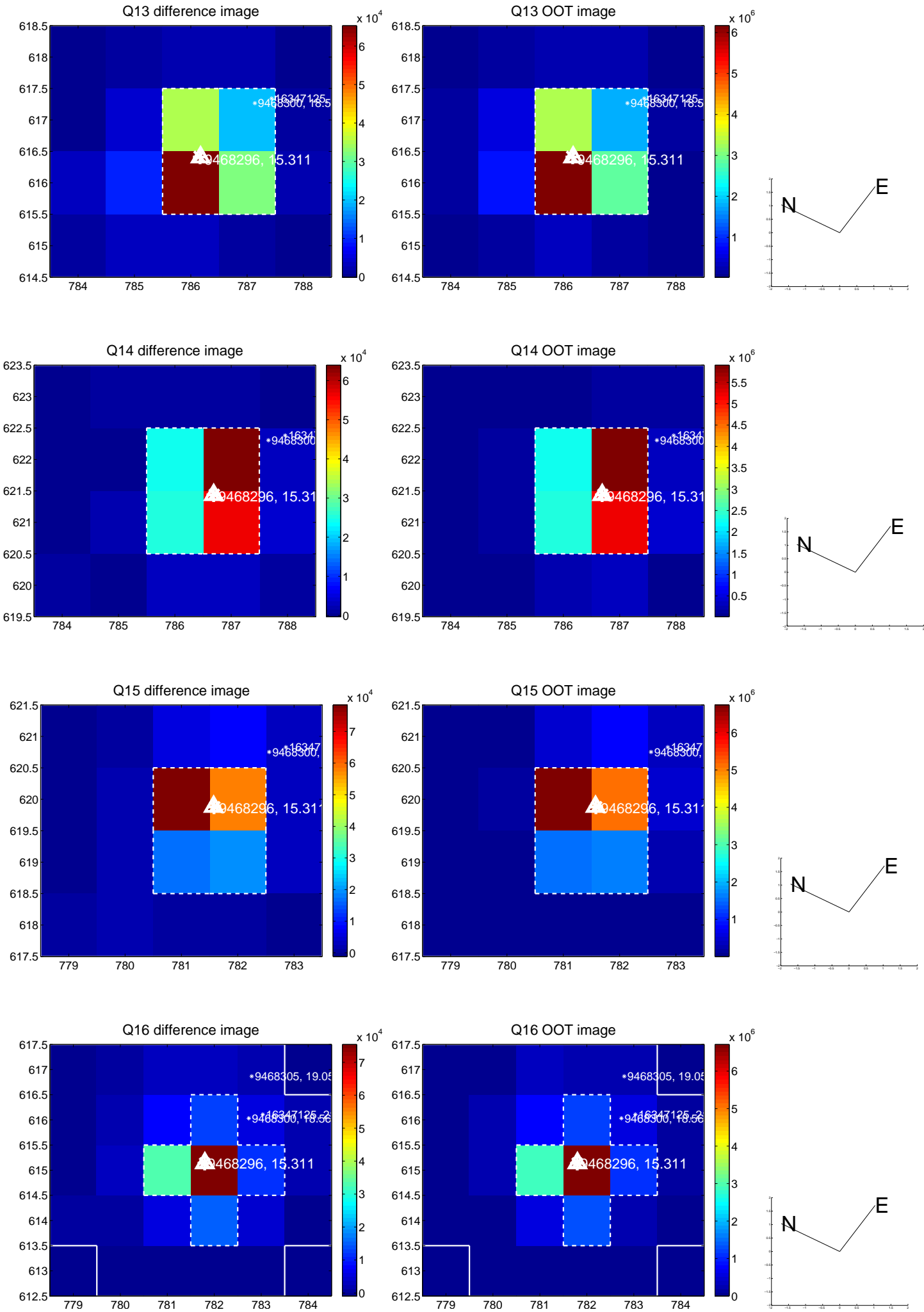
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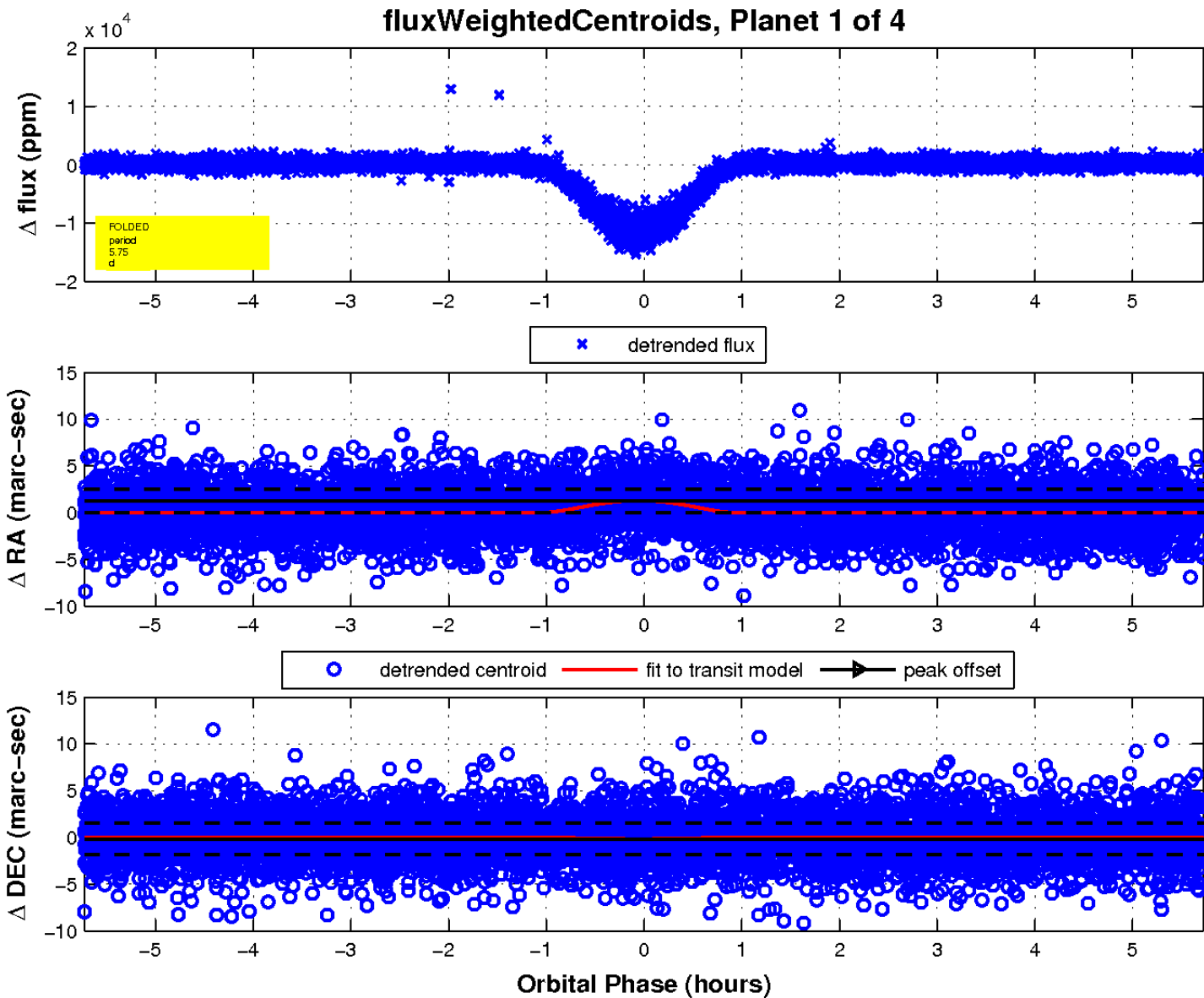
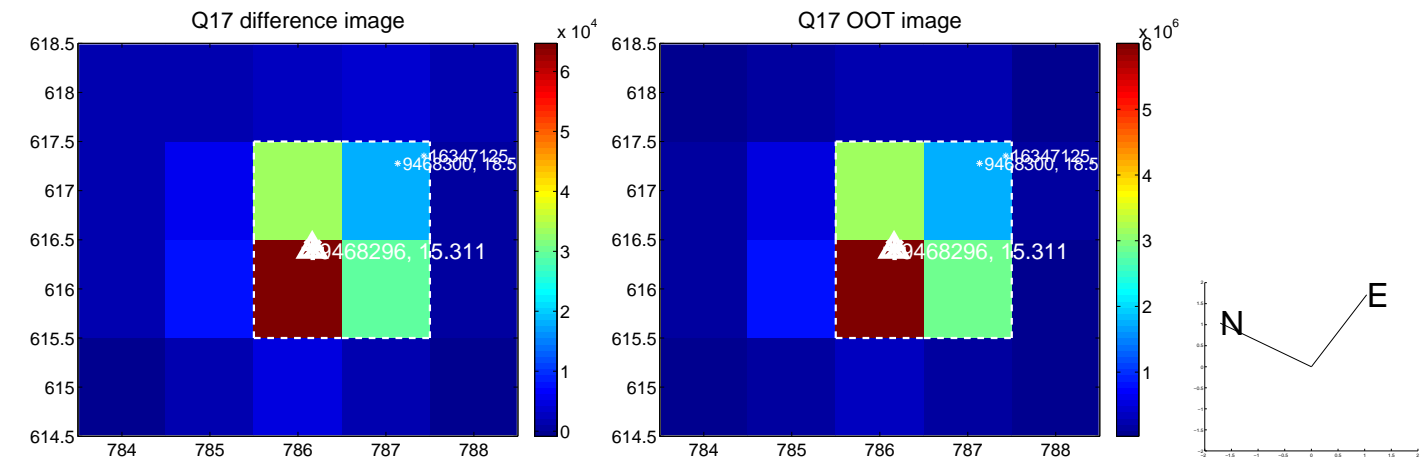
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

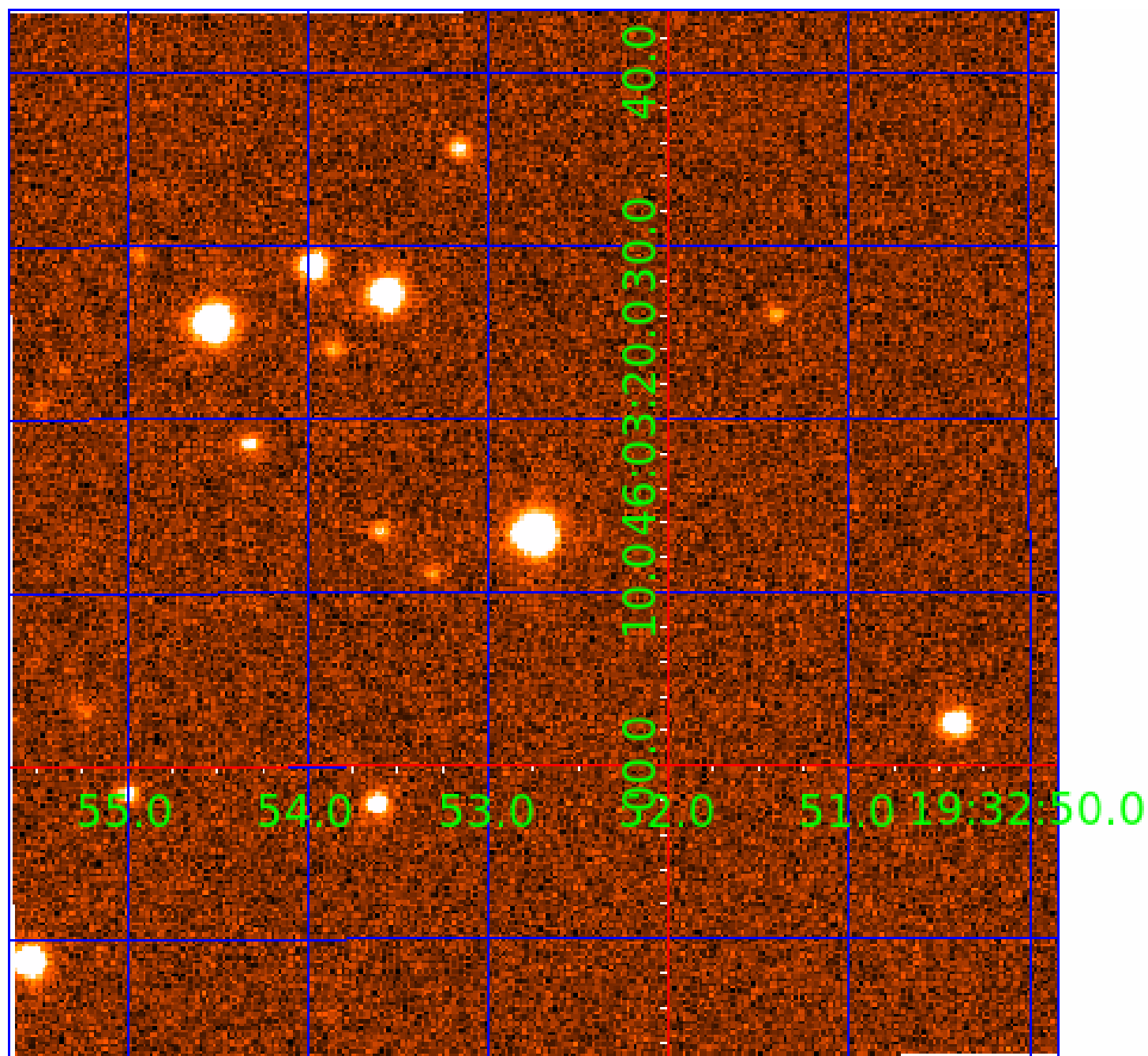


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009468296

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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Robovetter Results

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009468296-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009468296-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009468296-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

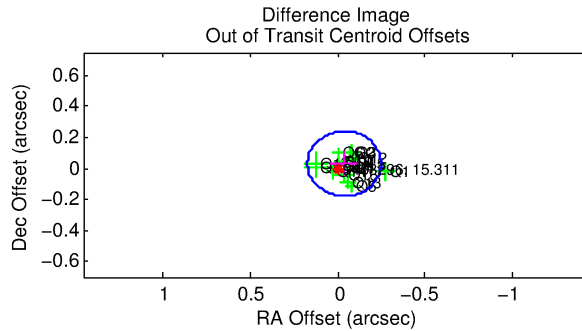
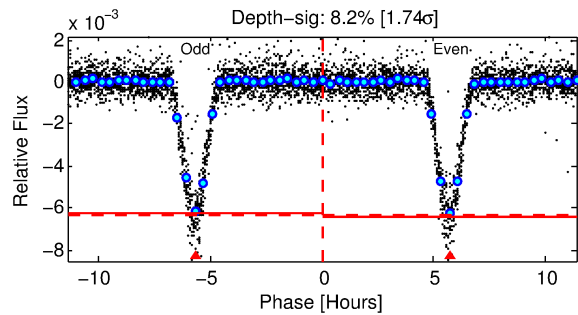
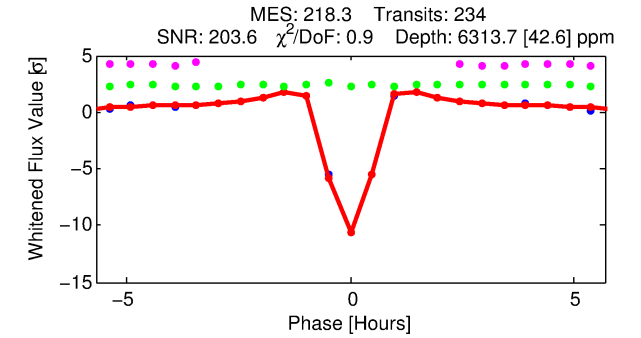
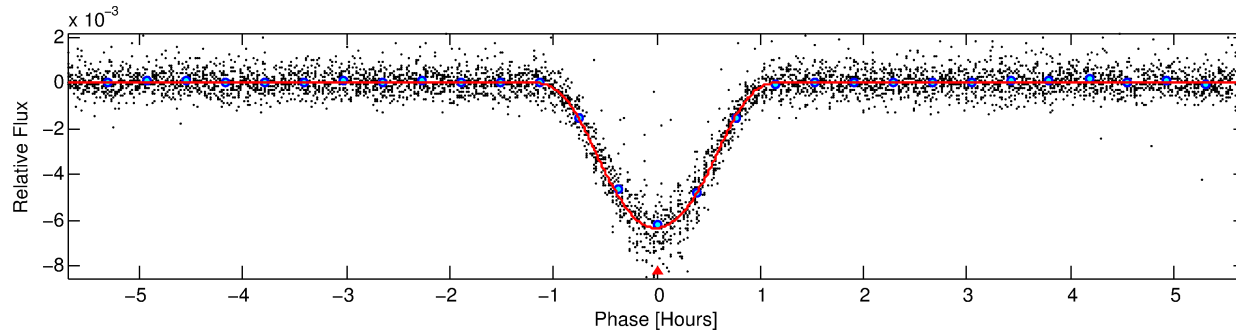
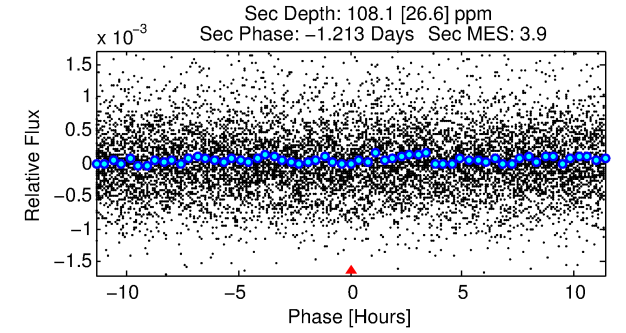
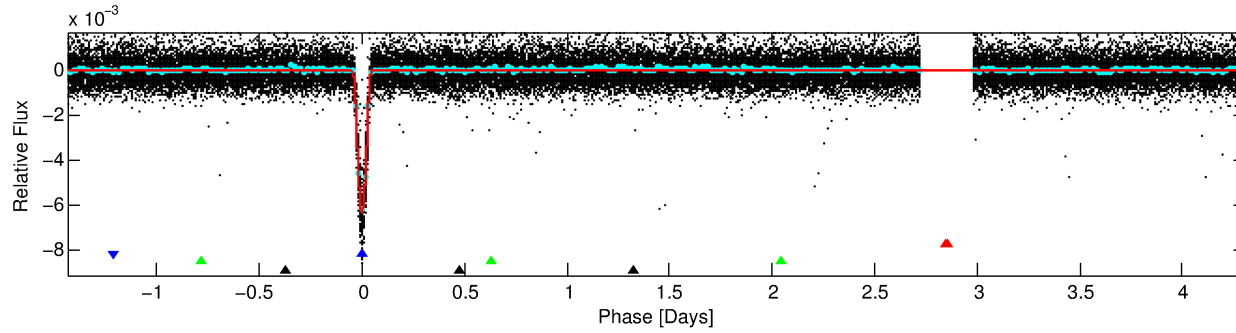
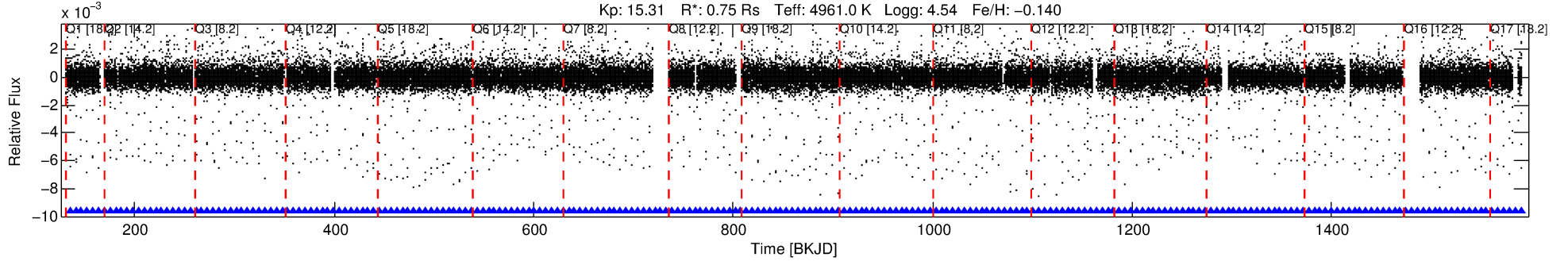
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009468296-02

No Significant Match Found

DV One-Page Summary

KIC: 9468296 Candidate: 2 of 4 Period: 5.749 d
KOI: K07176 Corr: No Ephemeris Match



DV Fit Results:

Period = 5.74882 [0.00000] d
Epoch = 135.1768 [0.0002] BKJD
Rp/R* = 0.1047 [0.0089]
a/R* = 13.36 [0.41]
b = 0.94 [0.02]
Seff = 96.59 [17.82]
Teq = 799 [37] K
Rp = 8.61 [1.16] Re
a = 0.0564 [0.0052] AU
Ag = 2.56 [0.84] [1.85 σ]
Teffp = 1563 [126] K [5.81 σ]

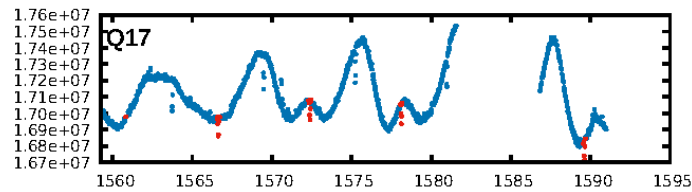
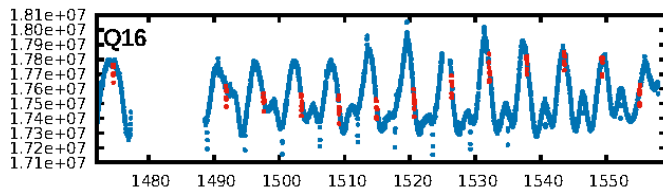
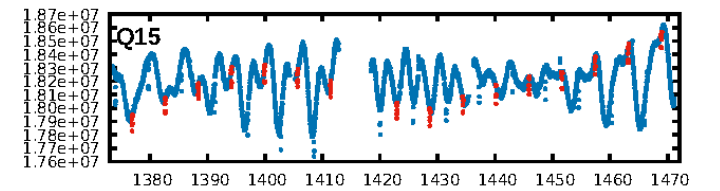
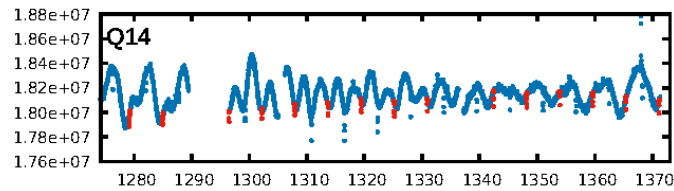
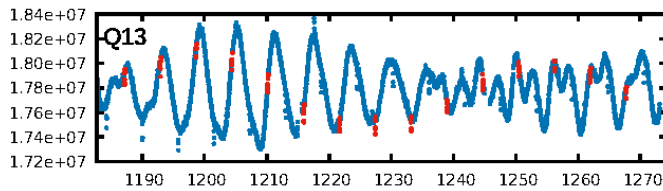
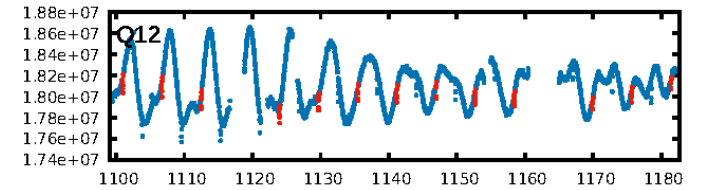
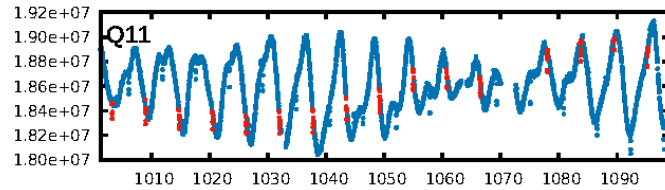
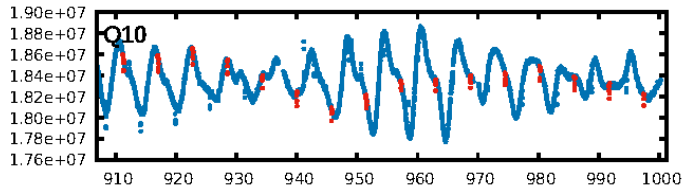
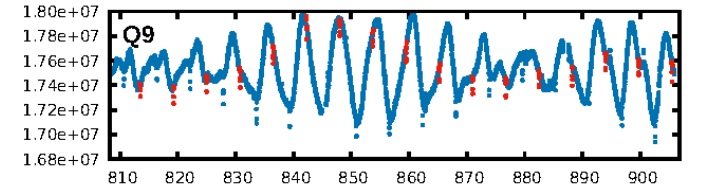
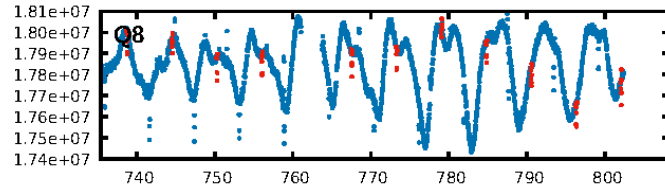
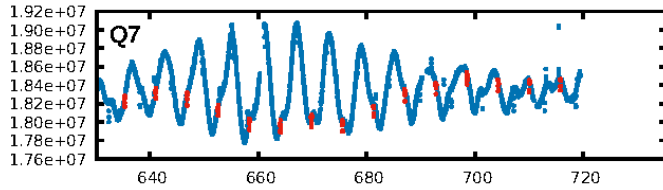
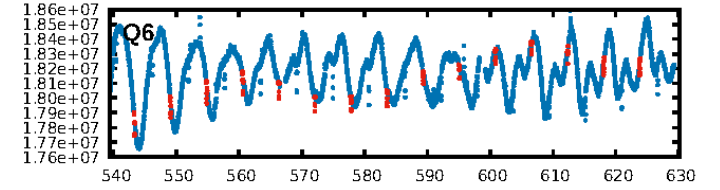
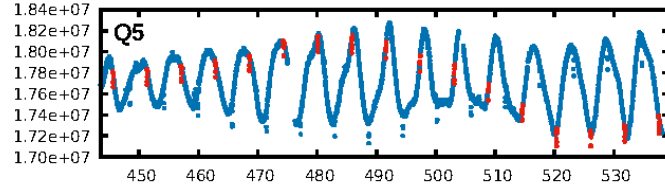
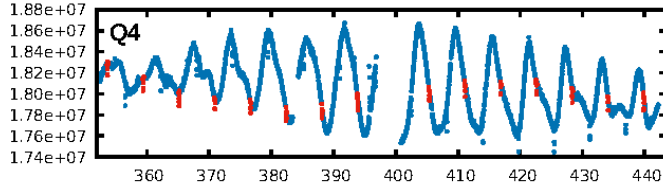
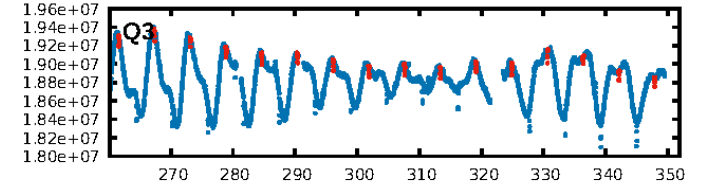
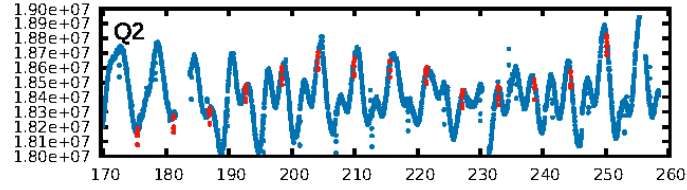
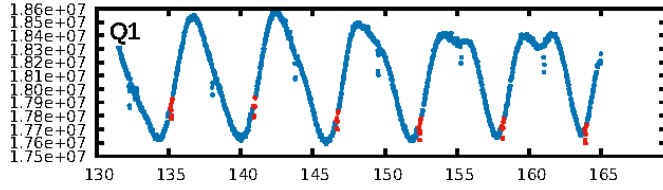
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [223/223]
GhostDiagnostic-chr: 2.266
Centroid-sig: 0.0%
Centroid-so: 0.197 arcsec [3.85 σ]
OotOffset-rm: 0.049 arcsec [0.70 σ]
KicOffset-rm: 0.068 arcsec [0.96 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

