

KIC 009581885

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})
009581885-01	OBS	No	331.372592	350.438432	3002.9	5.453	14.1	9.3	0.41	3587	2.21	0.05
009581885-02	OBS	No	587.705174	331.630355	2315.6	13.014	12.3	7.5	0.41	3587	2.31	0.02
009581885-03	OBS	No	21.427847	144.343293	451.7	1.315	8.5	6.1	0.41	3587	0.94	1.93
009581885-04	OBS	No	366.592709	273.153354	2289.2	3.044	9.6	6.7	0.41	3587	1.96	0.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009581885-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009581885-02	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
009581885-03	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009581885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

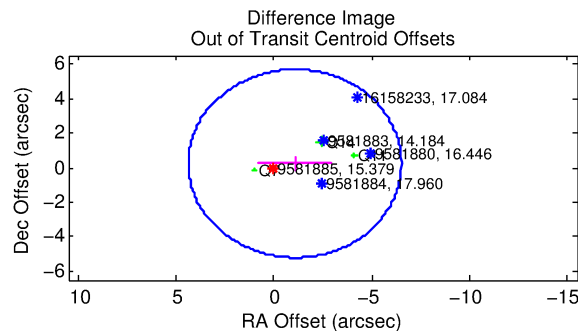
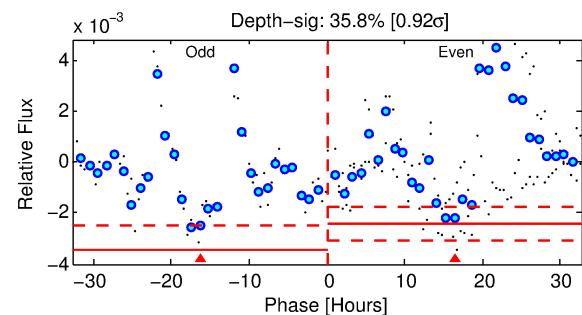
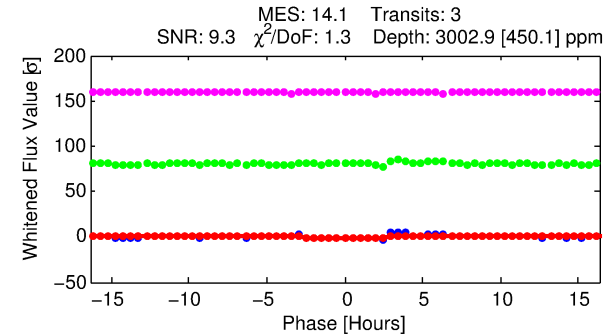
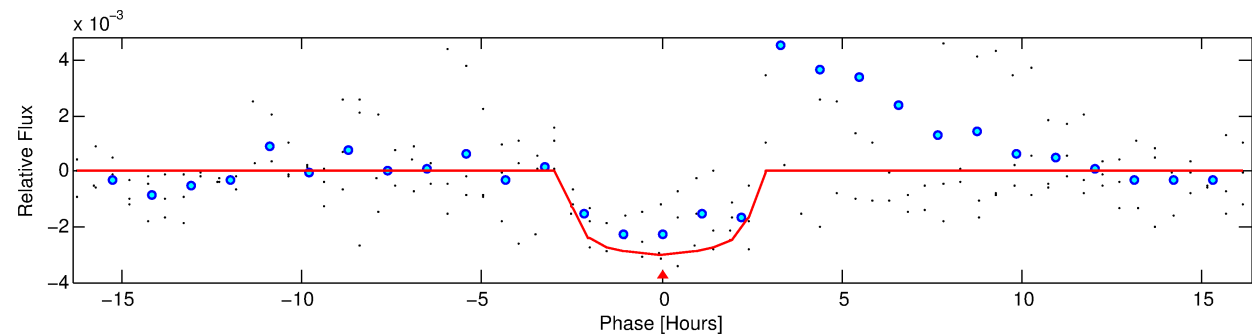
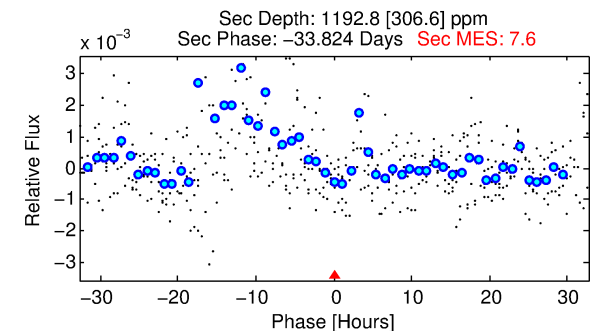
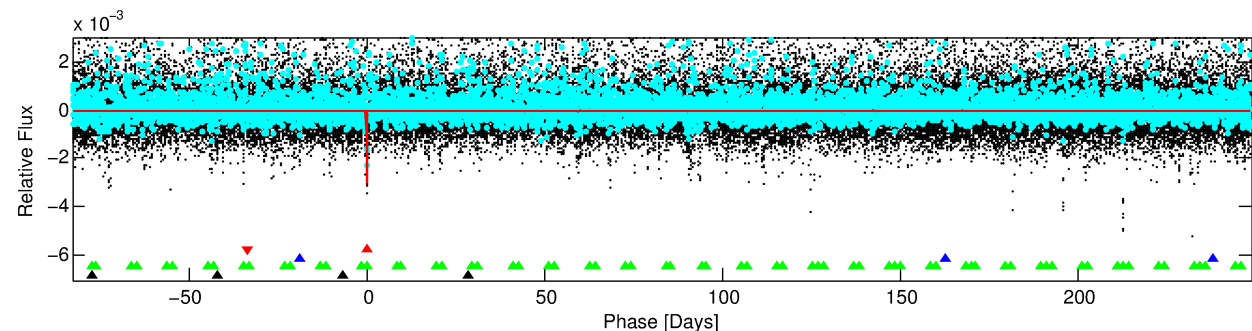
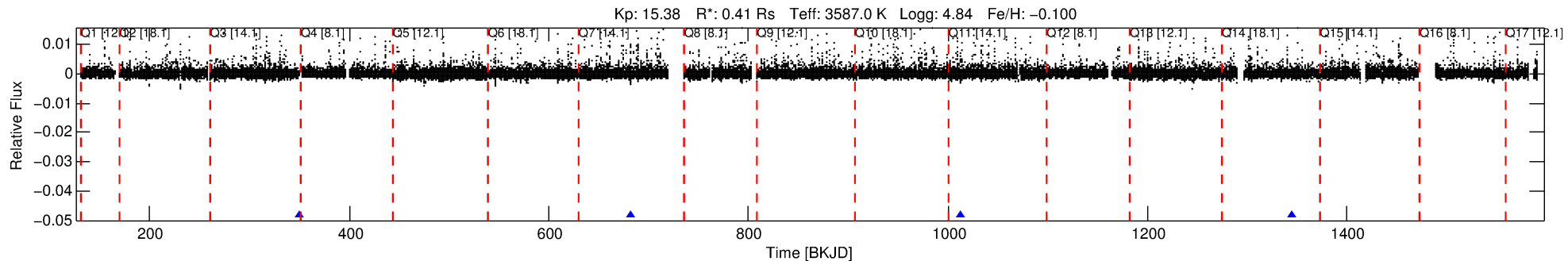
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009581885-01

No Significant Match Found

DV One-Page Summary

KIC: 9581885 Candidate: 1 of 4 Period: 331.373 d



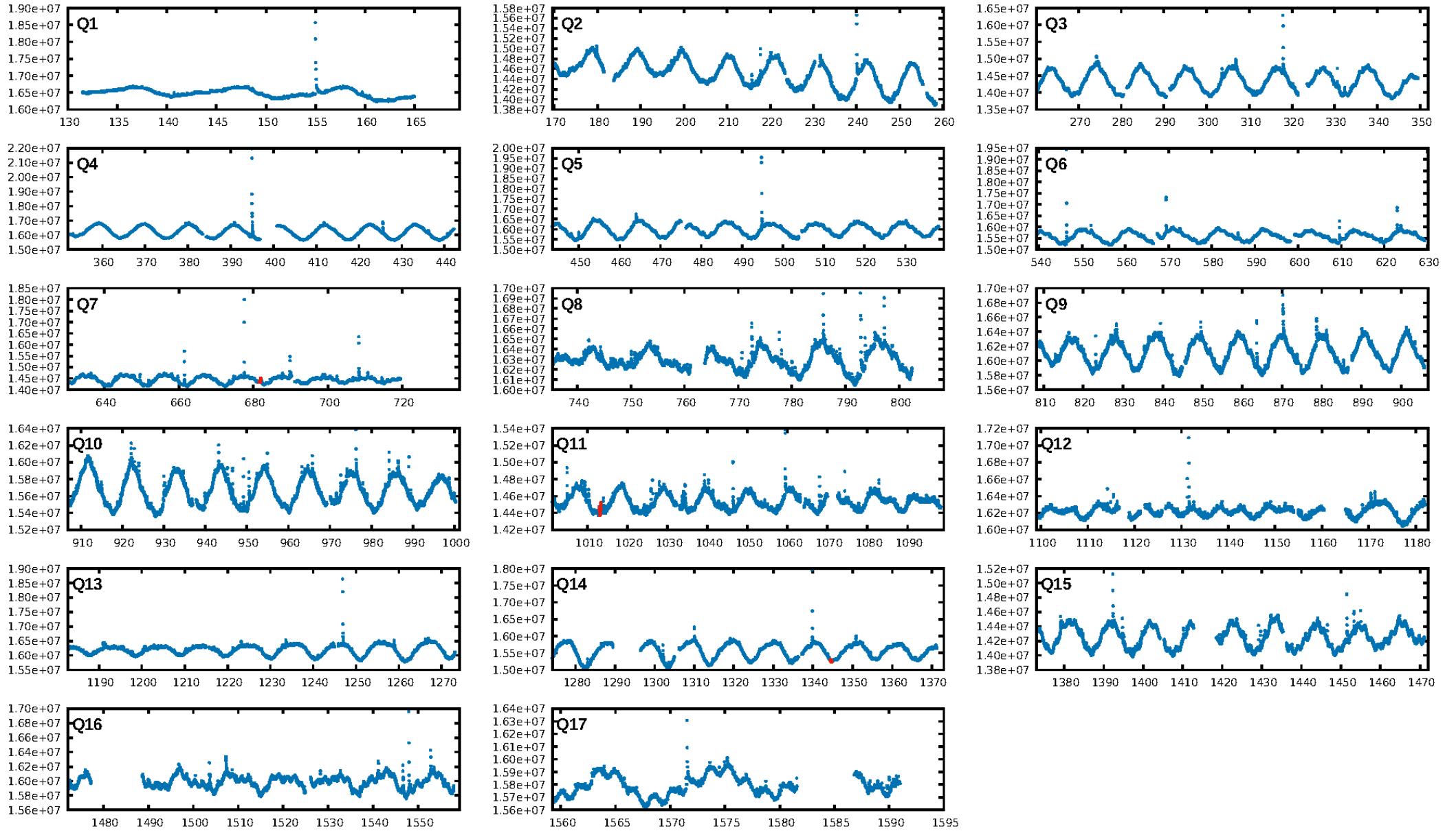
DV Fit Results:

Period = 331.37259 [0.00495] d
Epoch = 350.4384 [0.0120] BKJD
Rp/R* = 0.0496 [0.0485]
a/R* = 486.76 [2062.73]
b = 0.05 [91.48]
Seff = 0.05 [0.00]
Teq = 121 [3] K
Rp = 2.21 [2.17] Re
a = 0.7048 [0.0414] AU
Ag = 66503.81 [131290.25] [0.51σ]
Teffp = 2993 [1477] K [1.95σ]

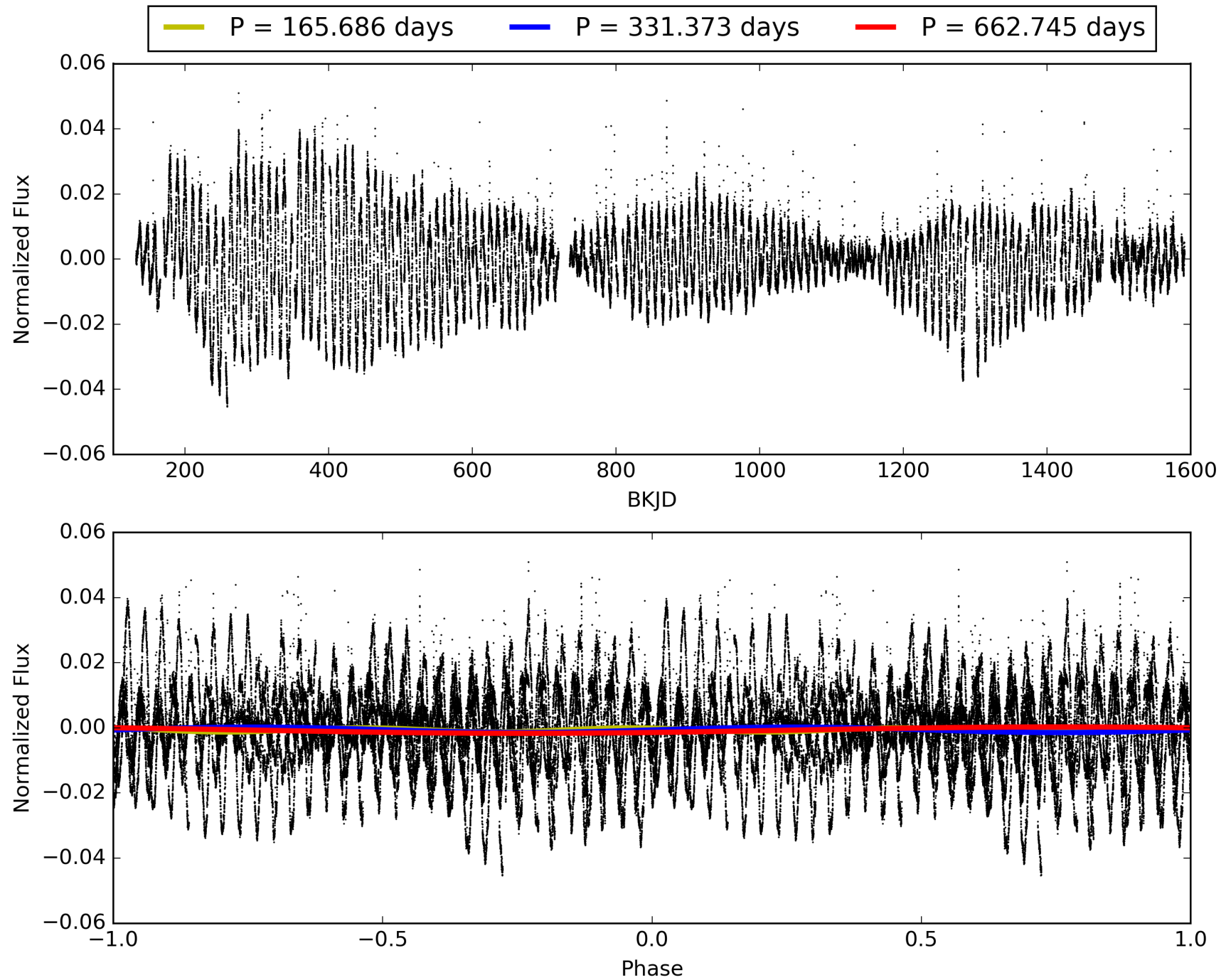
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1326.06σ]
LongPeriod-sig: 100.0% [135.35σ]
ModelChiSquare2-sig: 0.6%
ModelChiSquareGoF-sig: 96.1%
Bootstrap-pfa: 5.58e-14
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -7.024
Centroid-sig: 11.8%
Centroid-so: 0.256 arcsec [0.36σ]
OotOffset-rm: 1.098 arcsec [0.60σ]
KicOffset-rm: 1.311 arcsec [0.71σ]
OotOffset-st: 1/2/0/0 [3]
KicOffset-st: 1/2/0/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

TCE 009581885-01, PDC Light Curves

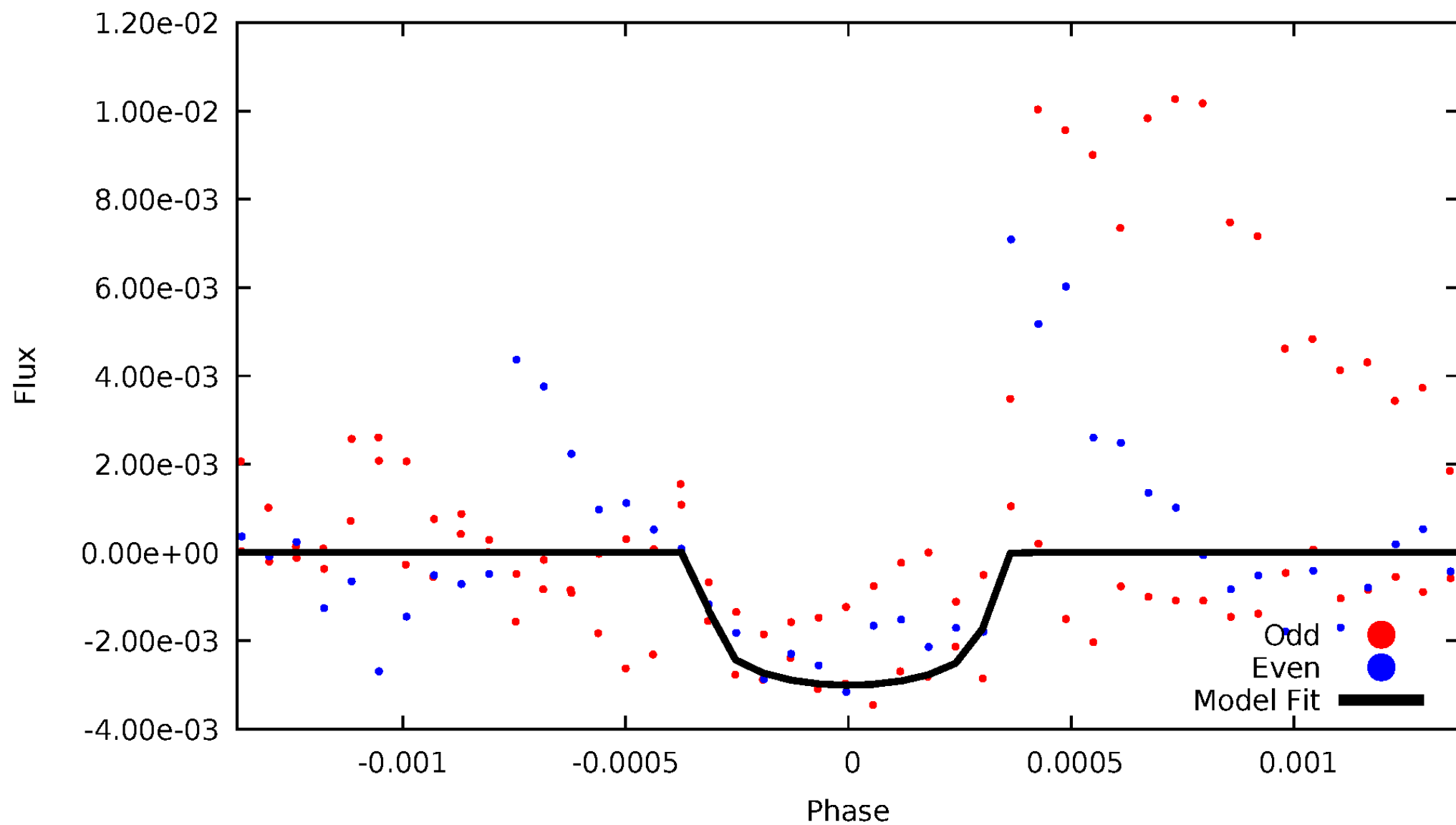


TCE 009581885-01



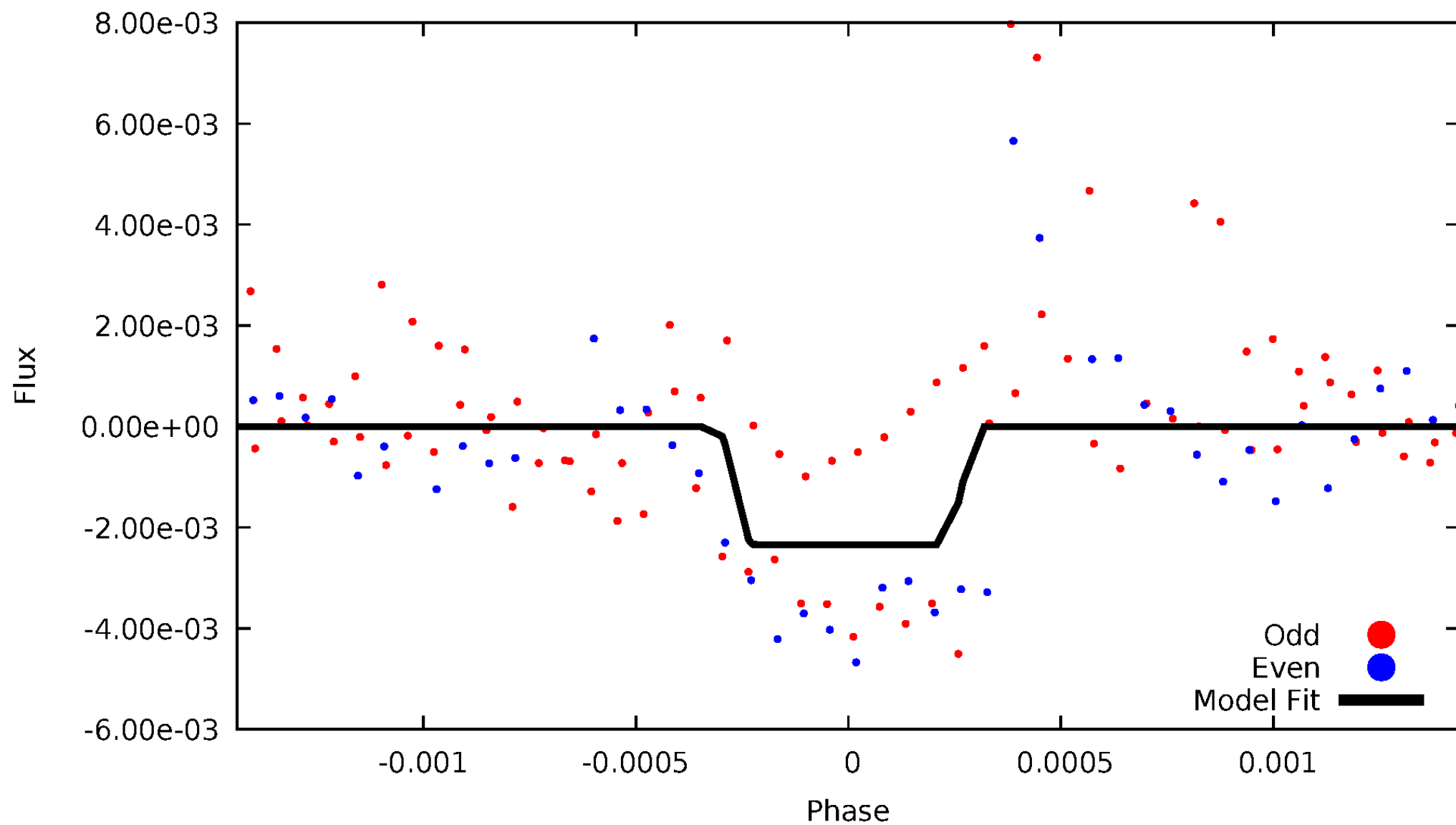
DV Odd/Even

TCE 009581885-01



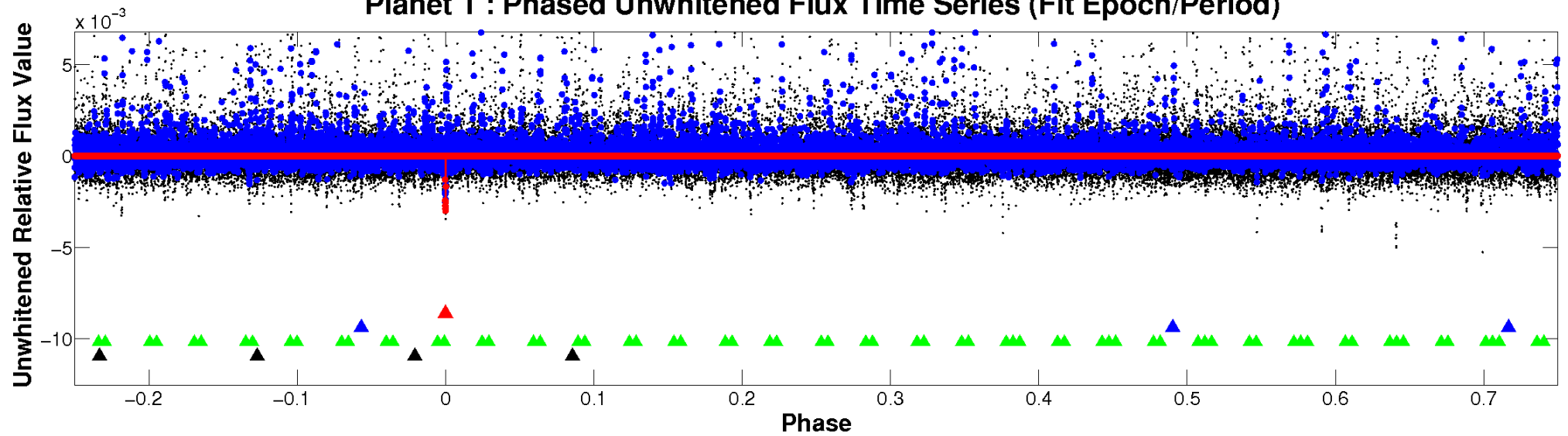
ALT Odd/Even

TCE 009581885-01

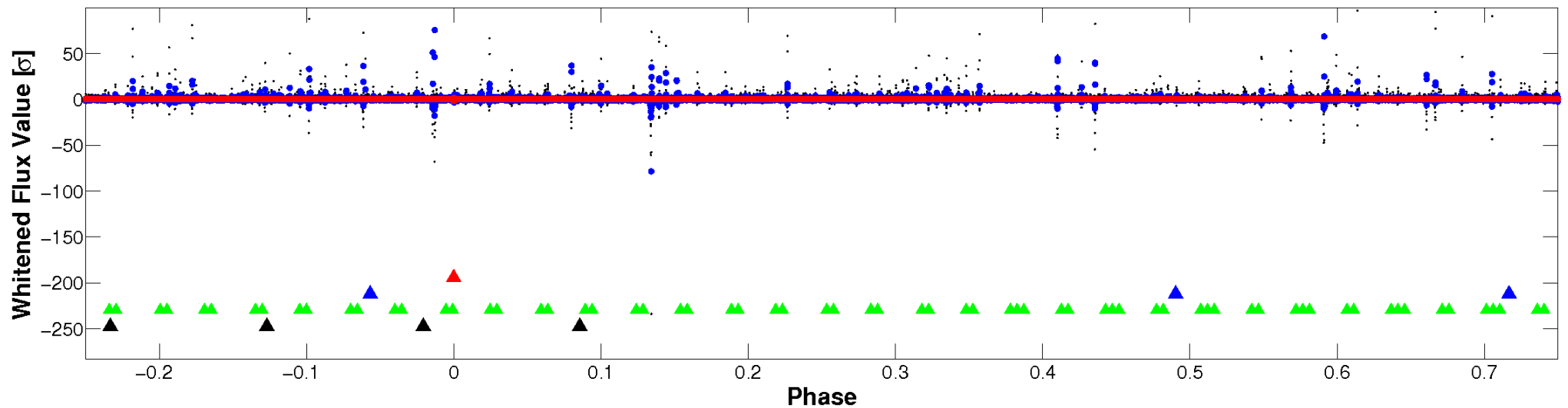


Non-Whitened Vs. Whitened Light Curve

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

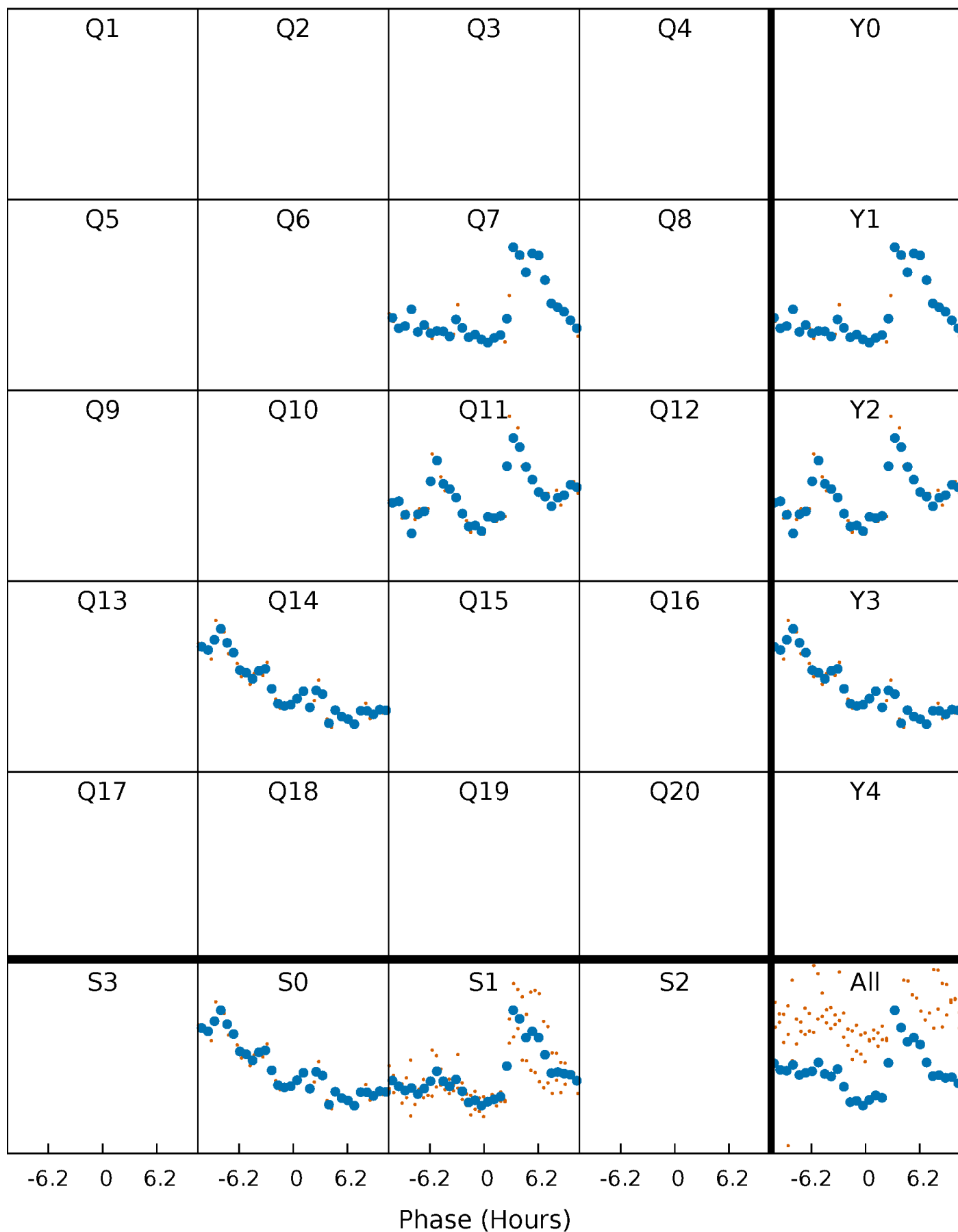


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



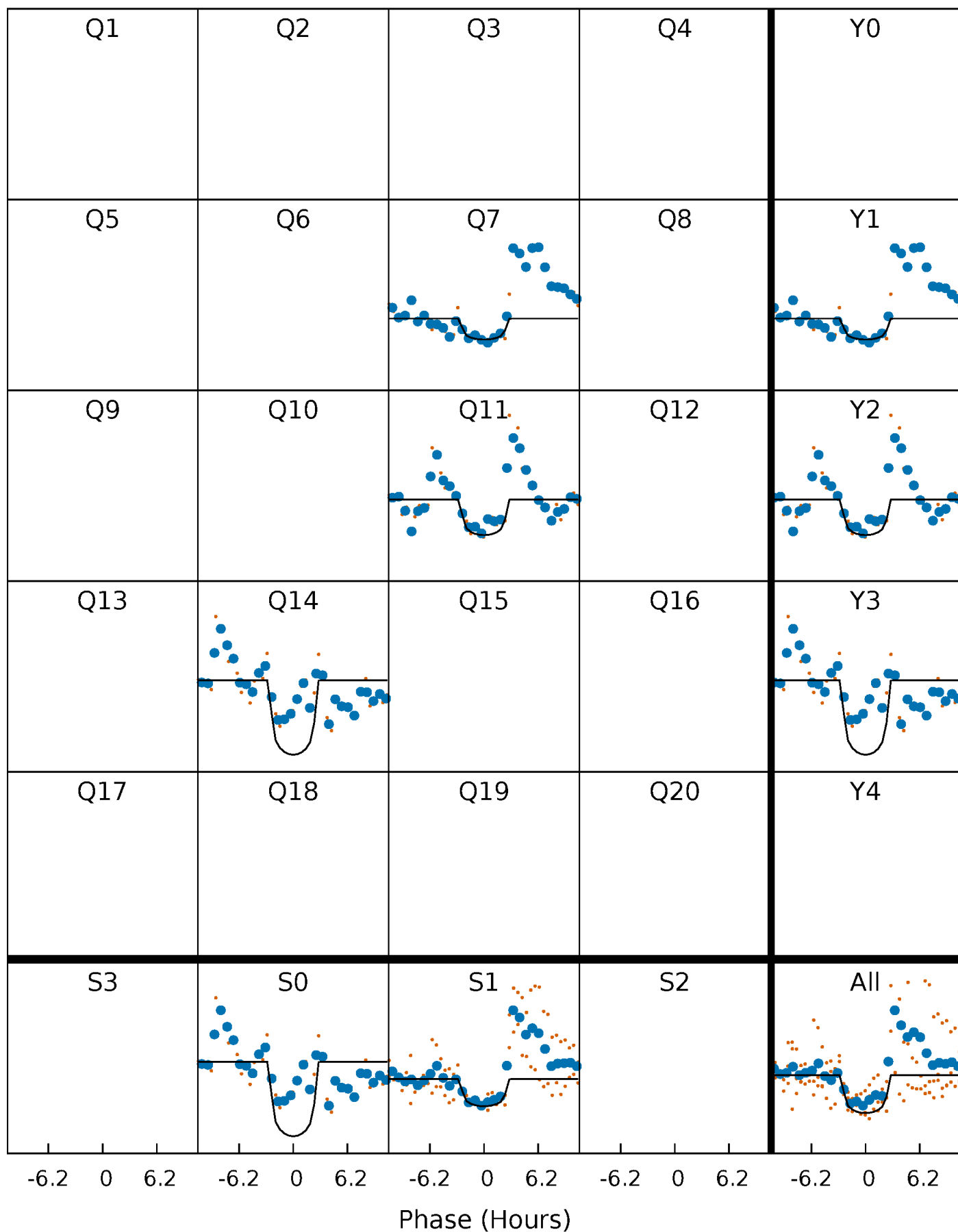
PDC Quarter-Phased Transit Curves

TCE 009581885-01 P=331.372592 Days $T_0=350.438432$ (BKJD)



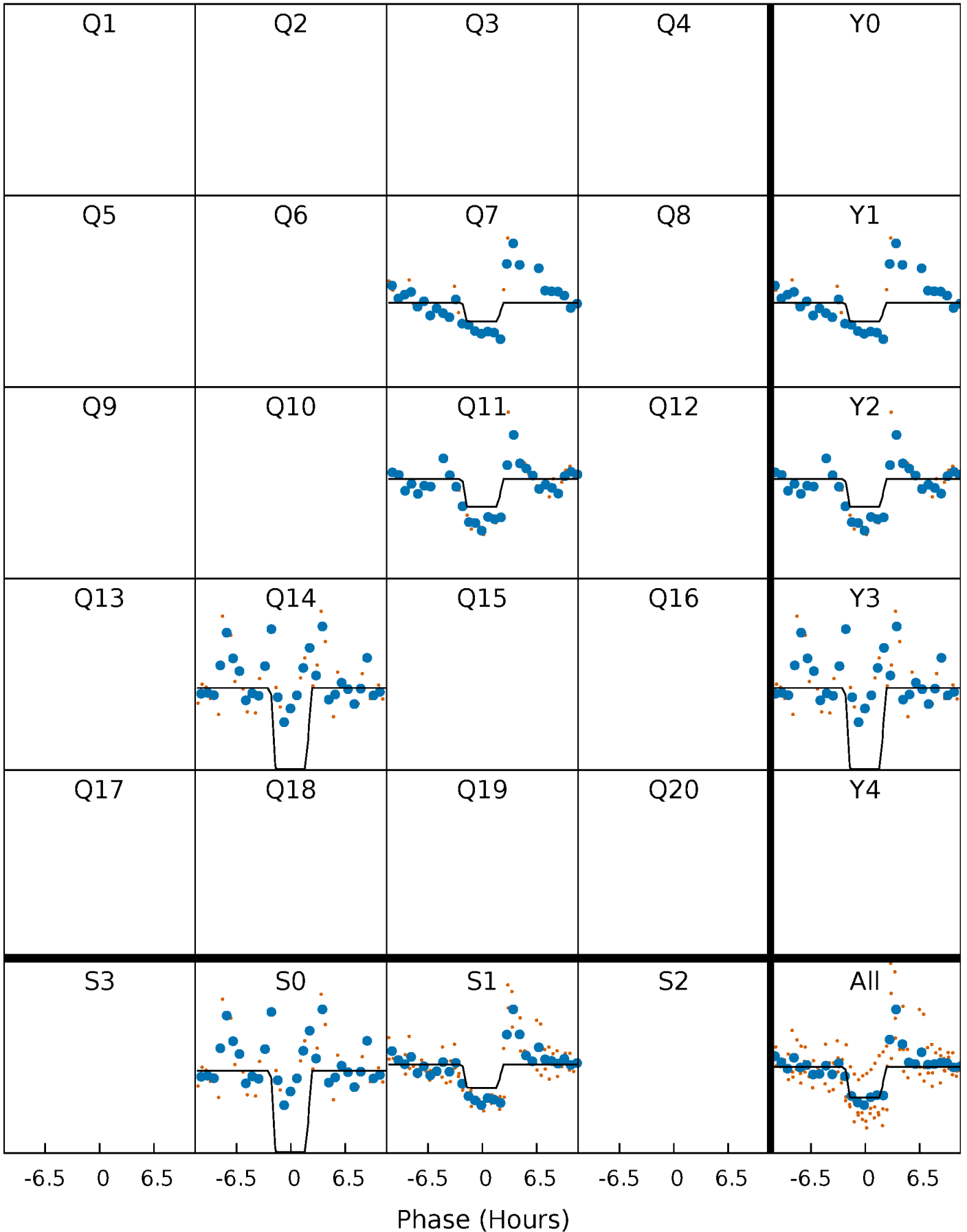
DV Quarter-Phased Transit Curves

TCE 009581885-01 P=331.372592 Days $T_0=350.438432$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

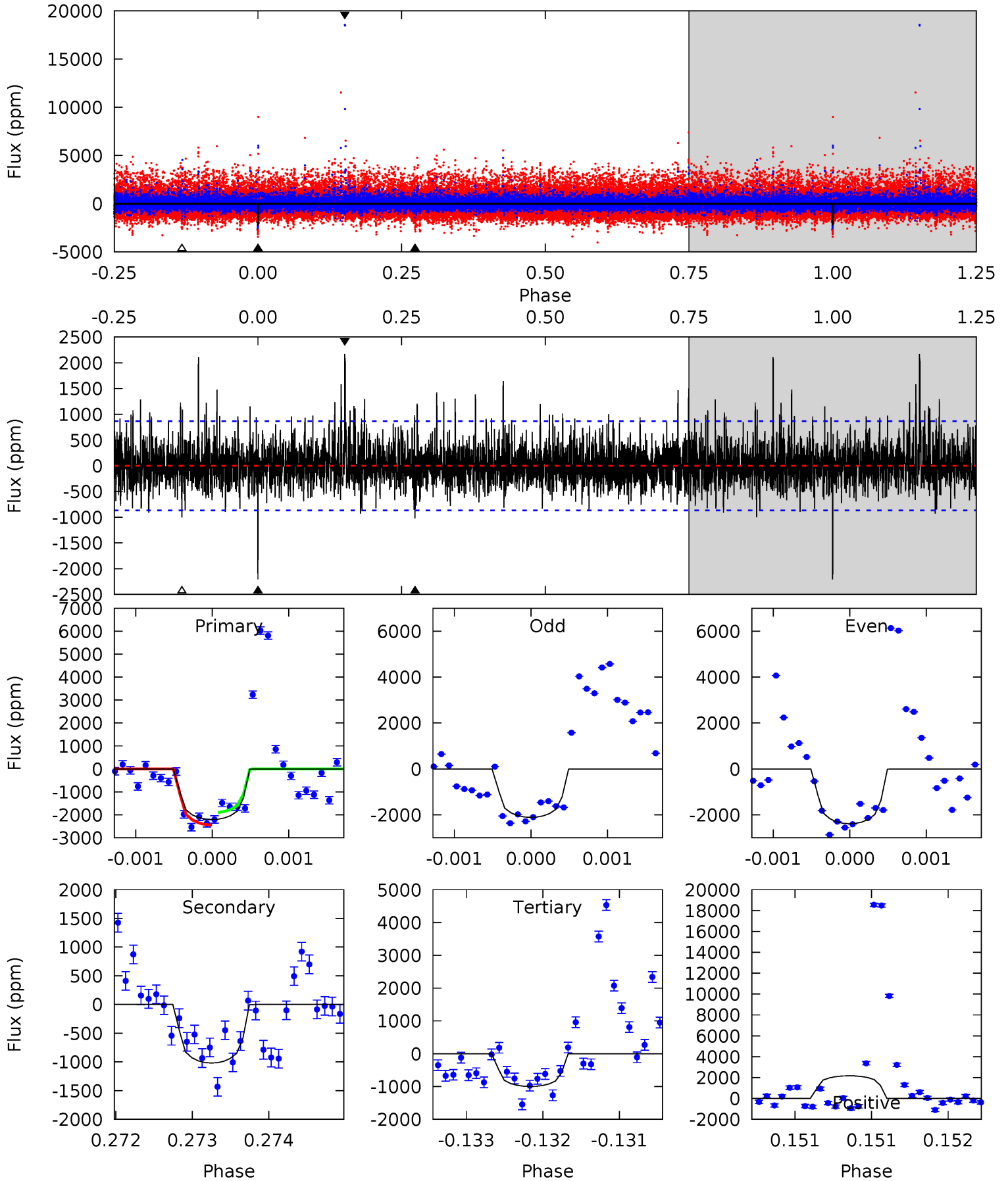
TCE 009581885-01 P=331.350609 Days $T_0=350.474692$ (BKJD)



DV Model-Shift Uniqueness Test

009581885-01, P = 331.372592 Days, E = 19.065840 Days

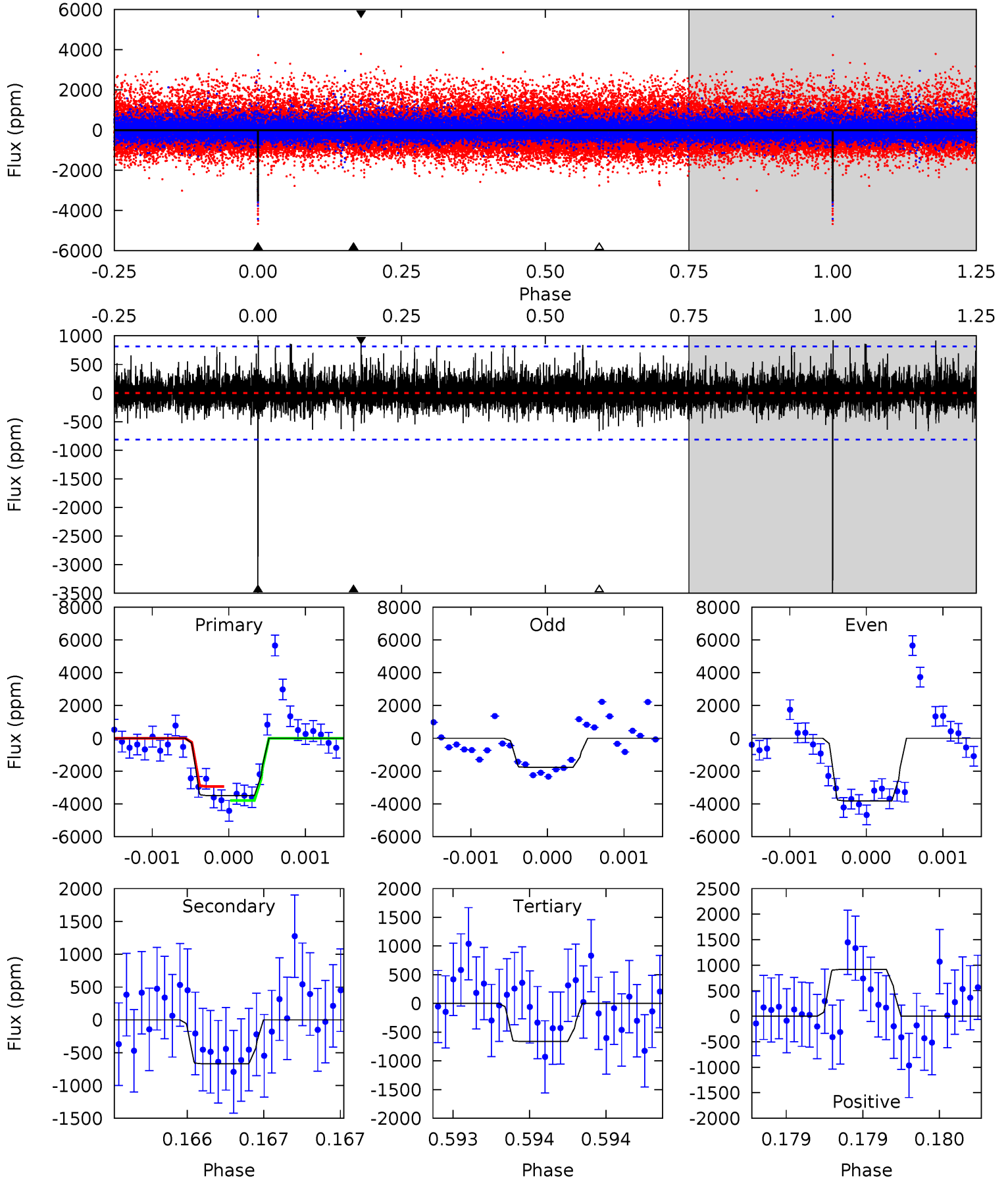
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	6.48	6.35	13.8	5.51	3.37	1.99	7.66	0.23	0.13	-7.29	0.70	0.92	0.50	1.76



Alt Model-Shift Uniqueness Test

009581885-01, P = 331.350609 Days, E = 19.124083 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	4.54	4.50	6.23	5.54	3.43	1.18	19.3	17.5	0.04	-1.69	7.74	0.69	0.21	2.98



Stellar Parameters For KIC 009581885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3587^{+43}_{-48}	$4.843^{+0.035}_{-0.028}$	$-0.100^{+0.100}_{-0.100}$	$0.409^{+0.029}_{-0.032}$	$0.427^{+0.030}_{-0.036}$	$8.764^{+1.697}_{-1.058}$
	+1%/-1%	+1%/-1%	+100%/-100%	+7%/-8%	+7%/-8%	+19%/-12%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009581885-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1020 ± 157	$2.63^{+2.07}_{-1.58}$	168^{+3}_{-3}	2983^{+1012}_{-438}	$41869^{+214005}_{-29730}$
Alt.	-668 ± 147	$2.50^{+2.04}_{-1.55}$	168^{+3}_{-3}	2834^{+999}_{-403}	$27924^{+178859}_{-19530}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

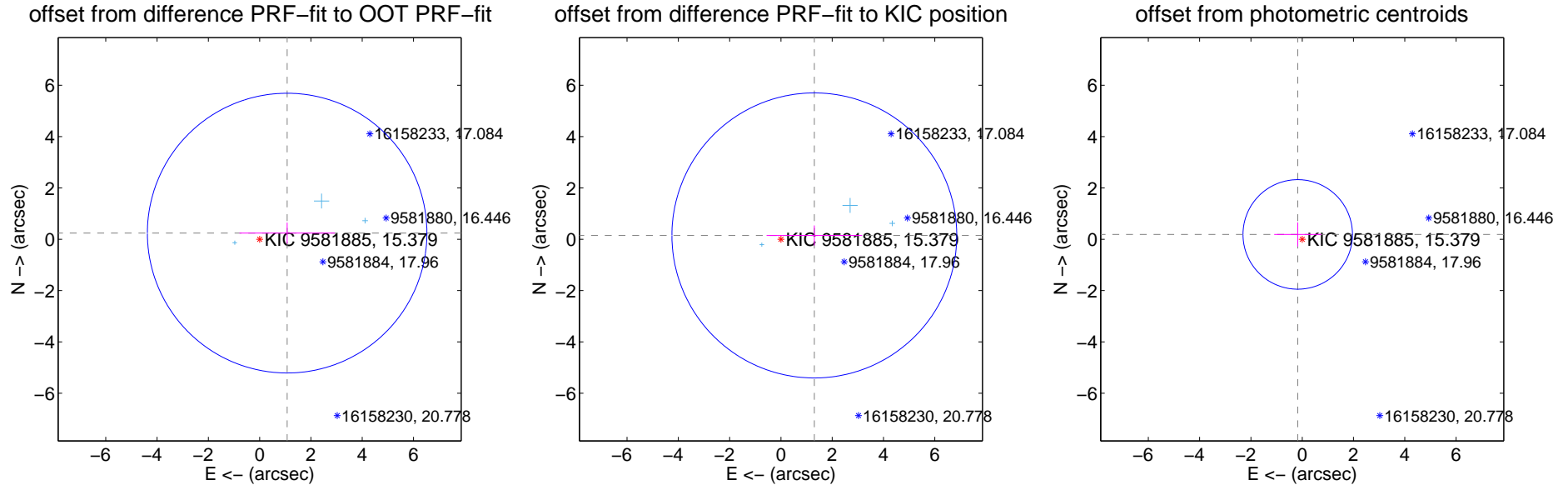
DV Centroid Data

Supplemental centroid analysis for 009581885-01. Kepler magnitude: 15.38. Transit SNR 9.27

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.098 ± 1.816	0.60	-1.072 ± 1.858	0.239 ± 0.410
PRF-fit source offset from KIC position	1.311 ± 1.850	0.71	-1.302 ± 1.862	0.148 ± 0.391
photometric centroid source offset	0.26 ± 0.71	0.36	0.17 ± 0.92	0.19 ± 0.47