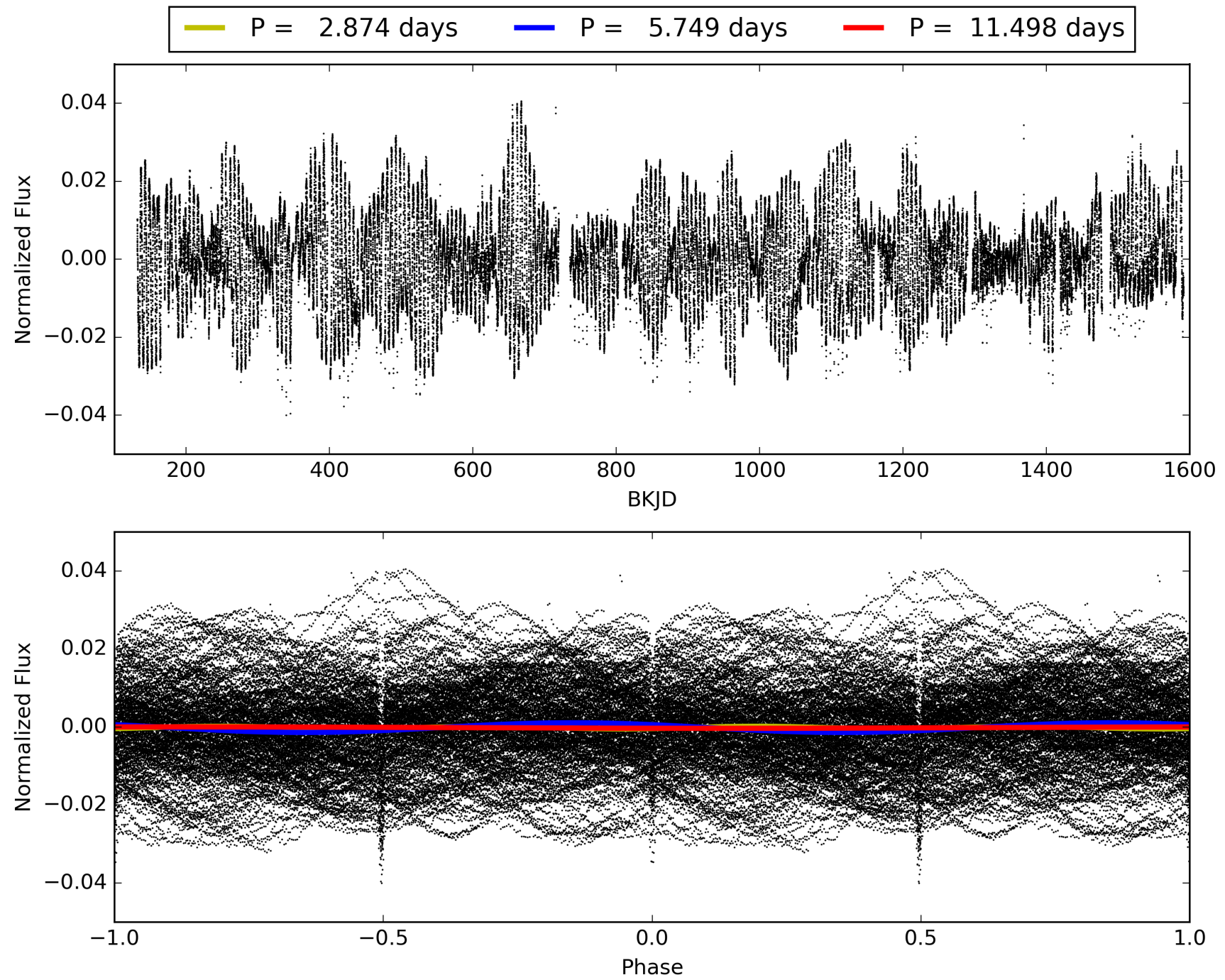
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:54:25 Z

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

TCE 009468296-02, PDC Light Curves

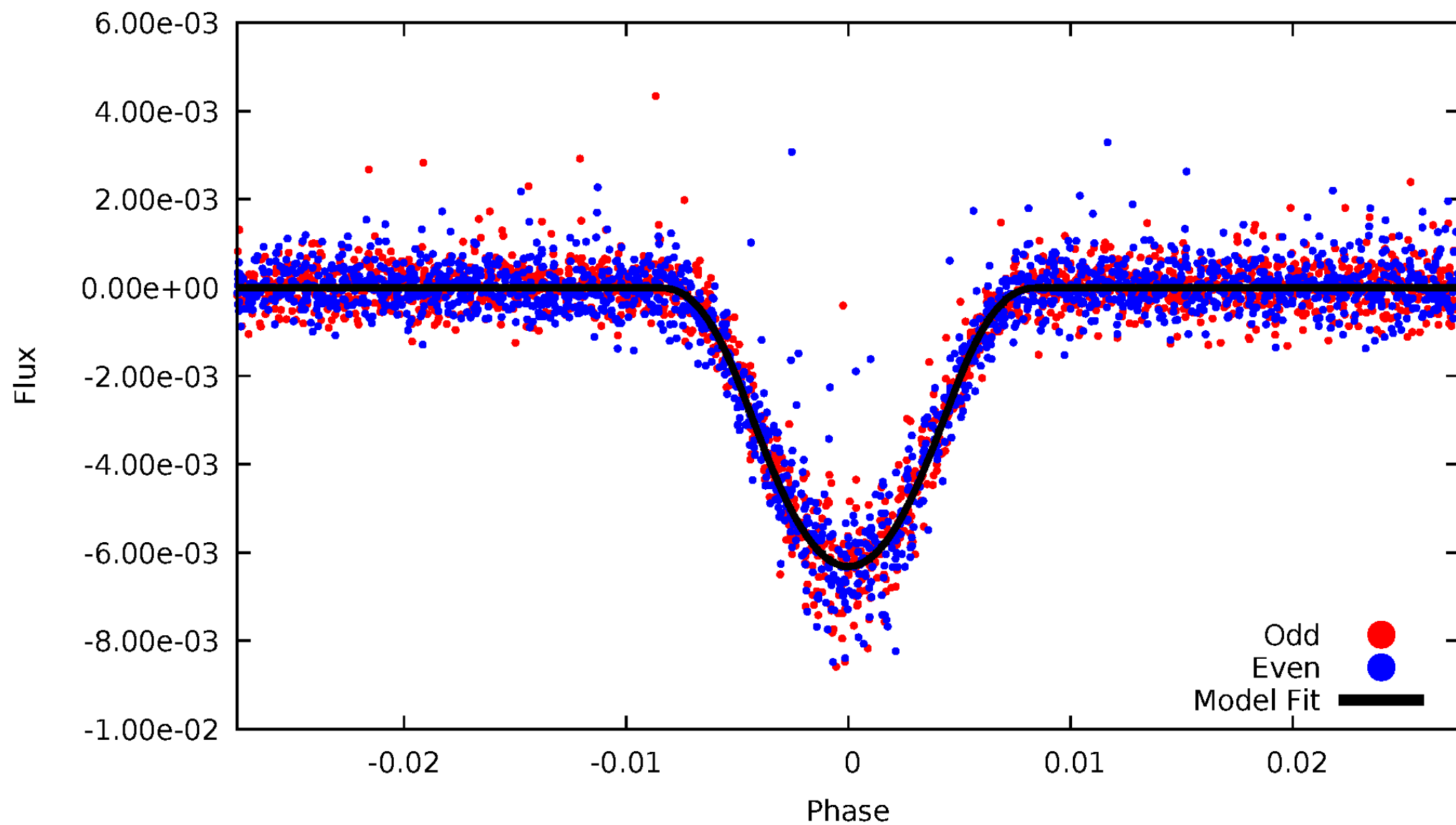


TCE 009468296-02



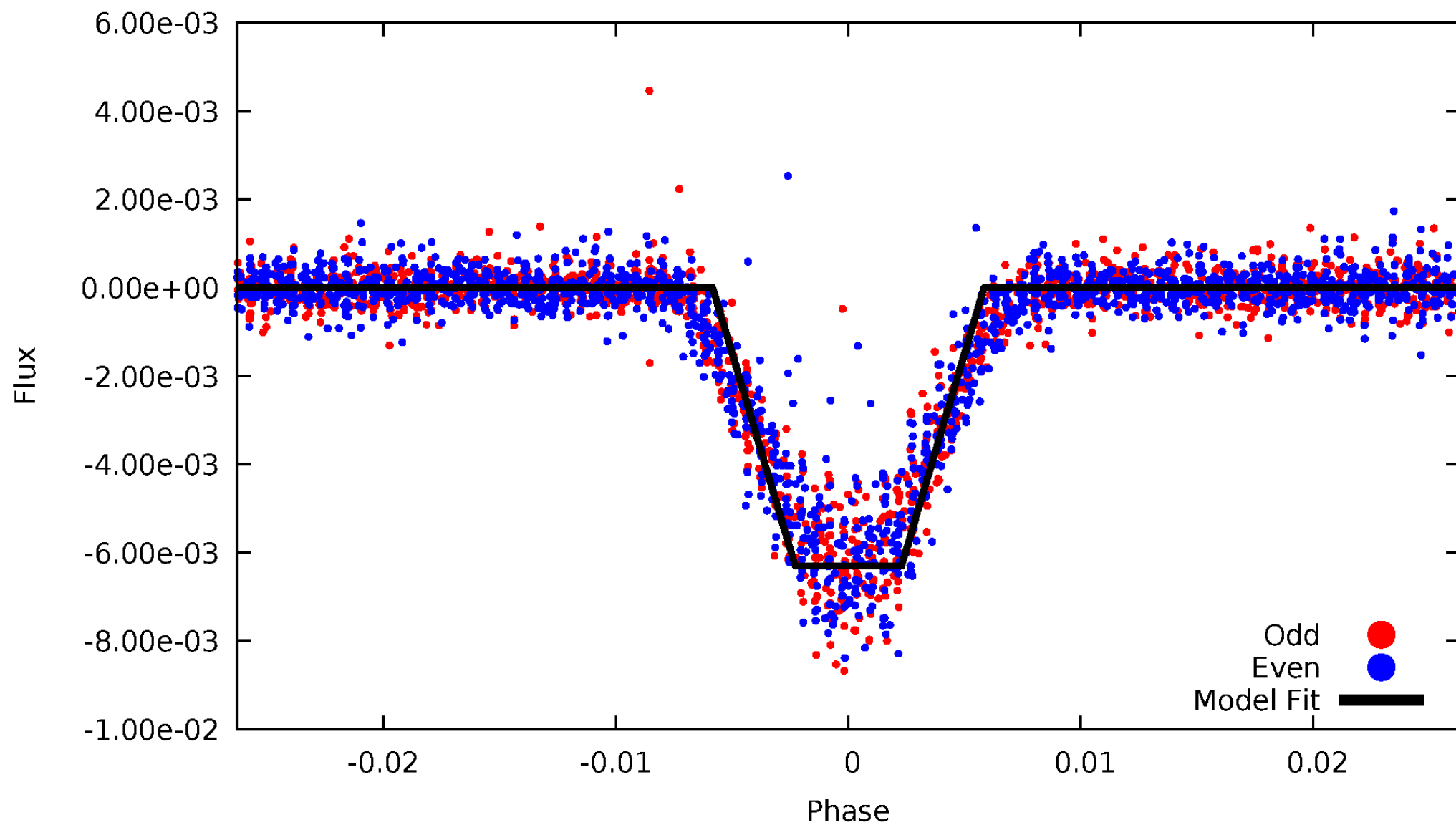
DV Odd/Even

TCE 009468296-02



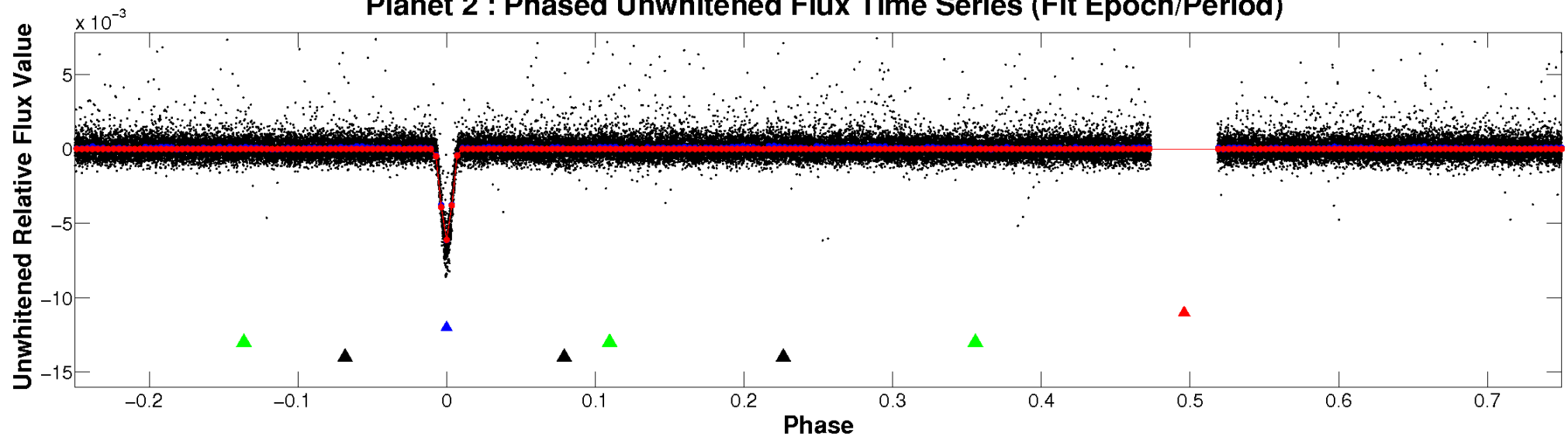
ALT Odd/Even

TCE 009468296-02

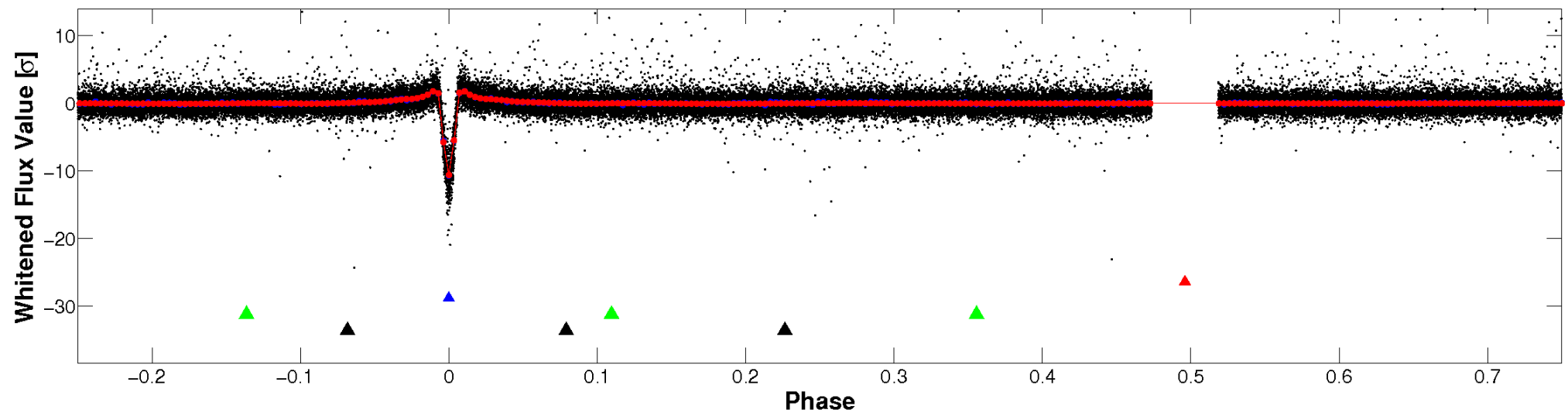


Non-Whitened Vs. Whitened Light Curve

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

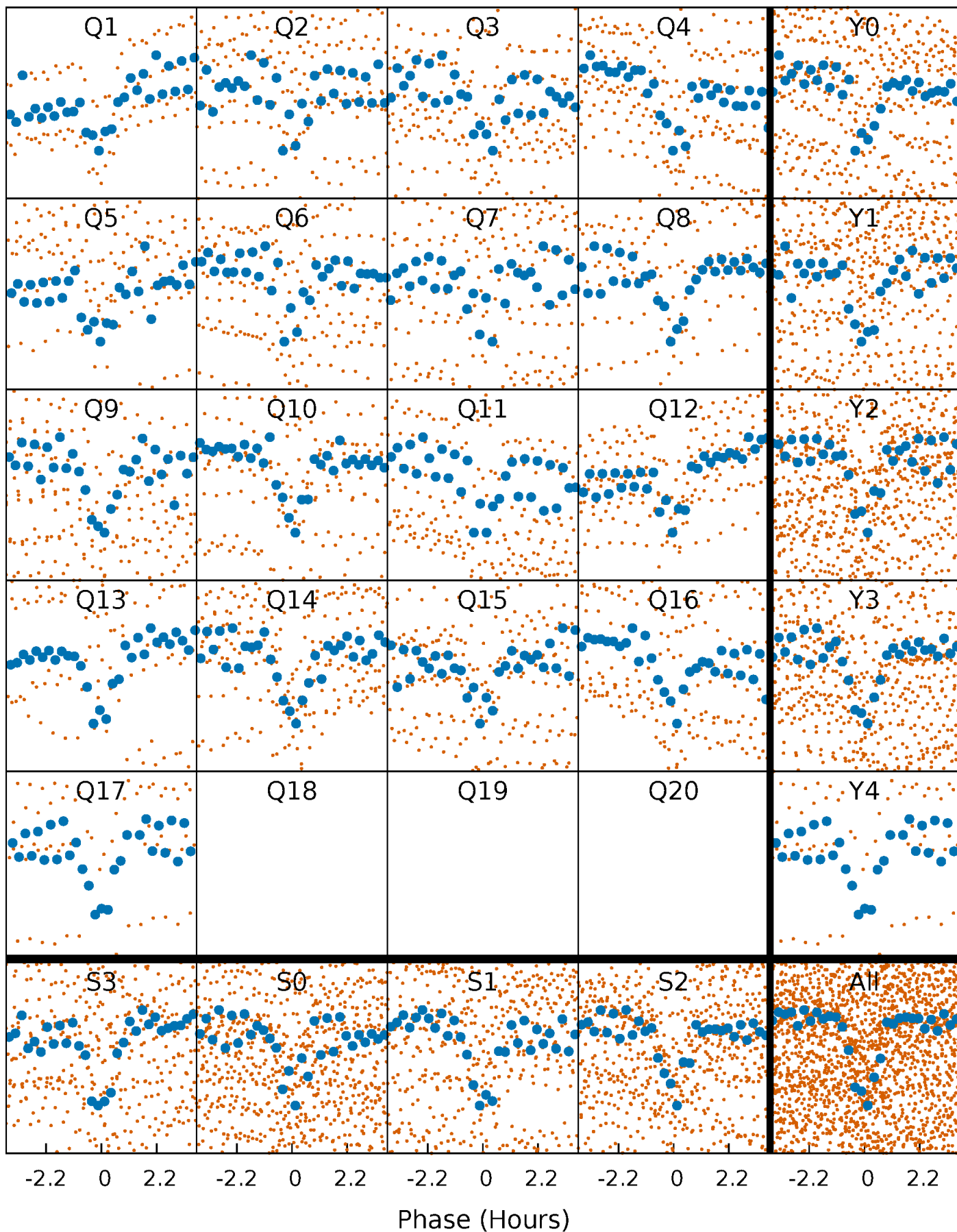


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



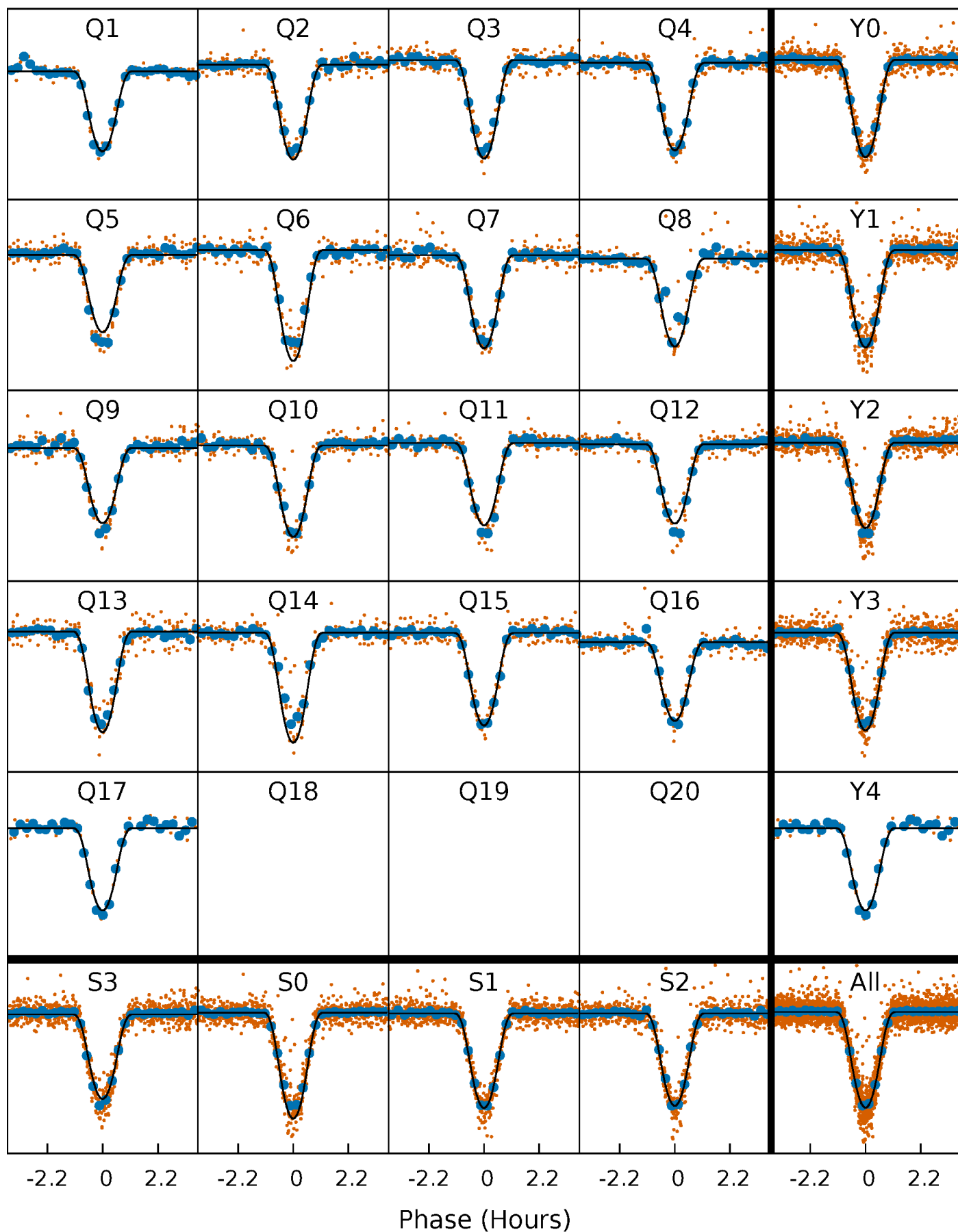
PDC Quarter-Phased Transit Curves

TCE 009468296-02 P= 5.748818 Days $T_0=135.176764$ (BKJD)



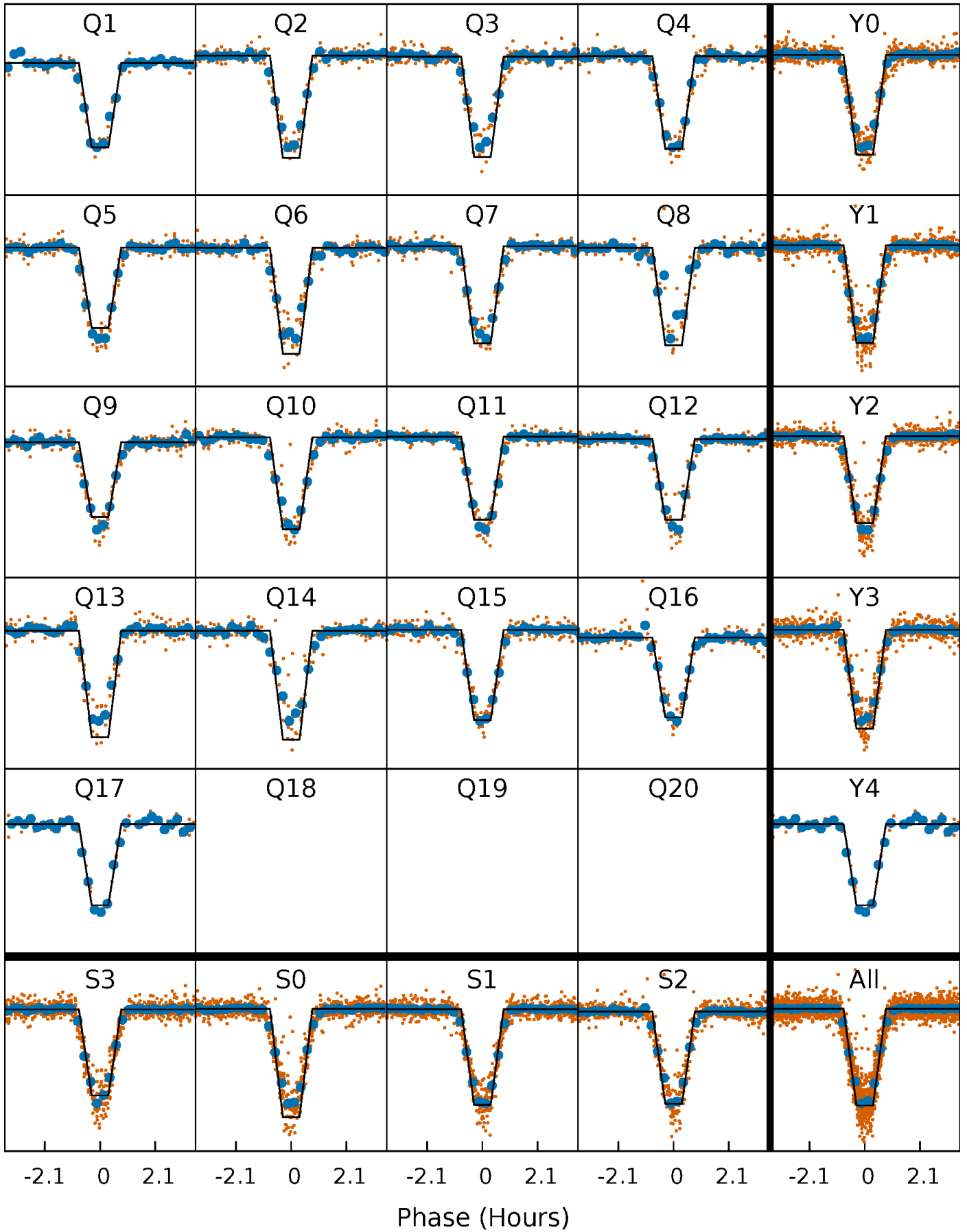
DV Quarter-Phased Transit Curves

TCE 009468296-02 $P = 5.748818$ Days $T_0 = 135.176764$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

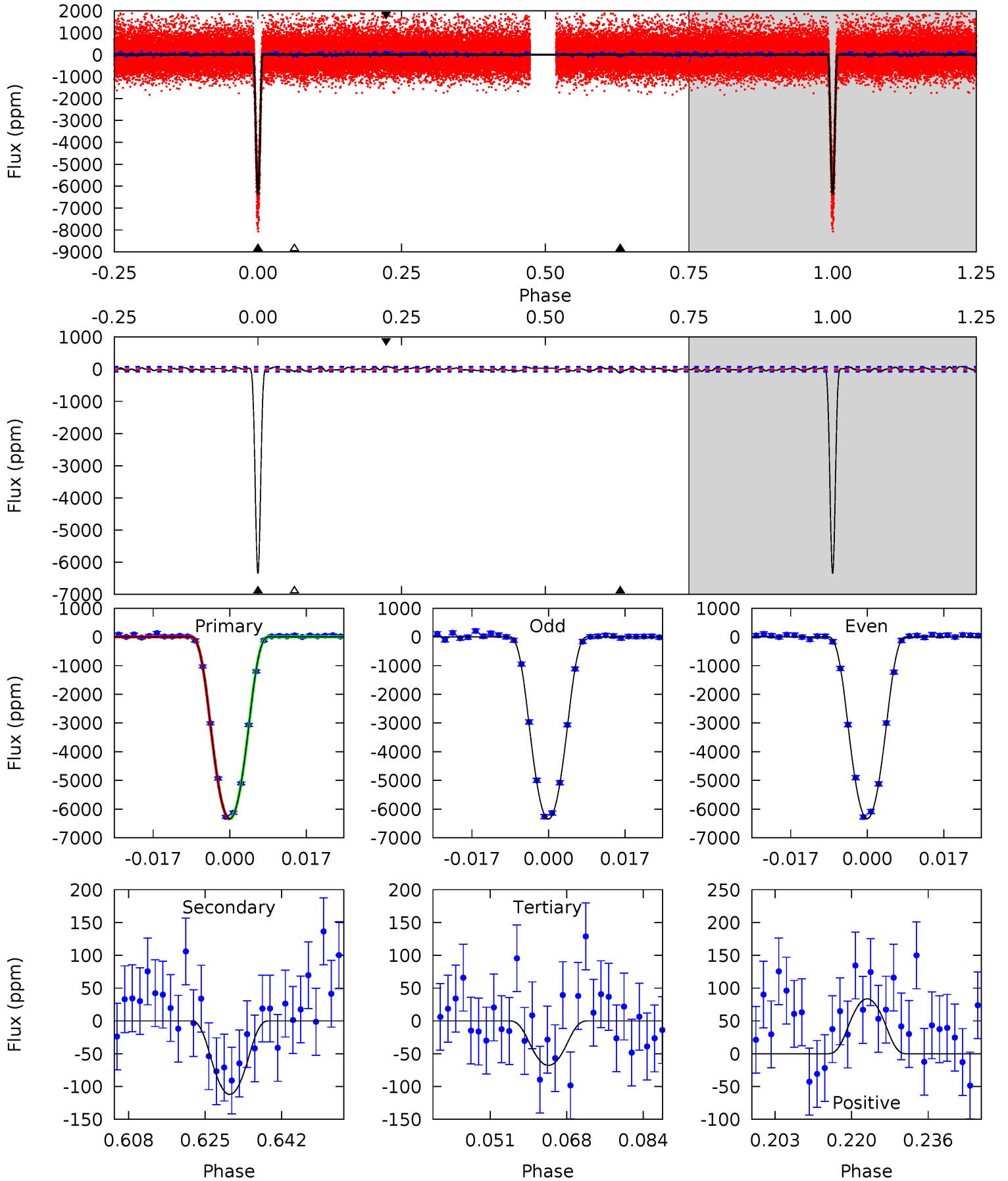
TCE 009468296-02 P= 5.748811 Days $T_0=135.177796$ (BKJD)