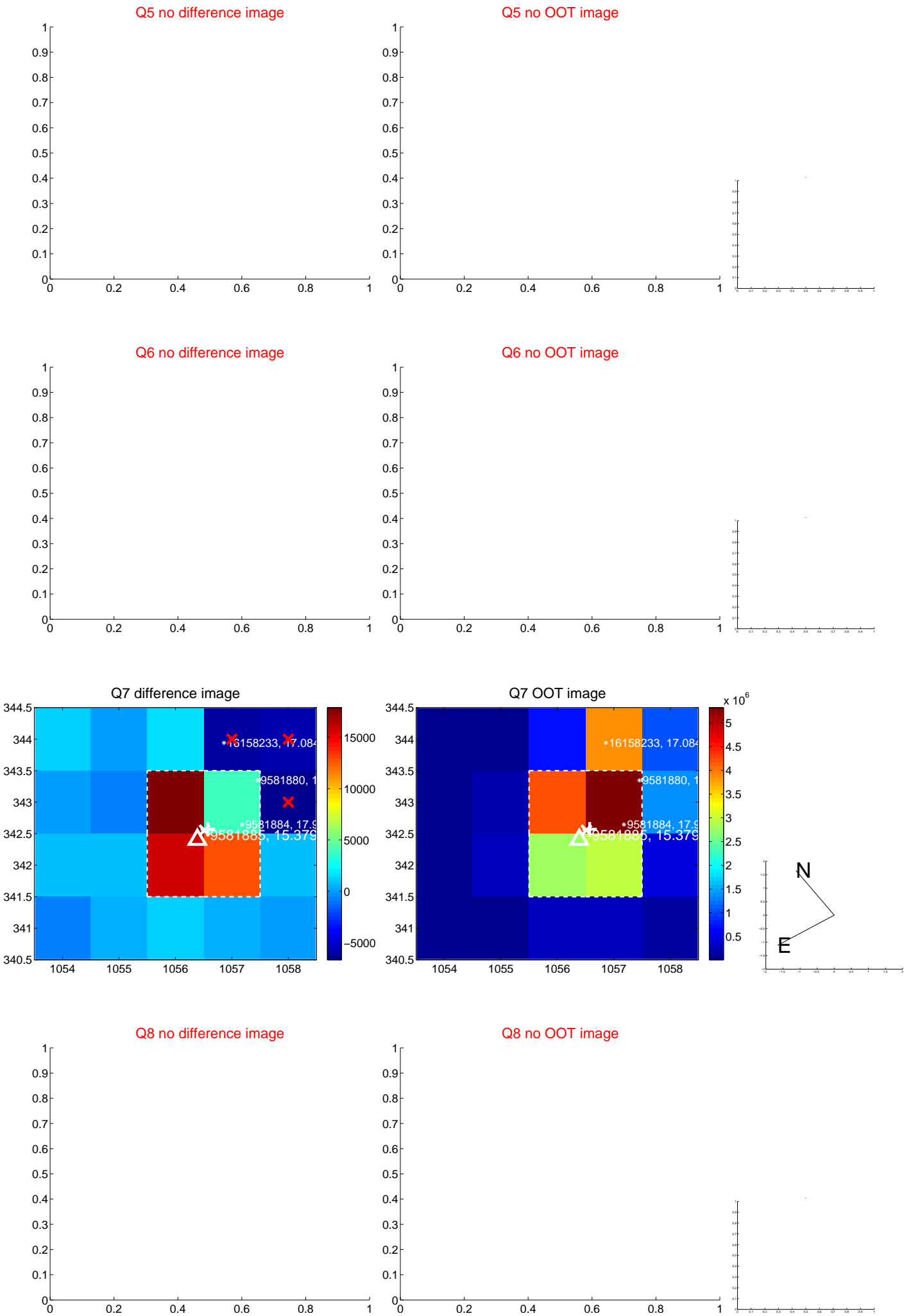


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

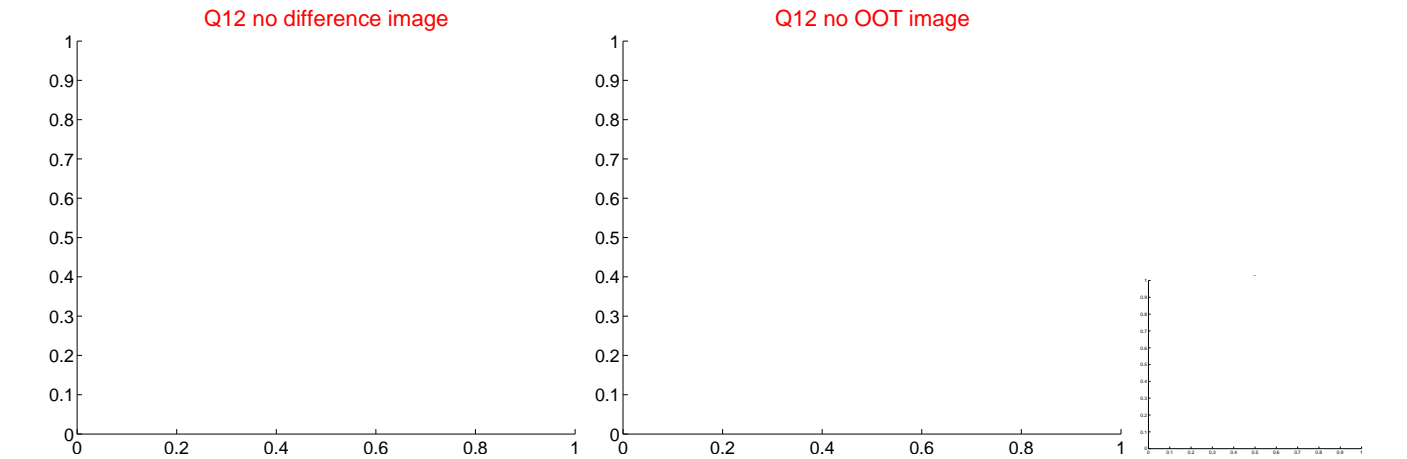
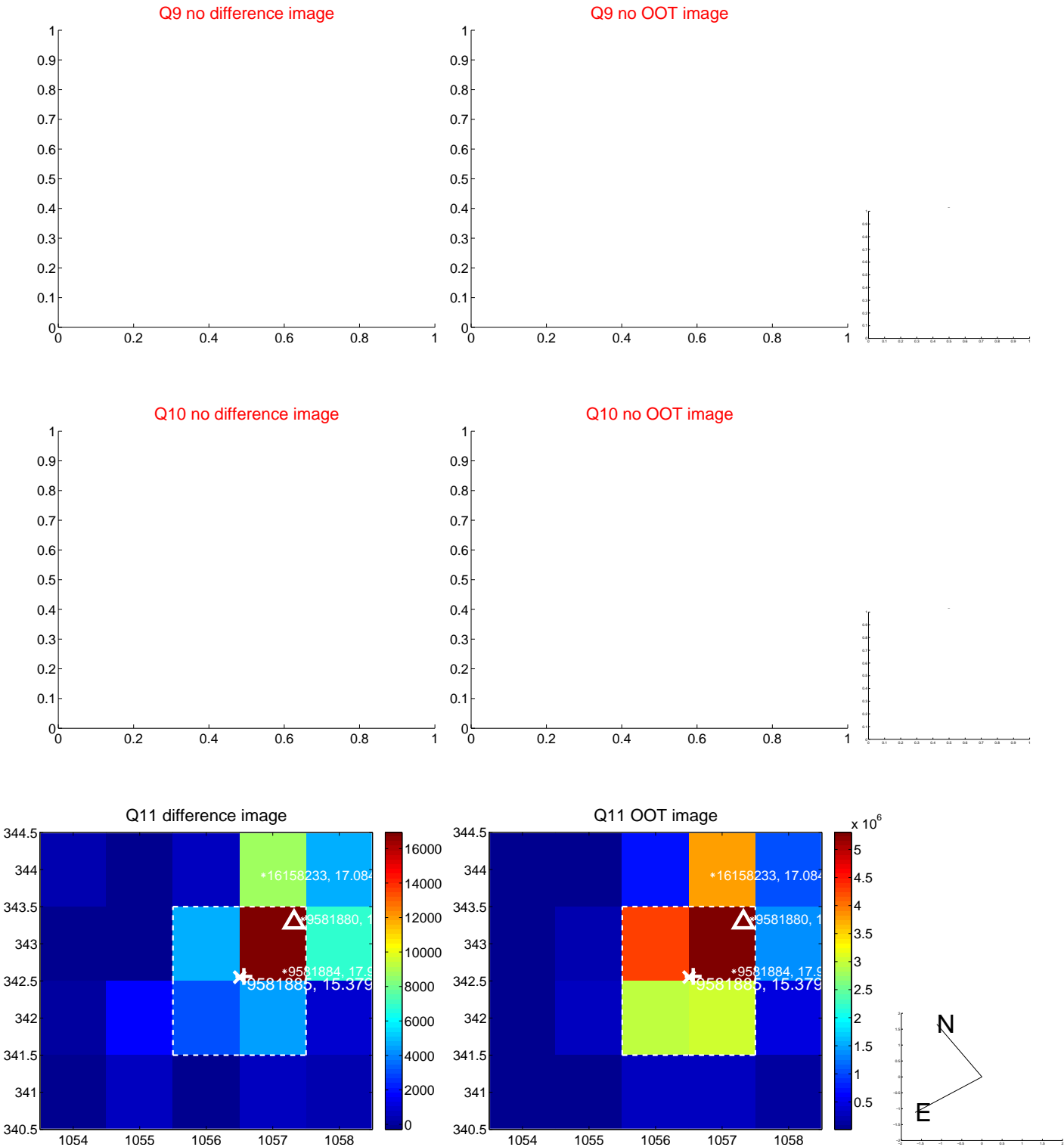
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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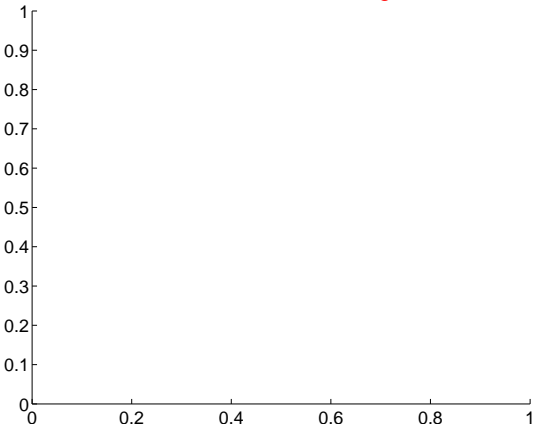


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

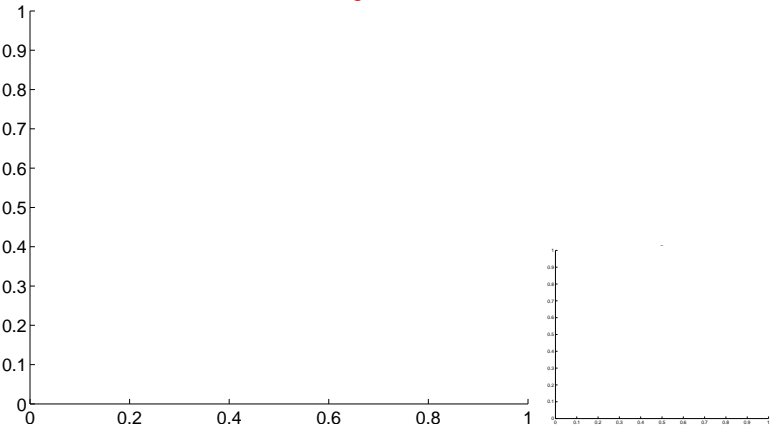


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

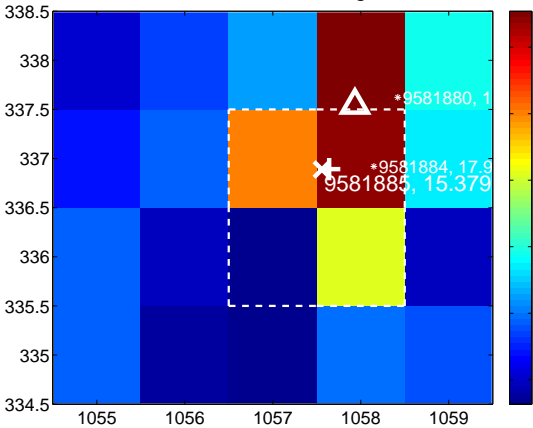
Q13 no difference image



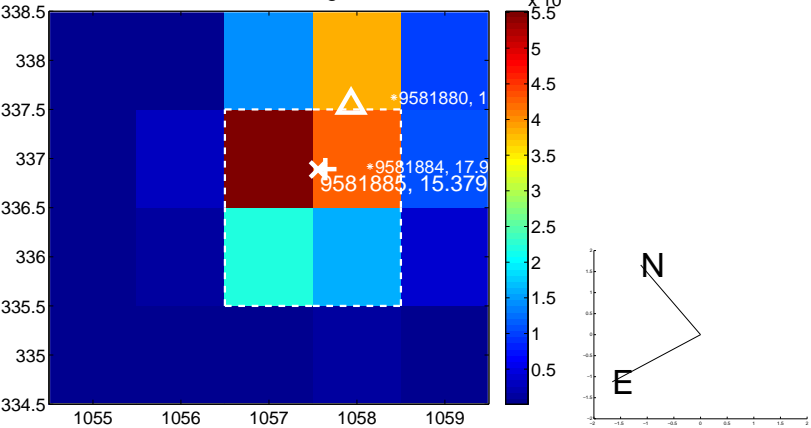
Q13 no OOT image



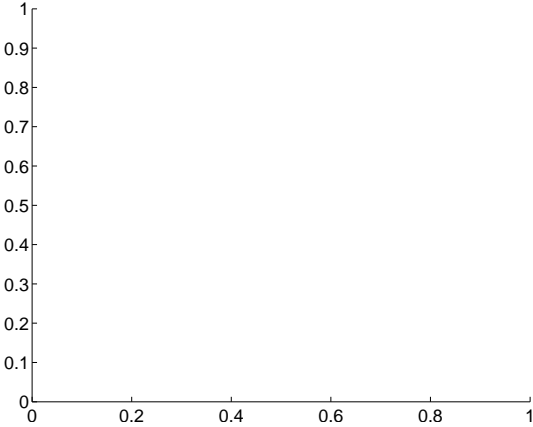
Q14 difference image



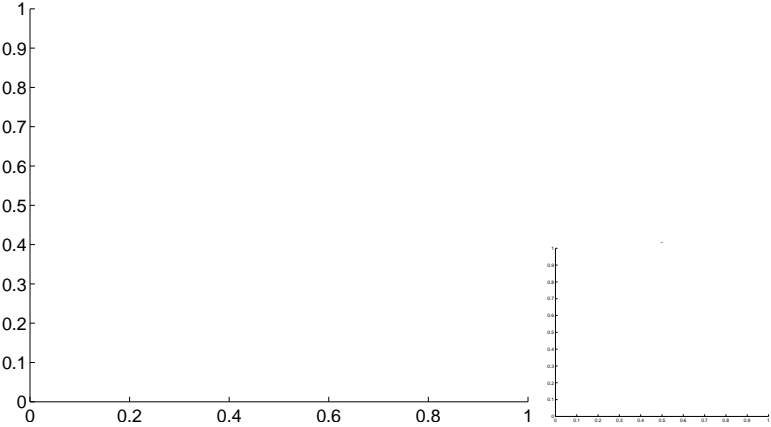
Q14 OOT image



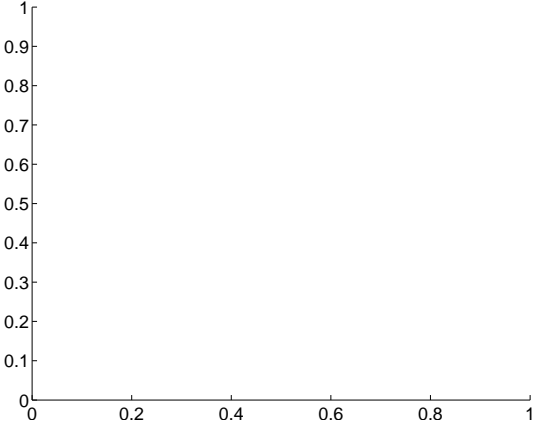
Q15 no difference image



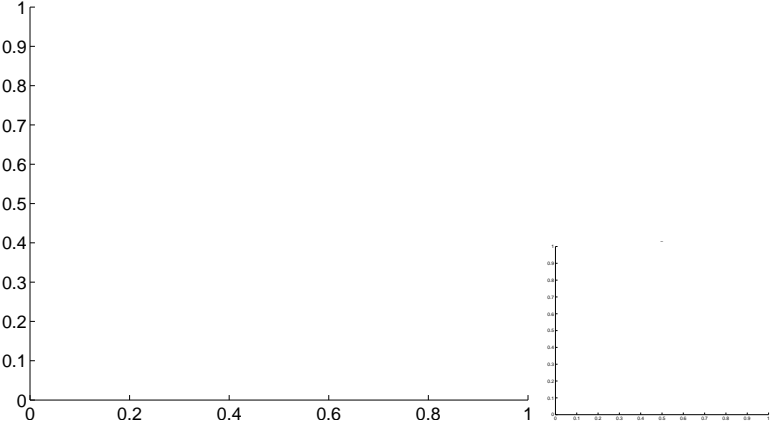
Q15 no OOT image



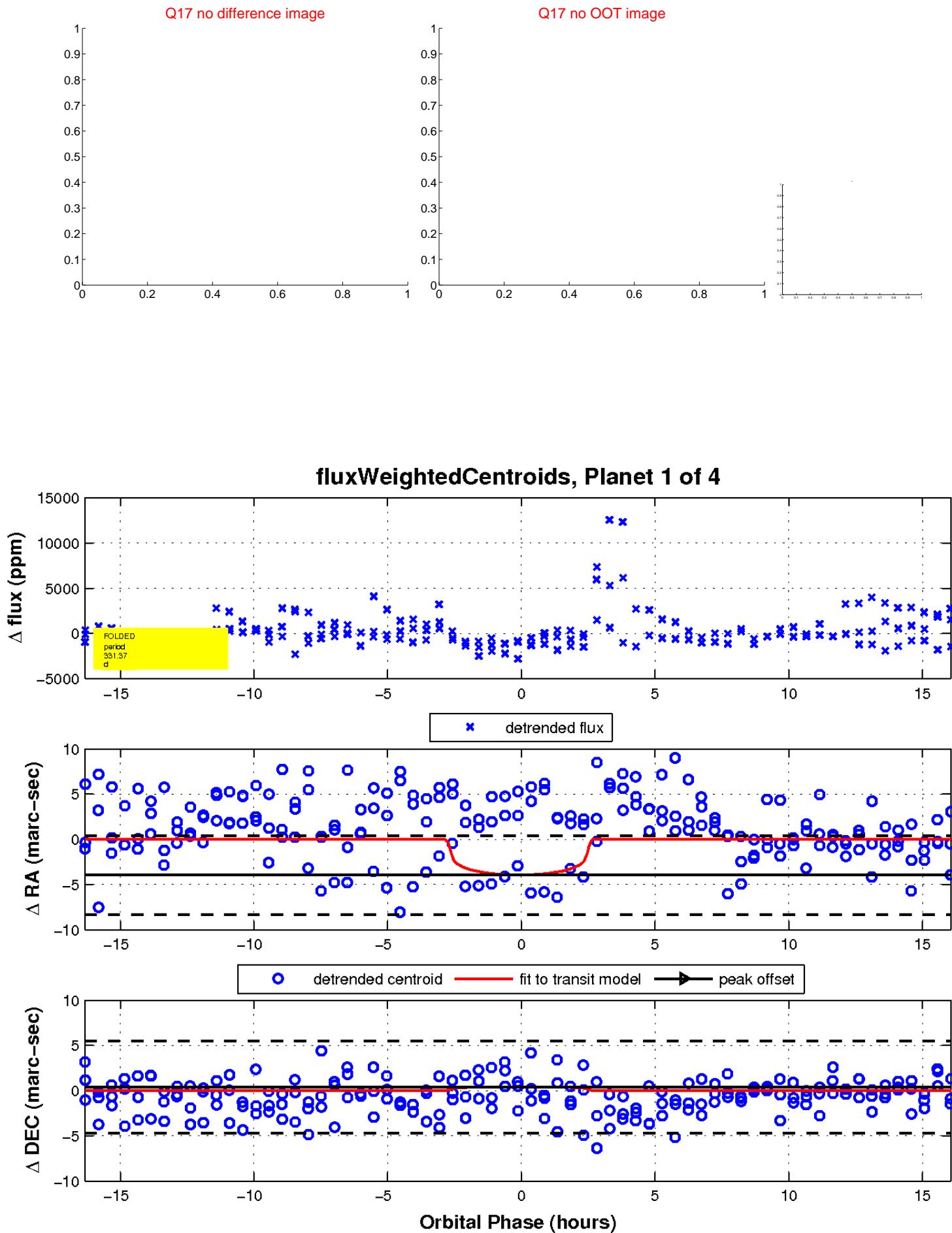
Q16 no difference image



Q16 no OOT image

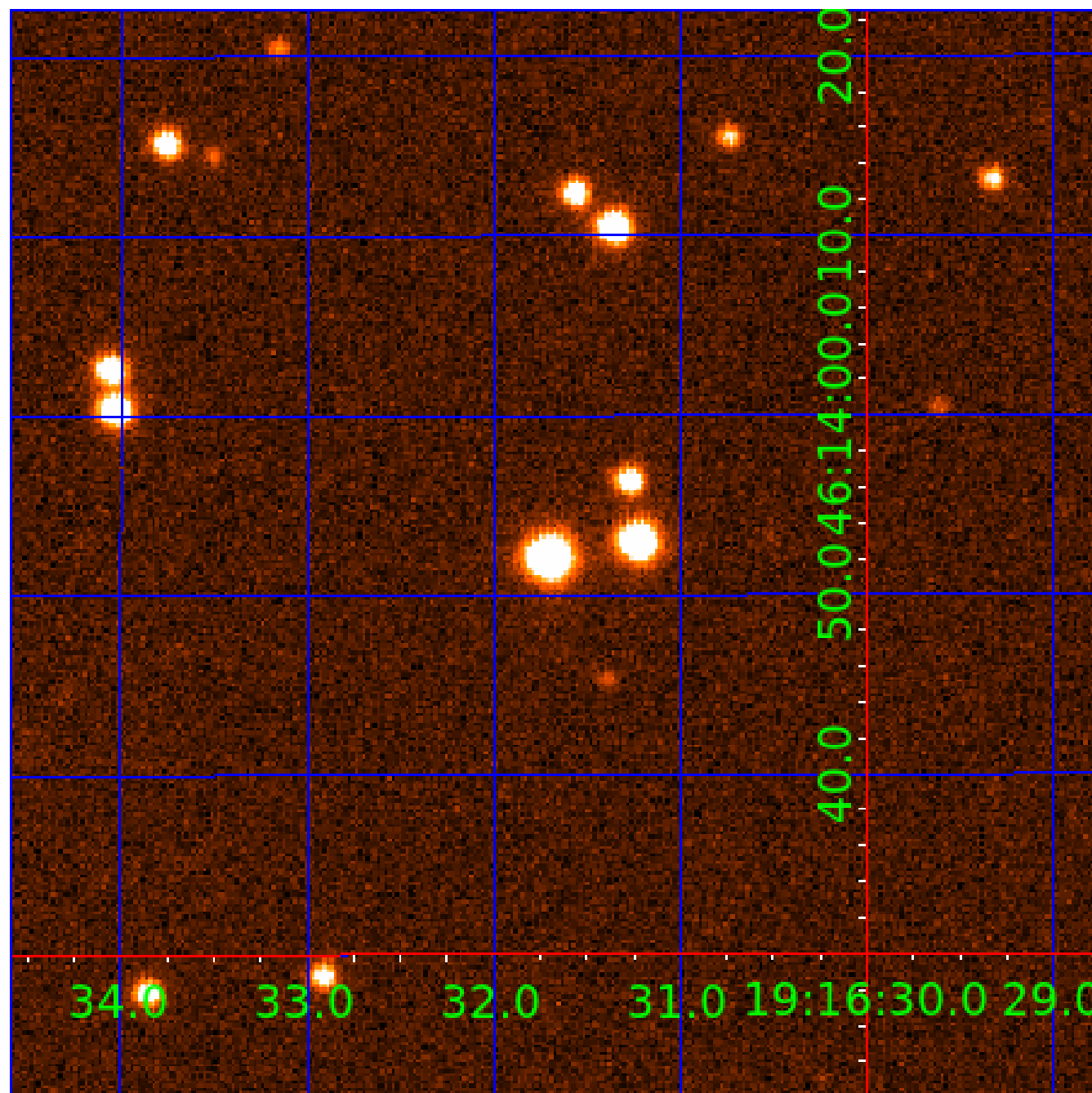


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009581885

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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009581885-02	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
009581885-03	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009581885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

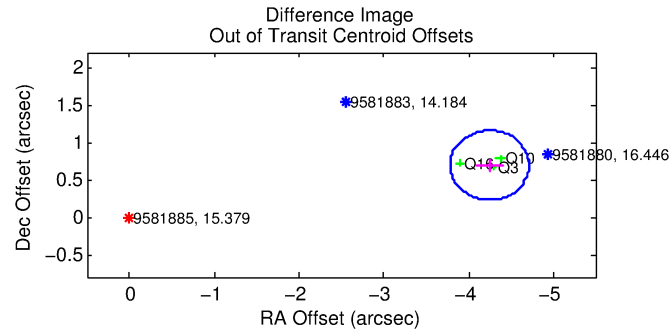
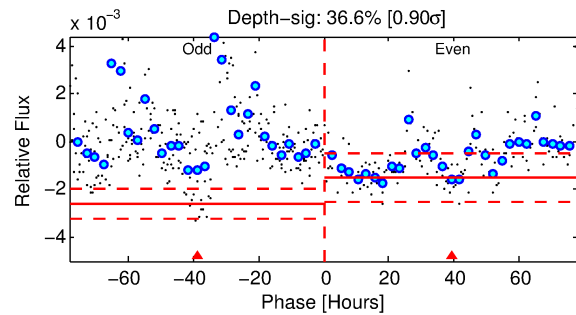
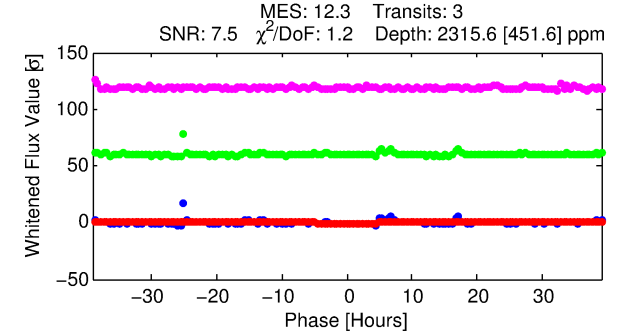
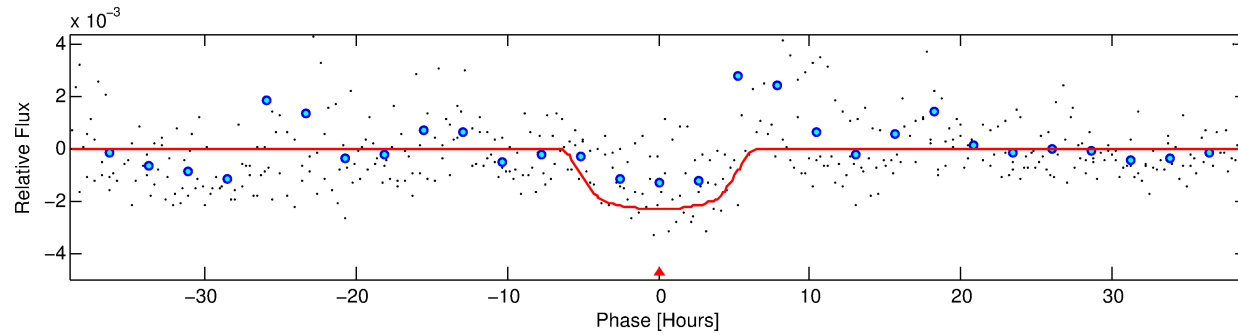
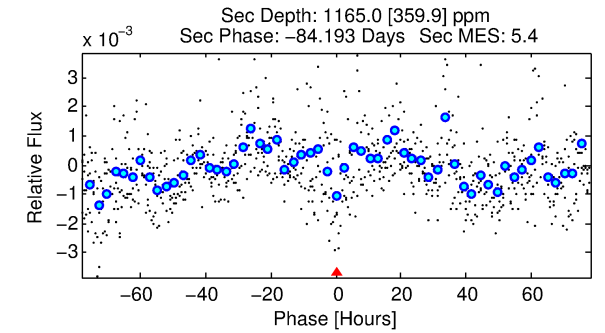
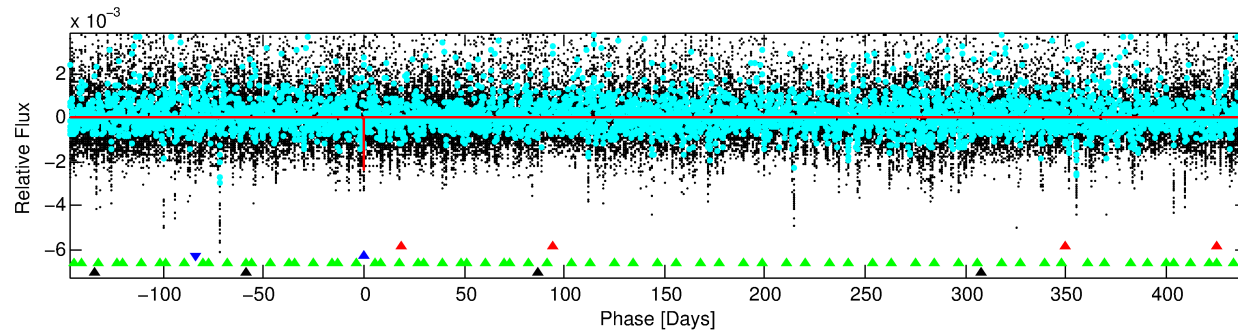
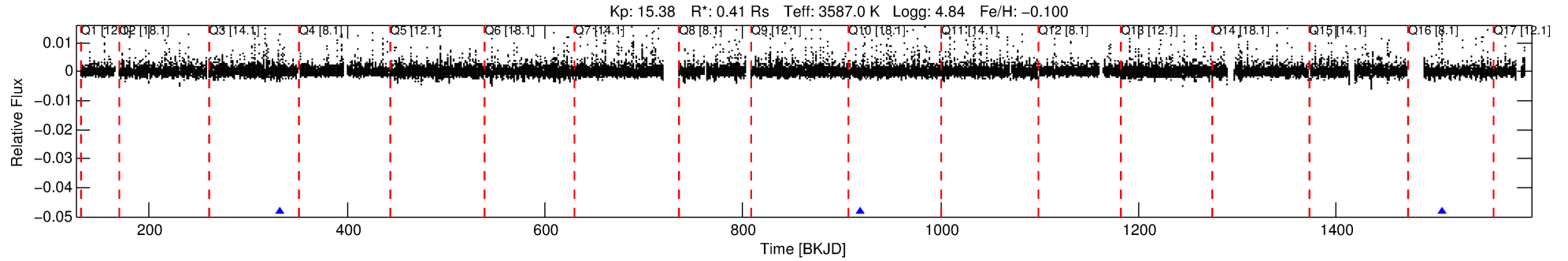
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009581885-02

No Significant Match Found

DV One-Page Summary

KIC: 9581885 Candidate: 2 of 4 Period: 587.705 d



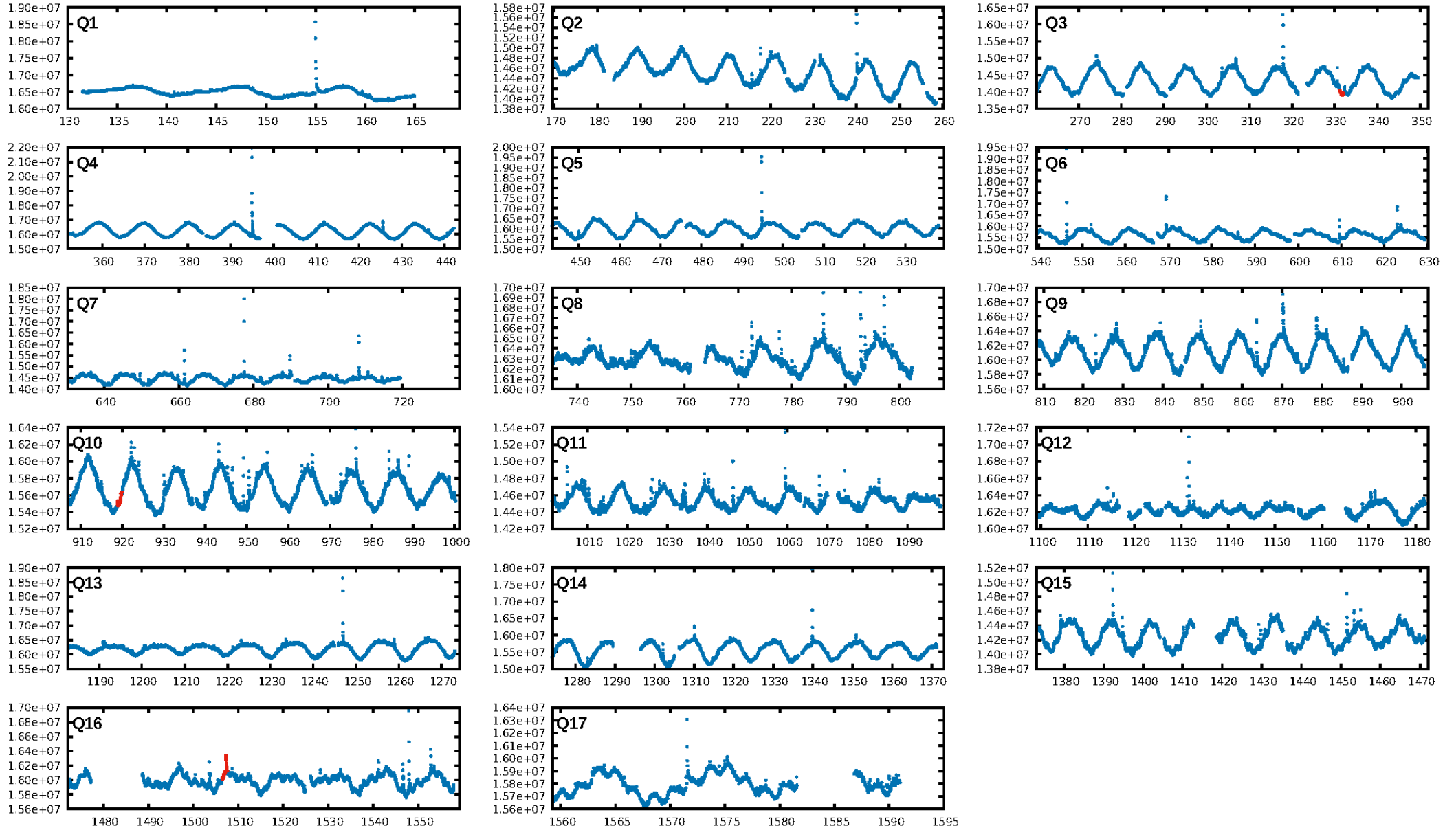
DV Fit Results:

Period = 587.70517 [0.02003] d
Epoch = 331.6304 [0.0269] BKJD
Rp/R* = 0.0519 [0.0064]
a/R* = 195.67 [49.95]
b = 0.89 [0.06]
Seff = 0.02 [0.00]
Teq = 100 [2] K
Rp = 2.31 [0.34] Re
a = 1.0326 [0.0606] AU
Ag = 127614.86 [51417.21] [2.48σ]
Teffp = 2910 [291] K [9.67σ]

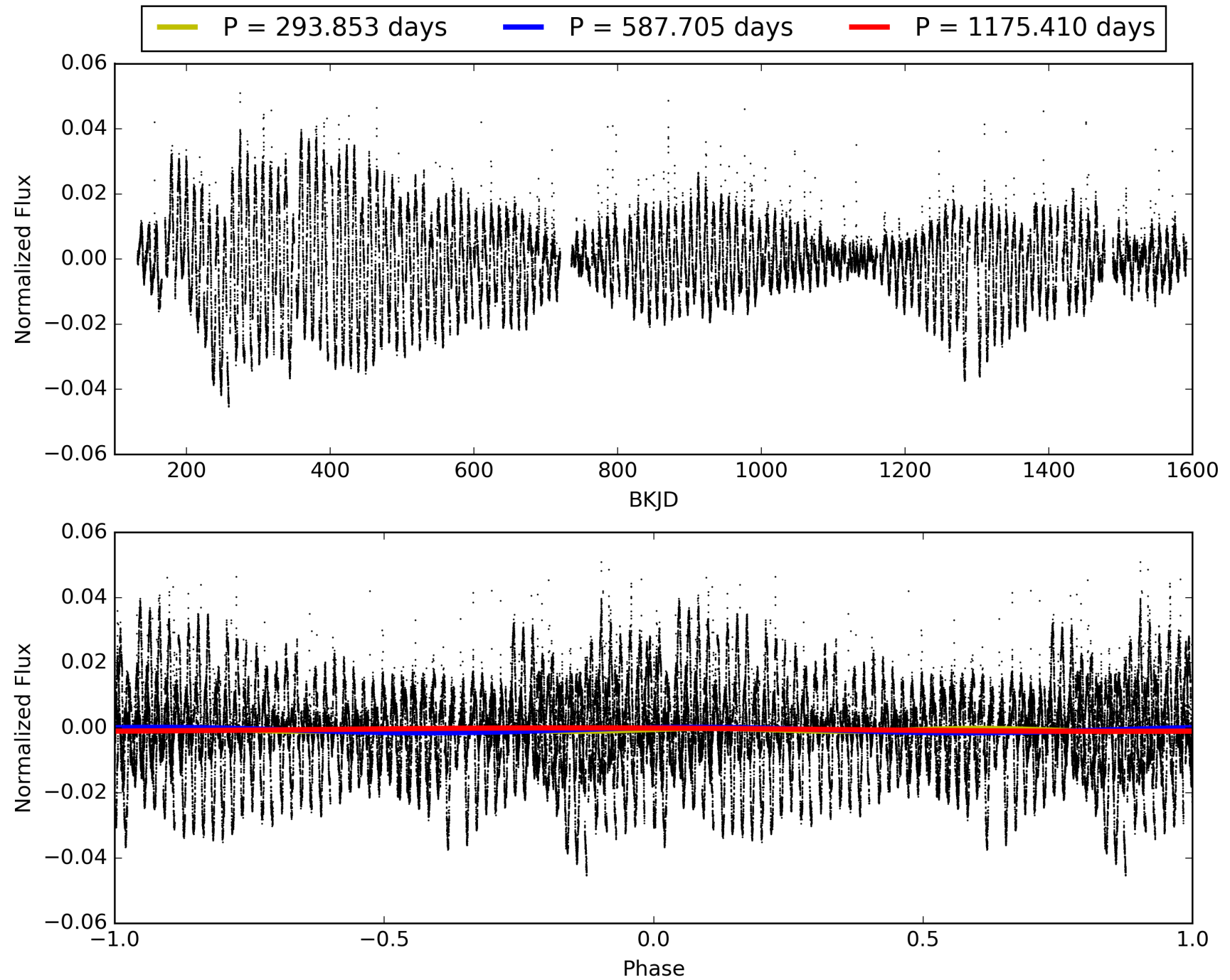
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [397.07σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 15.1%
ModelChiSquareGof-sig: 98.9%
Bootstrap-pfa: 1.47e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 3.389
Centroid-sig: 58.6%
Centroid-so: 0.885 arcsec [0.56σ]
OotOffset-rm: 4.303 arcsec [27.77σ]
KicOffset-rm: 4.636 arcsec [53.01σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 009581885-02, PDC Light Curves

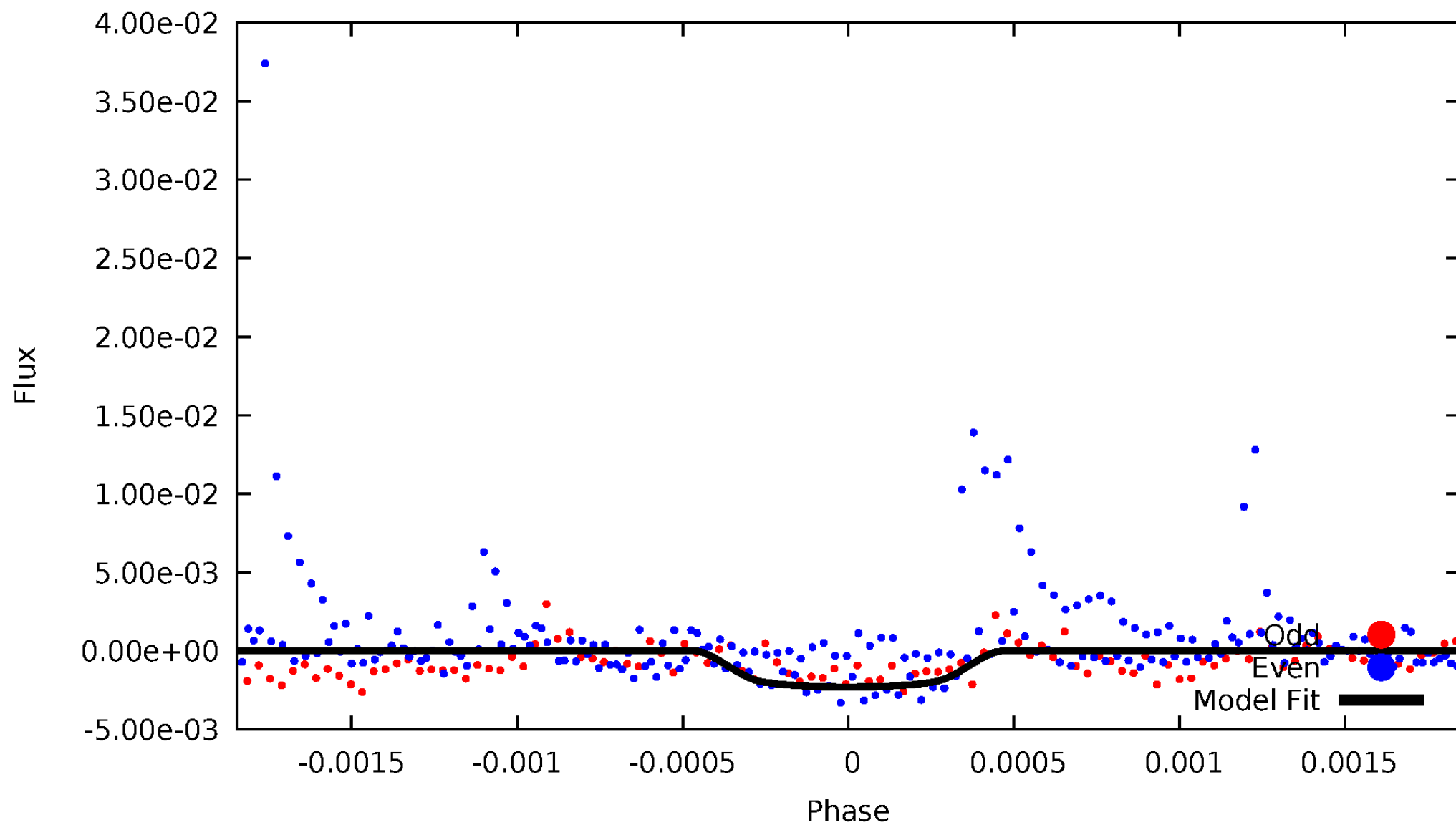


TCE 009581885-02



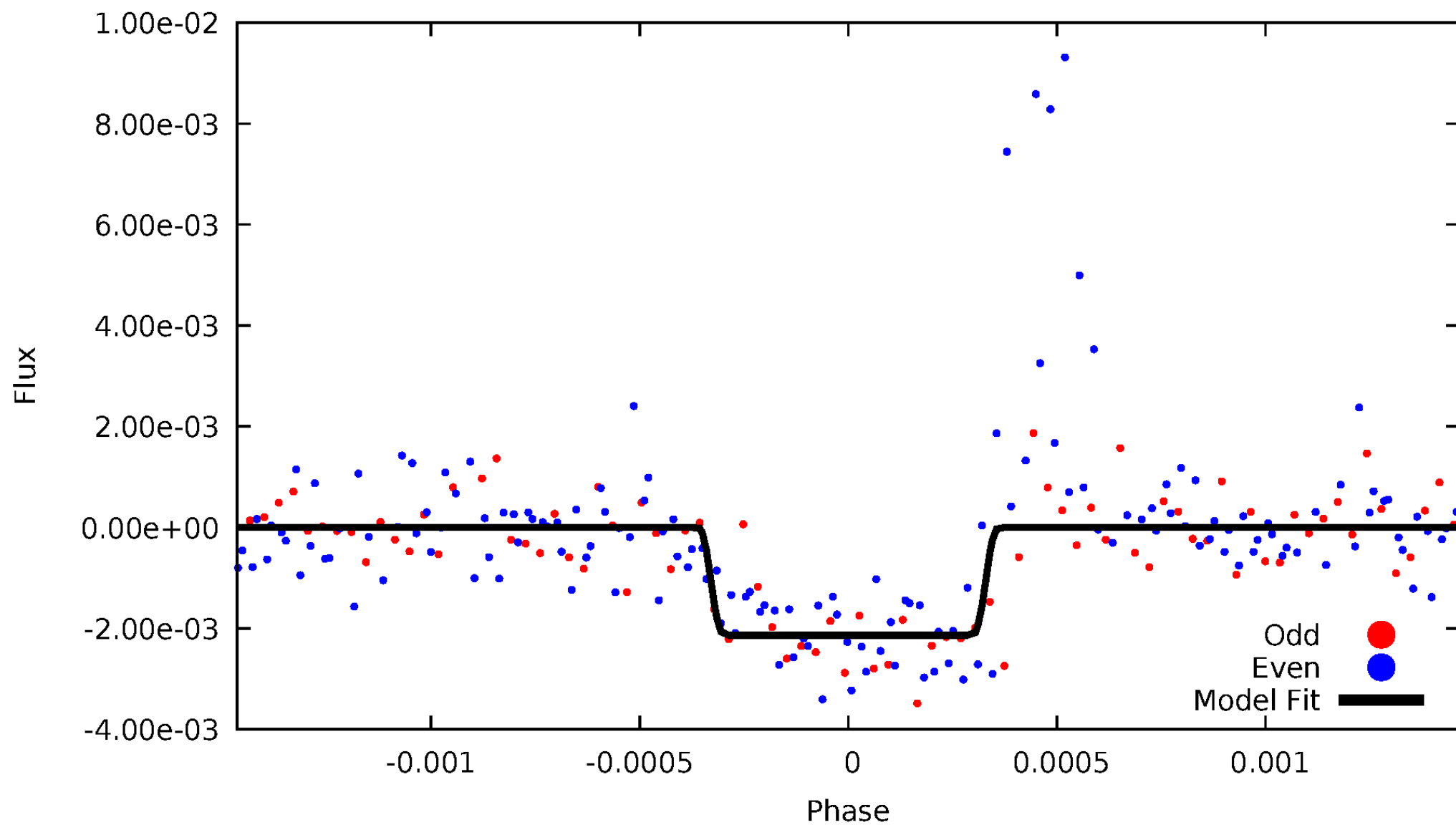
DV Odd/Even

TCE 009581885-02



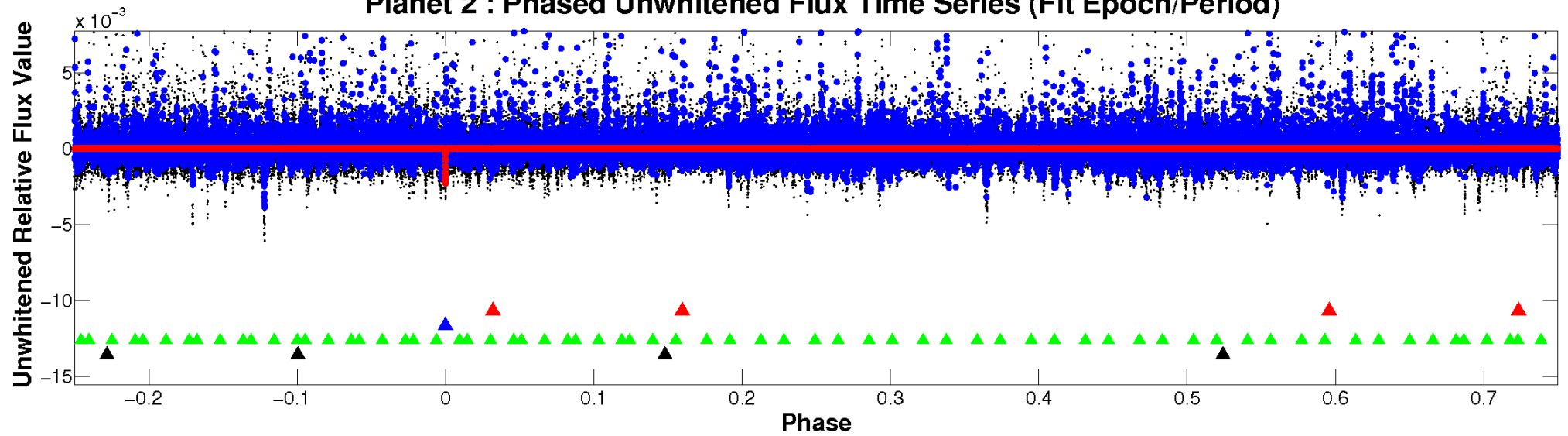
ALT Odd/Even

TCE 009581885-02

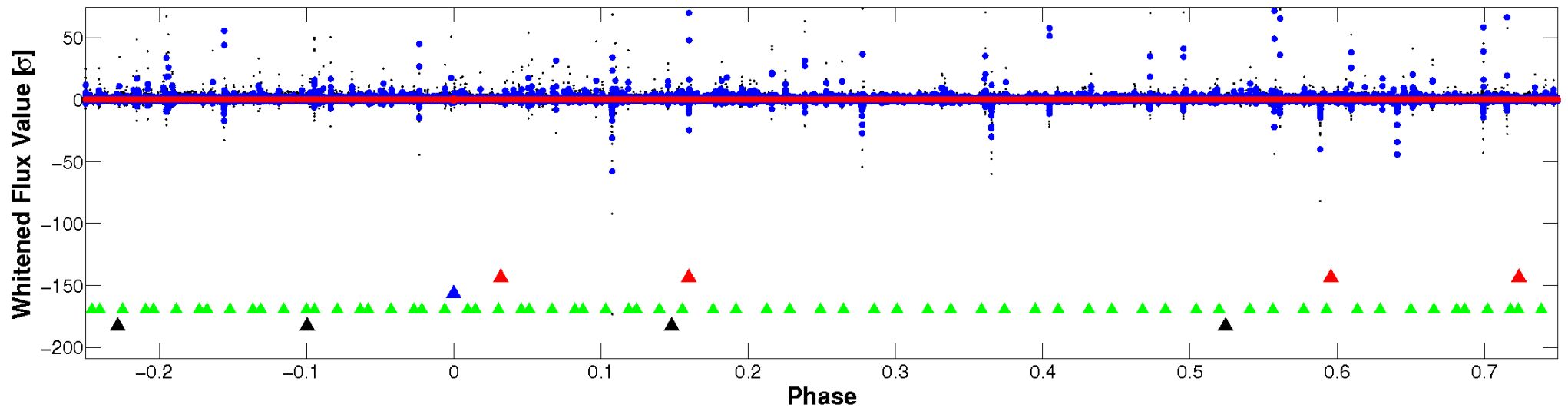


Non-Whitened Vs. Whitened Light Curve

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

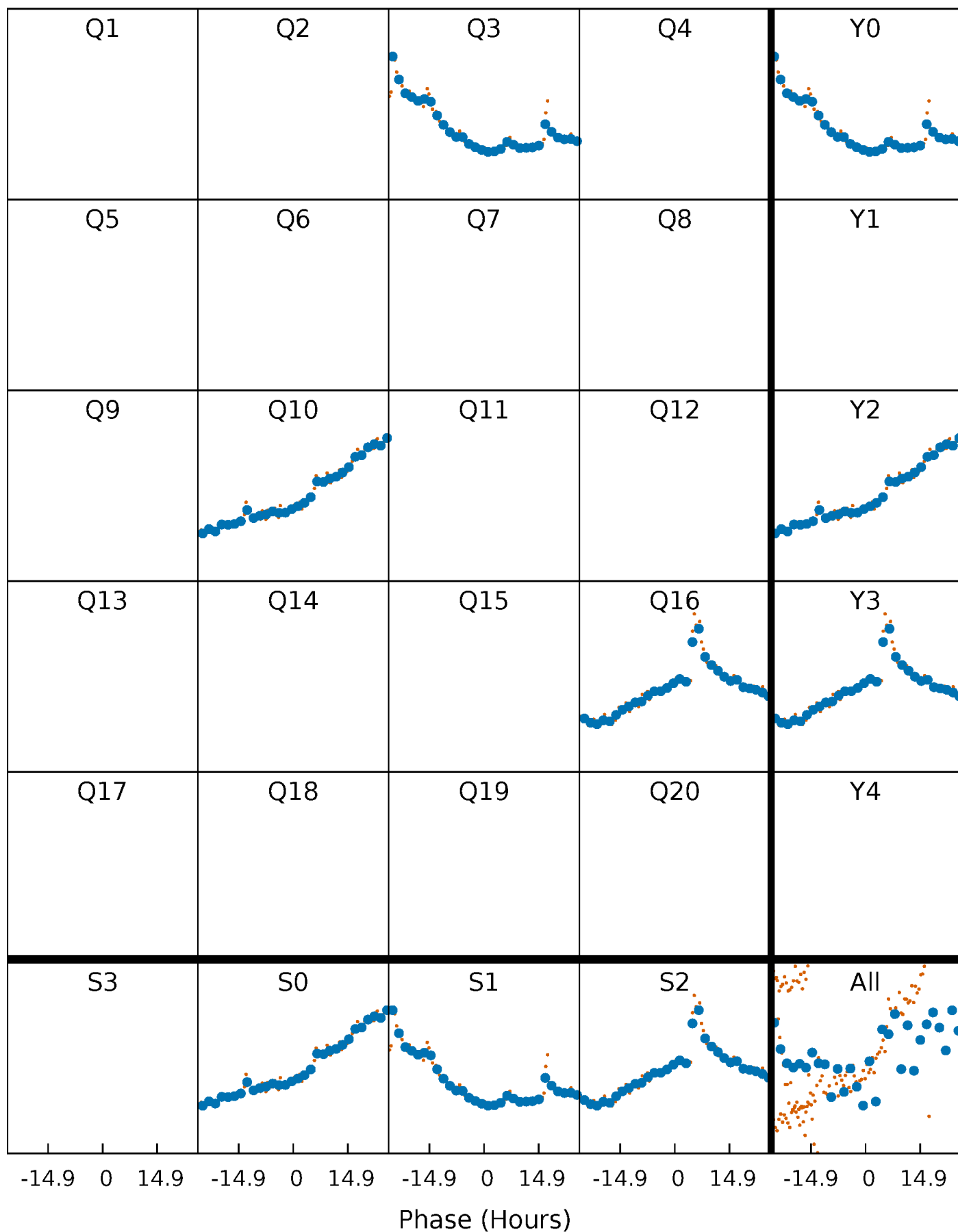


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



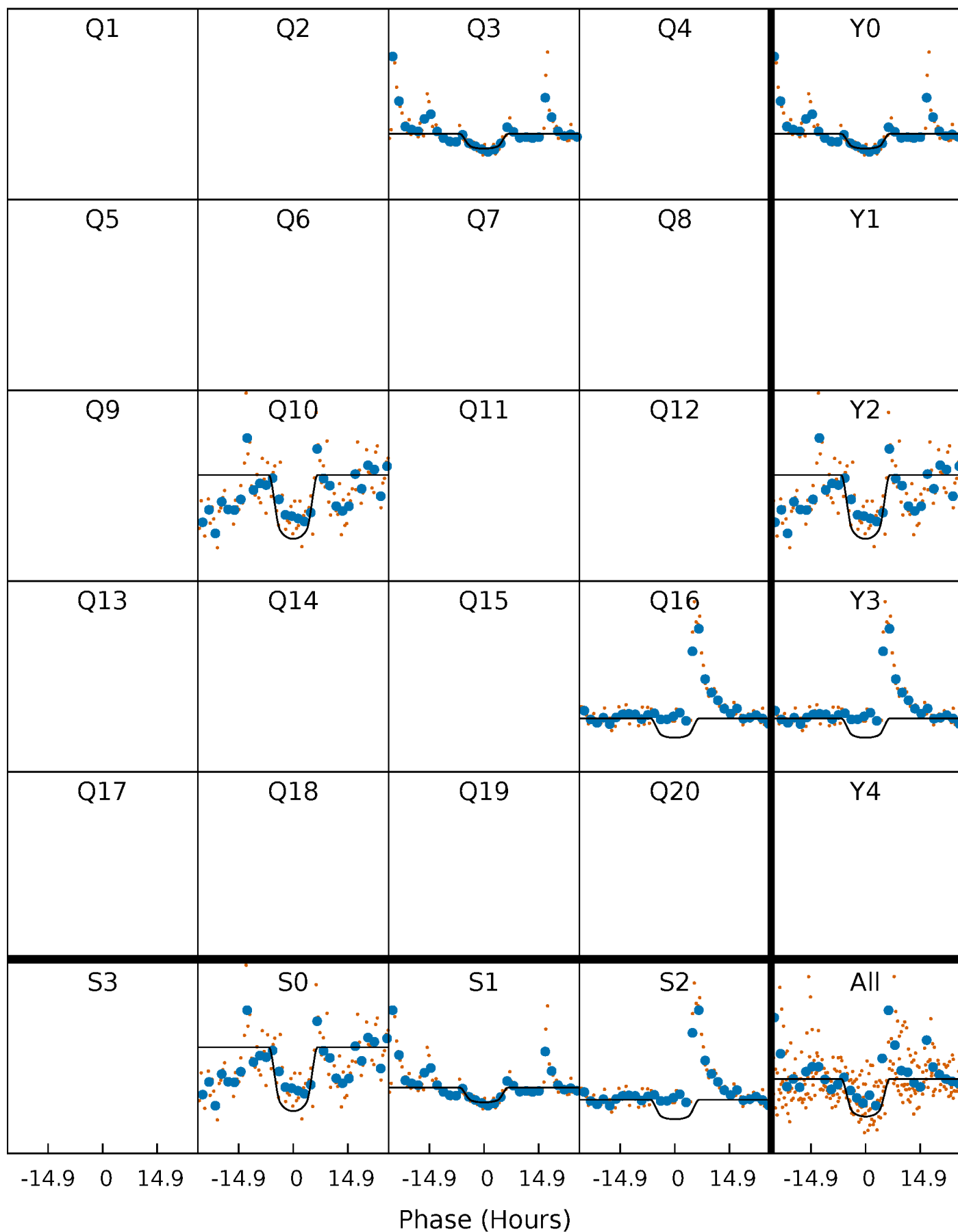
PDC Quarter-Phased Transit Curves

TCE 009581885-02 P=587.705174 Days $T_0=331.630355$ (BKJD)