DV Model-Shift Uniqueness Test

009468296-02, P = 5.748818 Days, E = 129.427946 Days

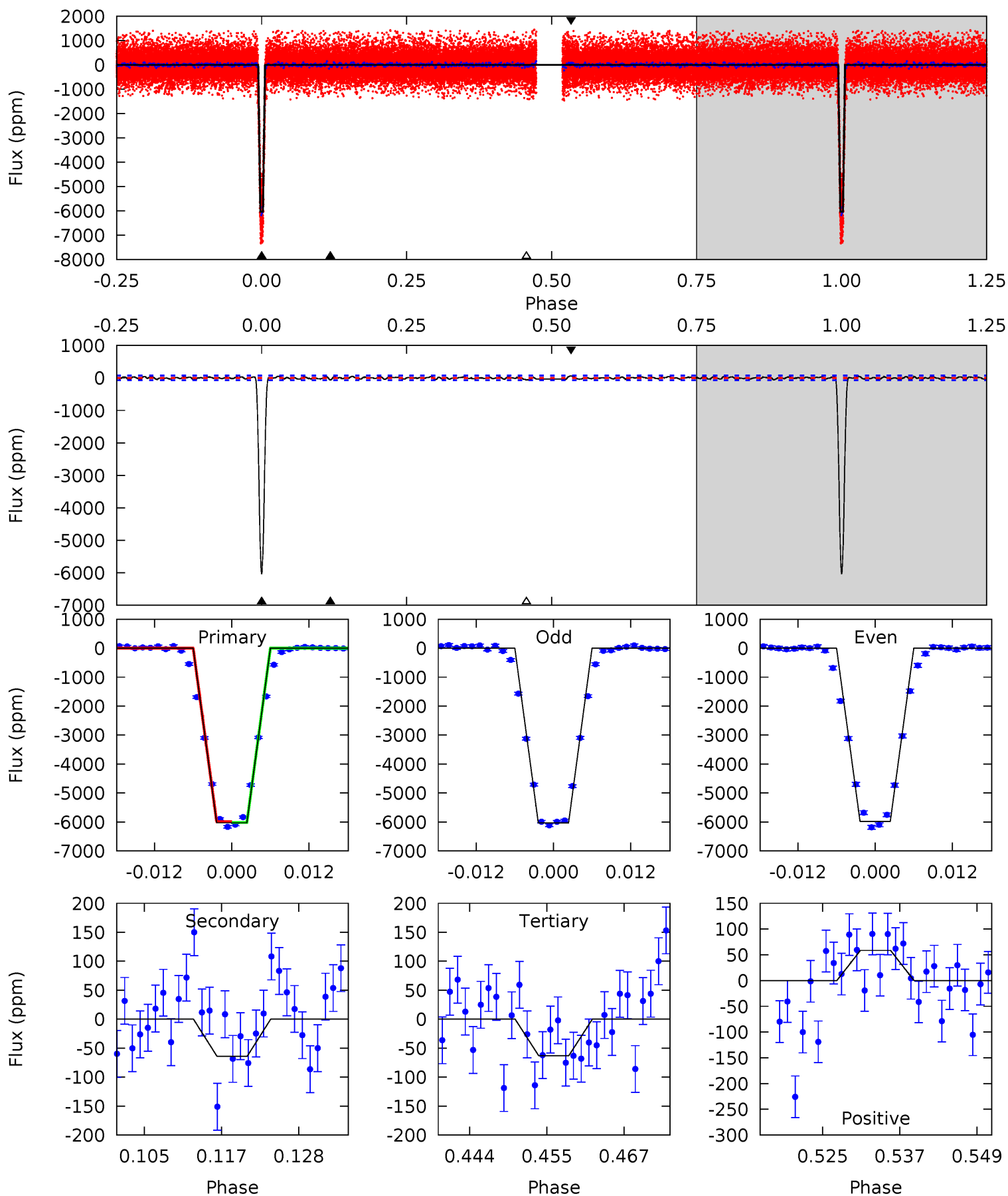
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
428.9	7.57	4.59	5.66	4.92	2.39	2.01	424.4	423.3	2.98	1.92	0.55	1.00	0.01	0.62



Alt Model-Shift Uniqueness Test

009468296-02, P = 5.748811 Days, E = 129.428985 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
415.7	4.42	4.34	4.03	5.00	2.52	1.46	411.4	411.7	0.08	0.39	1.78	0.99	0.01	0.89



Stellar Parameters For KIC 009468296

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4961^{+151}_{-136}	$4.545^{+0.078}_{-0.058}$	$-0.140^{+0.300}_{-0.300}$	$0.753^{+0.071}_{-0.079}$	$0.725^{+0.093}_{-0.057}$	$2.395^{+0.729}_{-0.421}$
	+3%/-3%	+2%/-1%	+214%/-214%	+9%/-10%	+13%/-8%	+30%/-18%
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 009468296-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-112 ± 15	$8.60^{+0.94}_{-0.92}$	1115^{+45}_{-43}	2398^{+77}_{-84}	$2.665^{+0.736}_{-0.567}$
Alt.	-64 ± 15	$6.50^{+0.88}_{-0.81}$	1111^{+46}_{-43}	2385^{+115}_{-110}	$2.665^{+1.036}_{-0.826}$

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

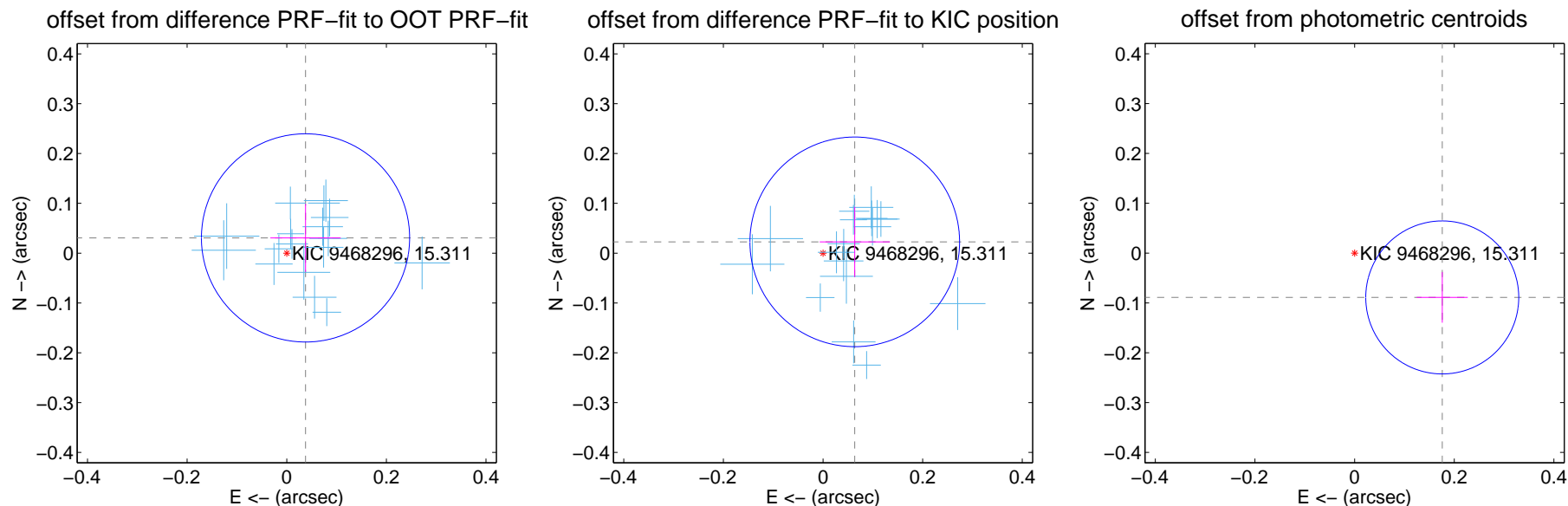
DV Centroid Data

Supplemental centroid analysis for 009468296-02. Kepler magnitude: 15.31. Transit SNR 203.65

There are 17 quarters with good PRF difference image offsets

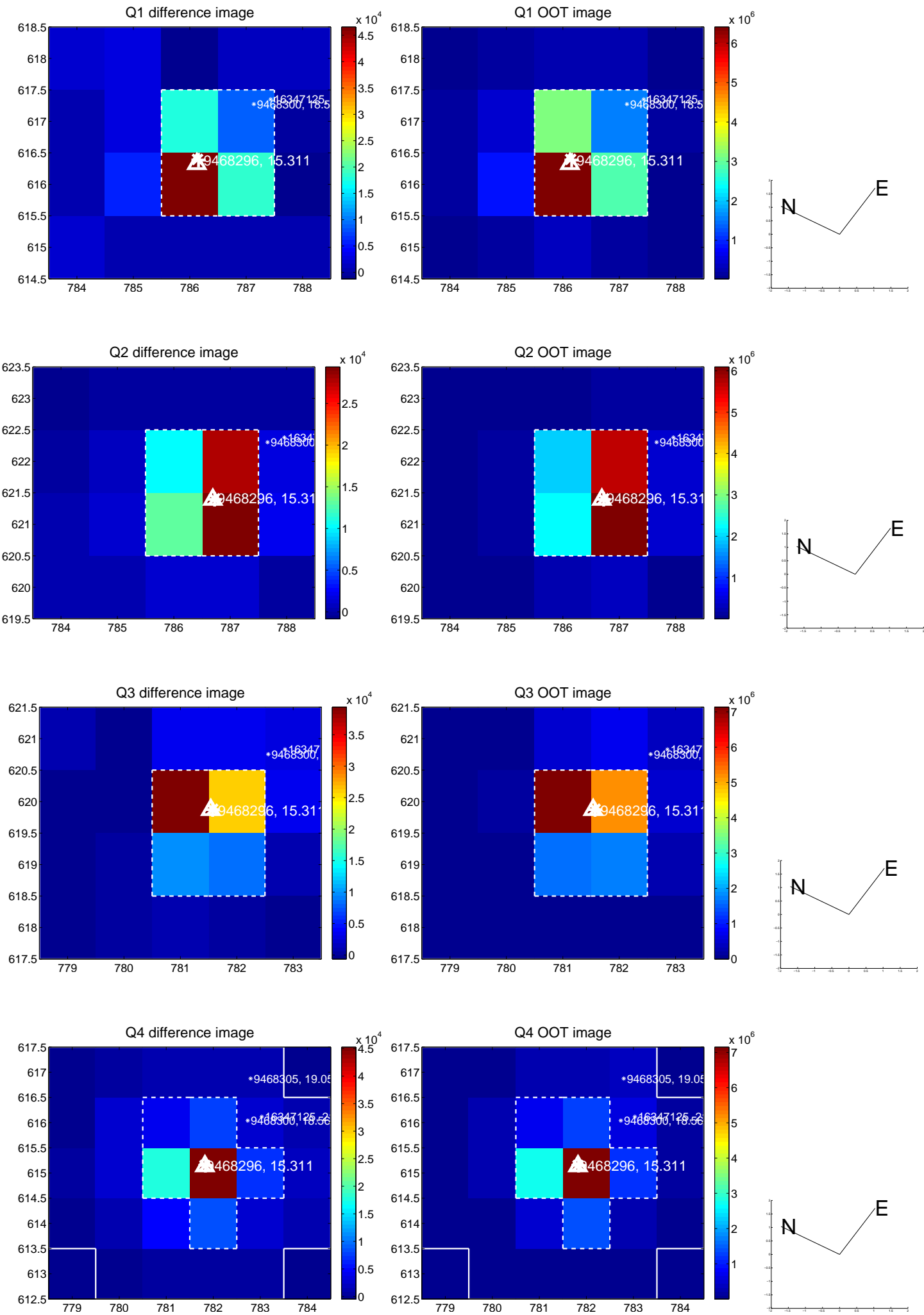
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.049 ± 0.070	0.70	-0.038 ± 0.071	0.031 ± 0.068
PRF-fit source offset from KIC position	0.068 ± 0.070	0.96	-0.064 ± 0.070	0.023 ± 0.070
photometric centroid source offset	0.20 ± 0.05	3.85	-0.18 ± 0.05	-0.09 ± 0.05

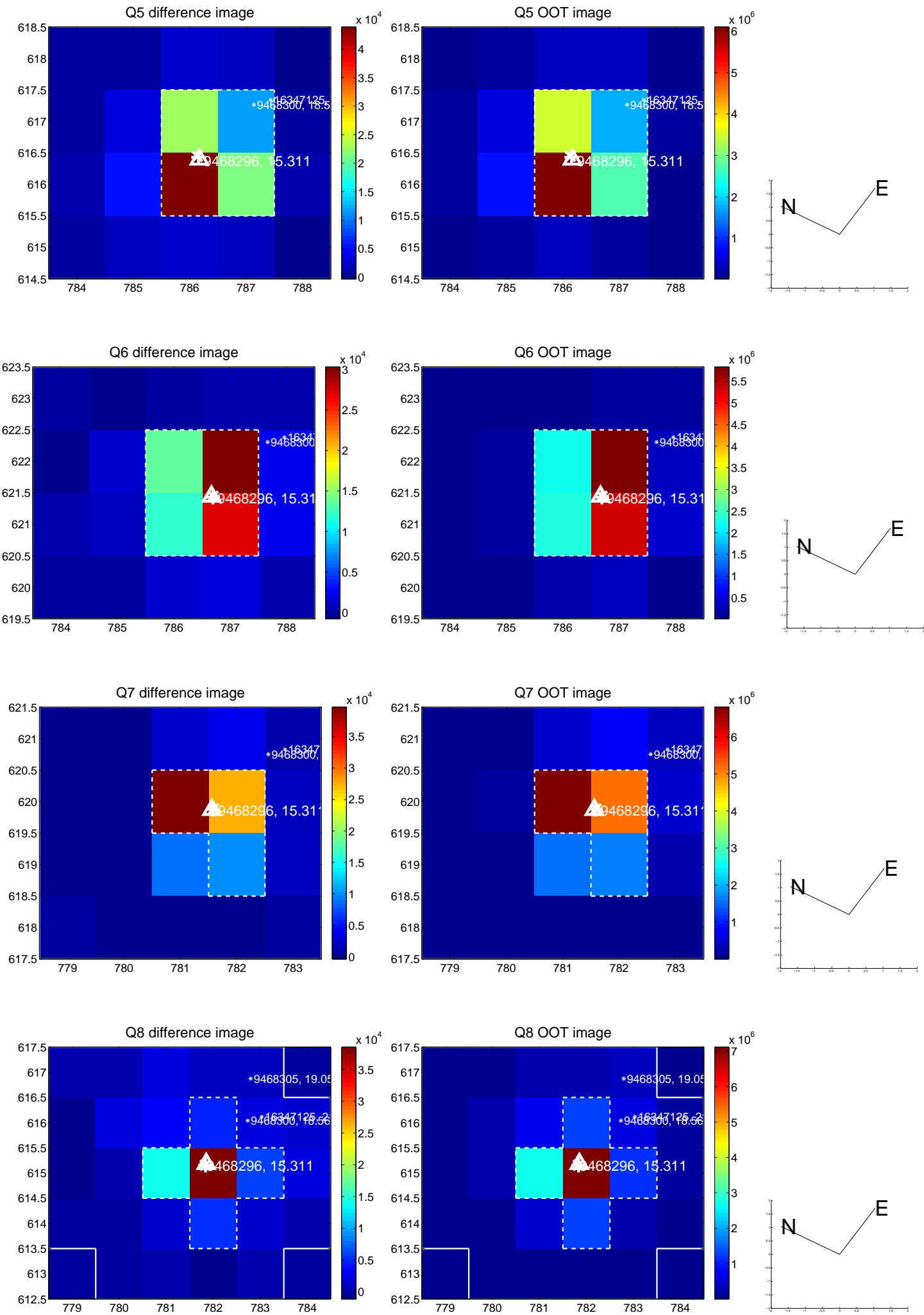


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

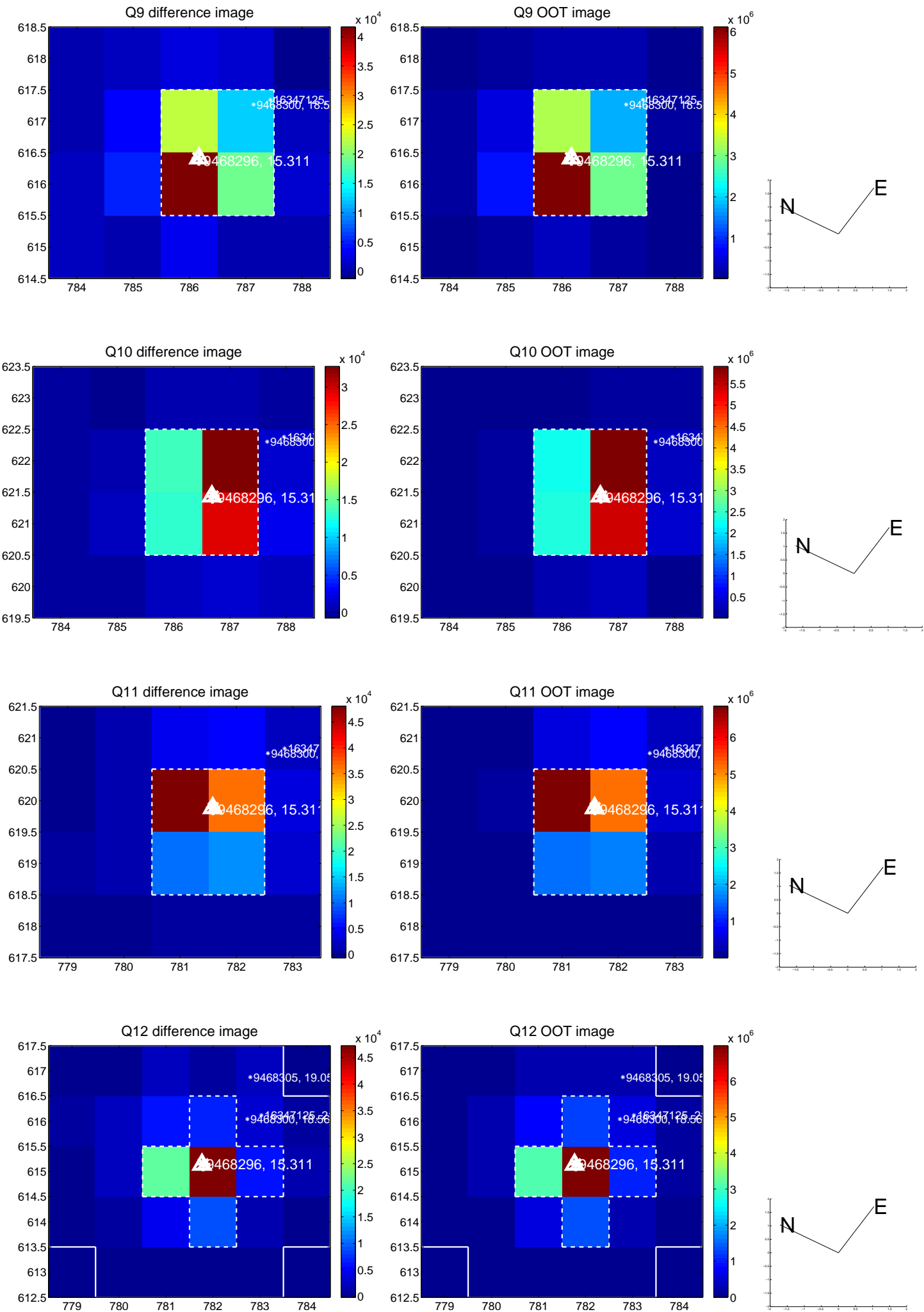
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



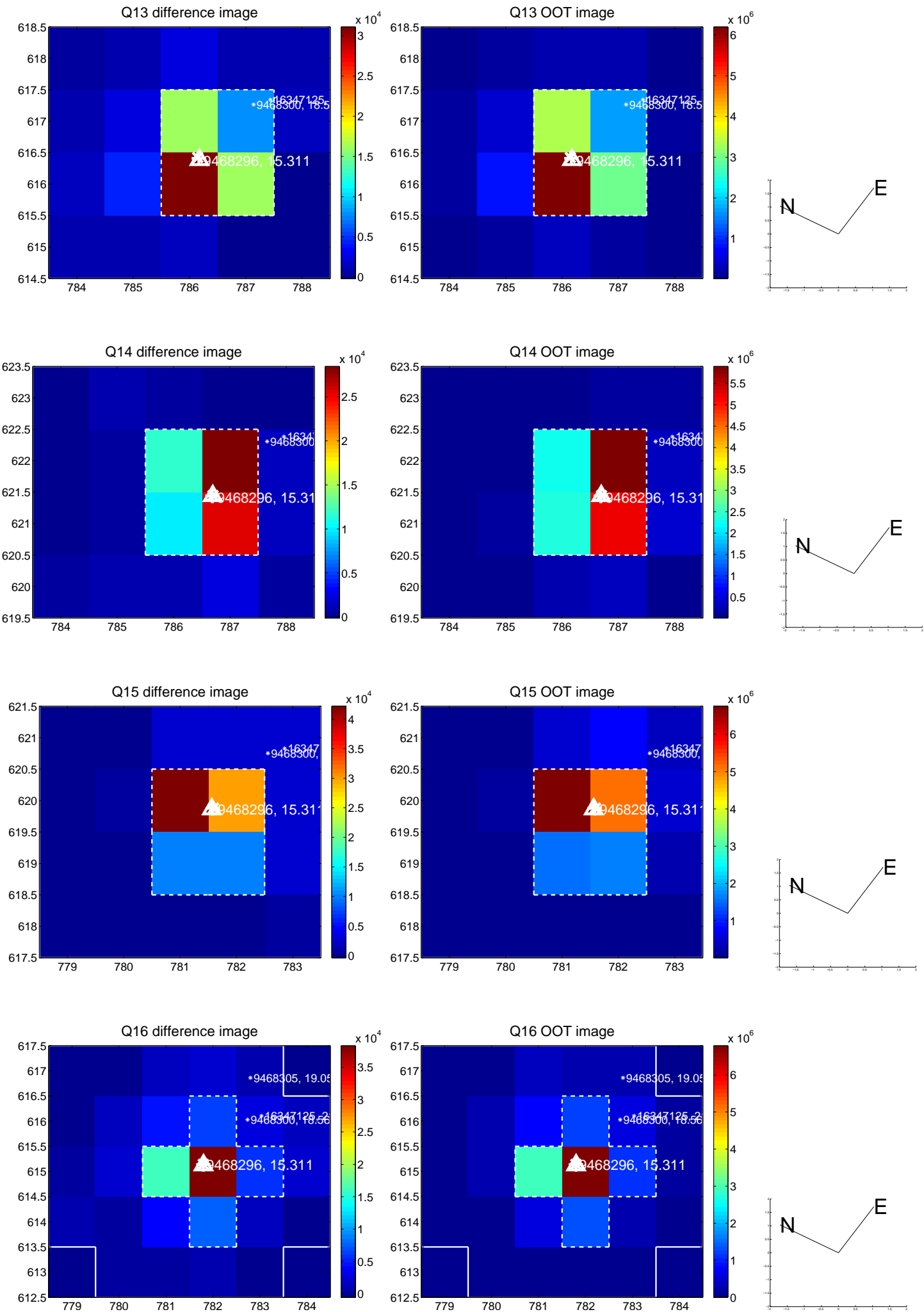
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



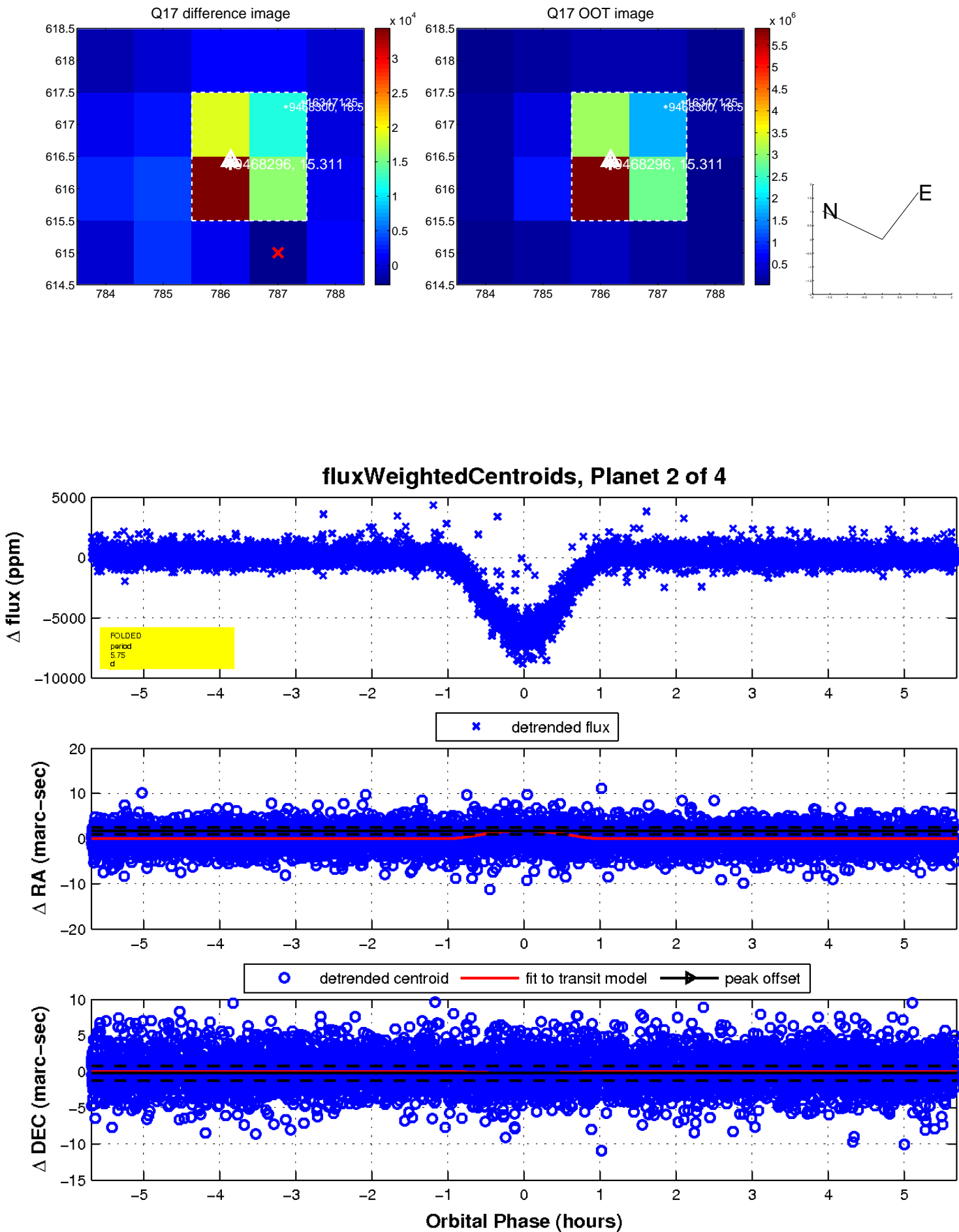
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

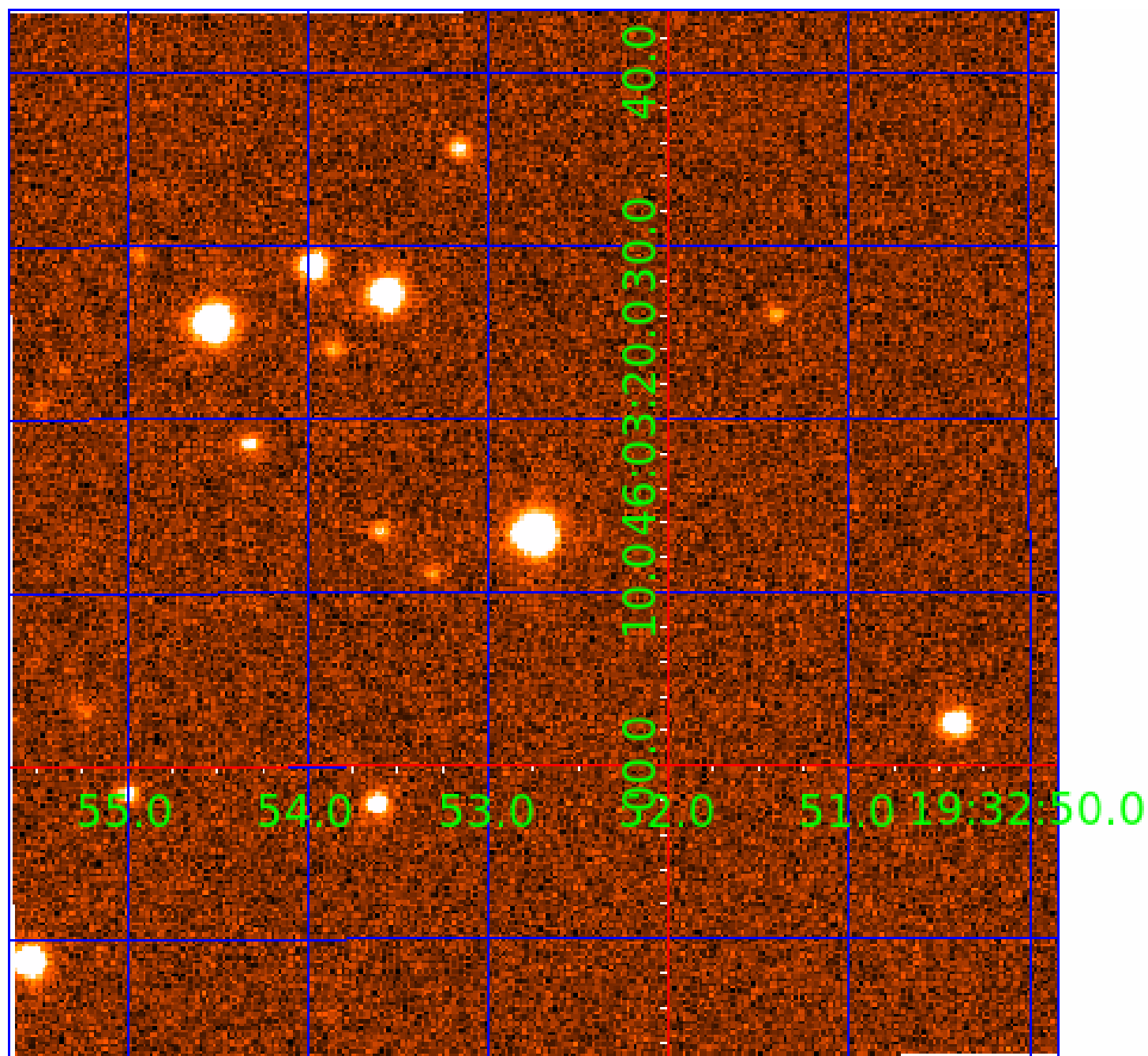


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009468296

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})
009468296-01	OBS	7176.01	5.748820	132.279533	11470.7	1.910	392.9	314.5	0.75	4961	12.17	96.59
009468296-02	OBS	No	5.748818	135.176764	6313.7	1.898	218.3	203.6	0.75	4961	8.61	96.59
009468296-03	OBS	No	556.221177	459.155108	1371.3	7.996	11.1	6.6	0.75	4961	2.94	0.22
009468296-04	OBS	No	528.044058	498.654389	1499.4	3.500	11.4	-1.0	0.75	4961	2.83	0.23

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009468296-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009468296-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009468296-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009468296-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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 009468296-03

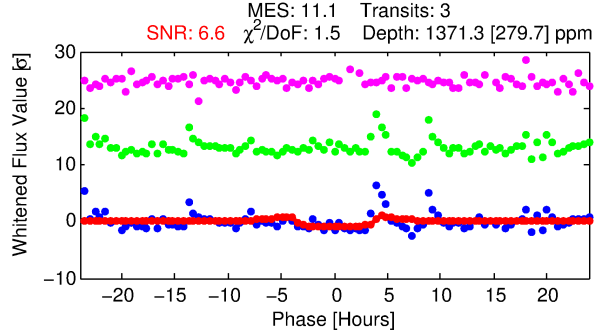
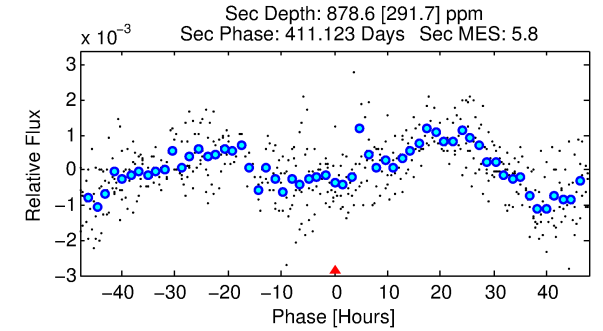
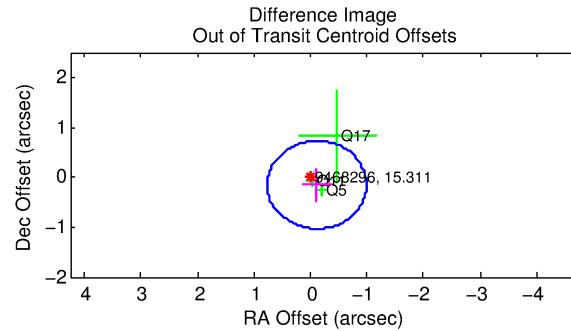
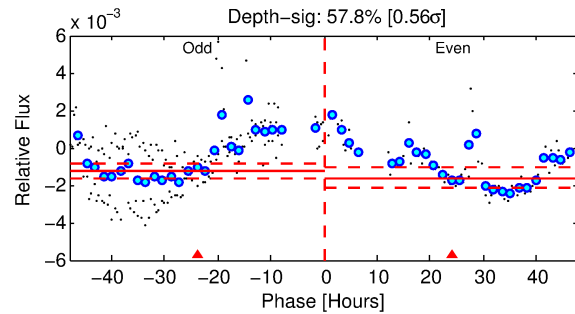
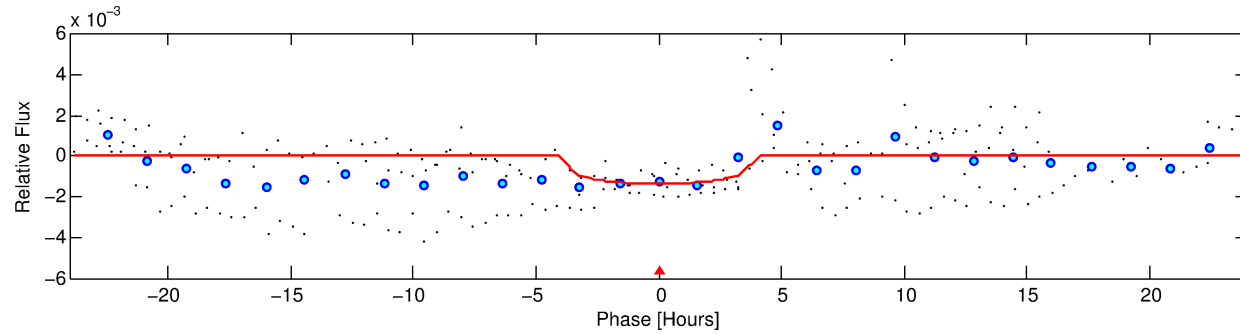
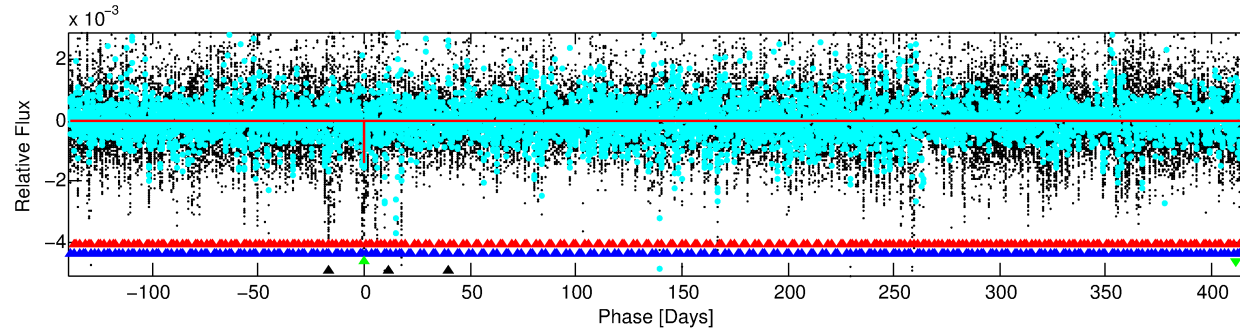
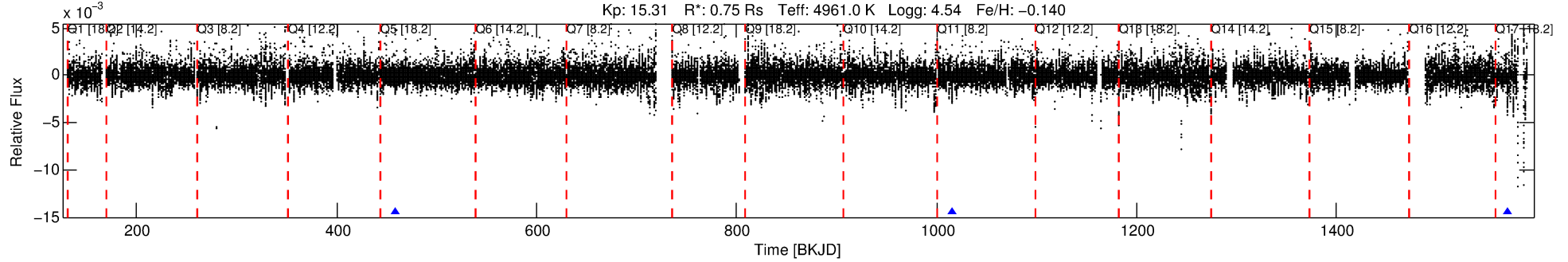
No Significant Match Found

DV One-Page Summary

KIC: 9468296 Candidate: 3 of 4 Period: 556.221 d

KOI: K07176 Corr: No Ephemeris Match

Kp: 15.31 R*: 0.75 Rs Teff: 4961.0 K Logg: 4.54 Fe/H: -0.140



DV Fit Results:

Period = 556.22118 [0.01025] d
Epoch = 459.1551 [0.0131] BKJD
Rp/R* = 0.0358 [0.0346]
a/R* = 418.22 [1399.49]
b = 0.67 [2.75]
Seff = 0.22 [0.04]
Teq = 174 [8] K
Rp = 2.95 [2.86] Re
a = 1.1896 [0.1095] AU
Ag = 78856.98 [154675.95] [0.51σ]
Teffp = 4511 [2211] K [1.96σ]

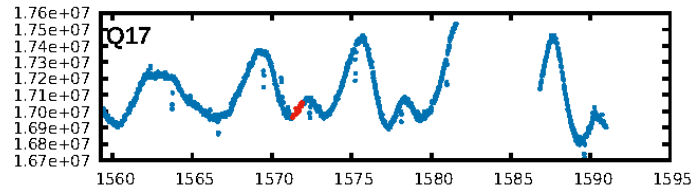
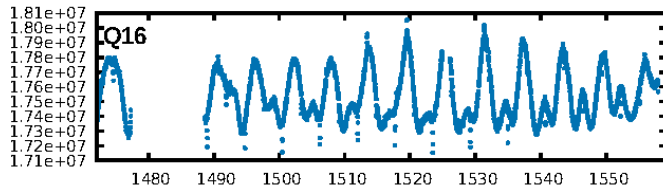
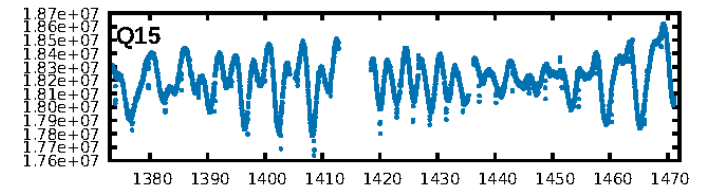
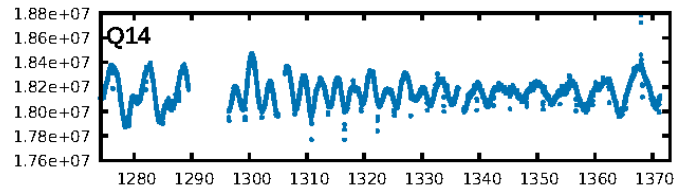
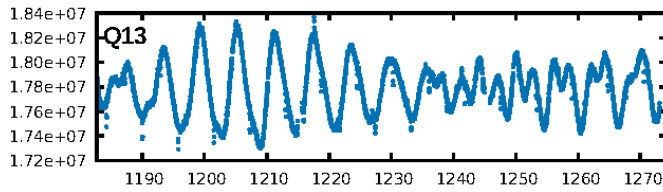
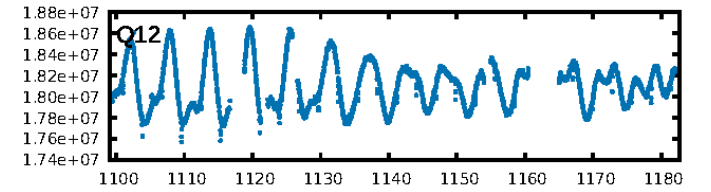
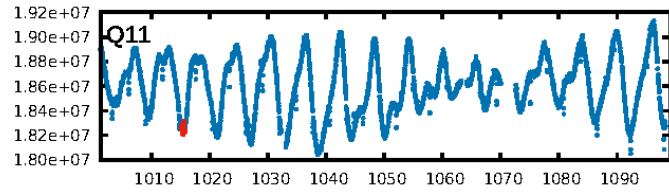
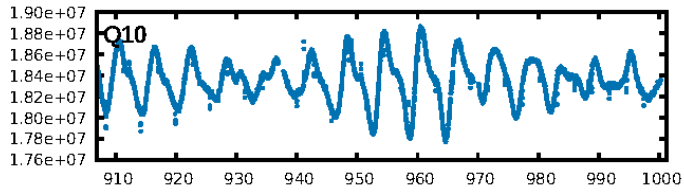
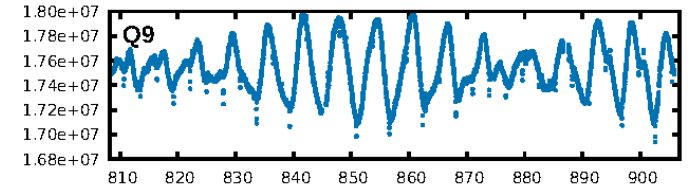
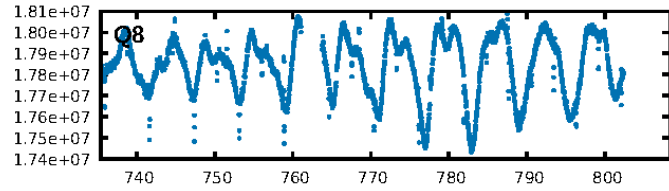
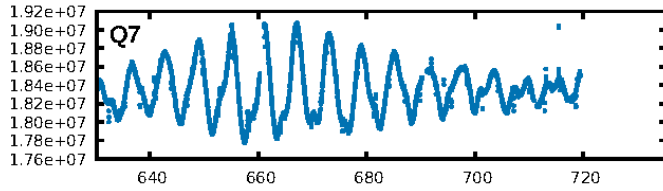
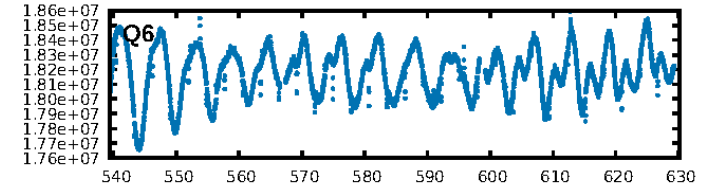
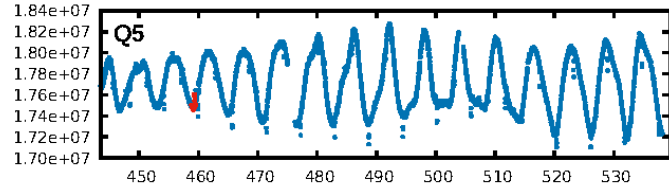
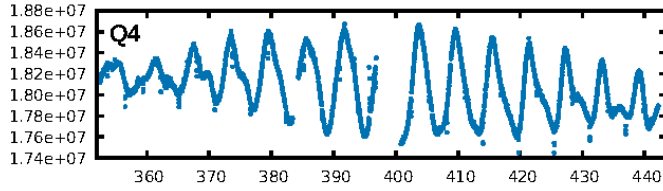
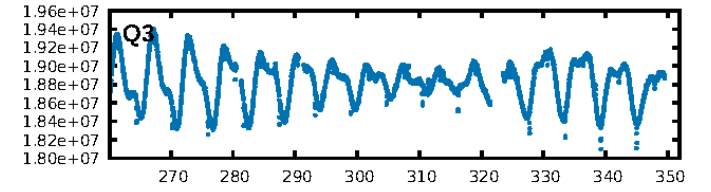
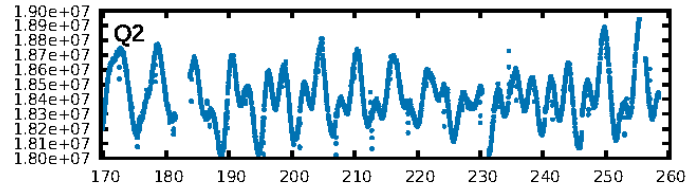
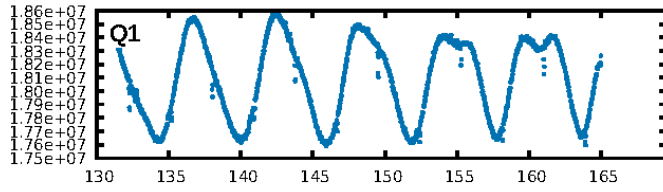
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [77.48σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 1.1%
ModelChiSquareGof-sig: 95.6%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 4.484
Centroid-sig: 91.3%
Centroid-so: 0.261 arcsec [0.24σ]
OotOffset-rm: 0.190 arcsec [0.65σ]
OotOffset-st: 0/1/0/2 [3]
KicOffset-rm: 0.263 arcsec [0.89σ]
KicOffset-st: 0/1/0/2 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

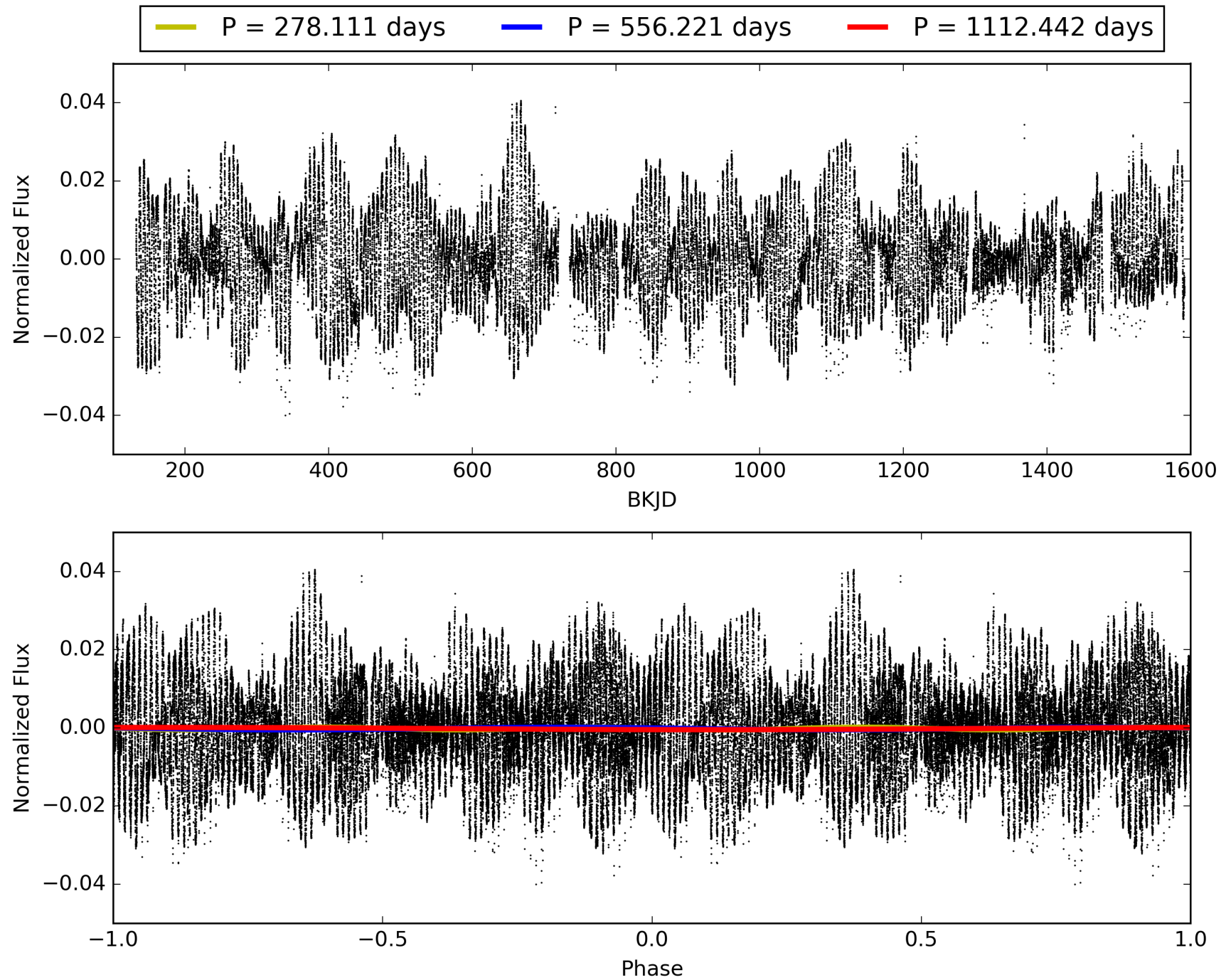
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:54:38 Z