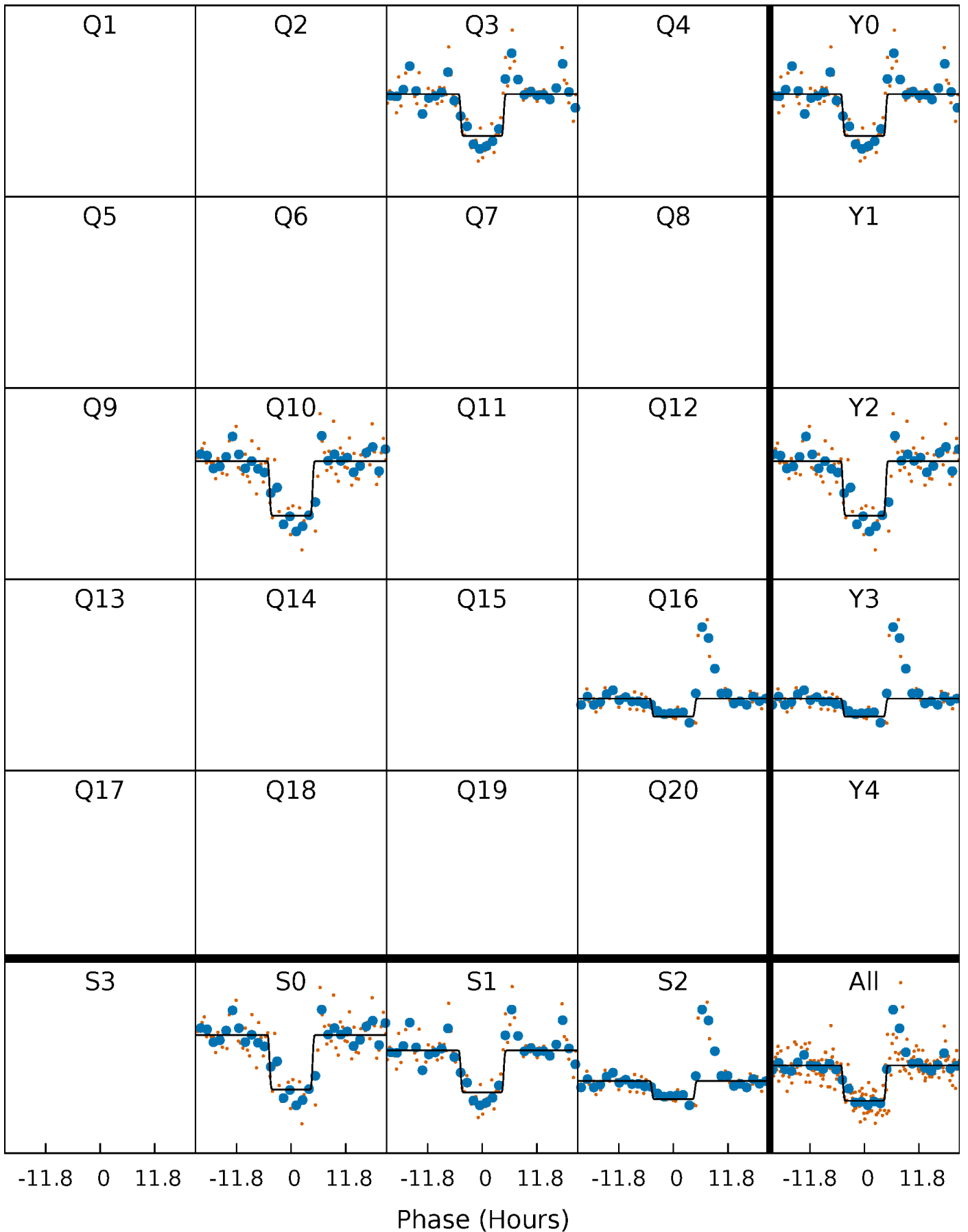
DV Quarter-Phased Transit Curves

TCE 009581885-02 $P=587.705174$ Days $T_0=331.630355$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

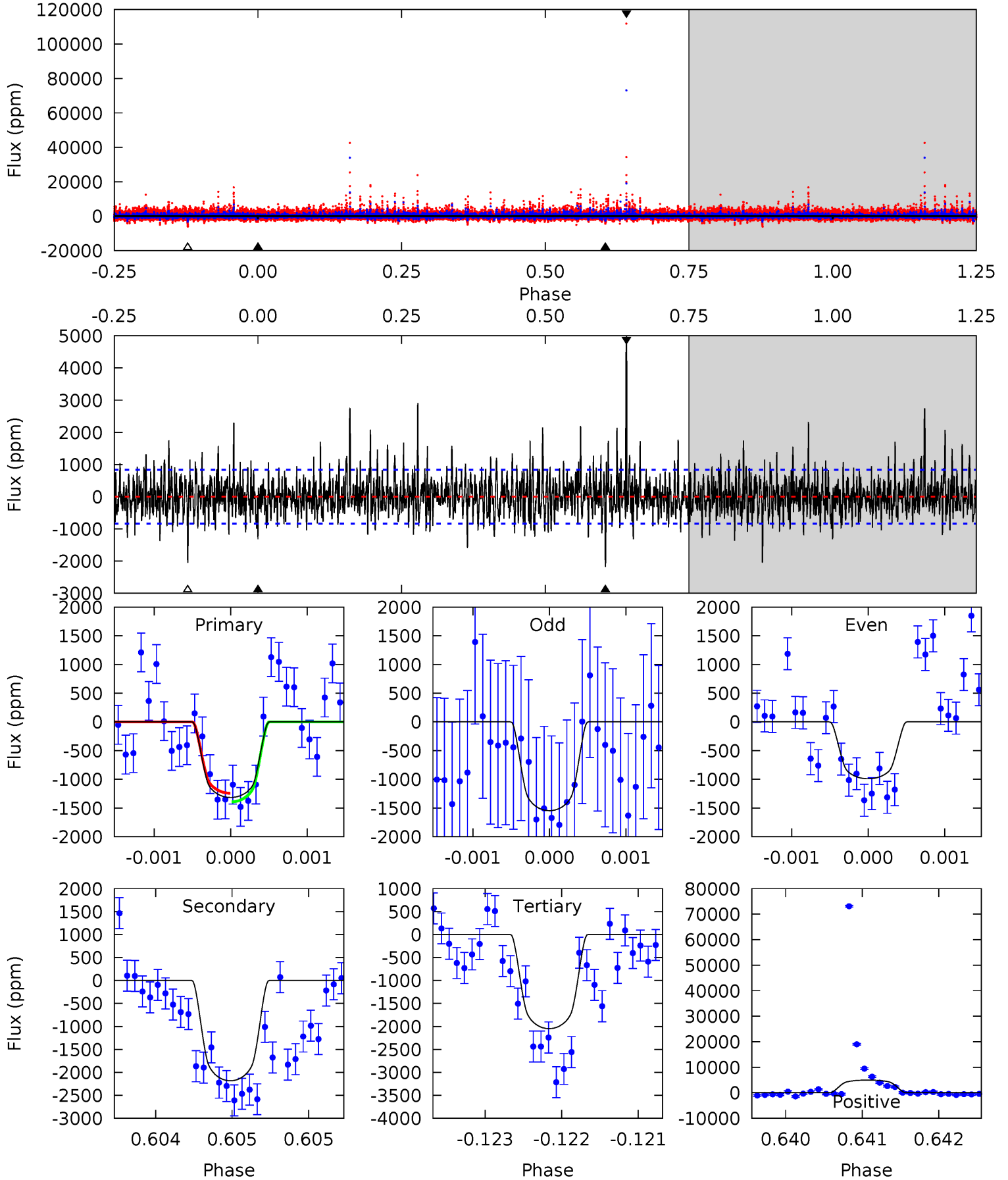
TCE 009581885-02 $P=587.682808$ Days $T_0=331.653390$ (BKJD)



DV Model-Shift Uniqueness Test

009581885-02, P = 587.705174 Days, E = 331.630355 Days

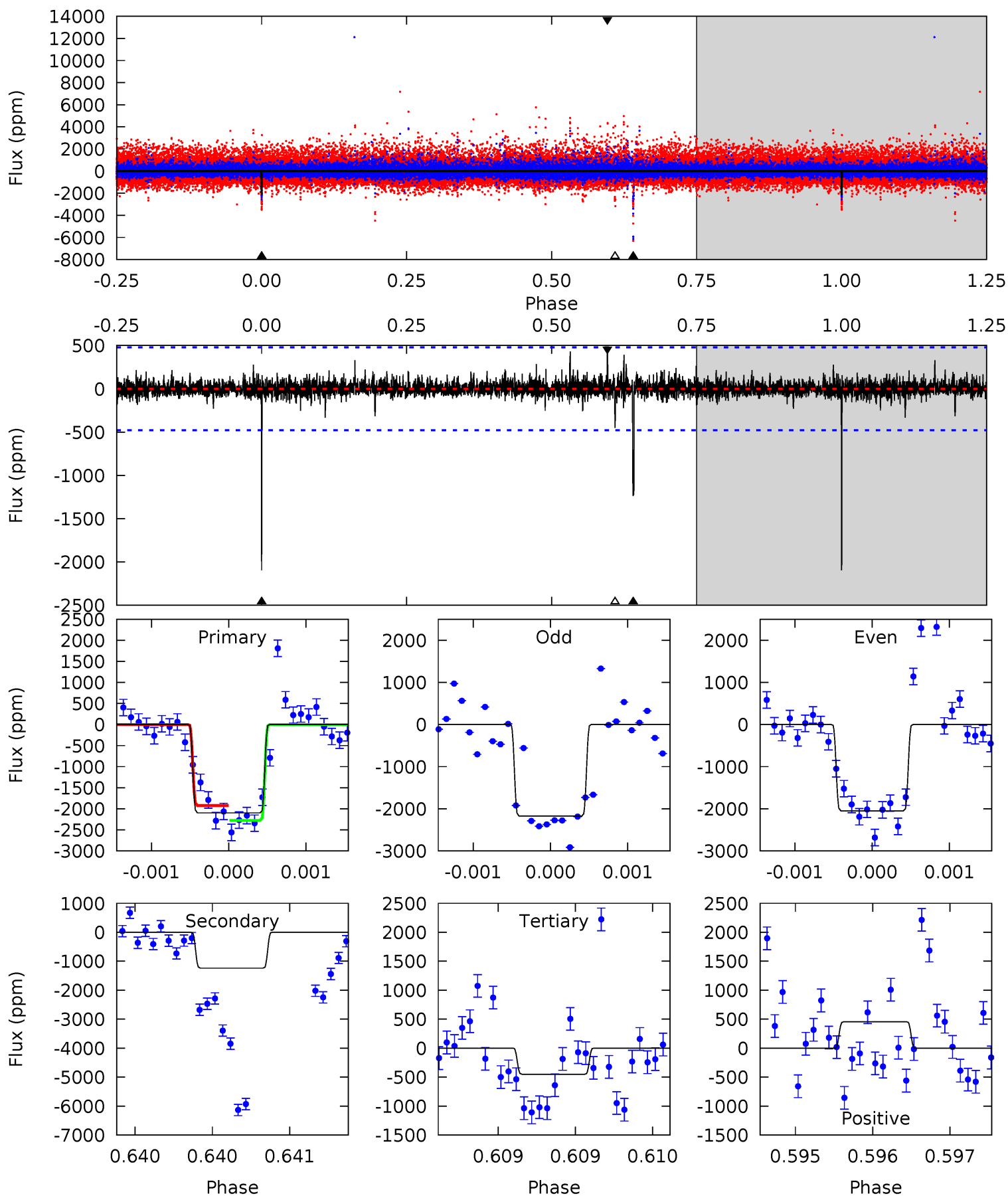
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.57	14.2	13.3	32.4	5.46	3.31	3.36	-4.76	-23.8	0.88	-18.2	1.03	0.69	0.70	0.50



Alt Model-Shift Uniqueness Test

009581885-02, P = 587.682808 Days, E = 331.653390 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.1	14.3	5.19	5.26	5.51	3.39	0.76	19.0	18.9	9.08	9.02	0.60	0.96	0.18	2.03



Stellar Parameters For KIC 009581885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3587^{+43}_{-48}	$4.843^{+0.035}_{-0.028}$	$-0.100^{+0.100}_{-0.100}$	$0.409^{+0.029}_{-0.032}$	$0.427^{+0.030}_{-0.036}$	$8.764^{+1.697}_{-1.058}$
	+1%/-1%	+1%/-1%	+100%/-100%	+7%/-8%	+7%/-8%	+19%/-12%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009581885-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-2183 ± 154	$2.29^{+0.31}_{-0.28}$	139^{+3}_{-3}	3478^{+158}_{-145}	243989^{+74559}_{-56114}
Alt.	-1239 ± 87	$2.06^{+0.31}_{-0.31}$	139^{+2}_{-2}	3293^{+164}_{-135}	171570^{+64543}_{-42766}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

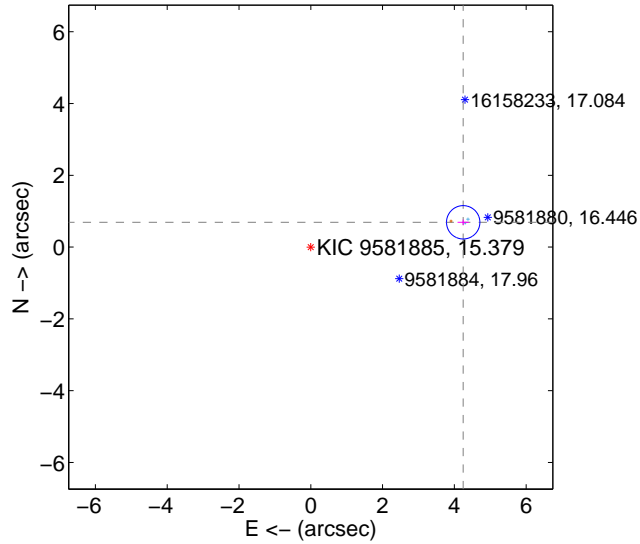
Supplemental centroid analysis for 009581885-02. Kepler magnitude: 15.38. Transit SNR 7.54

There are 2 quarters with good PRF difference image offsets

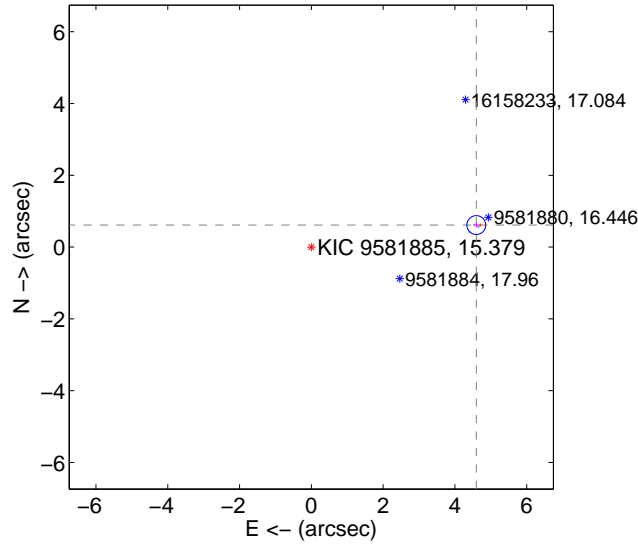
The direct PRF centroid is offset from the target star catalog position by about 0.81 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.303 ± 0.155	27.77	-4.247 ± 0.156	0.691 ± 0.077
PRF-fit source offset from KIC position	4.636 ± 0.087	53.01	-4.596 ± 0.088	0.614 ± 0.069
photometric centroid source offset	0.89 ± 1.58	0.56	-0.89 ± 1.58	-0.02 ± 0.69

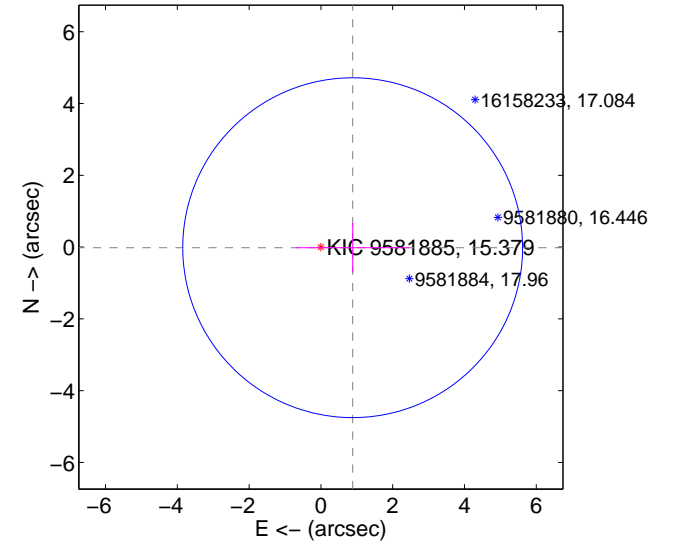
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

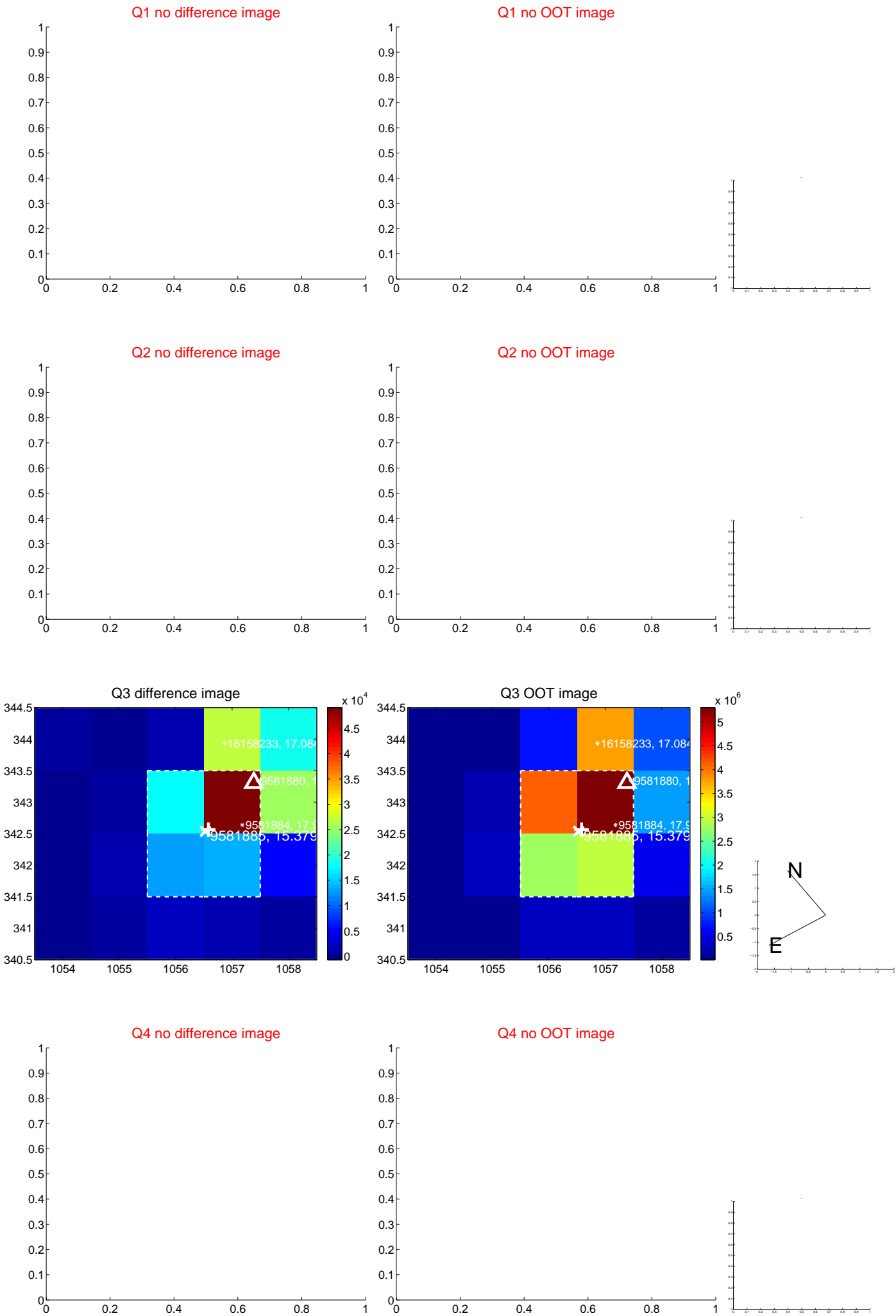


offset from photometric centroids

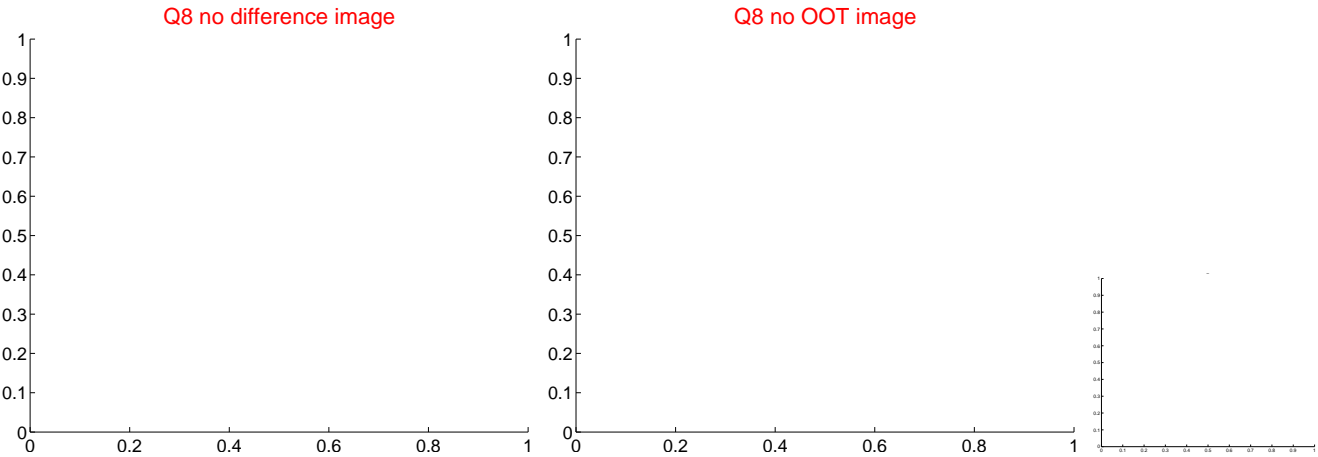
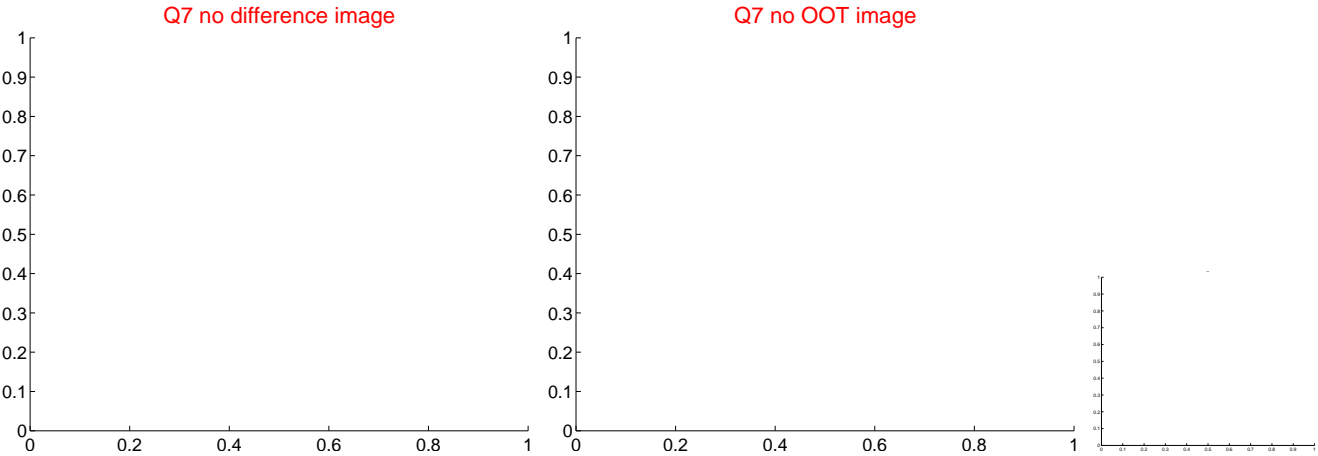
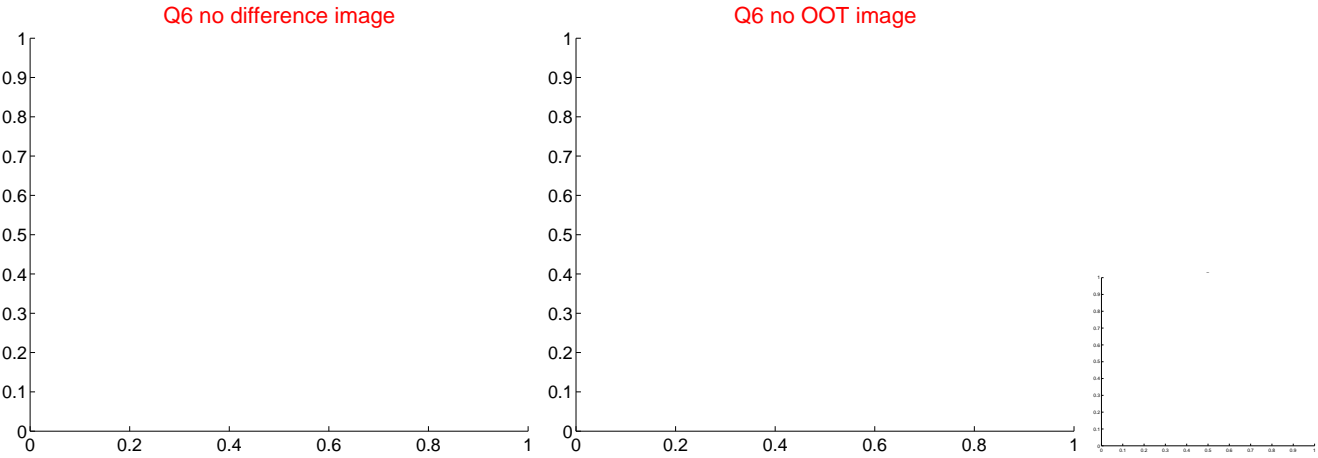
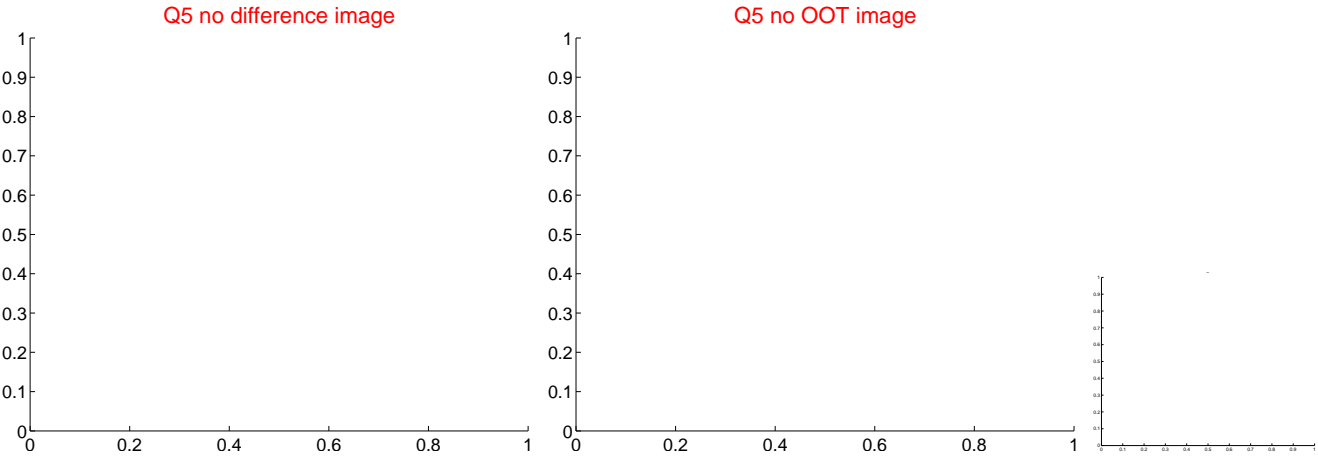