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

TCE 009468296-03, PDC Light Curves

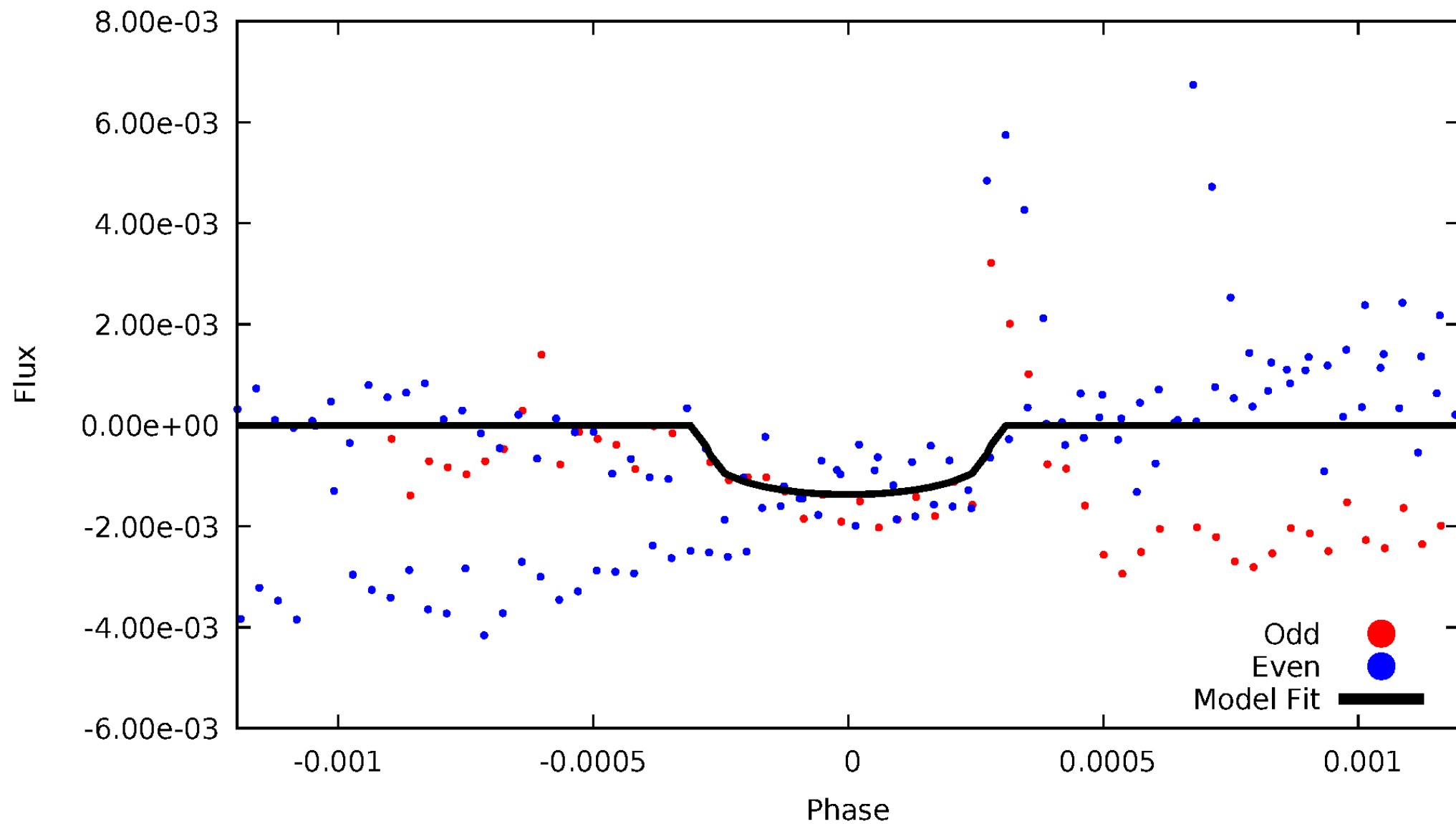


TCE 009468296-03



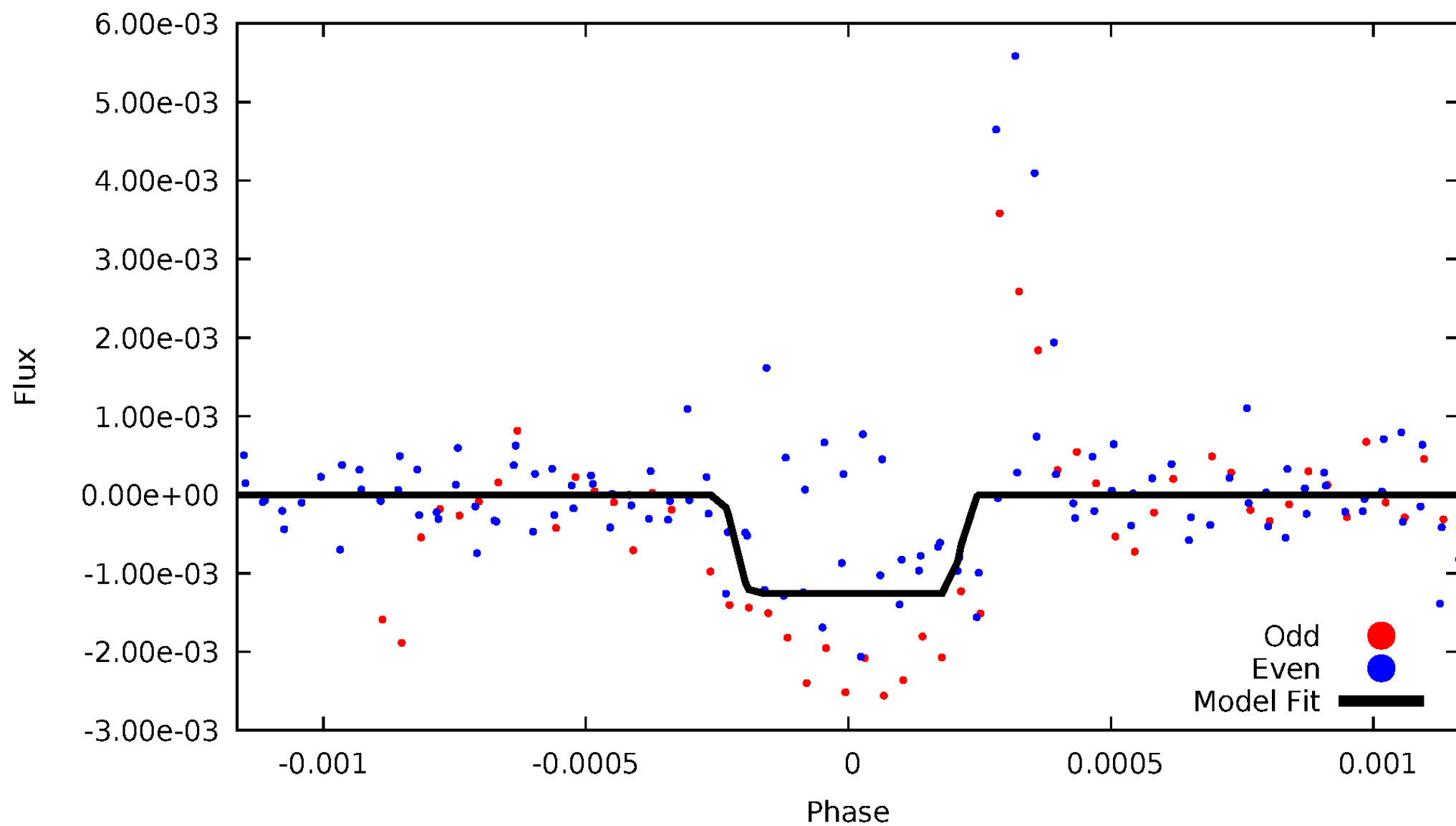
DV Odd/Even

TCE 009468296-03



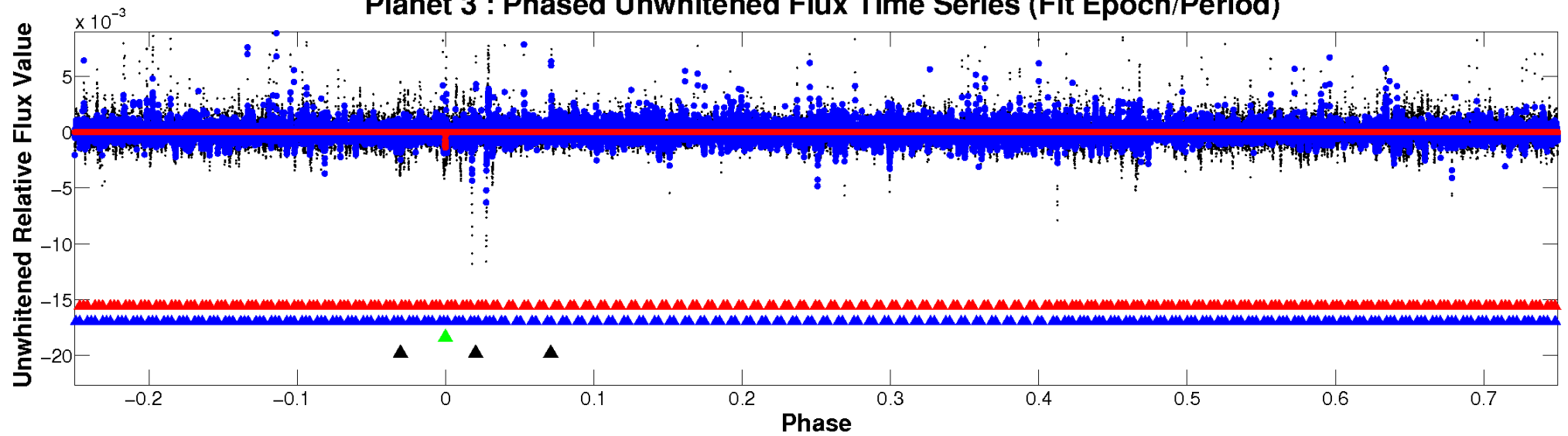
ALT Odd/Even

TCE 009468296-03

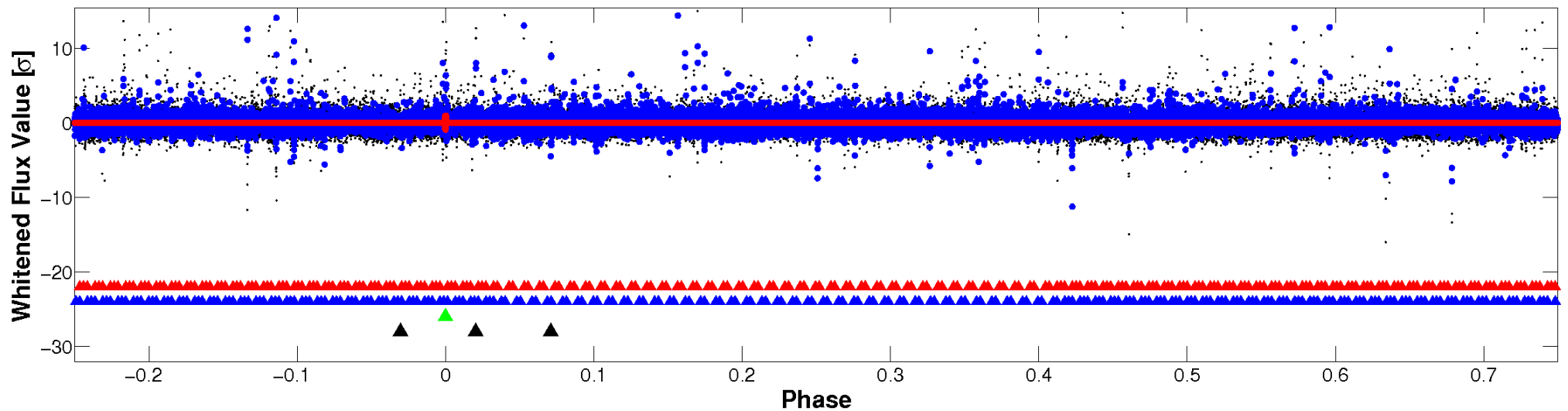


Non-Whitened Vs. Whitened Light Curve

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

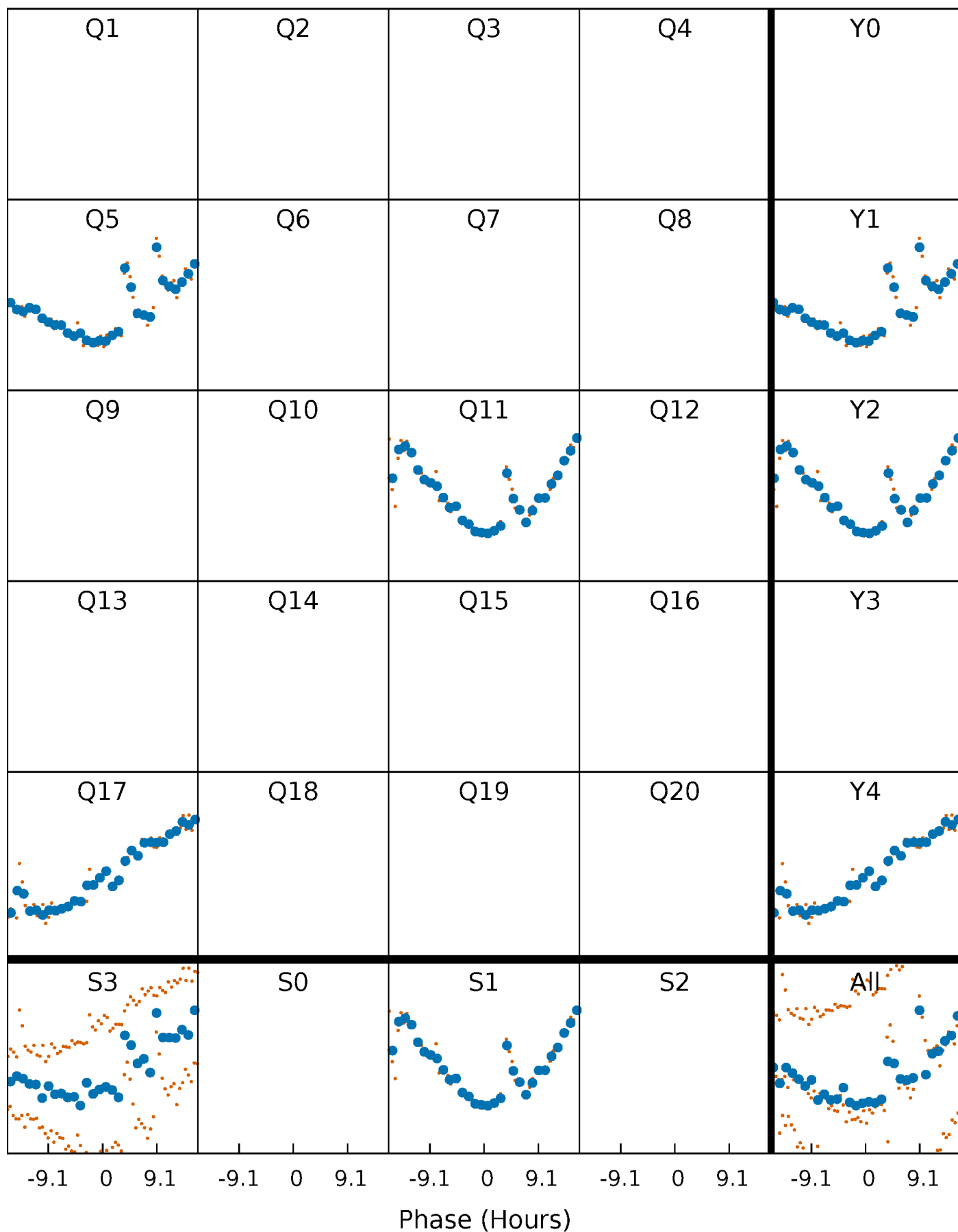


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



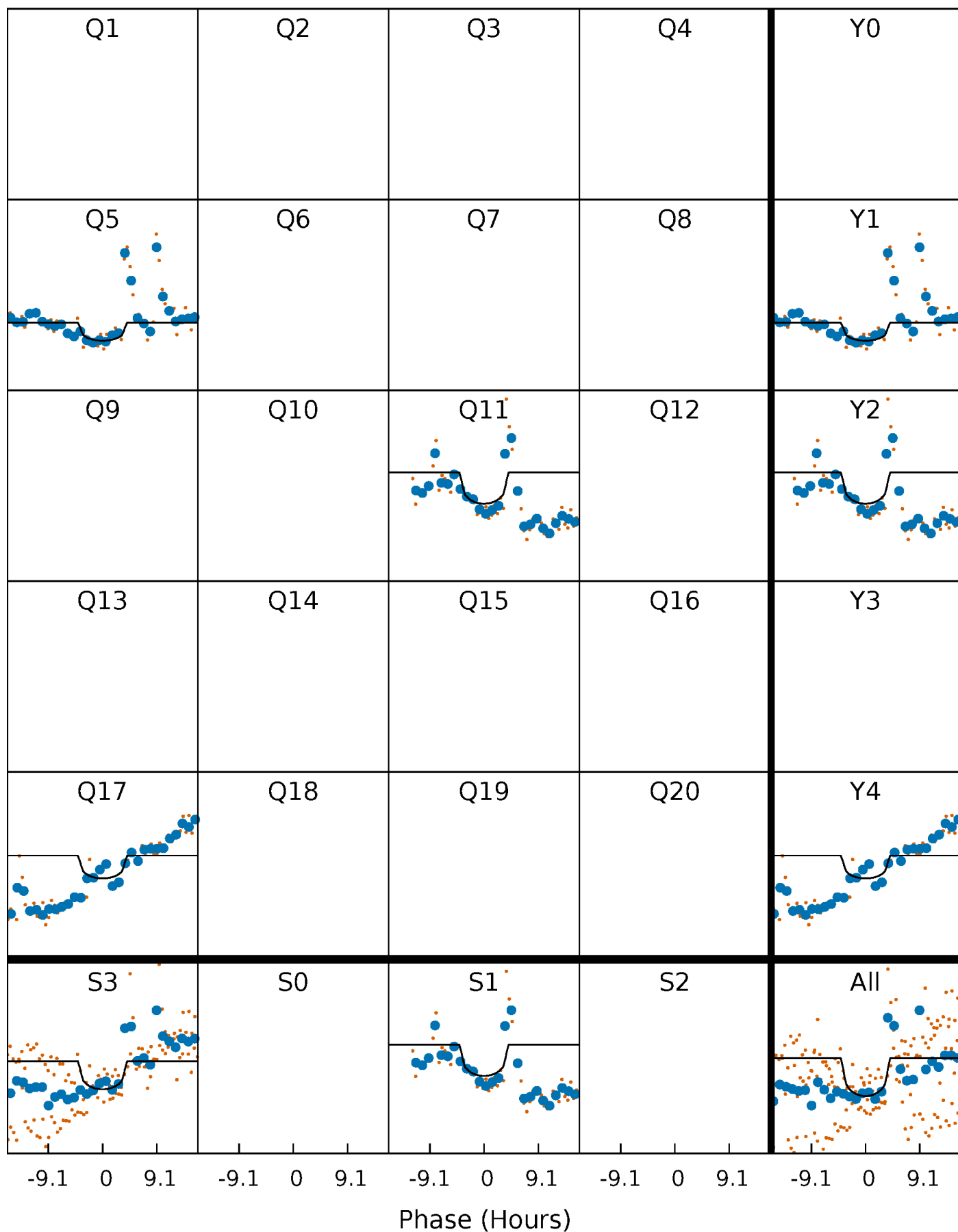
PDC Quarter-Phased Transit Curves

TCE 009468296-03 $P=556.221177$ Days $T_0=459.155108$ (BKJD)



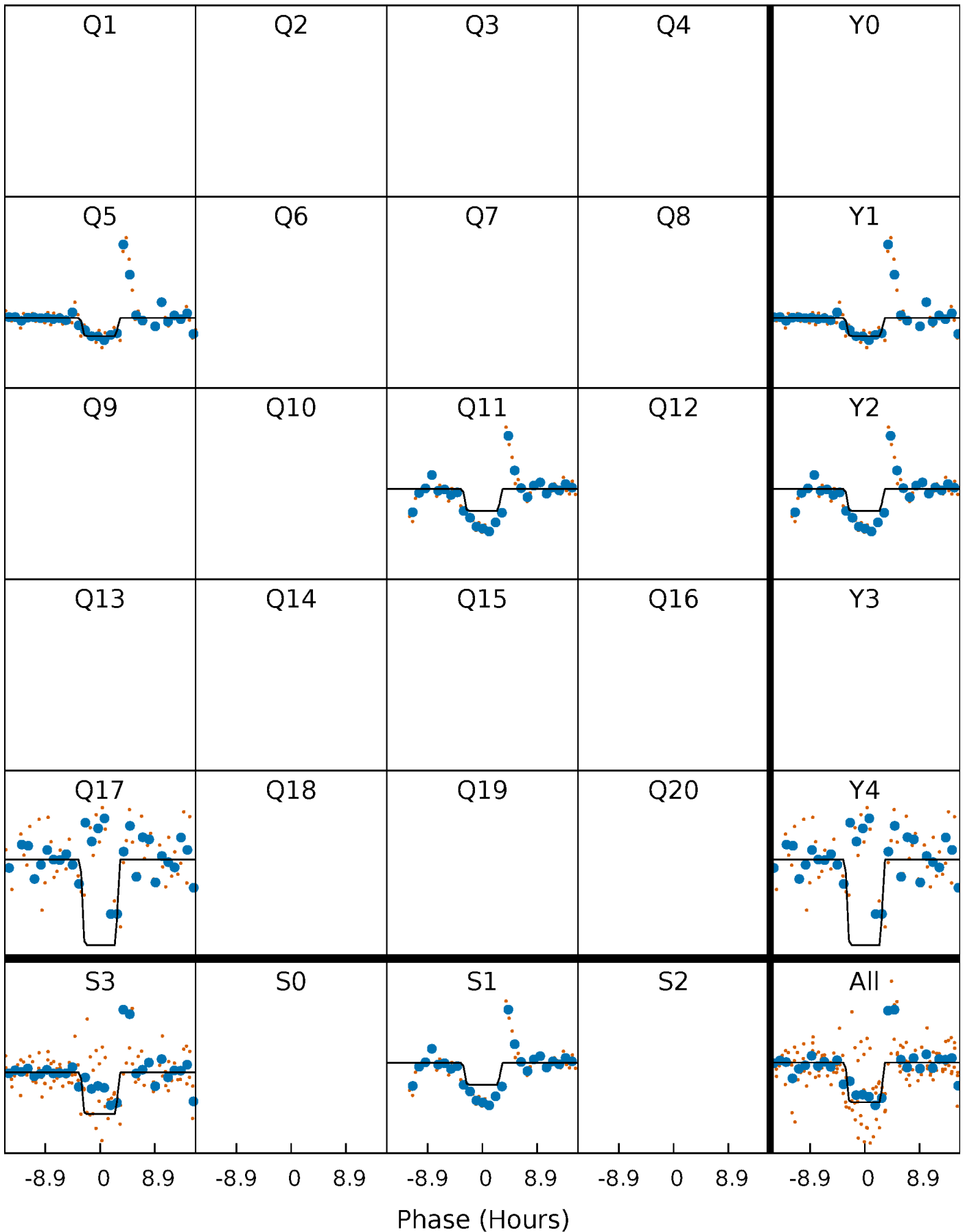
DV Quarter-Phased Transit Curves

TCE 009468296-03 $P=556.221177$ Days $T_0=459.155108$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

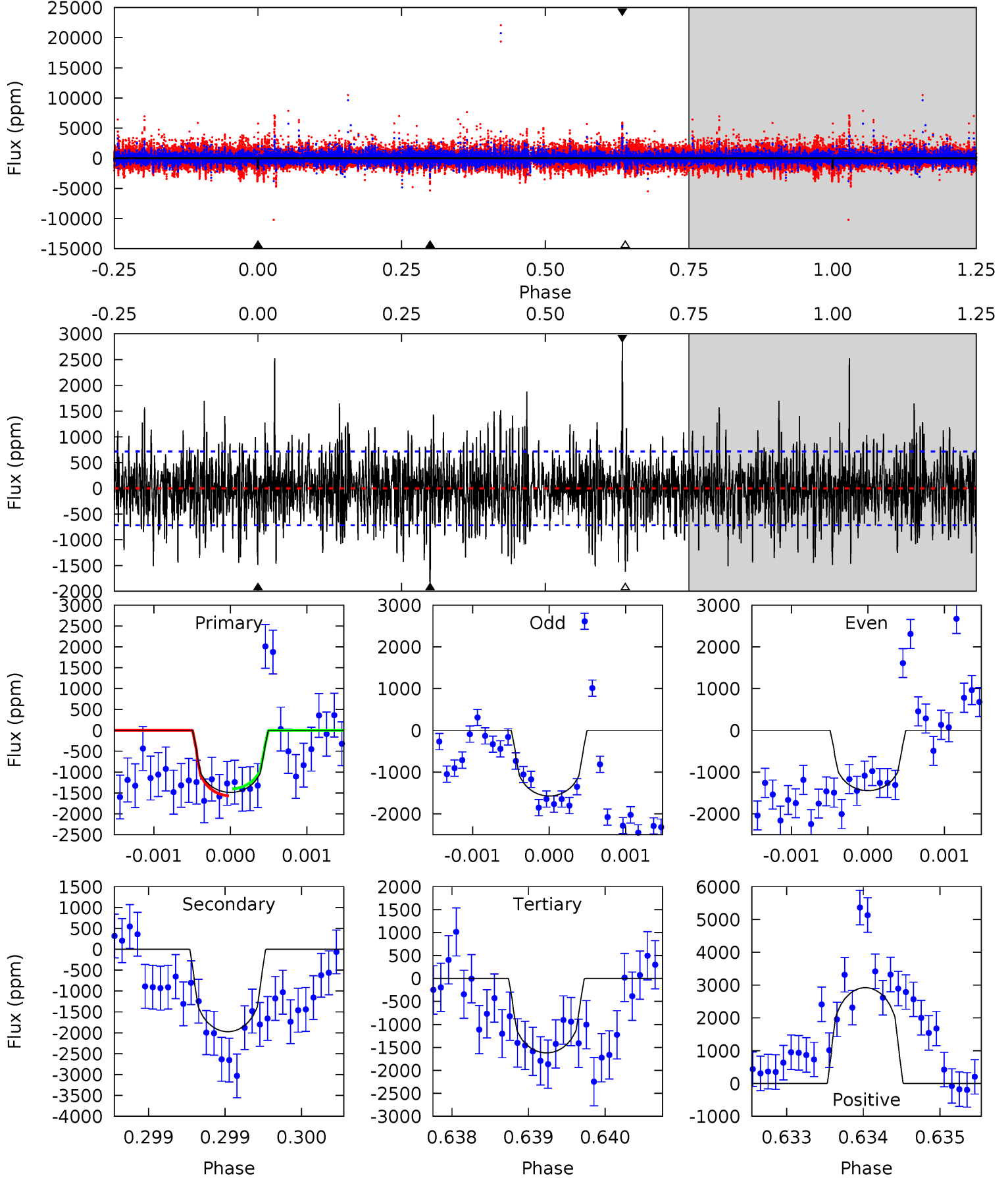
TCE 009468296-03 $P=556.221937$ Days $T_0=459.149777$ (BKJD)



DV Model-Shift Uniqueness Test

009468296-03, P = 556.221177 Days, E = 459.155108 Days

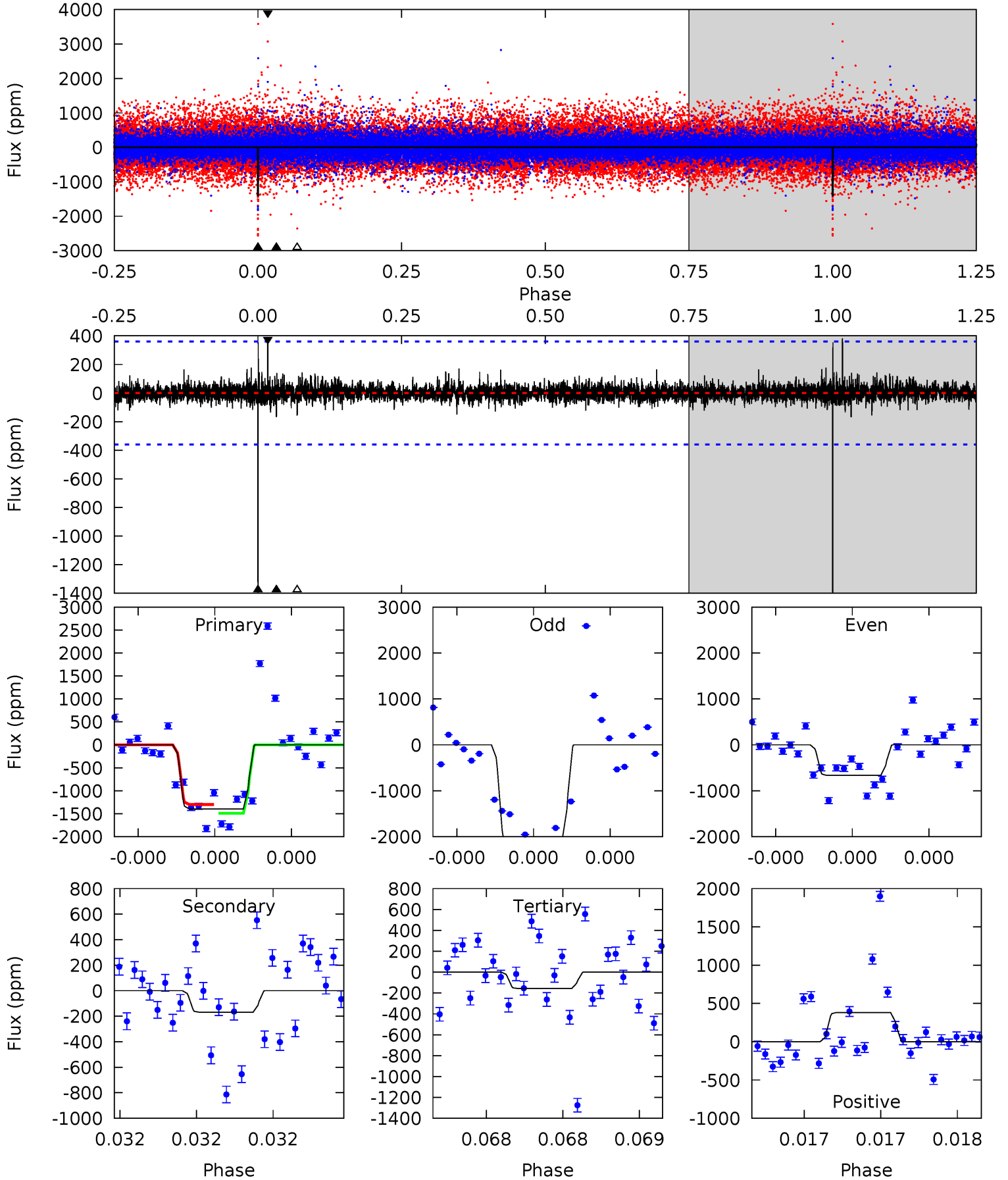
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	15.2	12.5	22.6	5.53	3.42	3.61	-1.01	-11.1	2.74	-7.31	0.44	0.93	0.60	0.64



Alt Model-Shift Uniqueness Test

009468296-03, P = 556.221937 Days, E = 459.149777 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.6	2.62	2.43	5.94	5.58	3.49	0.52	19.2	15.7	0.19	-3.32	11.1	0.88	0.22	1.50



Stellar Parameters For KIC 009468296

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4961^{+151}_{-136}	$4.545^{+0.078}_{-0.058}$	$-0.140^{+0.300}_{-0.300}$	$0.753^{+0.071}_{-0.079}$	$0.725^{+0.093}_{-0.057}$	$2.395^{+0.729}_{-0.421}$
	+3%/-3%	+2%/-1%	+214%/-214%	+9%/-10%	+13%/-8%	+30%/-18%
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 009468296-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1973 ± 129	$3.46^{+2.55}_{-2.18}$	243^{+9}_{-9}	5076^{+3561}_{-1002}	$126769^{+876185}_{-84589}$
Alt.	-169 ± 64	$3.39^{+2.57}_{-1.90}$	243^{+9}_{-9}	3259^{+1105}_{-475}	10960^{+47238}_{-7474}

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

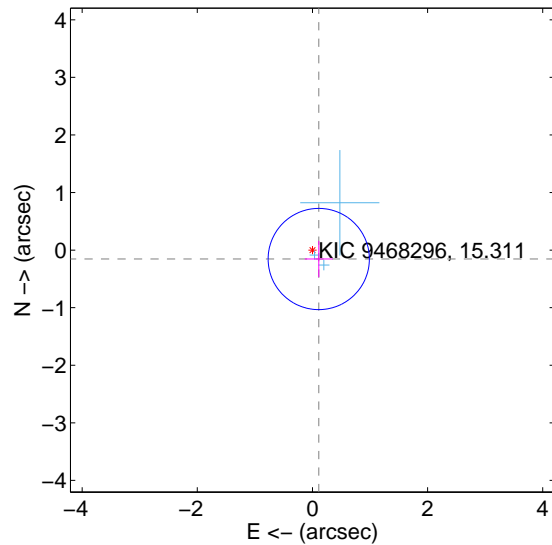
Supplemental centroid analysis for 009468296-03. Kepler magnitude: 15.31. Transit SNR 6.59

There are 3 quarters with good PRF difference image offsets

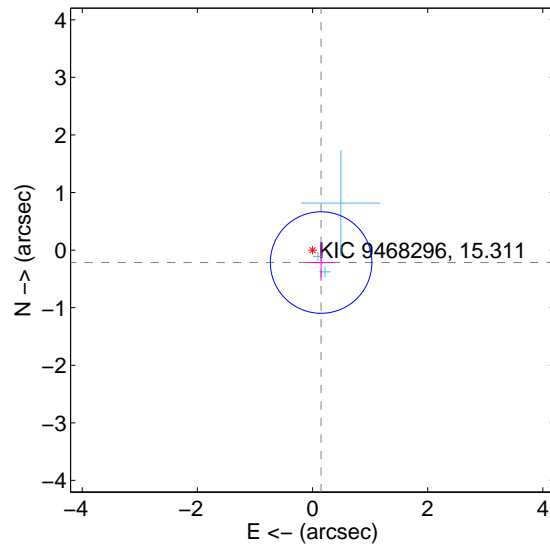
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.190 ± 0.293	0.65	-0.110 ± 0.243	-0.155 ± 0.315
PRF-fit source offset from KIC position	0.263 ± 0.294	0.89	-0.149 ± 0.243	-0.216 ± 0.315
photometric centroid source offset	0.26 ± 1.08	0.24	0.24 ± 1.09	0.09 ± 0.99

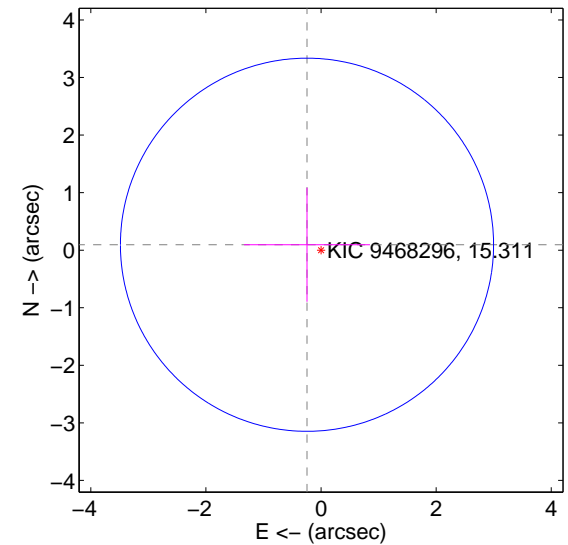
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

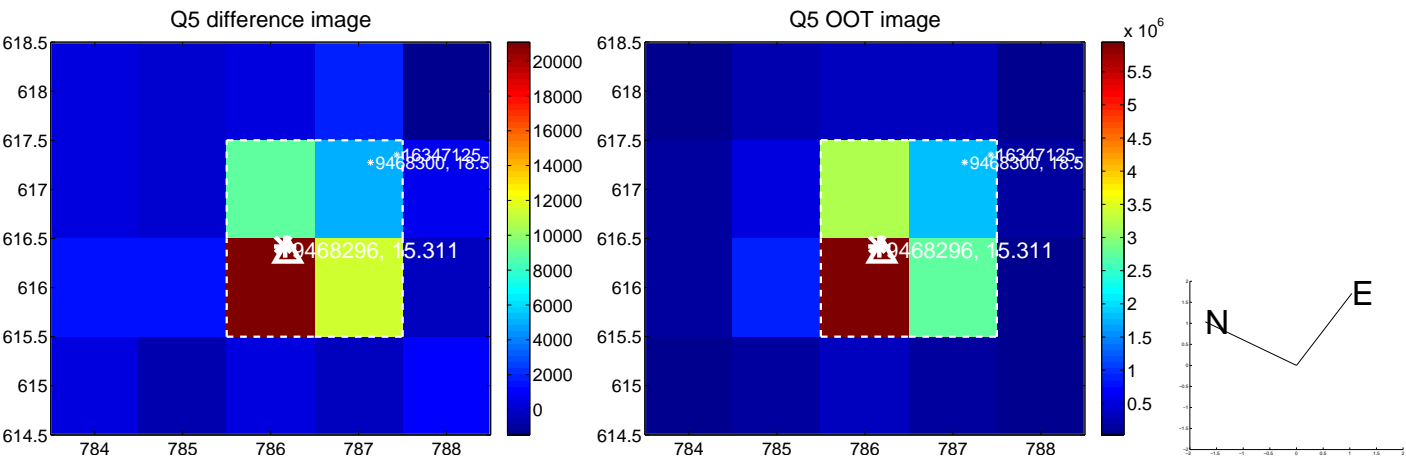


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

Q9 no difference image



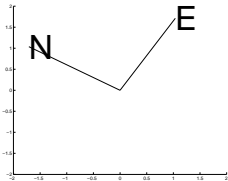
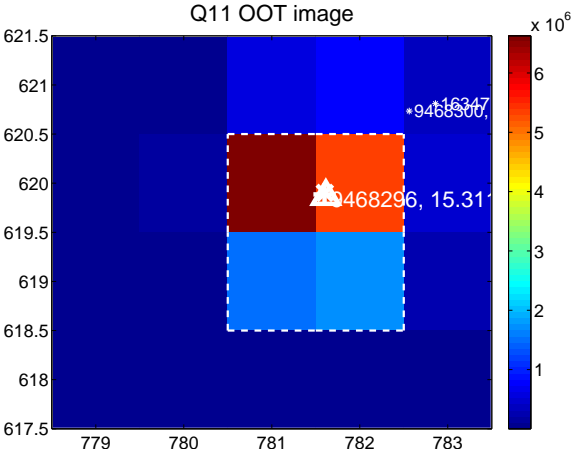
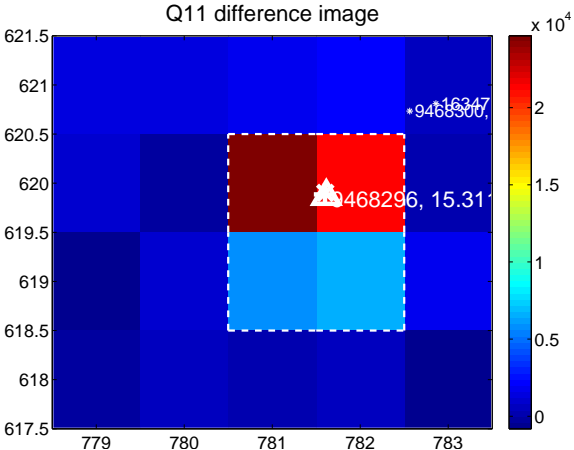
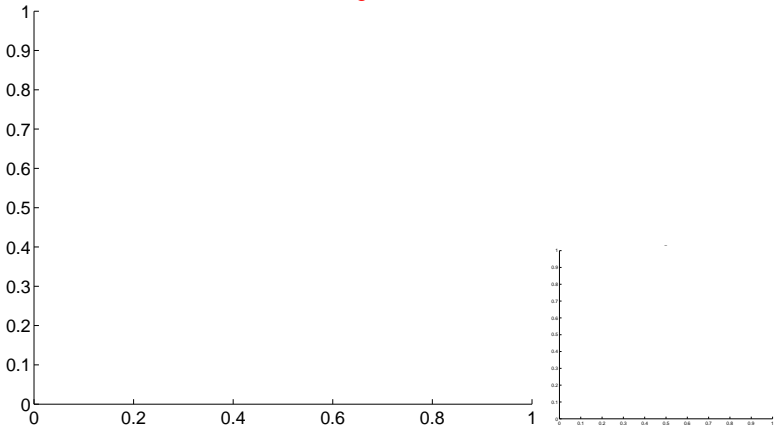
Q9 no OOT image



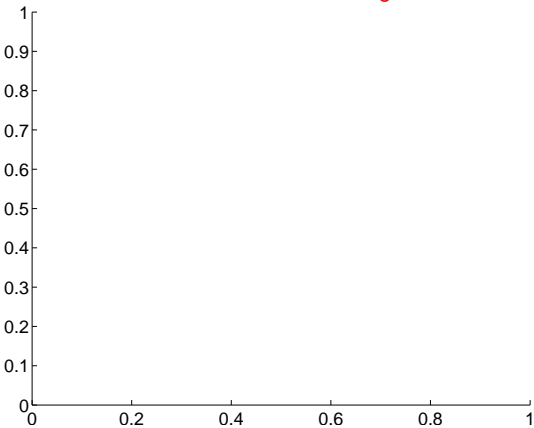
Q10 no difference image



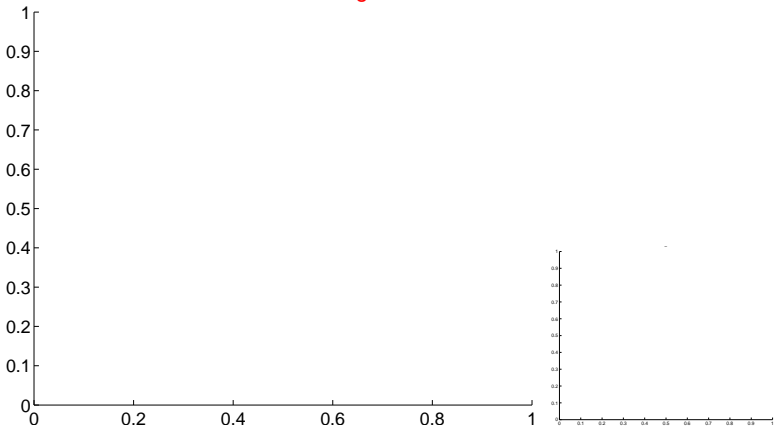
Q10 no OOT image



Q12 no difference image



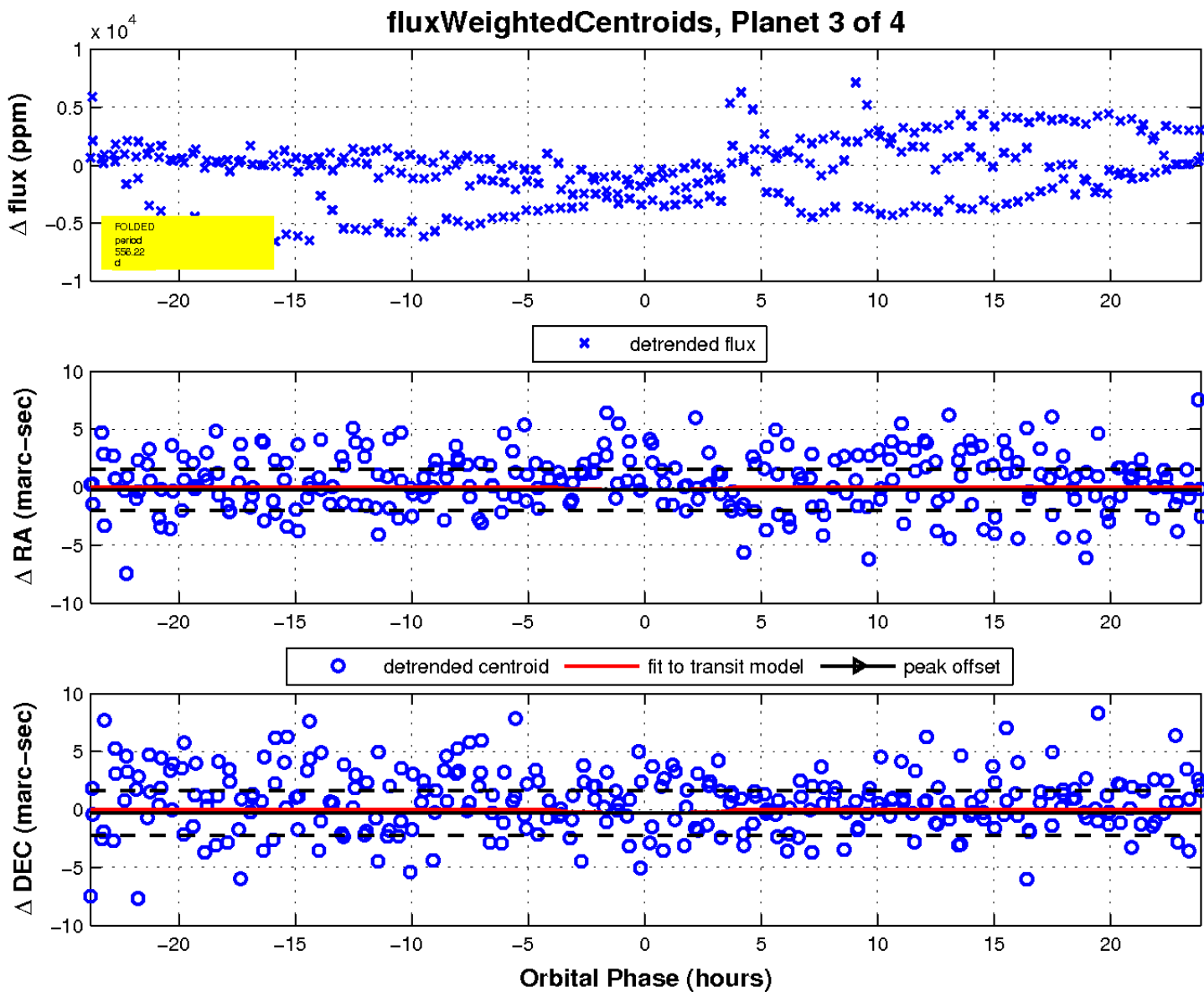
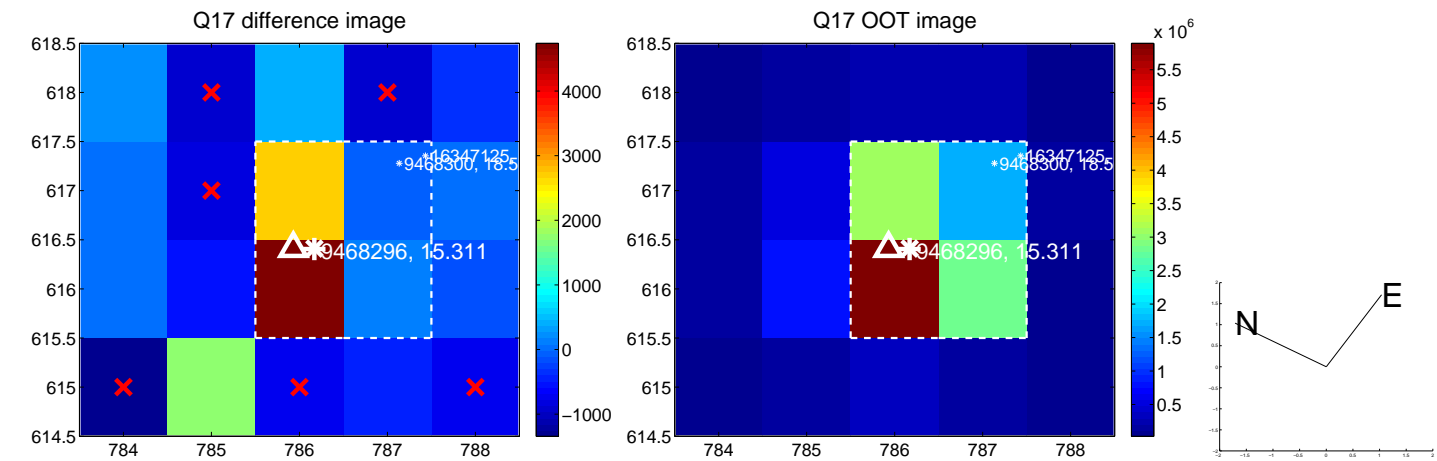
Q12 no OOT image



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

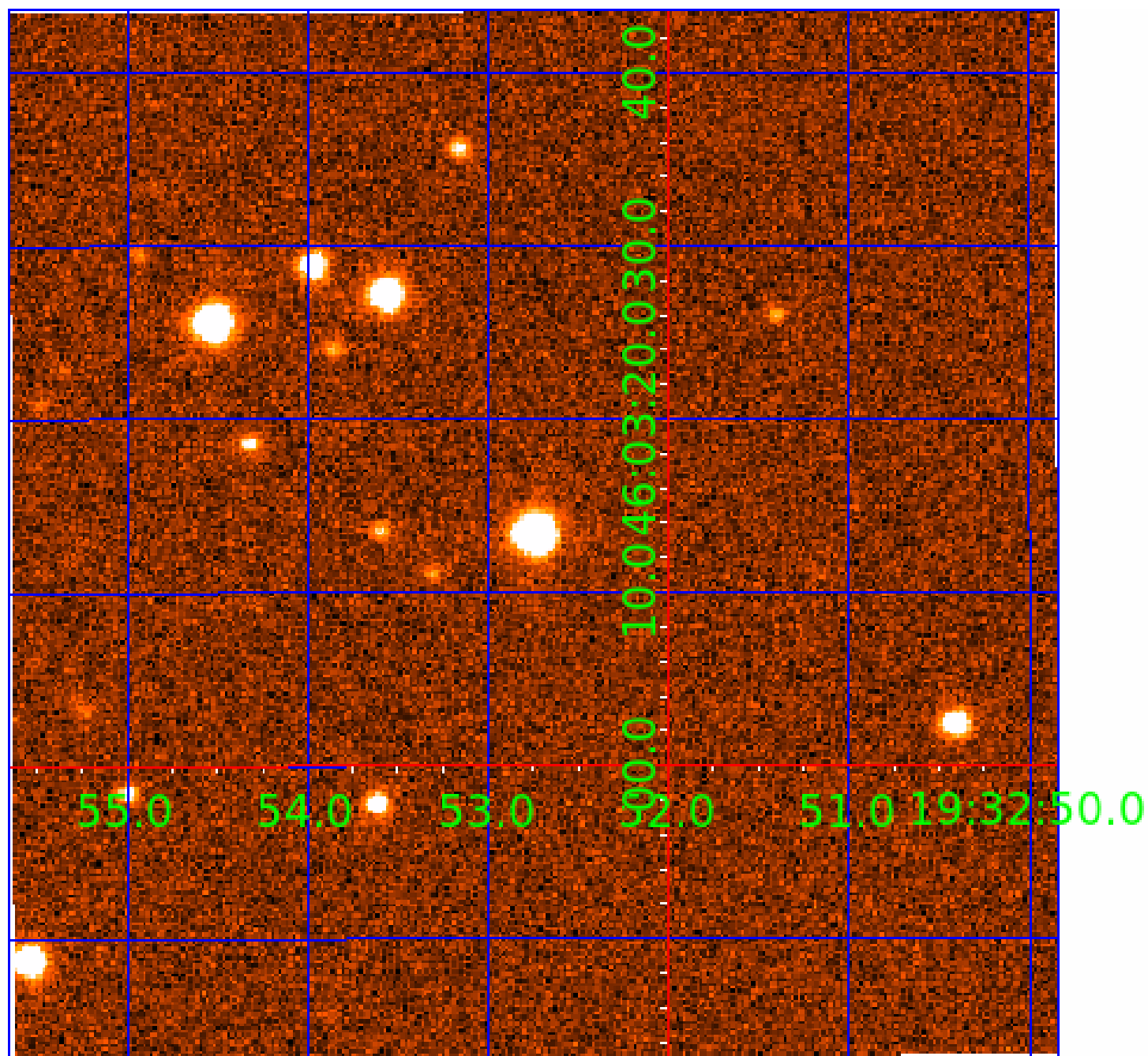


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009468296

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})
009468296-01	OBS	7176.01	5.748820	132.279533	11470.7	1.910	392.9	314.5	0.75	4961	12.17	96.59
009468296-02	OBS	No	5.748818	135.176764	6313.7	1.898	218.3	203.6	0.75	4961	8.61	96.59
009468296-03	OBS	No	556.221177	459.155108	1371.3	7.996	11.1	6.6	0.75	4961	2.94	0.22
009468296-04	OBS	No	528.044058	498.654389	1499.4	3.500	11.4	-1.0	0.75	4961	2.83	0.23

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009468296-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE
009468296-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE
009468296-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009468296-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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 009468296-04

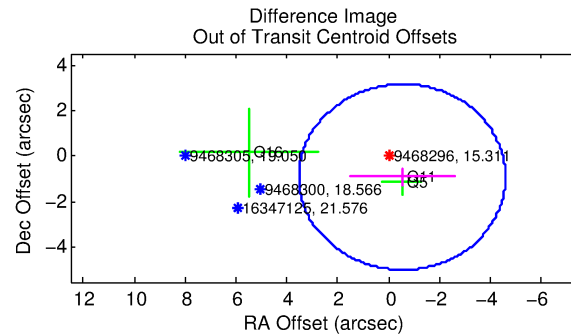
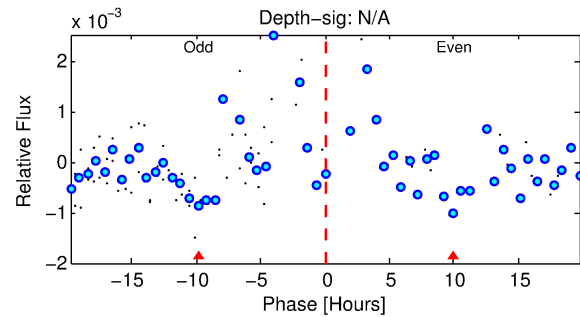
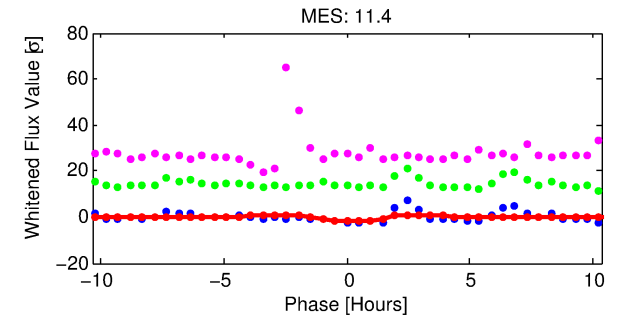
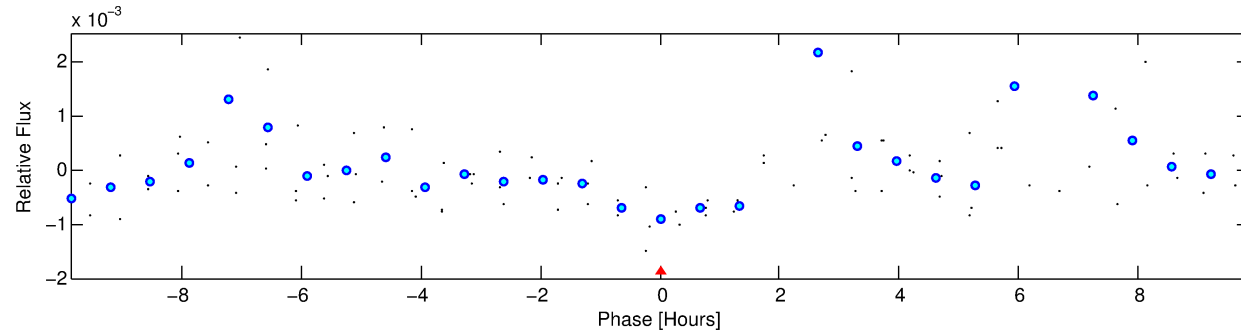
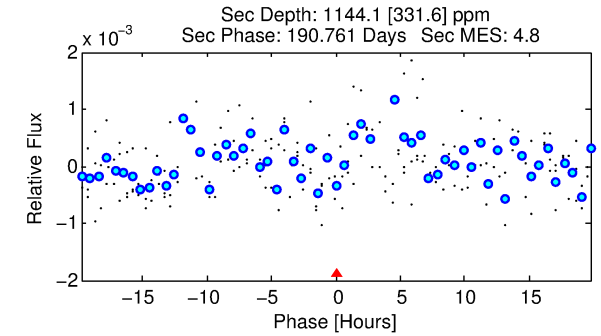
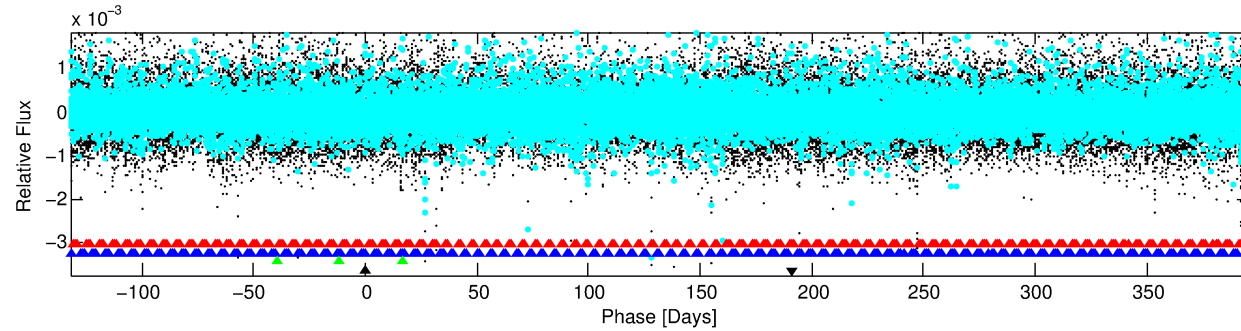
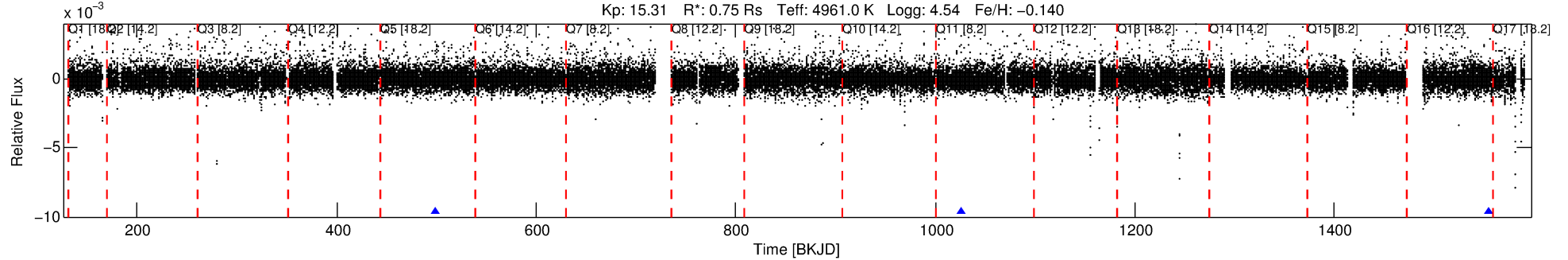
No Significant Match Found

DV One-Page Summary

KIC: 9468296 Candidate: 4 of 4 Period: 528.044 d

KOI: K07176 Corr: No Ephemeris Match

Kp: 15.31 R*: 0.75 Rs Teff: 4961.0 K Logg: 4.54 Fe/H: -0.140



TPS TCE Results:

Period = 528.04406 d
Epoch = 498.6544 BKJD

DV fit results are unavailable

DV Diagnostic Results:

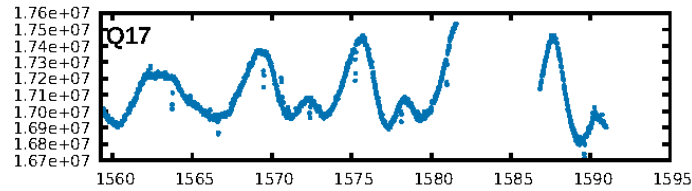
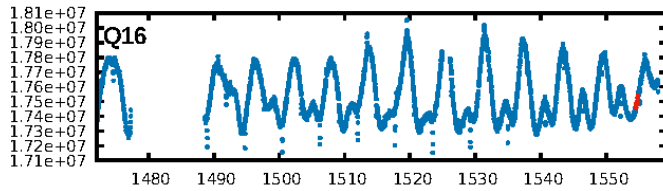
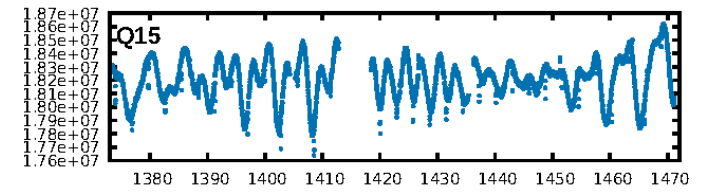
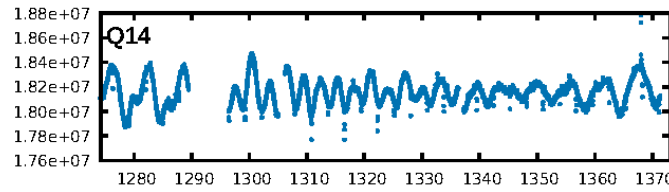
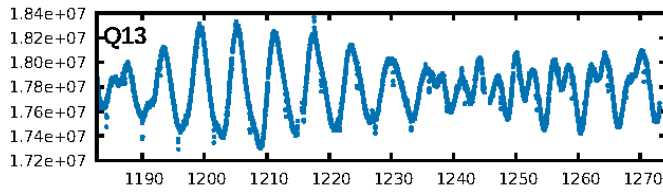
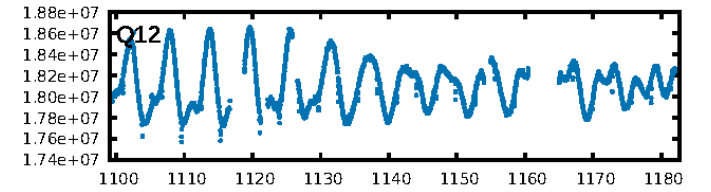
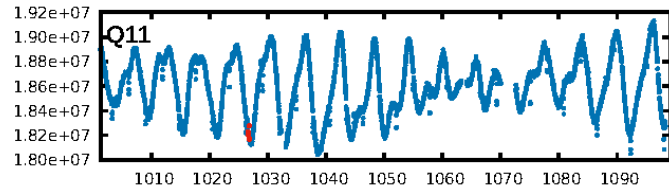
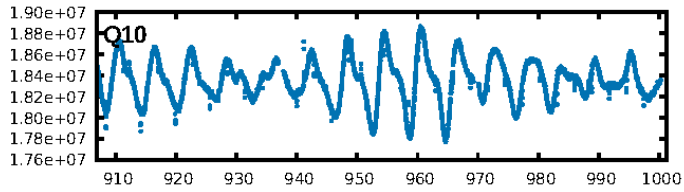
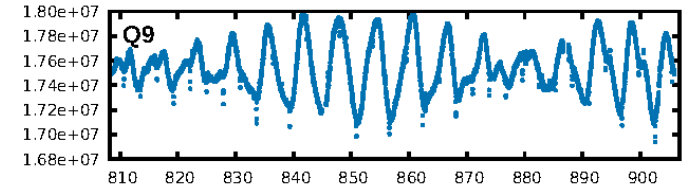
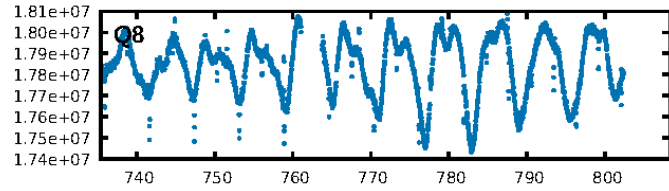
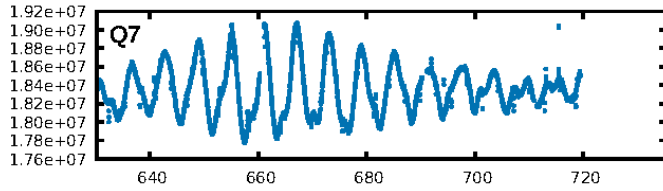
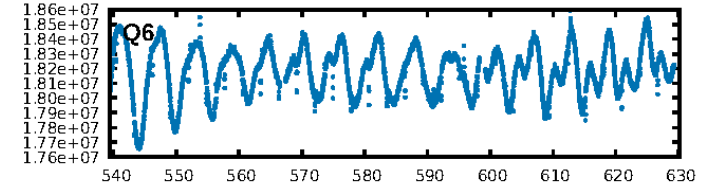
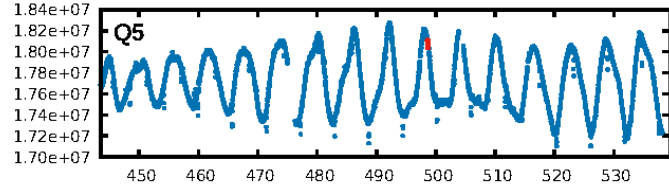
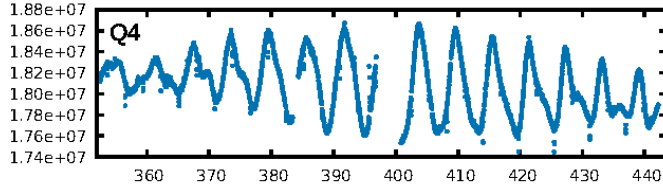
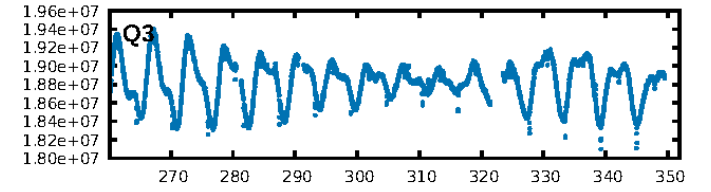
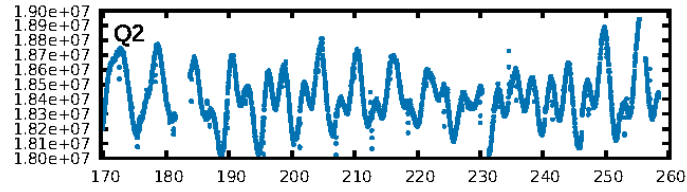
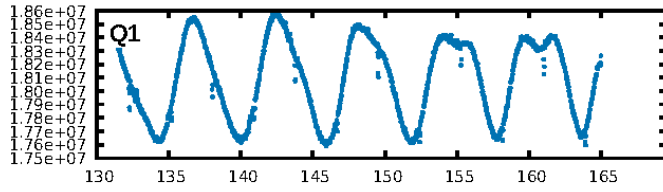
ShortPeriod-sig: 100.0% [3143.89σ]
LongPeriod-sig: 100.0% [77.48σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.491

Centroid-sig: 74.7%
Centroid-so: 0.865 arcsec [0.44σ]
OotOffset-rm: 1.053 arcsec [0.78σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-rm: 1.107 arcsec [1.11σ]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.67 [2/3]

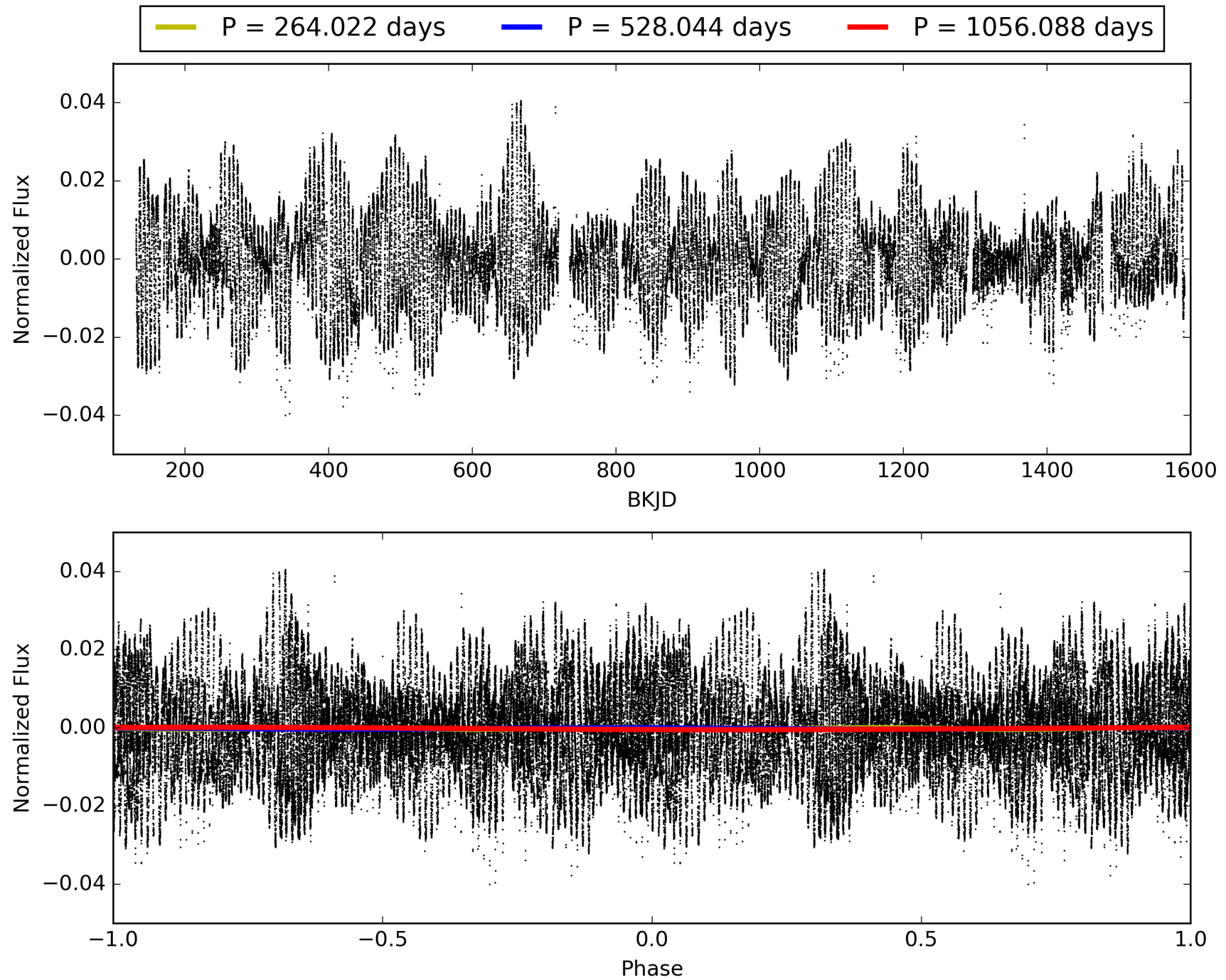
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:54:58 Z