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

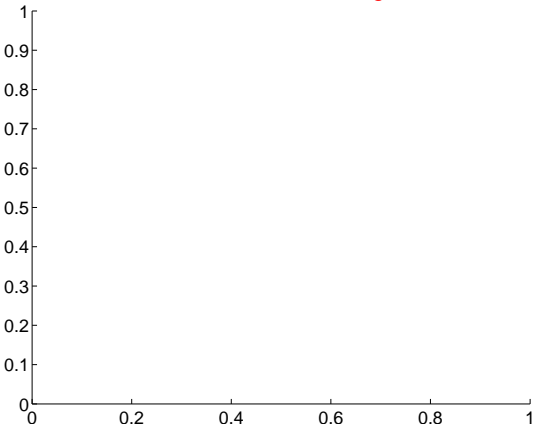


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

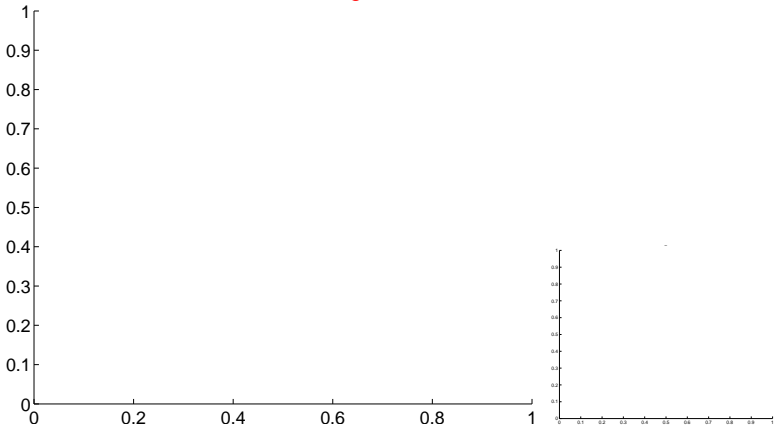


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

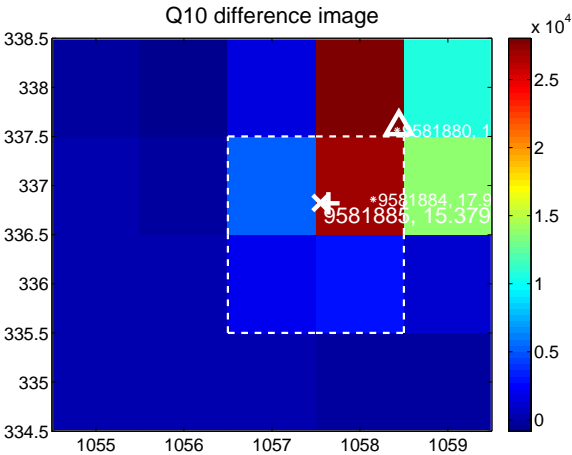
Q9 no difference image



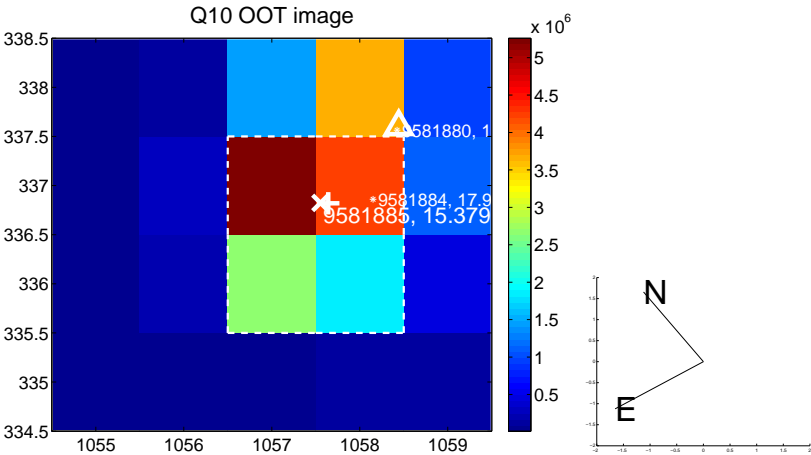
Q9 no OOT image



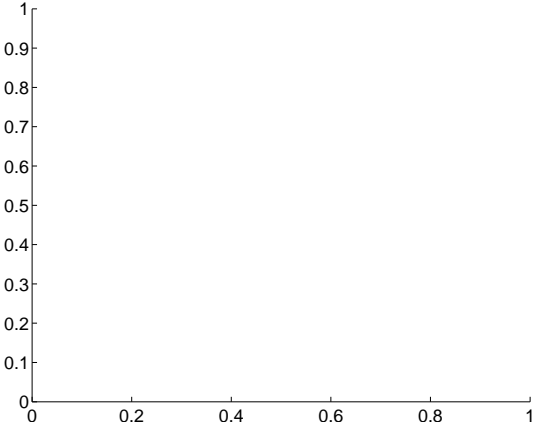
Q10 difference image



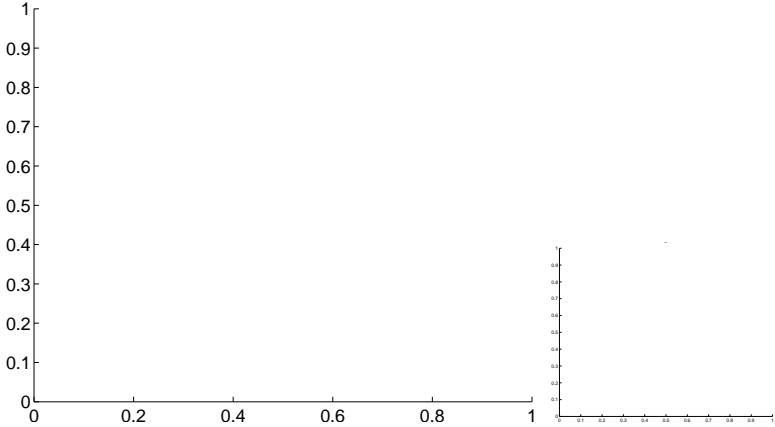
Q10 OOT image



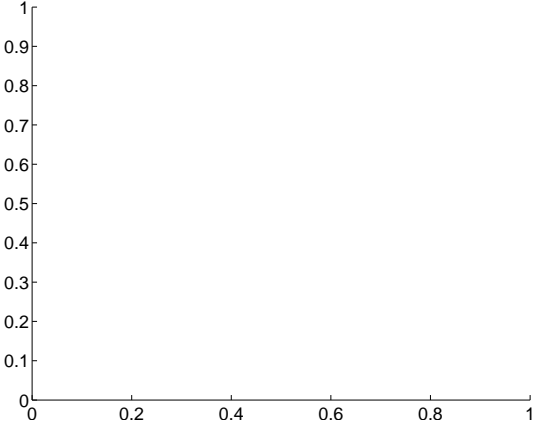
Q11 no difference image



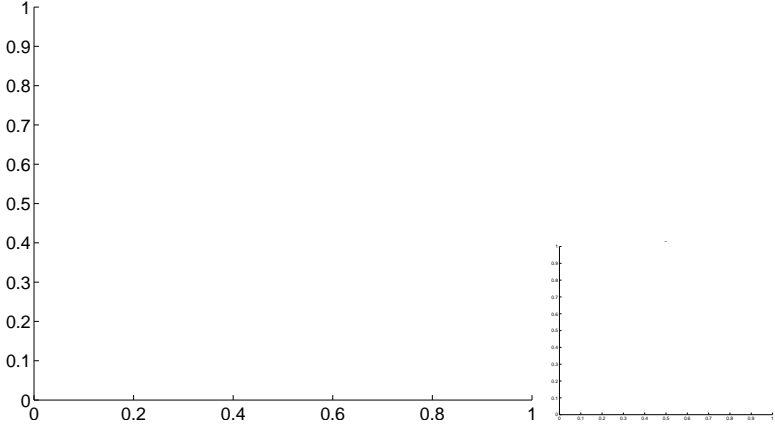
Q11 no OOT image



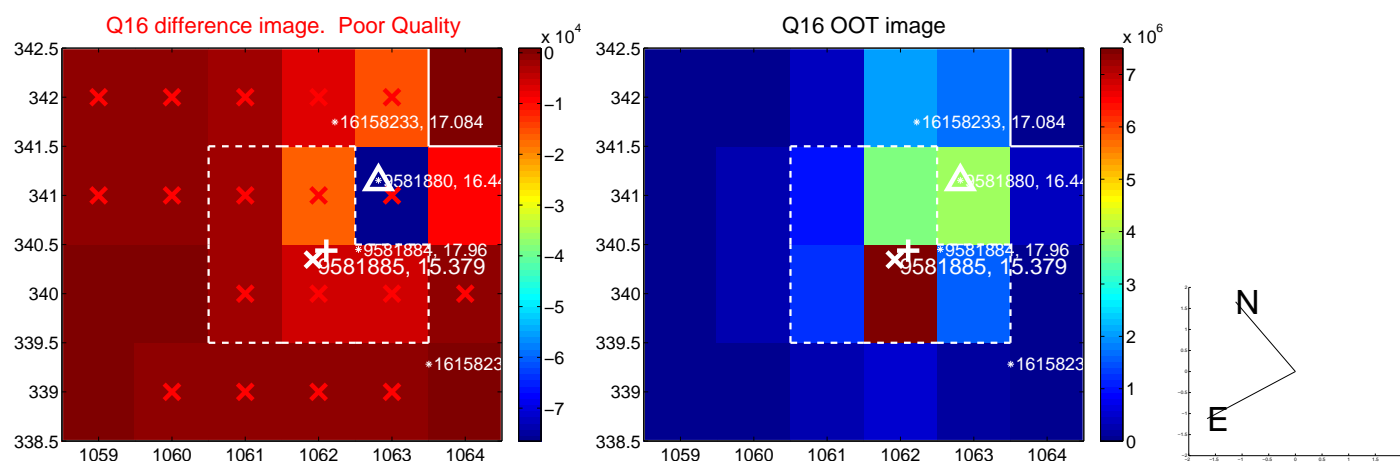
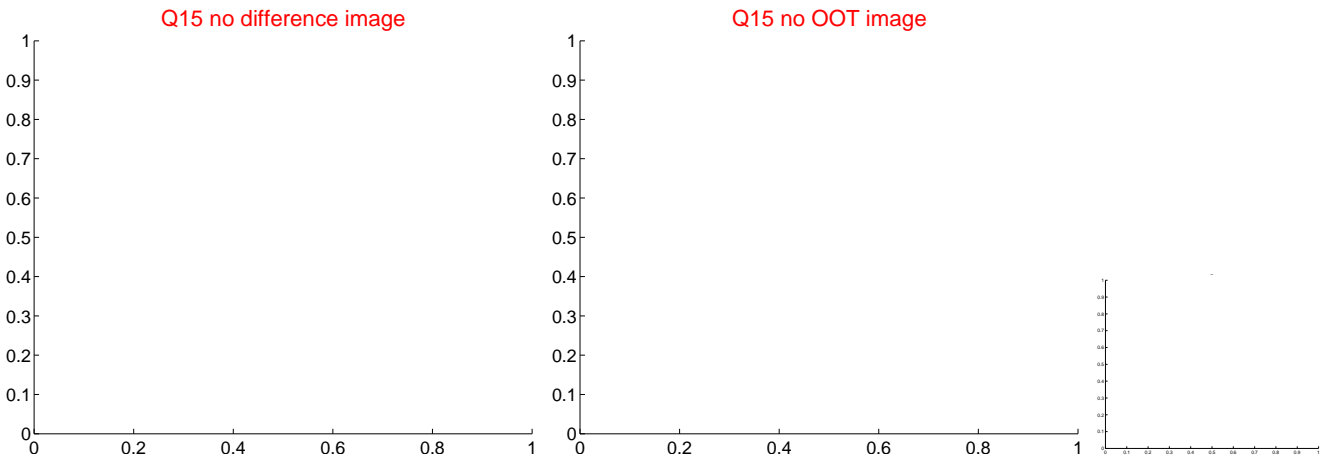
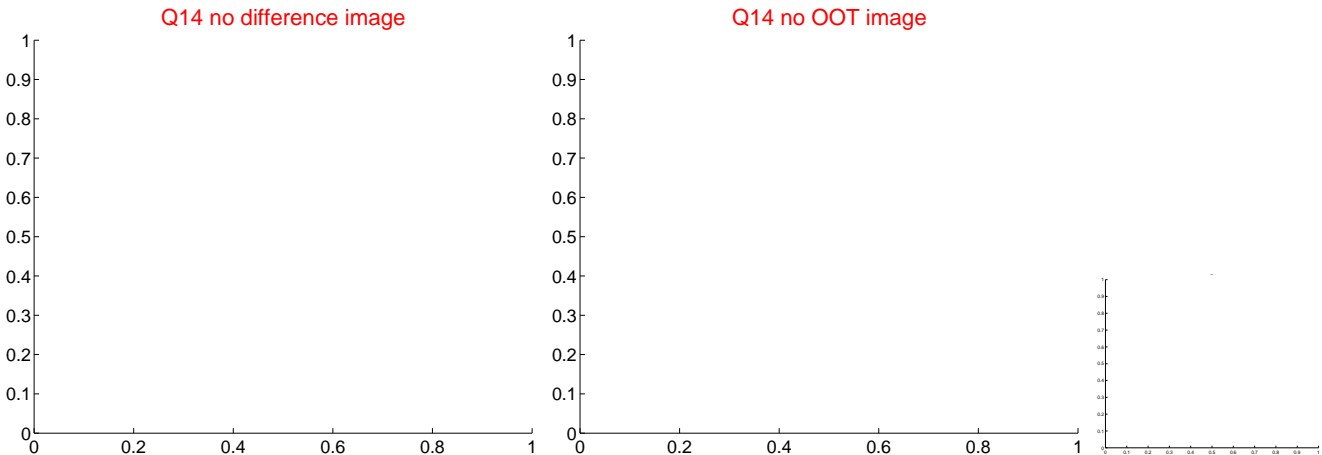
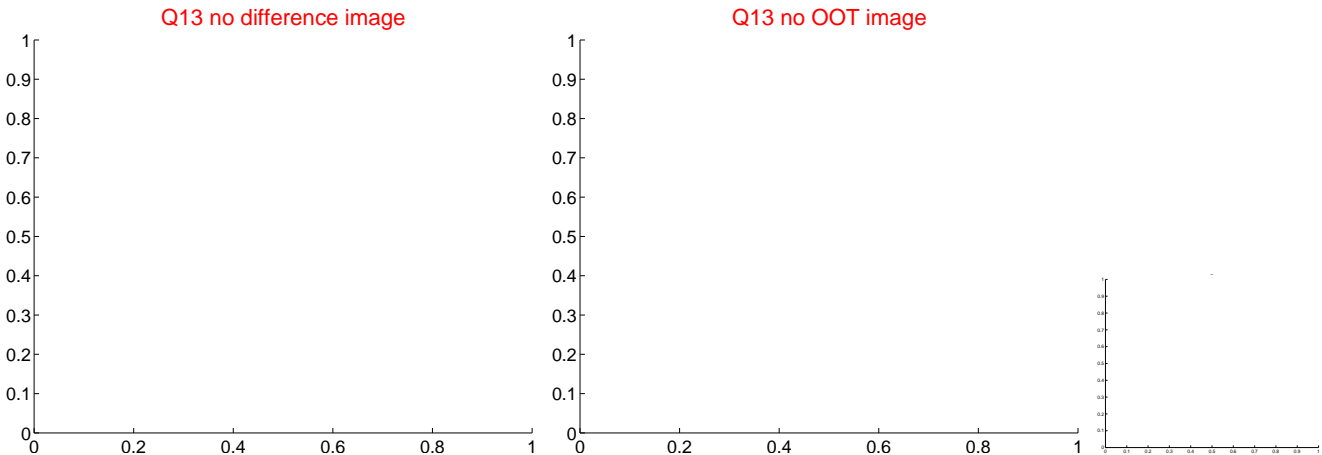
Q12 no difference image



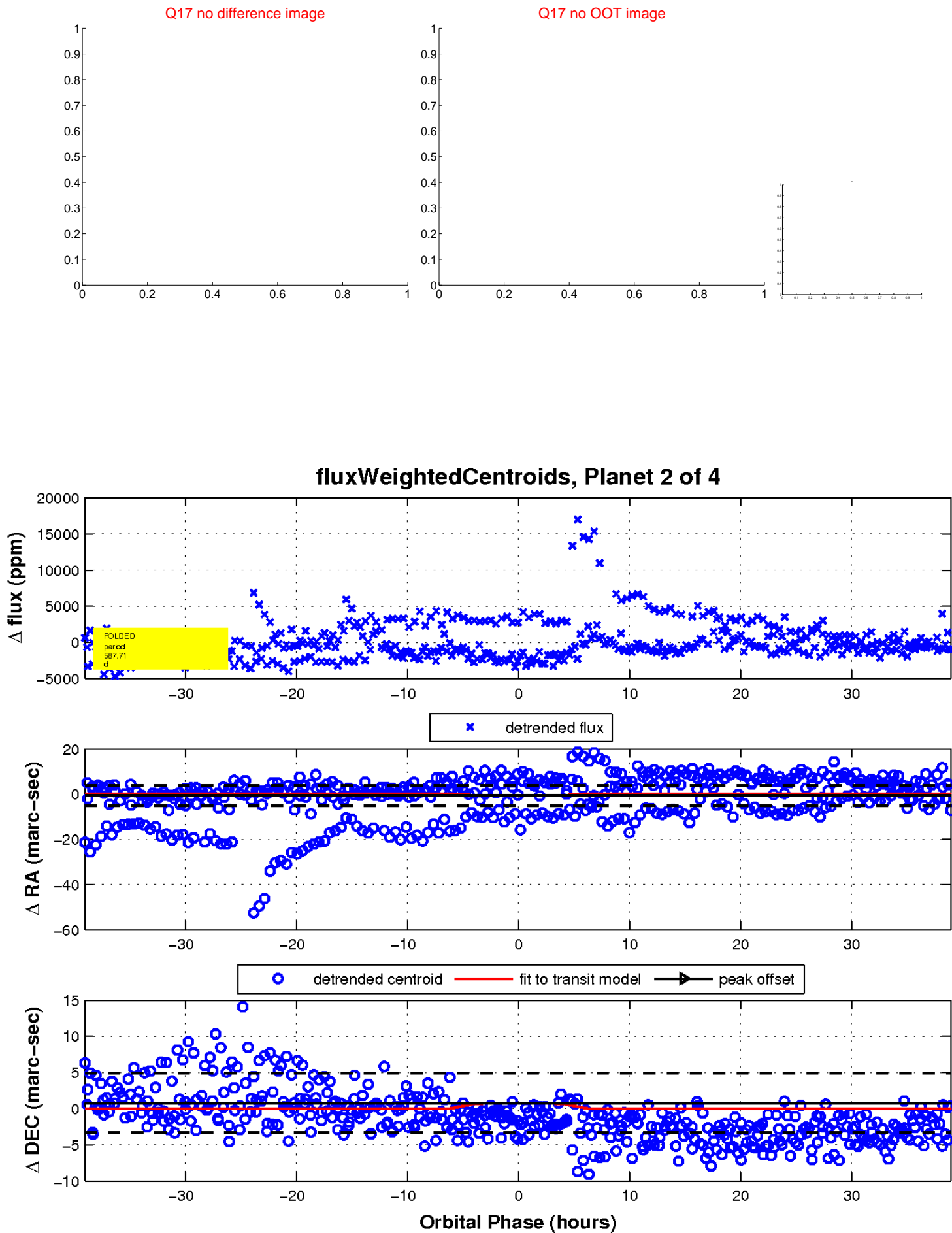
Q12 no OOT image



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

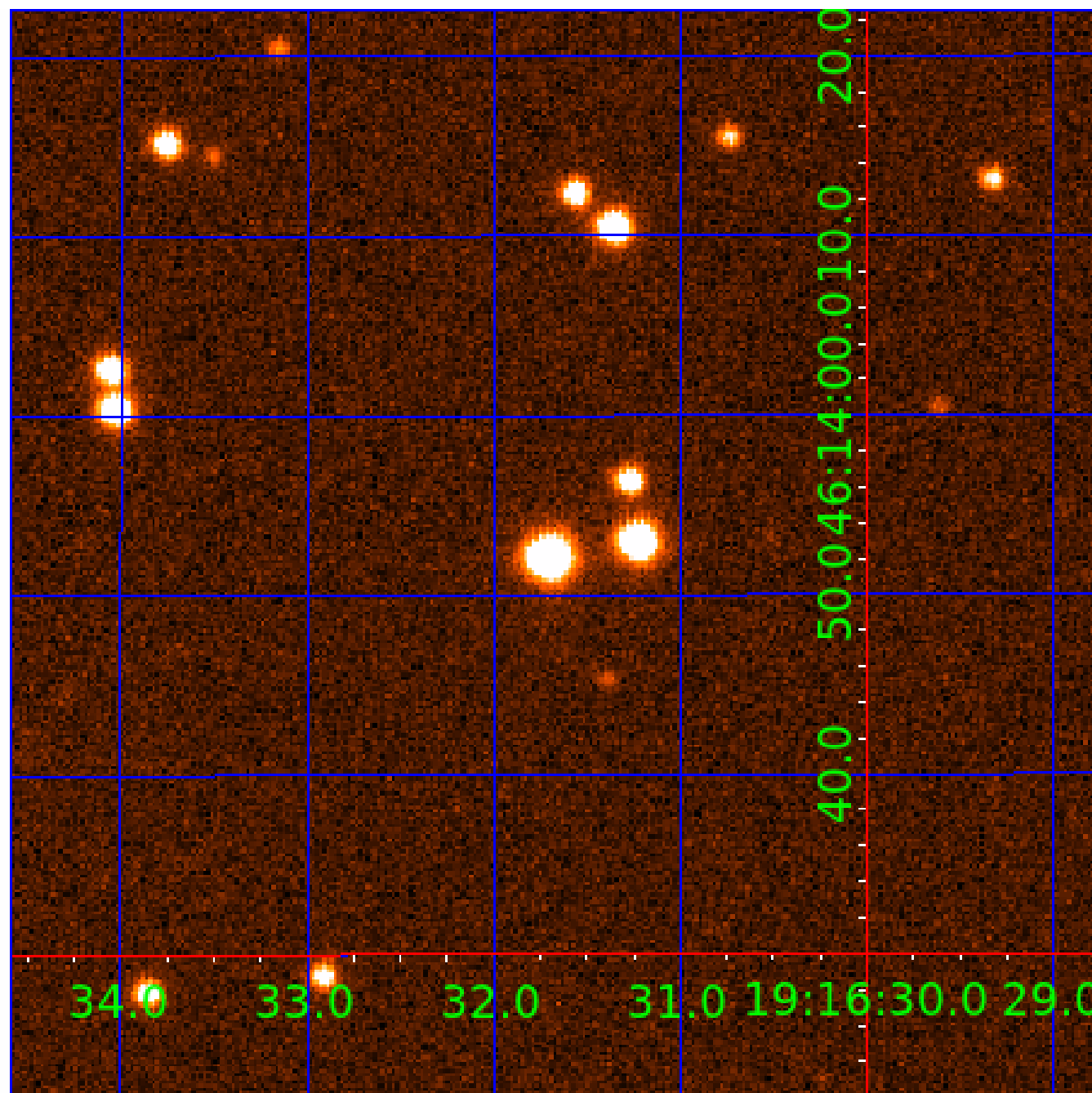


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009581885

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})
009581885-01	OBS	No	331.372592	350.438432	3002.9	5.453	14.1	9.3	0.41	3587	2.21	0.05
009581885-02	OBS	No	587.705174	331.630355	2315.6	13.014	12.3	7.5	0.41	3587	2.31	0.02
009581885-03	OBS	No	21.427847	144.343293	451.7	1.315	8.5	6.1	0.41	3587	0.94	1.93
009581885-04	OBS	No	366.592709	273.153354	2289.2	3.044	9.6	6.7	0.41	3587	1.96	0.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009581885-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009581885-02	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
009581885-03	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009581885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

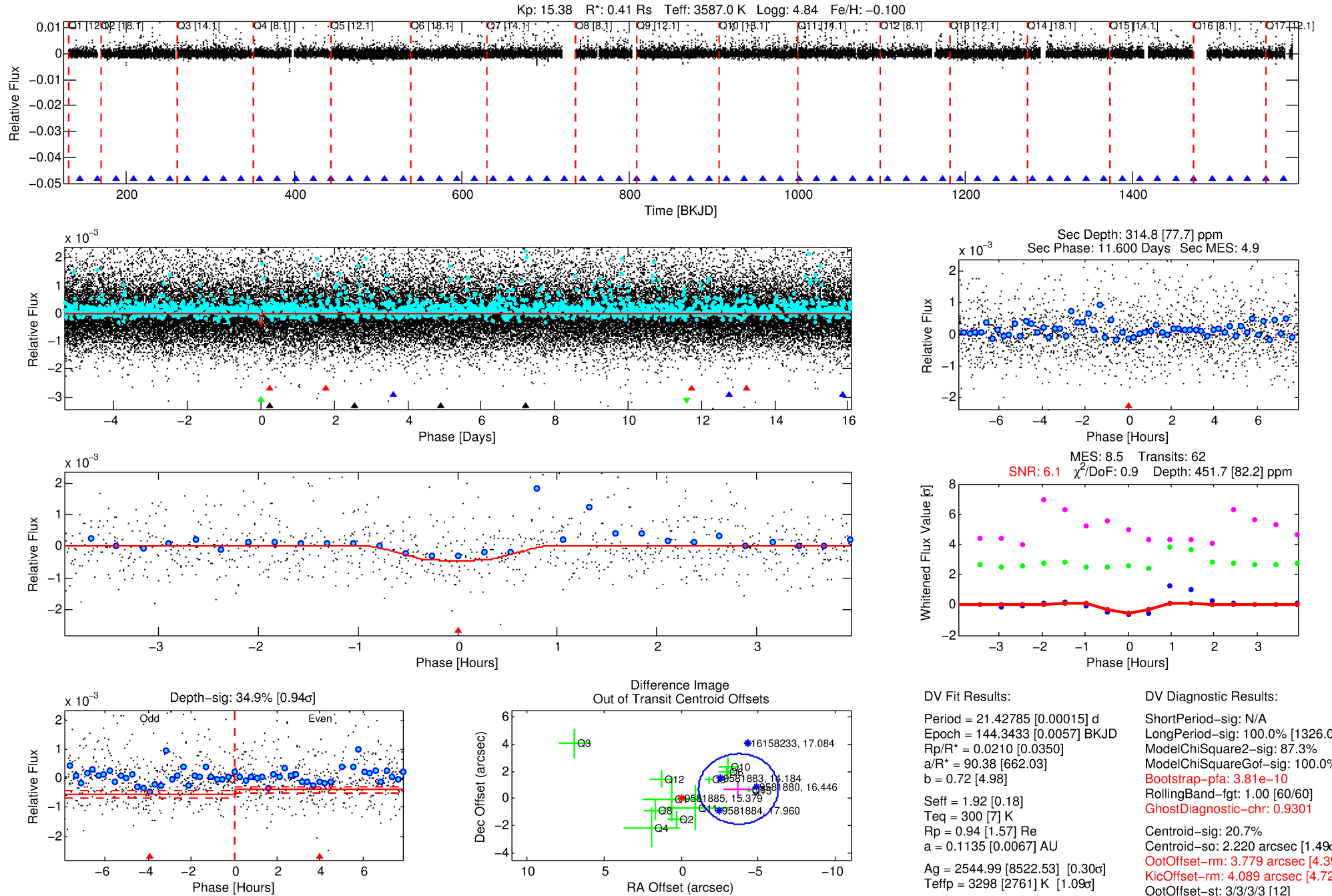
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009581885-03