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

TCE 009468296-04, PDC Light Curves

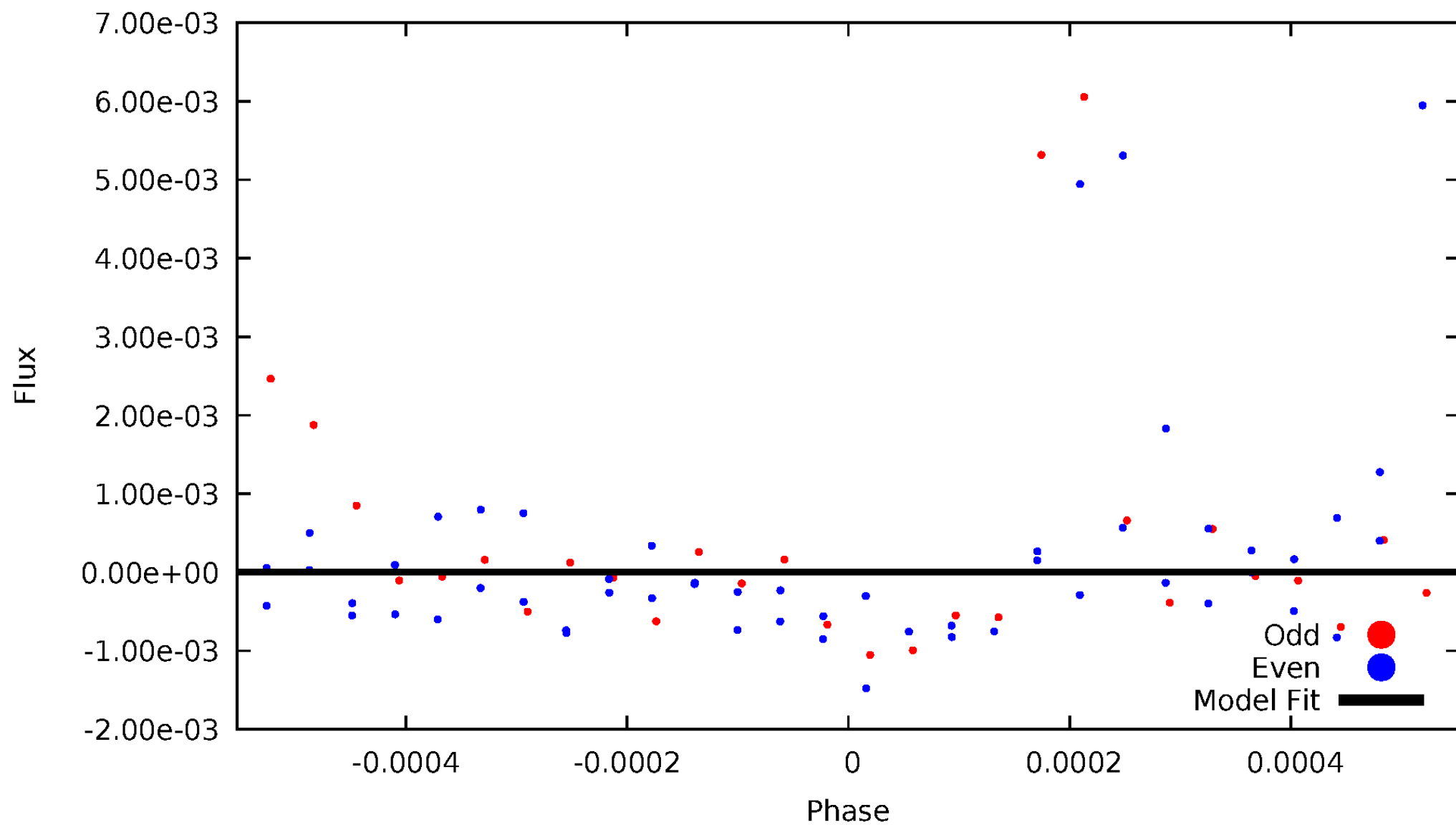


TCE 009468296-04



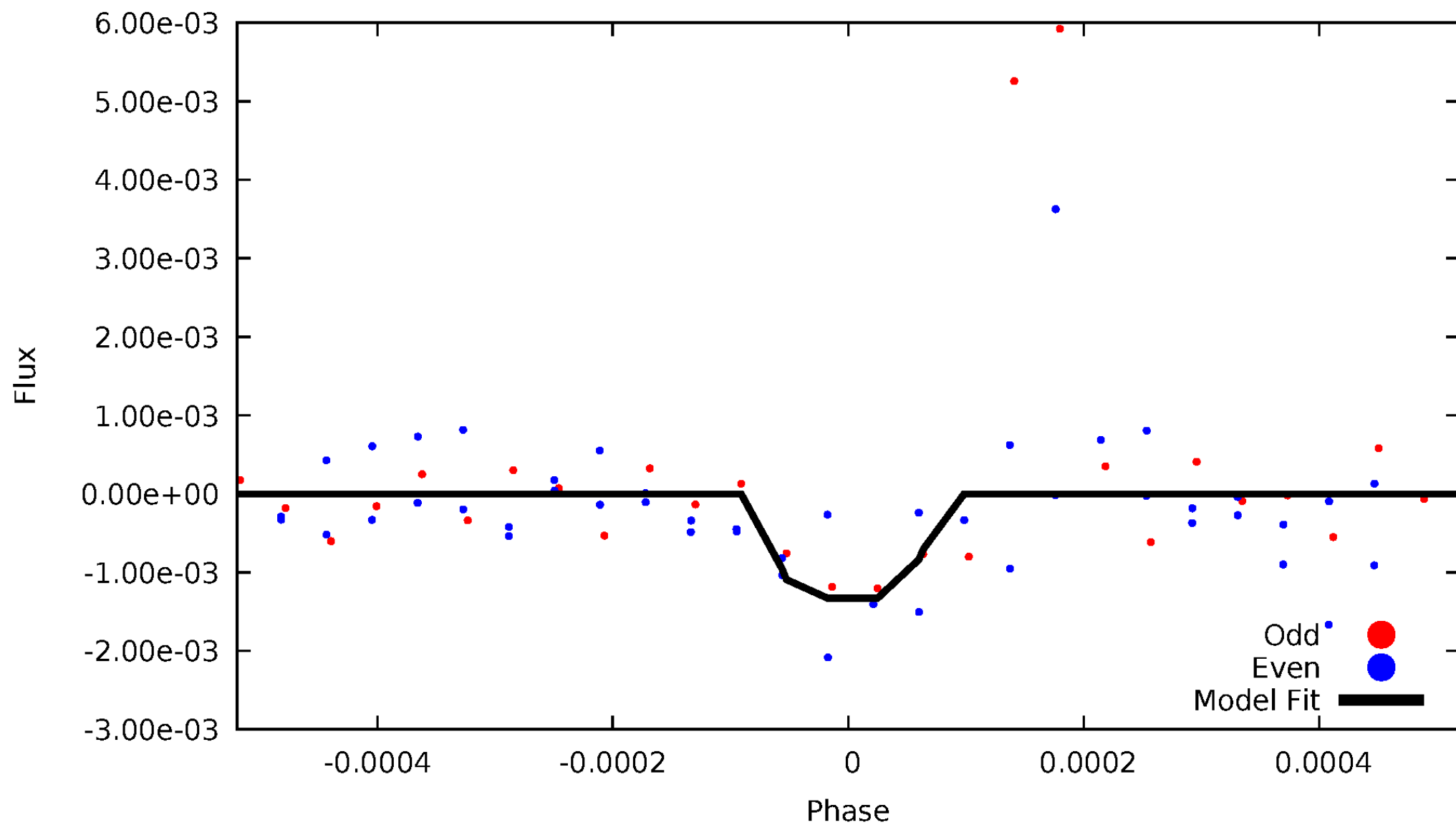
DV Odd/Even

TCE 009468296-04



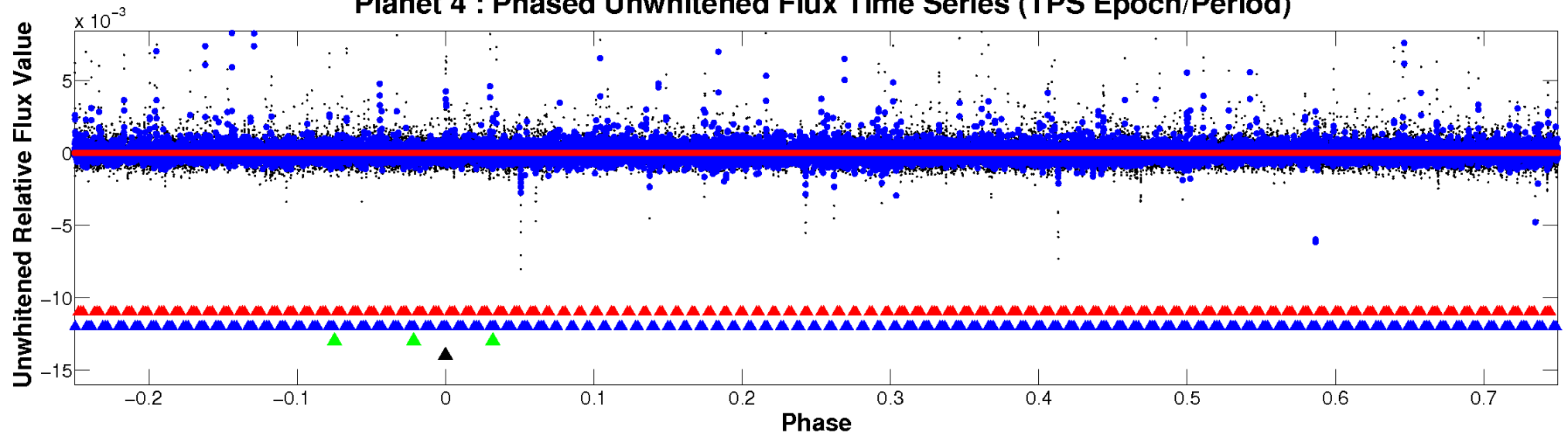
ALT Odd/Even

TCE 009468296-04

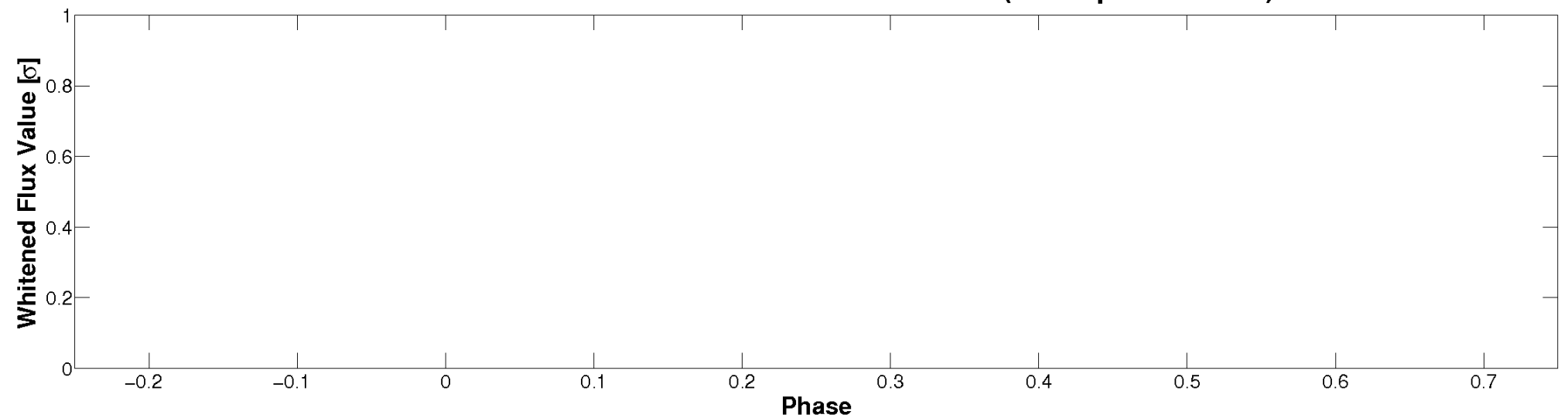


Non-Whitened Vs. Whitened Light Curve

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

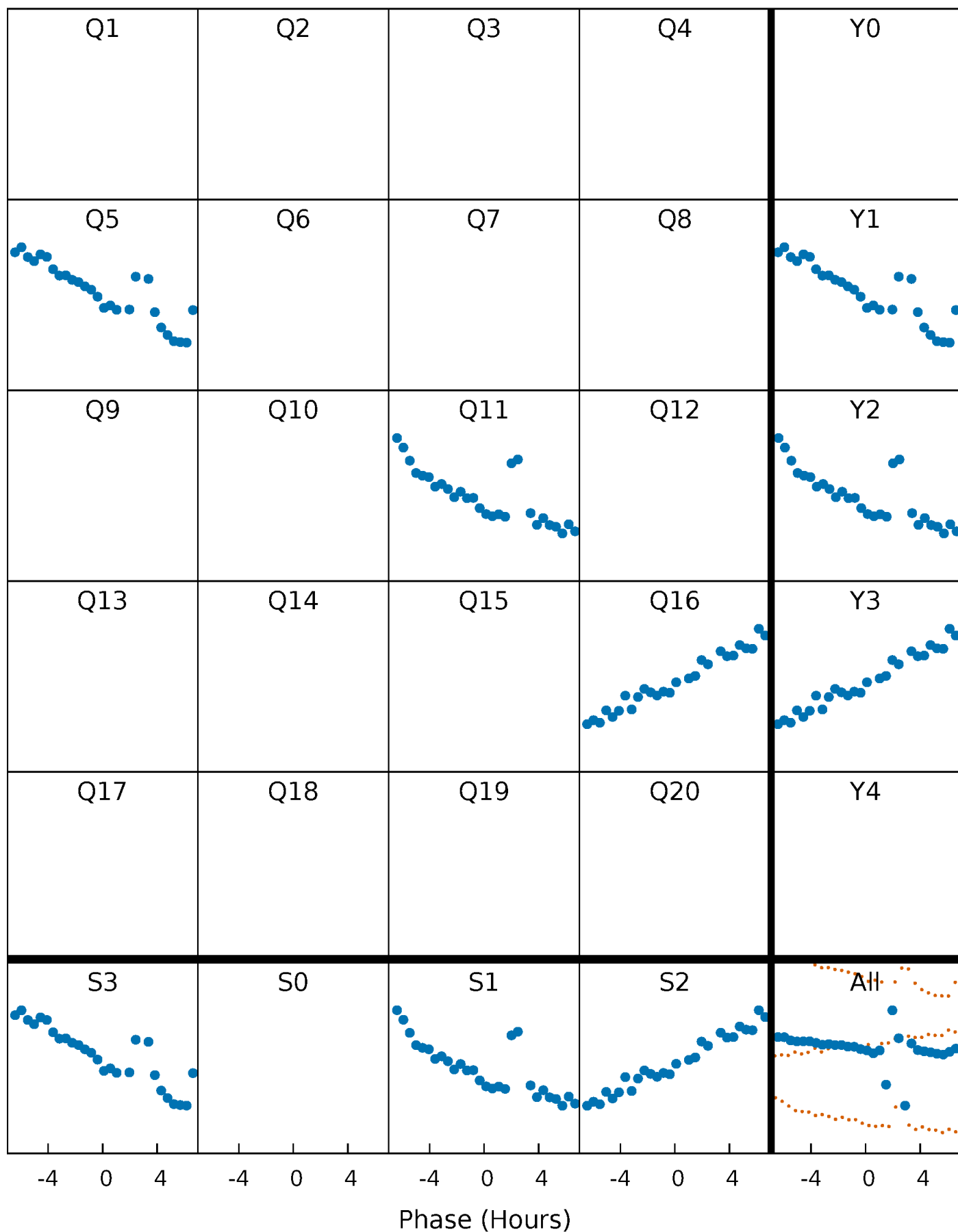


Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)



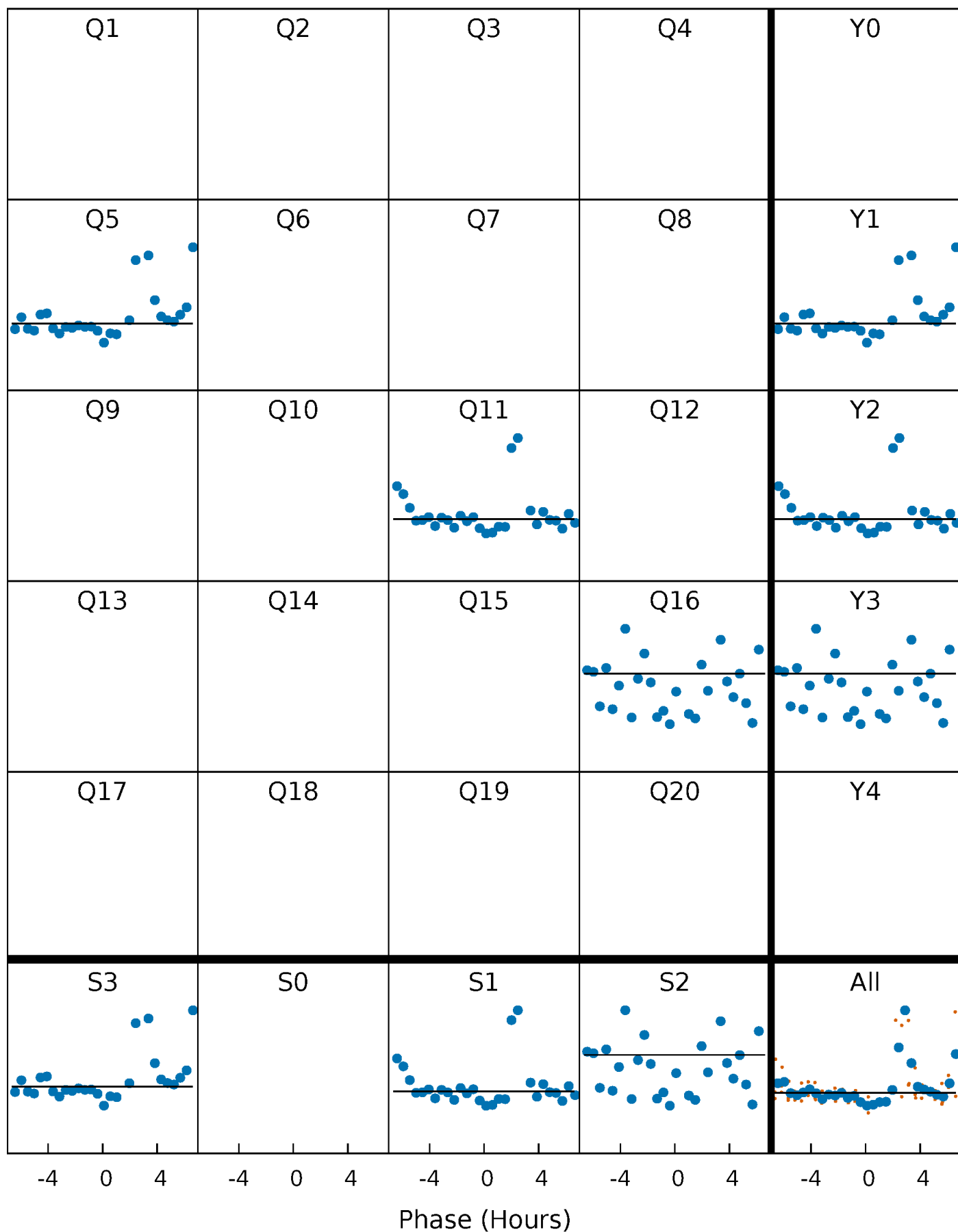
PDC Quarter-Phased Transit Curves

TCE 009468296-04 $P=528.044058$ Days $T_0=498.654389$ (BKJD)



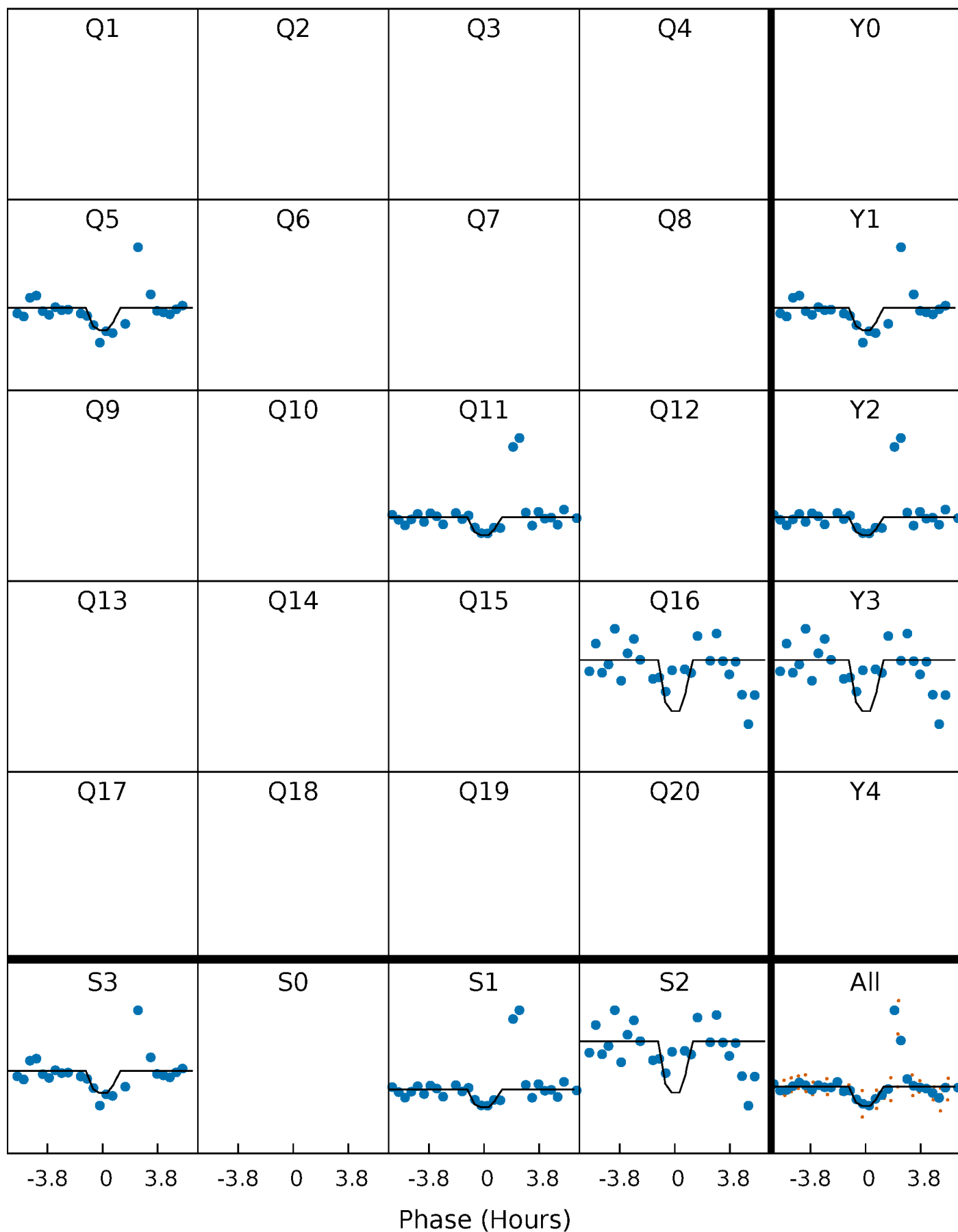
DV Quarter-Phased Transit Curves

TCE 009468296-04 $P=528.044058$ Days $T_0=498.654389$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

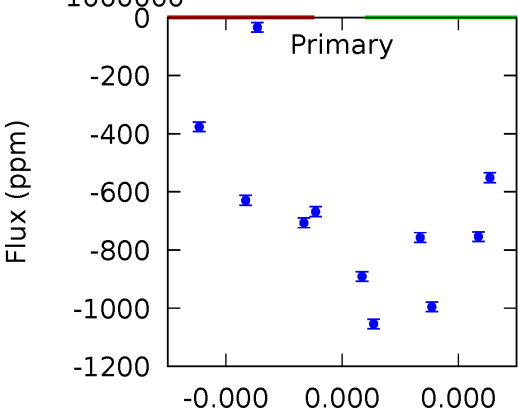
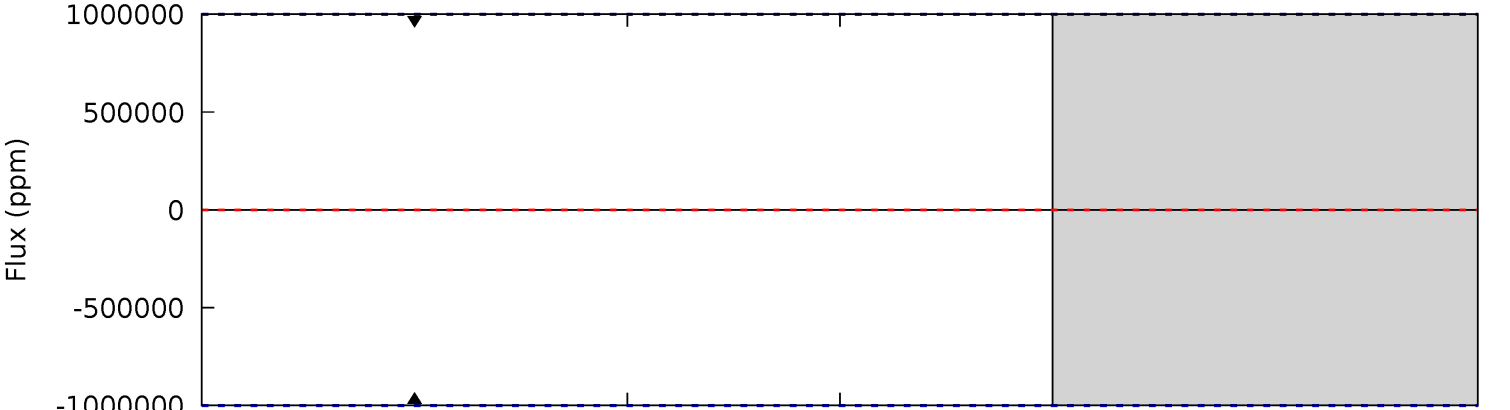
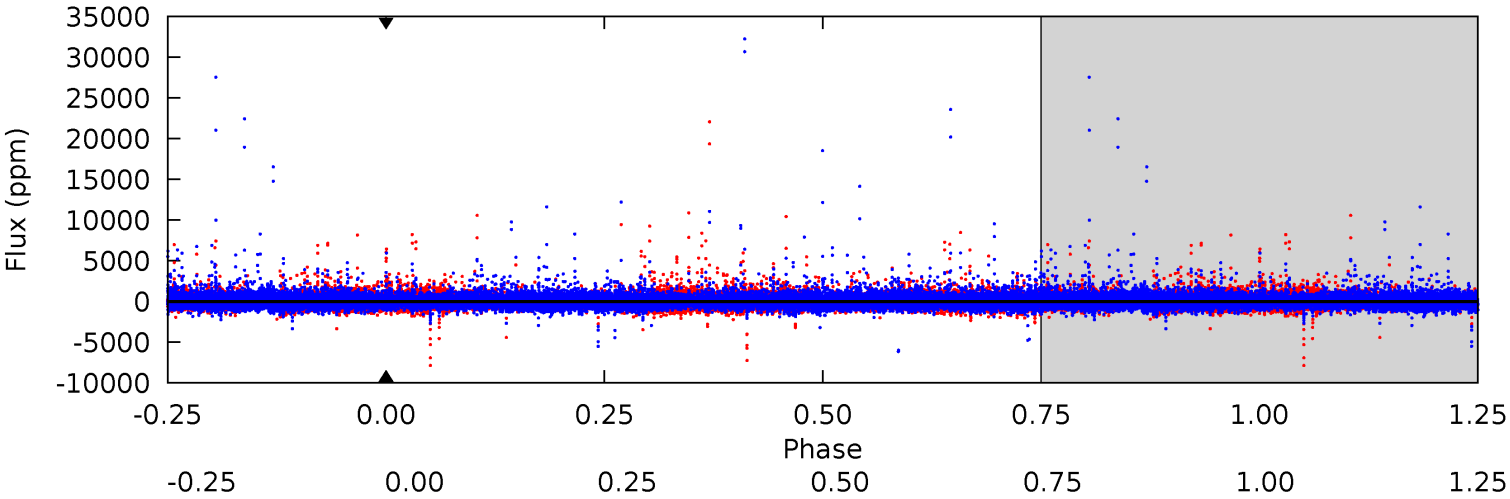
TCE 009468296-04 $P=528.044058$ Days $T_0=498.672056$ (BKJD)



DV Model-Shift Uniqueness Test

009468296-04, P = 528.044058 Days, E = 498.654389 Days

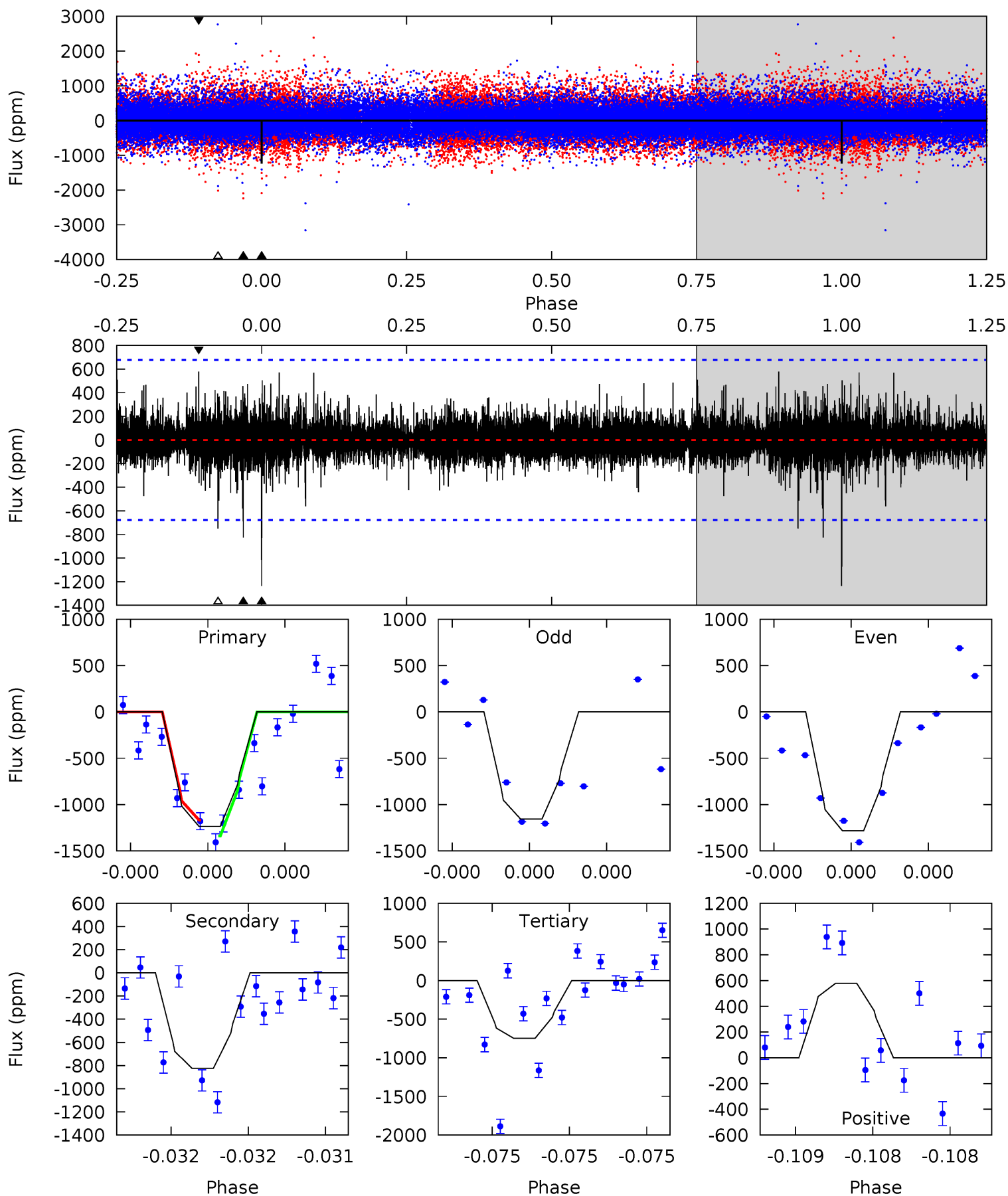
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

009468296-04, P = 528.044058 Days, E = 498.672056 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	7.02	6.38	4.93	5.77	3.78	0.82	4.14	5.59	0.65	2.10	0.52	1.00	0.32	0.74



Stellar Parameters For KIC 009468296

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4961^{+151}_{-136}	$4.545^{+0.078}_{-0.058}$	$-0.140^{+0.300}_{-0.300}$	$0.753^{+0.071}_{-0.079}$	$0.725^{+0.093}_{-0.057}$	$2.395^{+0.729}_{-0.421}$
	+3%/-3%	+2%/-1%	+214%/-214%	+9%/-10%	+13%/-8%	+30%/-18%
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 009468296-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	0 ± 1000000	$6.91^{+5.98}_{-4.59}$	247^{+10}_{-10}	-3695^{+16576}_{-10095}	$-22592.729^{+2506649.017}_{-3051710.766}$
Alt.	-825 ± 117	$7.04^{+6.79}_{-4.81}$	247^{+10}_{-9}	3336^{+1751}_{-575}	$11901^{+101584}_{-8761}$

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

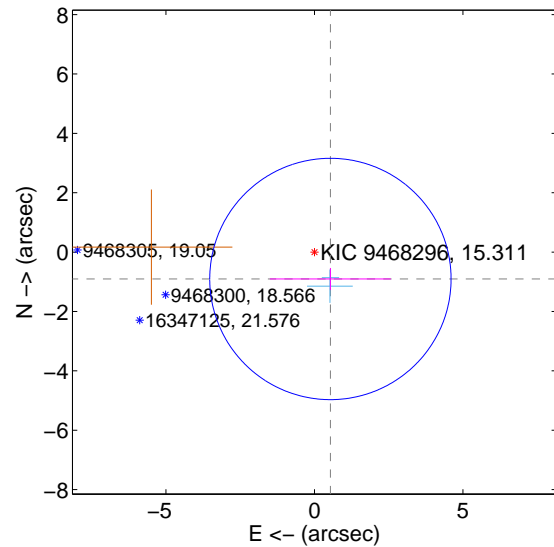
Supplemental centroid analysis for 009468296-04. Kepler magnitude: 15.31. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

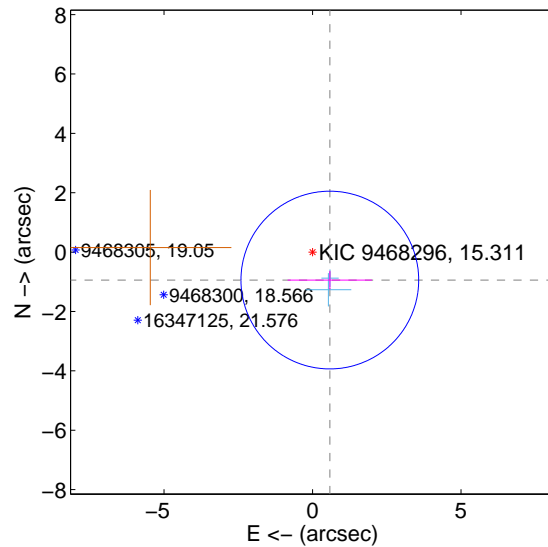
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.053 ± 1.355	0.78	-0.538 ± 2.039	-0.905 ± 0.372
PRF-fit source offset from KIC position	1.107 ± 0.998	1.11	-0.583 ± 1.422	-0.942 ± 0.310
photometric centroid source offset	0.87 ± 1.98	0.44	-0.84 ± 1.98	0.22 ± 1.91

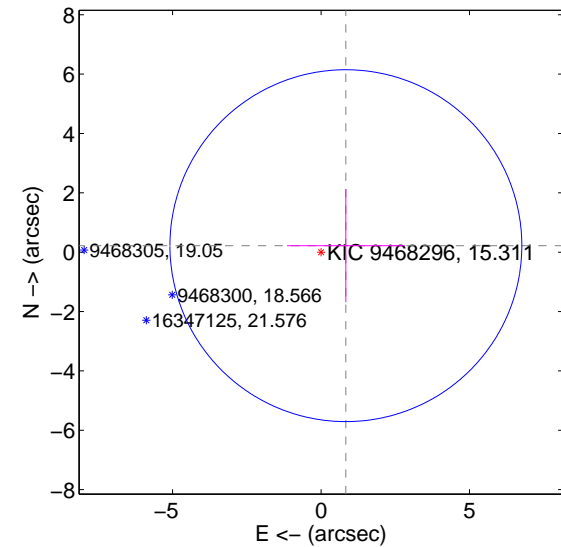
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

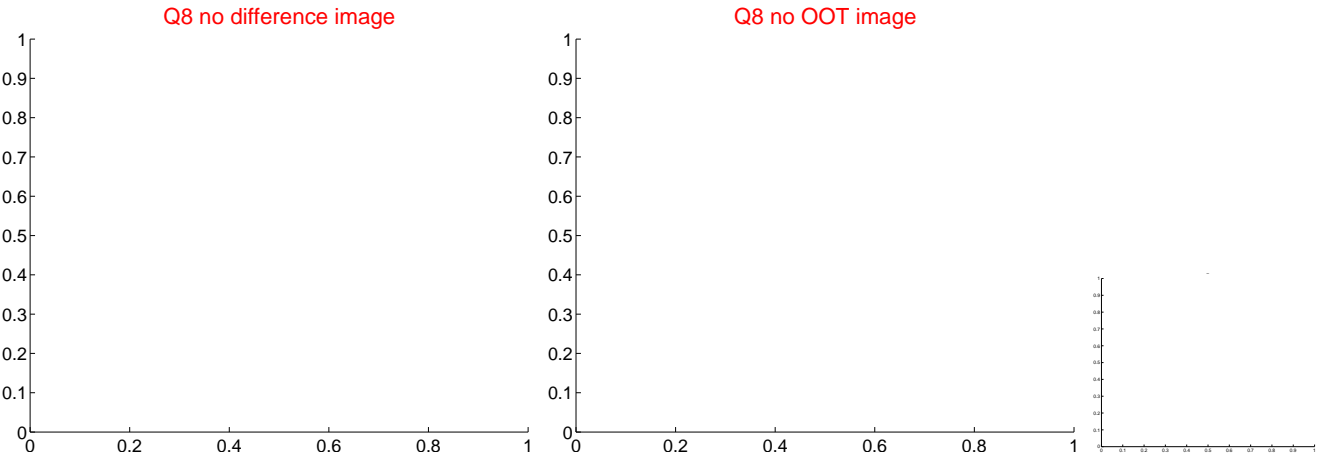
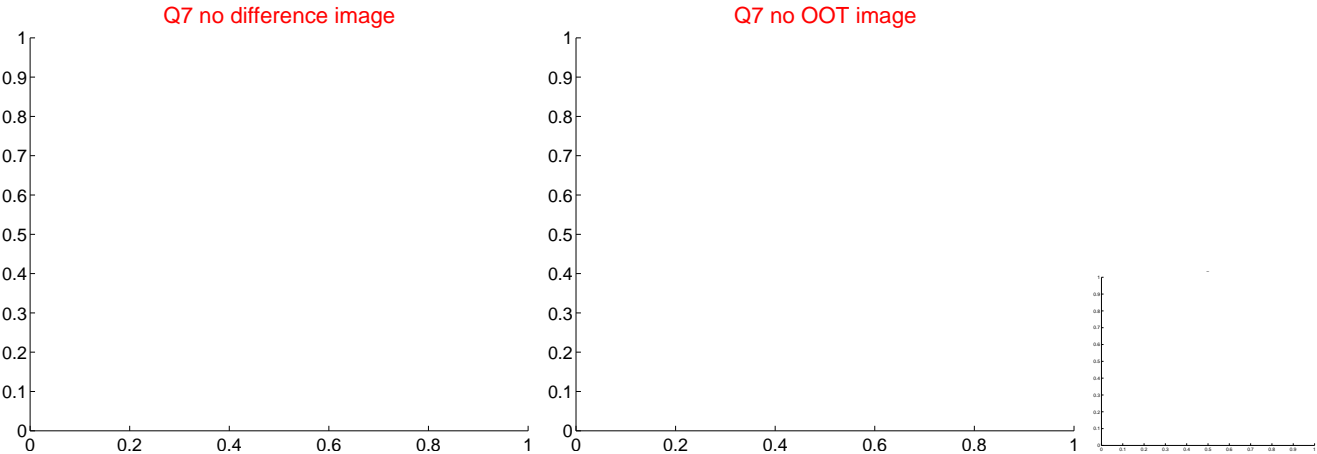
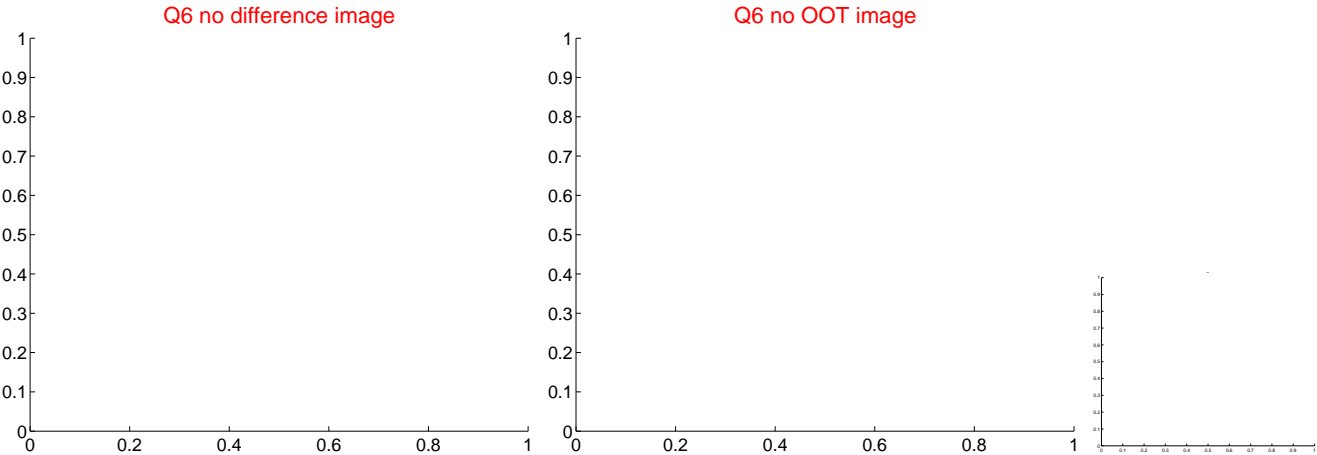
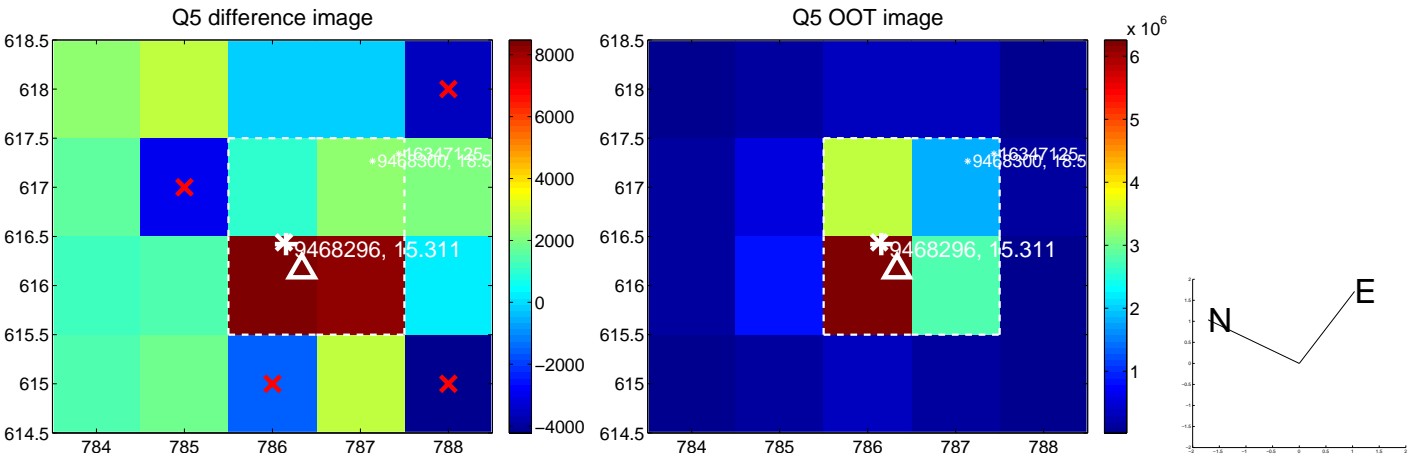


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



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

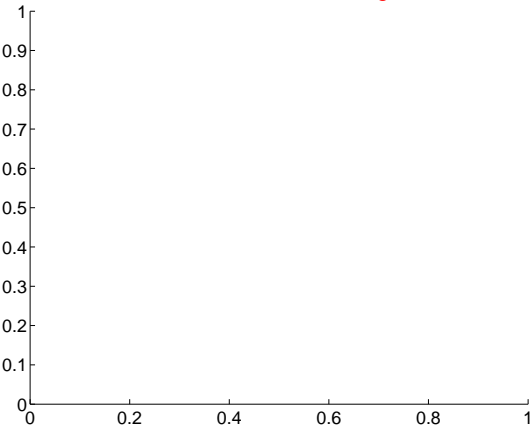
Q9 no difference image



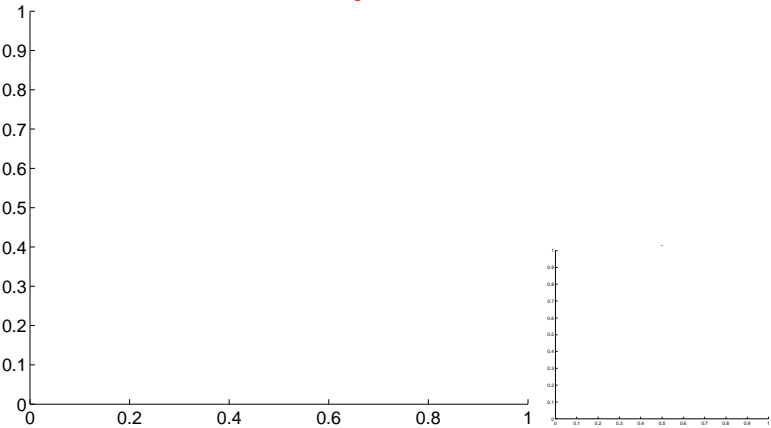
Q9 no OOT image



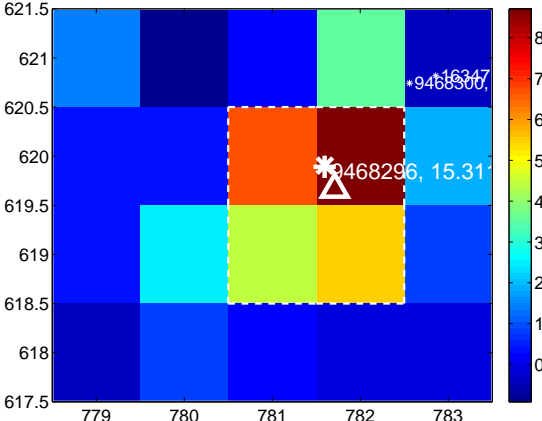
Q10 no difference image



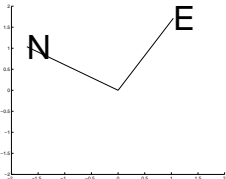
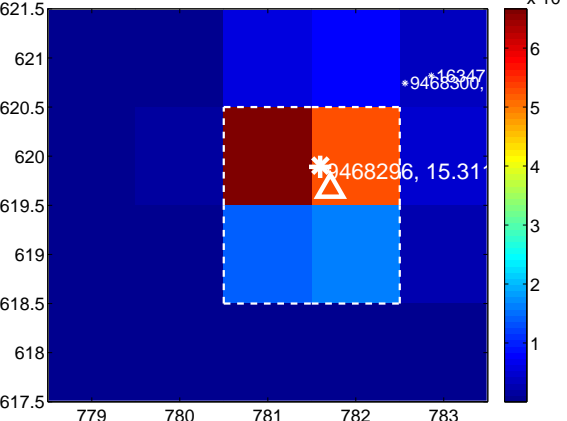
Q10 no OOT image



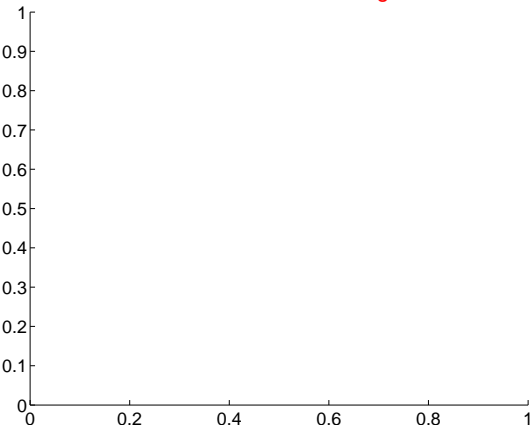
Q11 difference image



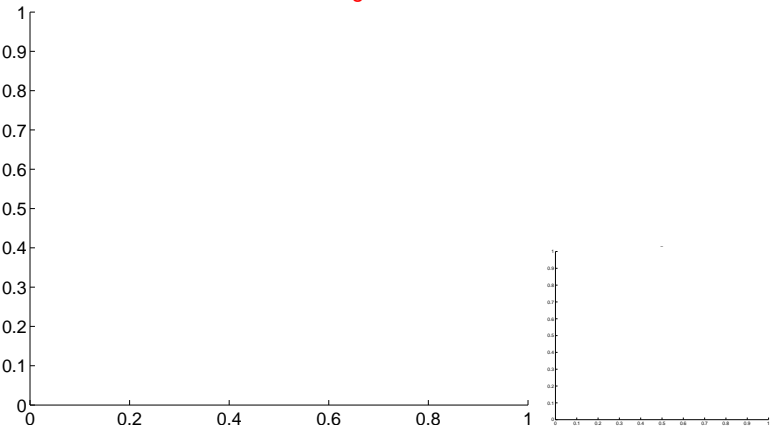
Q11 OOT image



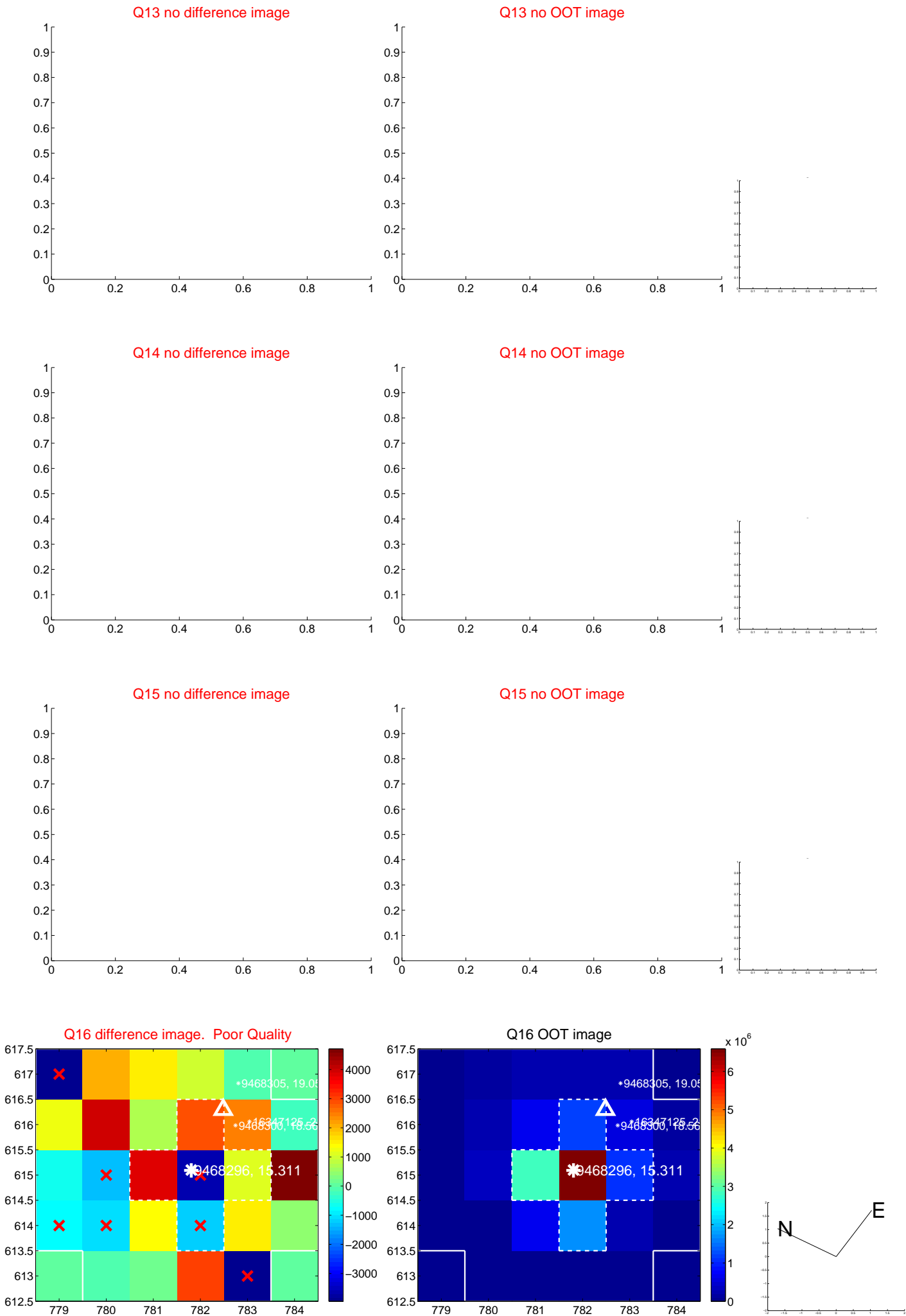
Q12 no difference image



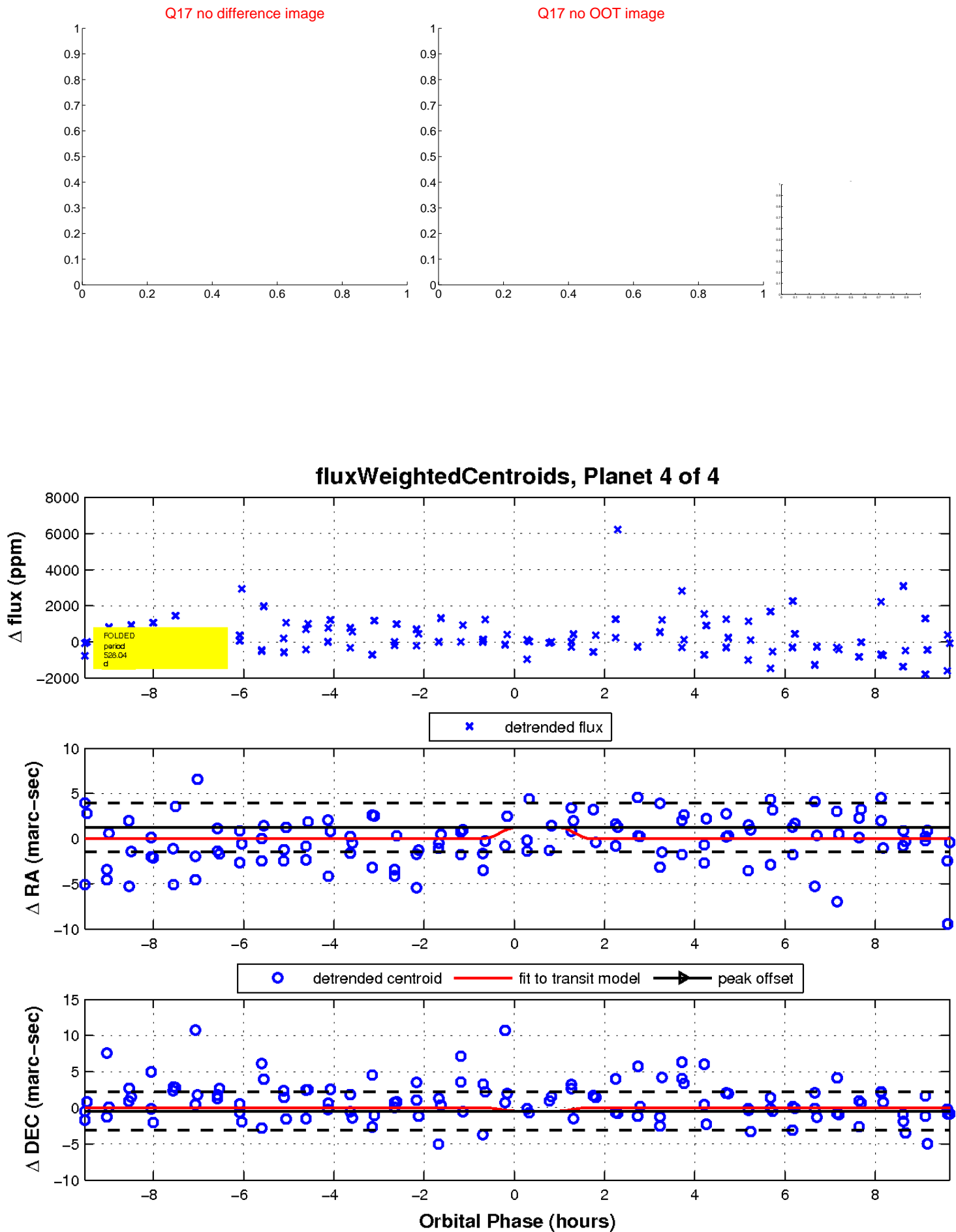
Q12 no OOT image



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.



UKIRT Image

Declination