No Significant Match Found

DV One-Page Summary

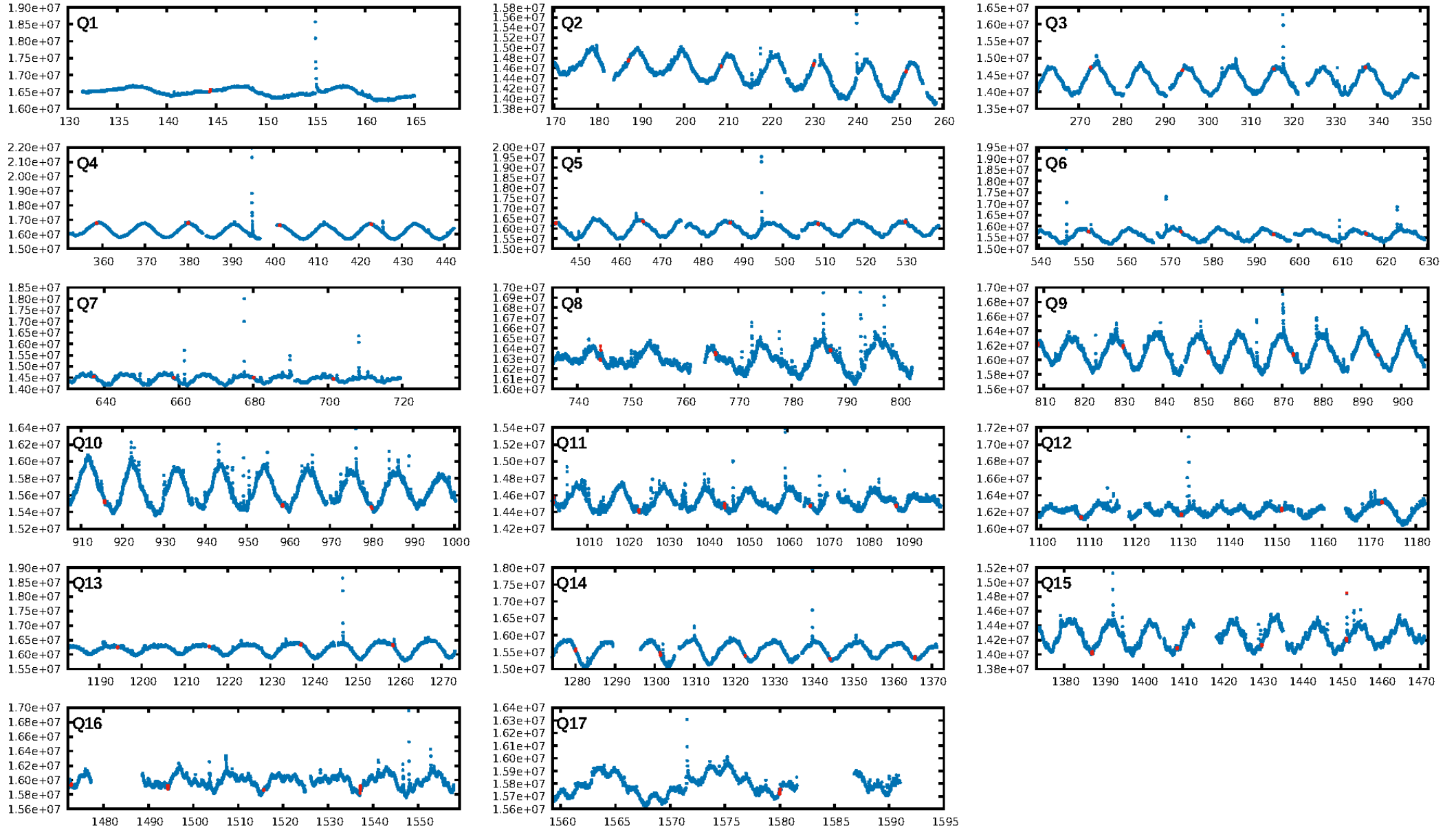
KIC: 9581885 Candidate: 3 of 4 Period: 21.428 d



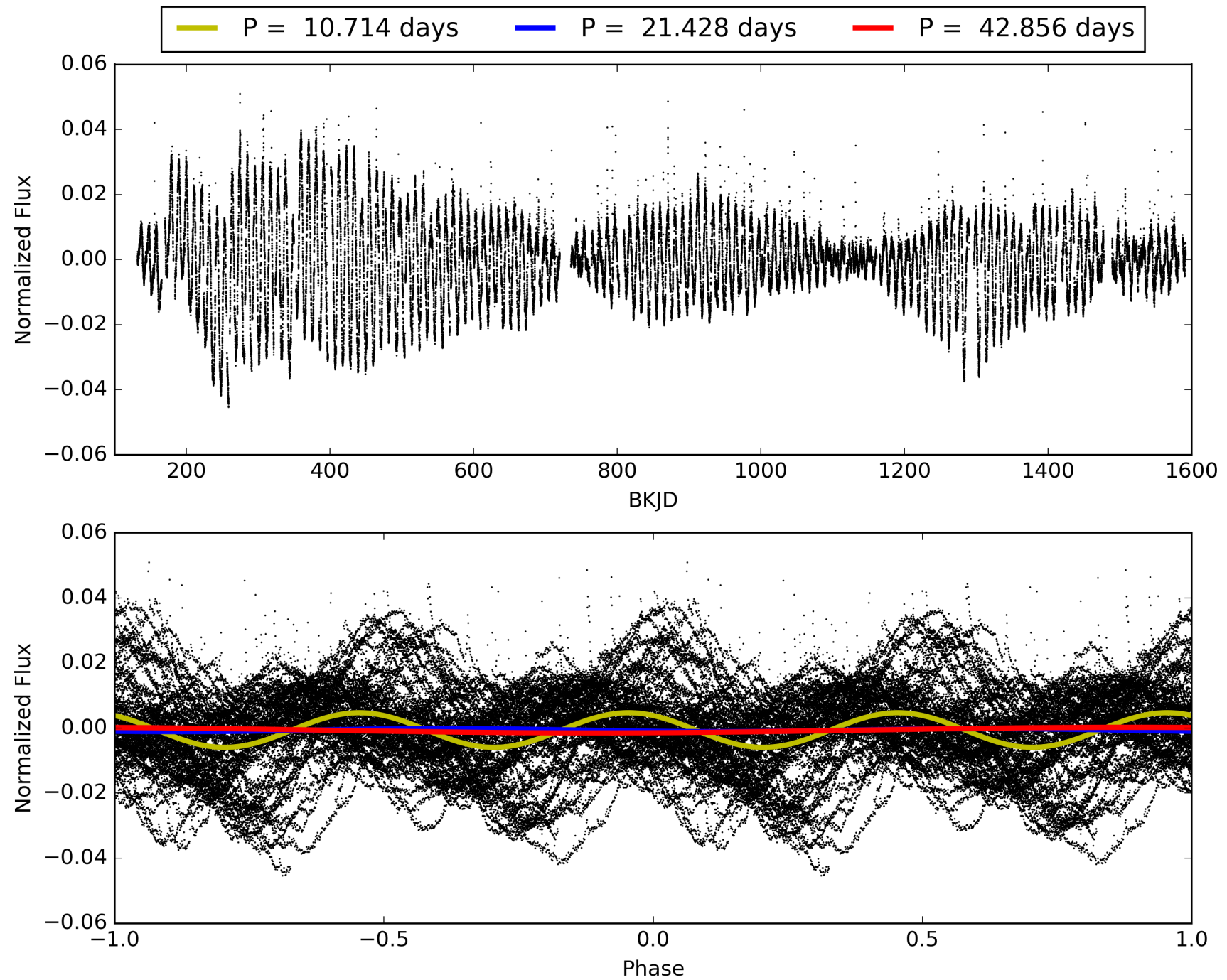
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:29:42 Z

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

TCE 009581885-03, PDC Light Curves

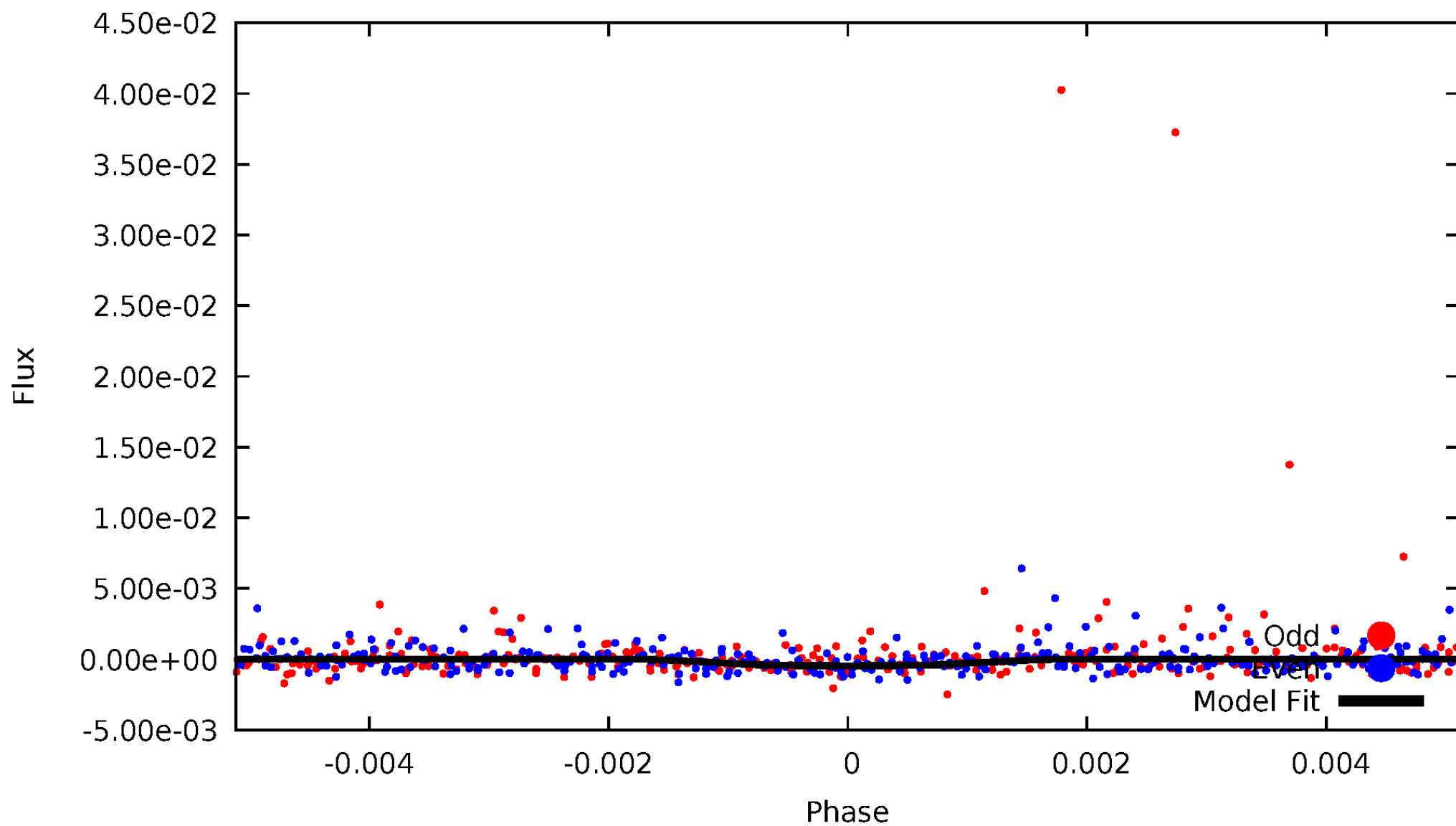


TCE 009581885-03



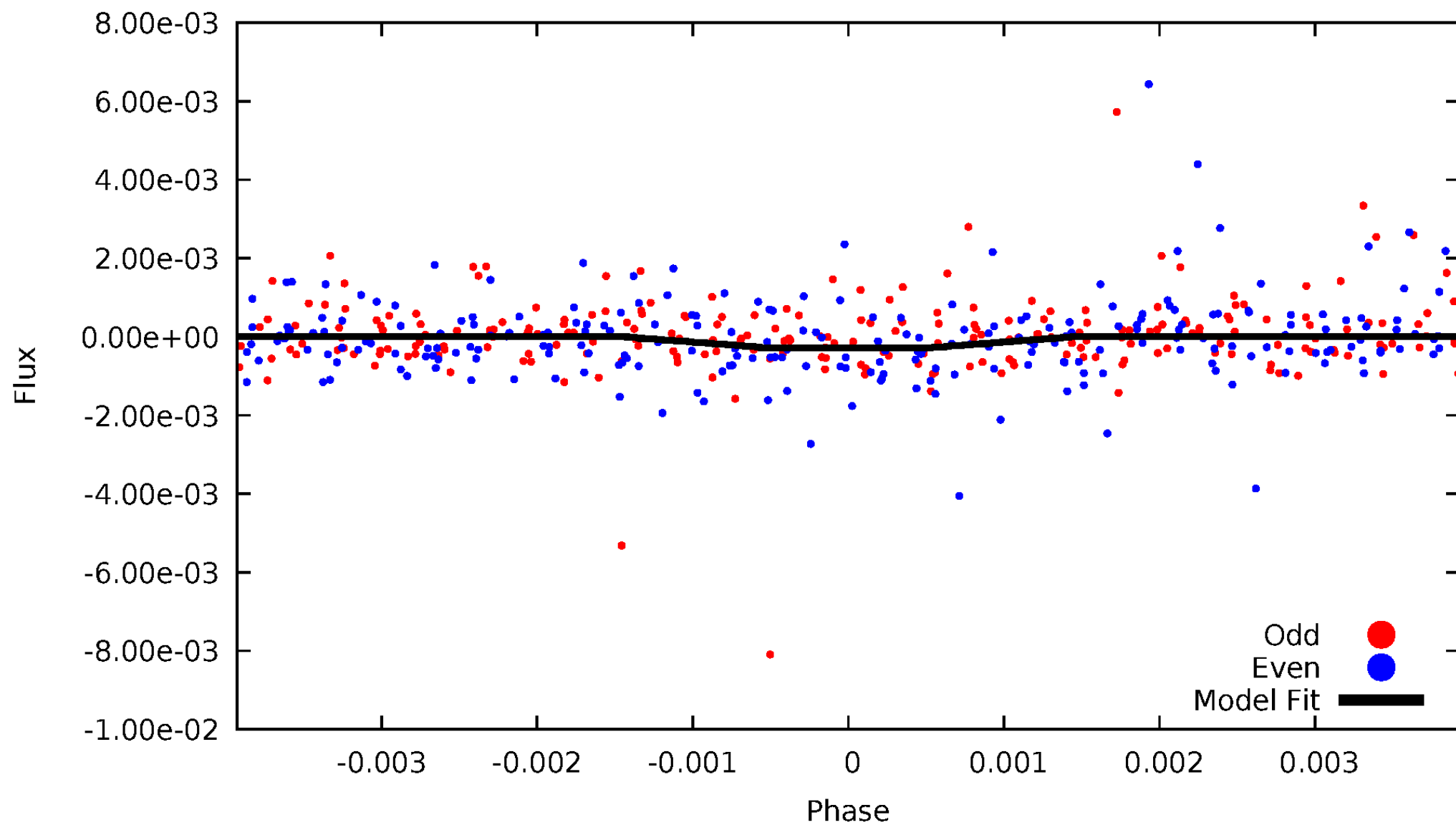
DV Odd/Even

TCE 009581885-03



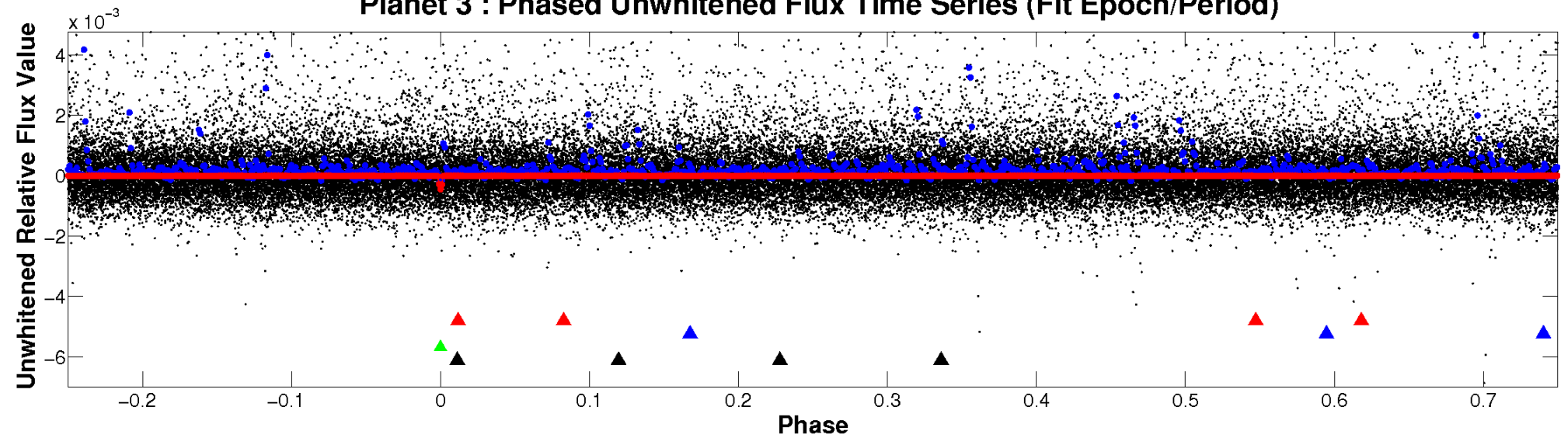
ALT Odd/Even

TCE 009581885-03

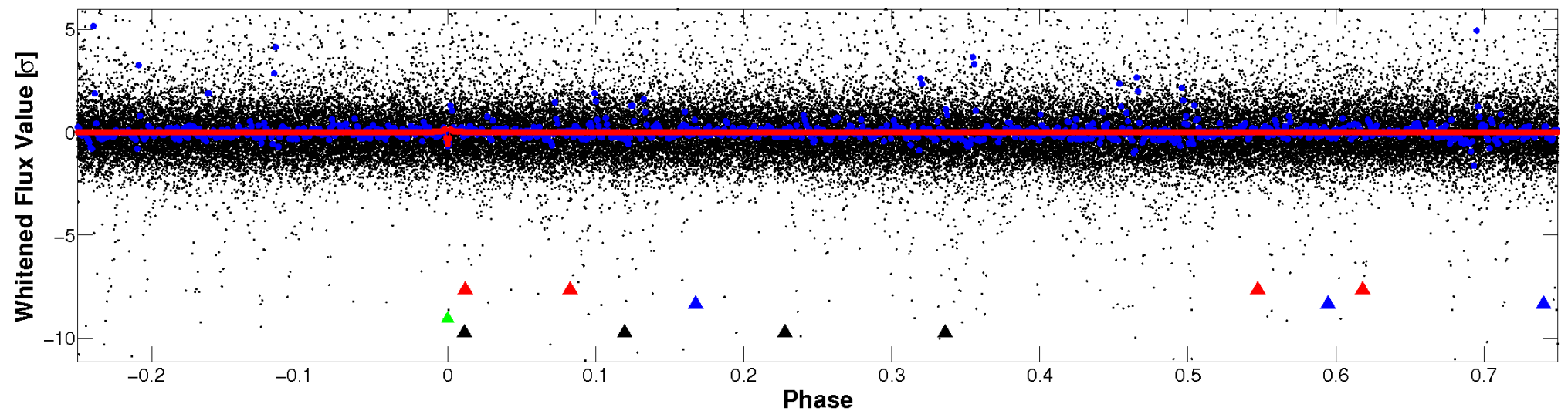


Non-Whitened Vs. Whitened Light Curve

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

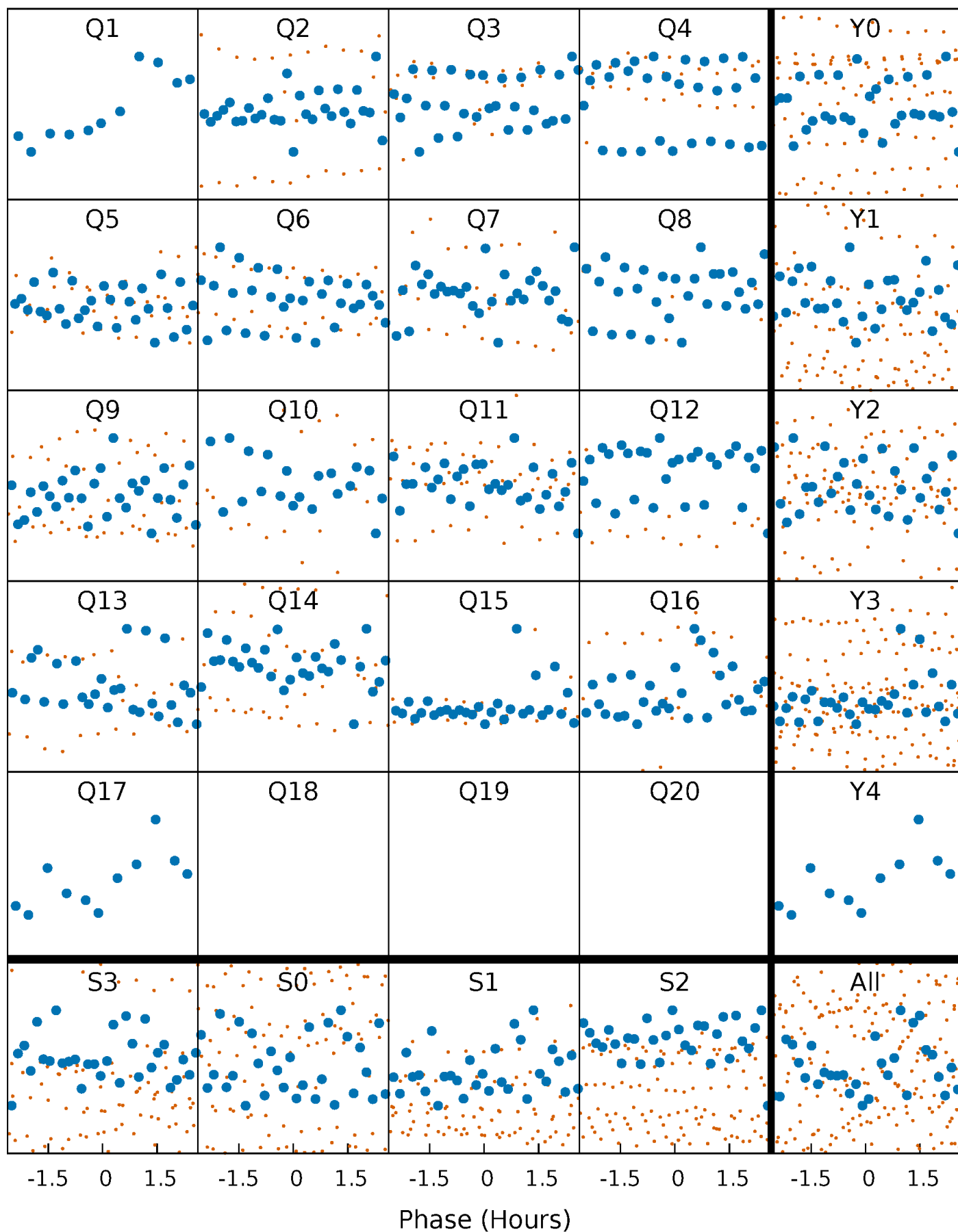


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



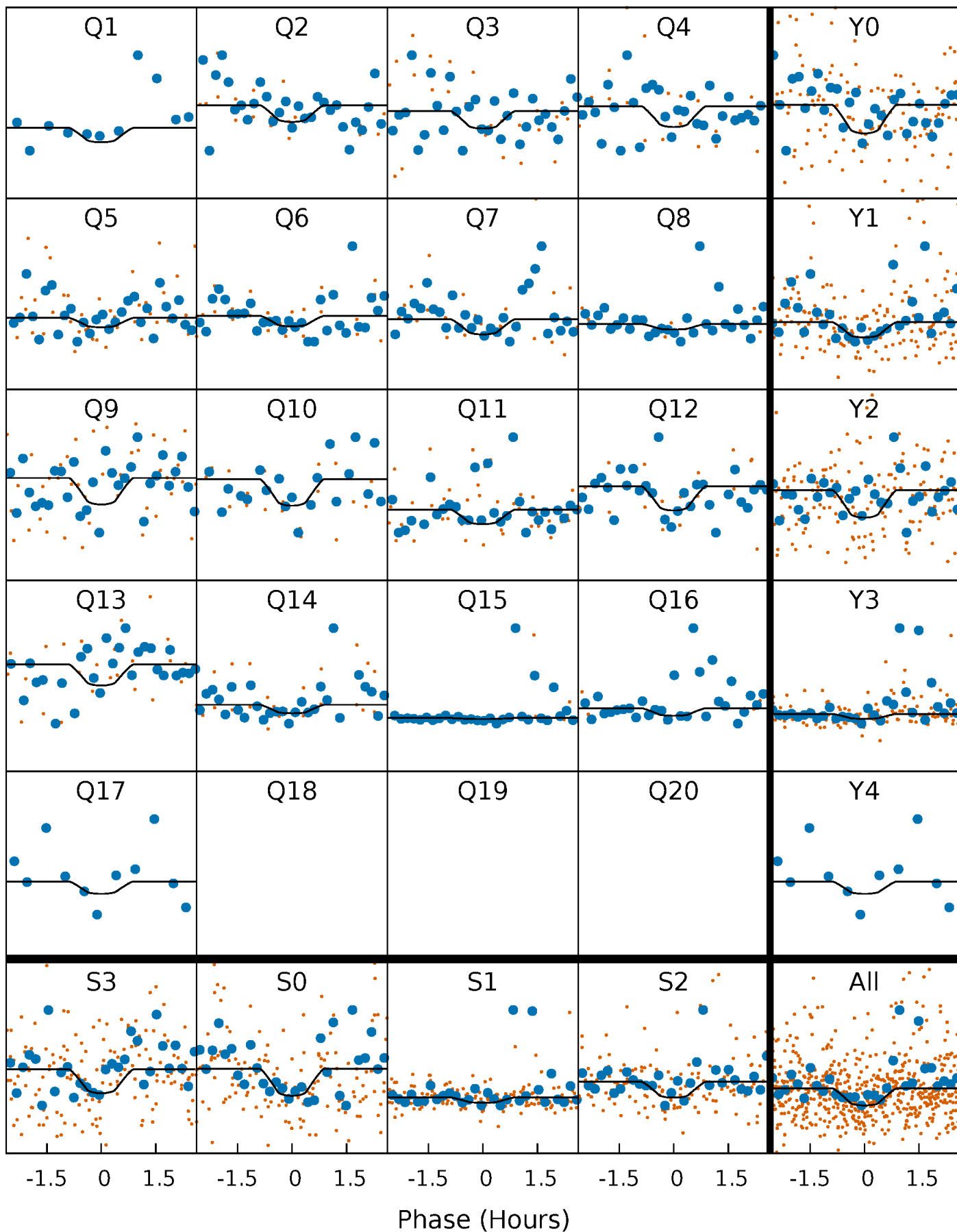
PDC Quarter-Phased Transit Curves

TCE 009581885-03 P= 21.427847 Days $T_0=144.343293$ (BKJD)



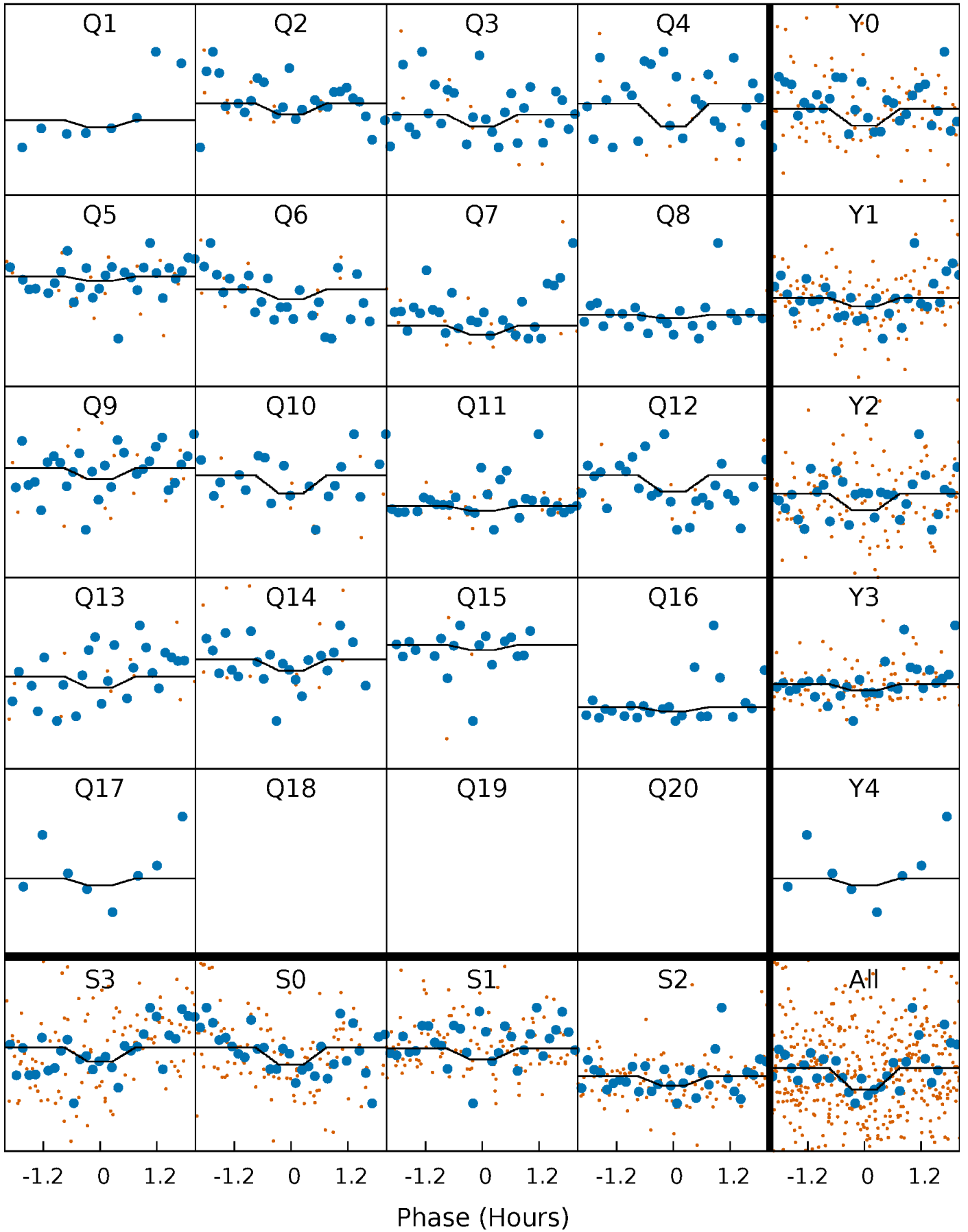
DV Quarter-Phased Transit Curves

TCE 009581885-03 P= 21.427847 Days $T_0=144.343293$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

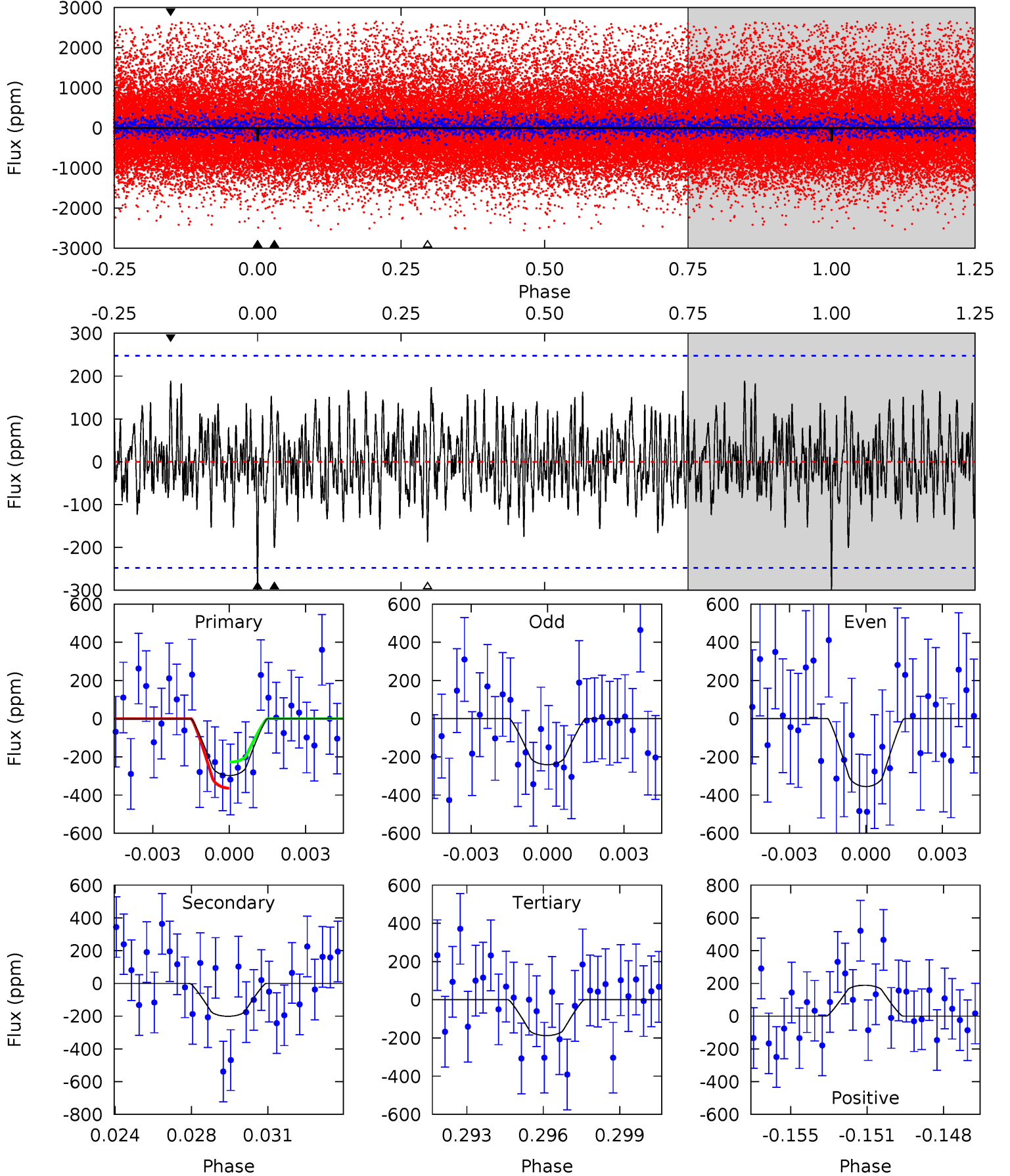
TCE 009581885-03 P= 21.427787 Days $T_0=144.334740$ (BKJD)



DV Model-Shift Uniqueness Test

009581885-03, P = 21.427847 Days, E = 122.915446 Days

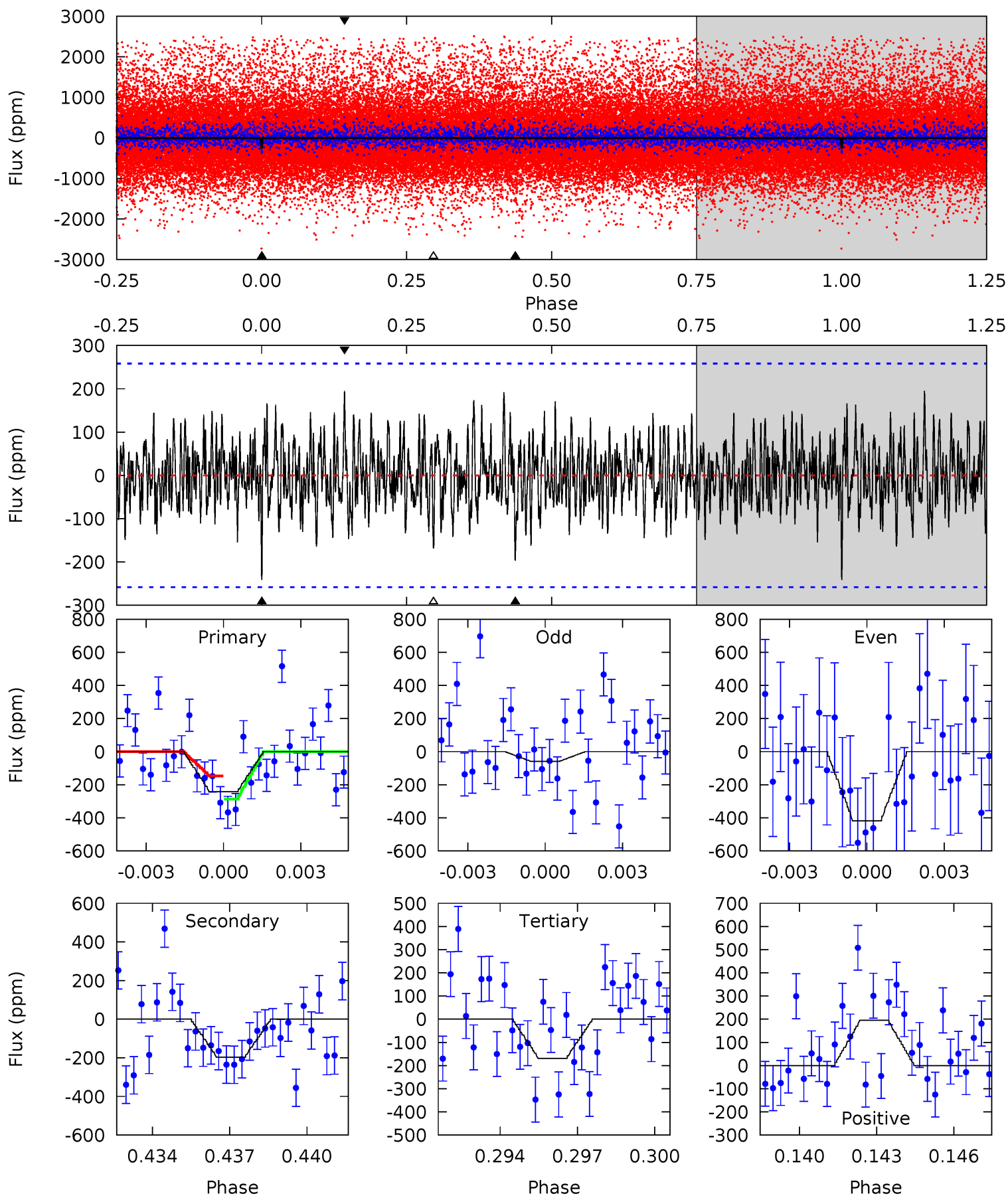
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.29	4.24	3.96	3.98	5.23	2.93	1.39	2.33	2.30	0.28	0.25	1.22	0.76	0.39	1.45



Alt Model-Shift Uniqueness Test

009581885-03, P = 21.427787 Days, E = 122.906953 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.92	4.01	3.45	3.98	5.27	2.99	1.27	1.47	0.94	0.57	0.03	3.67	0.73	0.45	1.43



Stellar Parameters For KIC 009581885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3587^{+43}_{-48}	$4.843^{+0.035}_{-0.028}$	$-0.100^{+0.100}_{-0.100}$	$0.409^{+0.029}_{-0.032}$	$0.427^{+0.030}_{-0.036}$	$8.764^{+1.697}_{-1.058}$
	+1%/-1%	+1%/-1%	+100%/-100%	+7%/-8%	+7%/-8%	+19%/-12%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009581885-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-201 ± 47	$1.53^{+1.33}_{-1.04}$	419^{+8}_{-9}	2759^{+1129}_{-411}	605^{+5161}_{-447}
Alt.	-197 ± 49	$1.35^{+1.38}_{-0.91}$	420^{+7}_{-8}	2842^{+1171}_{-468}	730^{+6444}_{-556}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

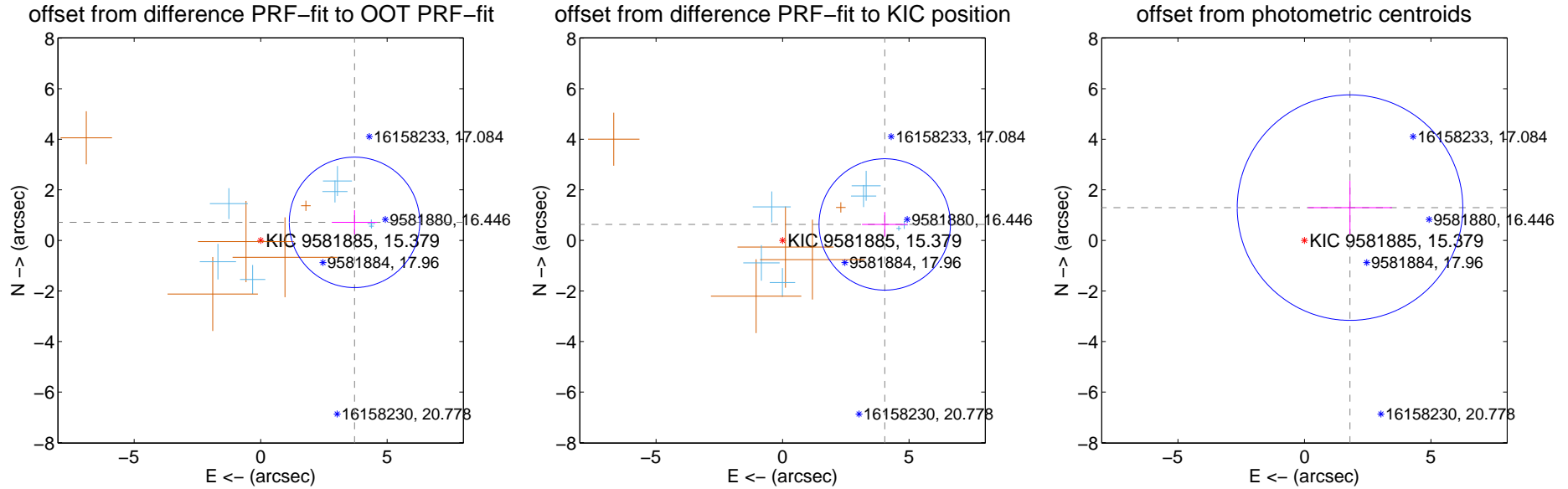
DV Centroid Data

Supplemental centroid analysis for 009581885-03. Kepler magnitude: 15.38. Transit SNR 6.08

There are 7 quarters with good PRF difference image offsets

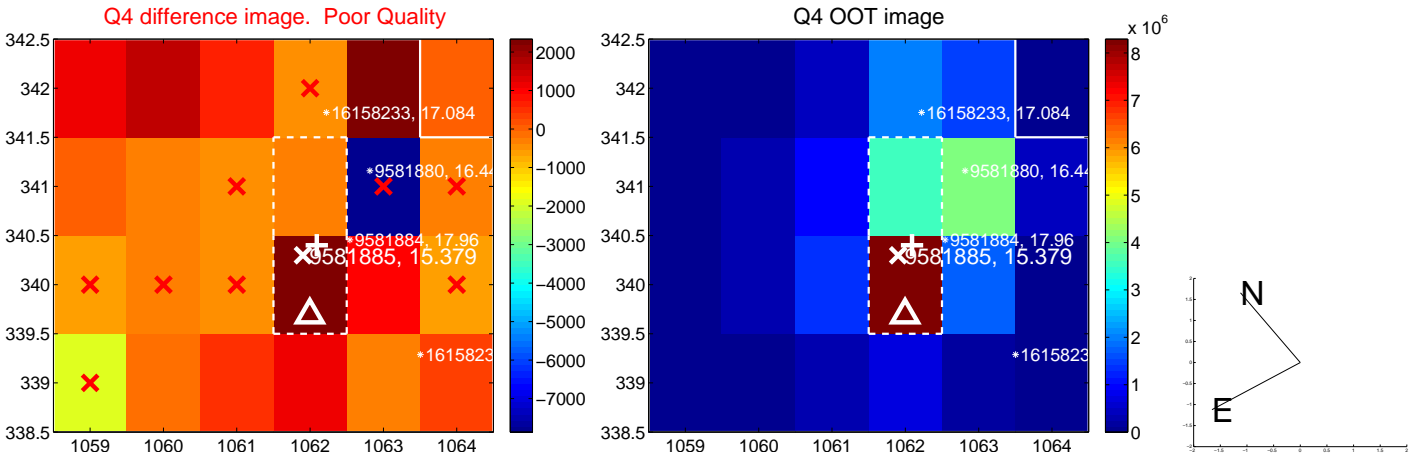
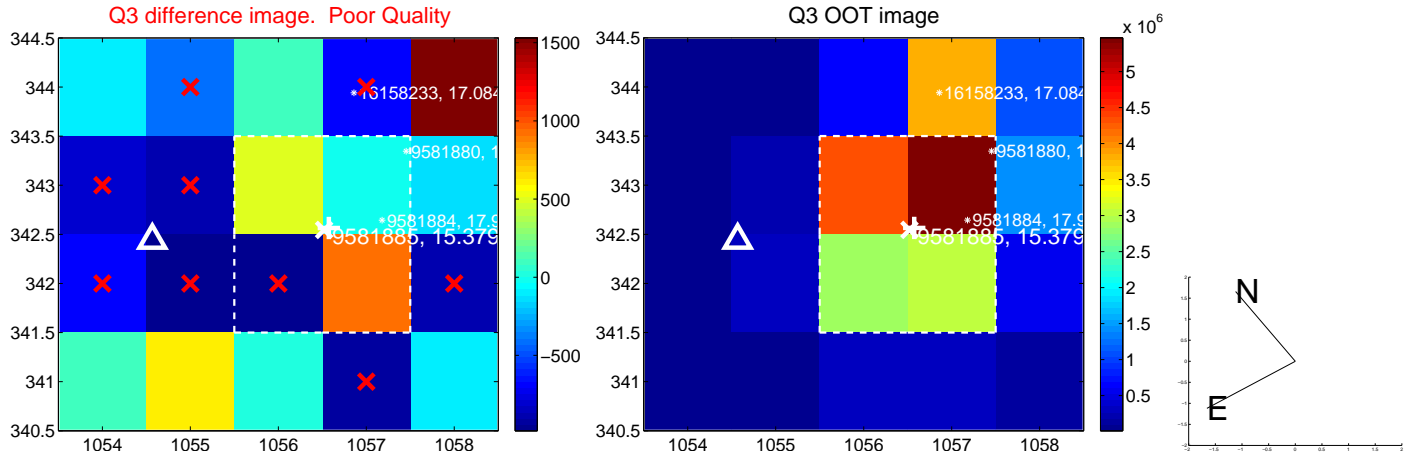
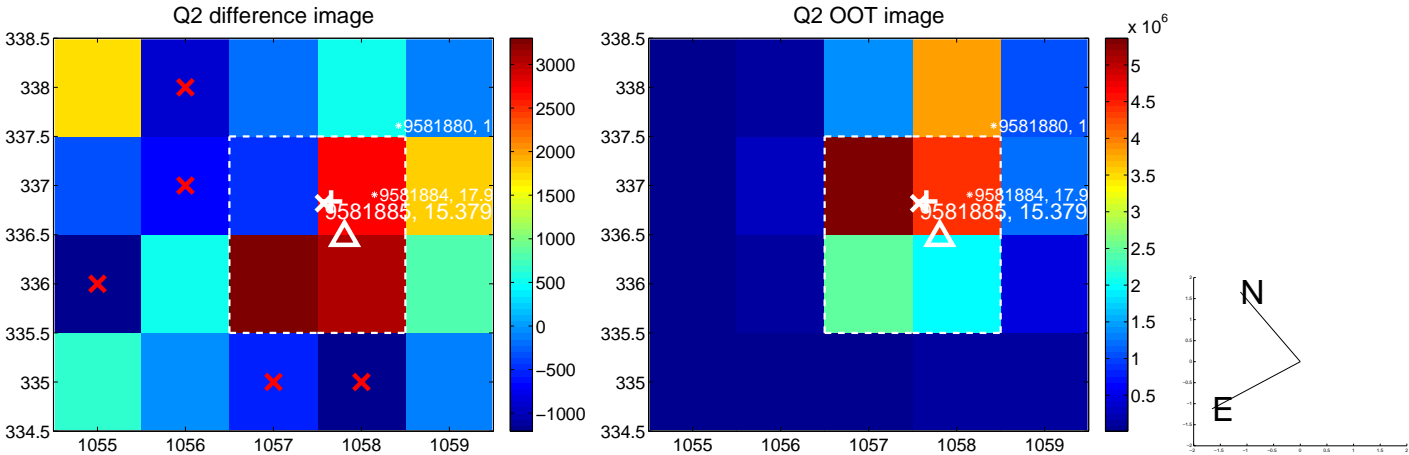
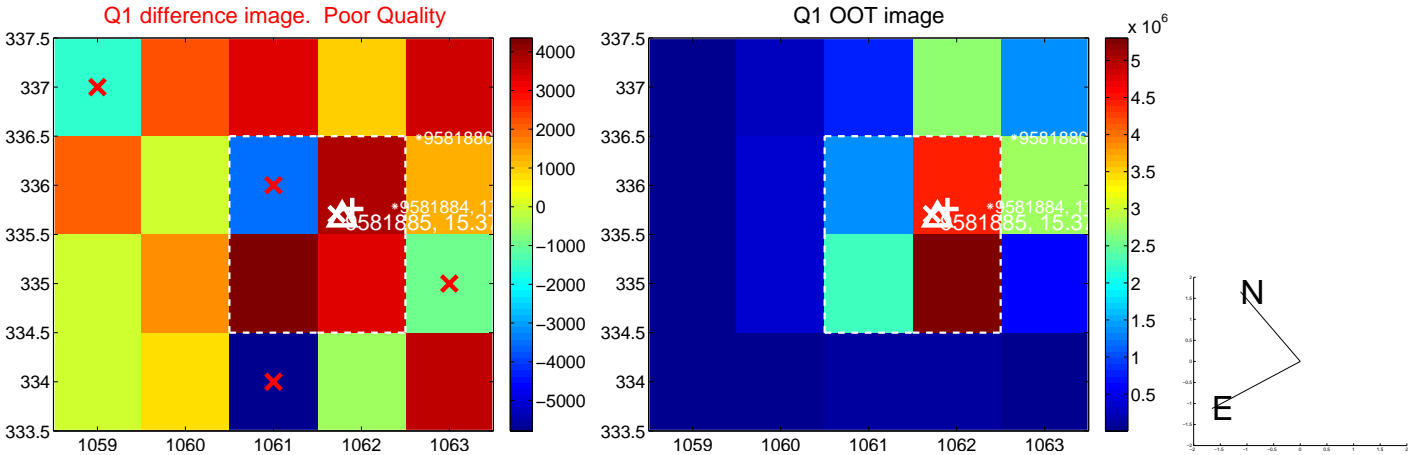
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.779 ± 0.860	4.39	-3.711 ± 0.894	0.714 ± 0.481
PRF-fit source offset from KIC position	4.089 ± 0.866	4.72	-4.040 ± 0.899	0.631 ± 0.489
photometric centroid source offset	2.22 ± 1.49	1.49	-1.80 ± 1.66	1.30 ± 1.06

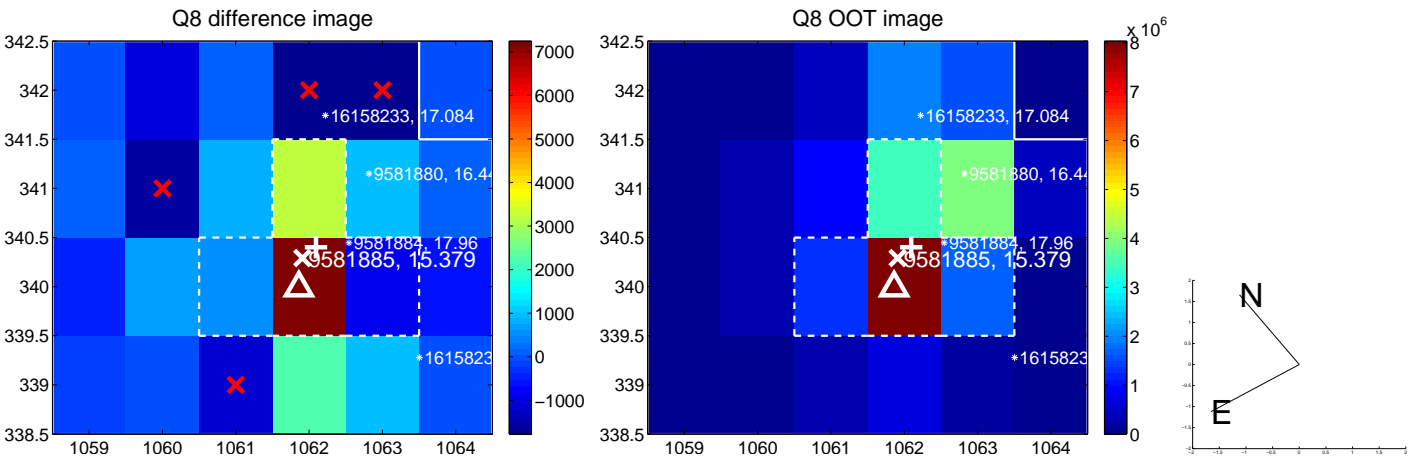
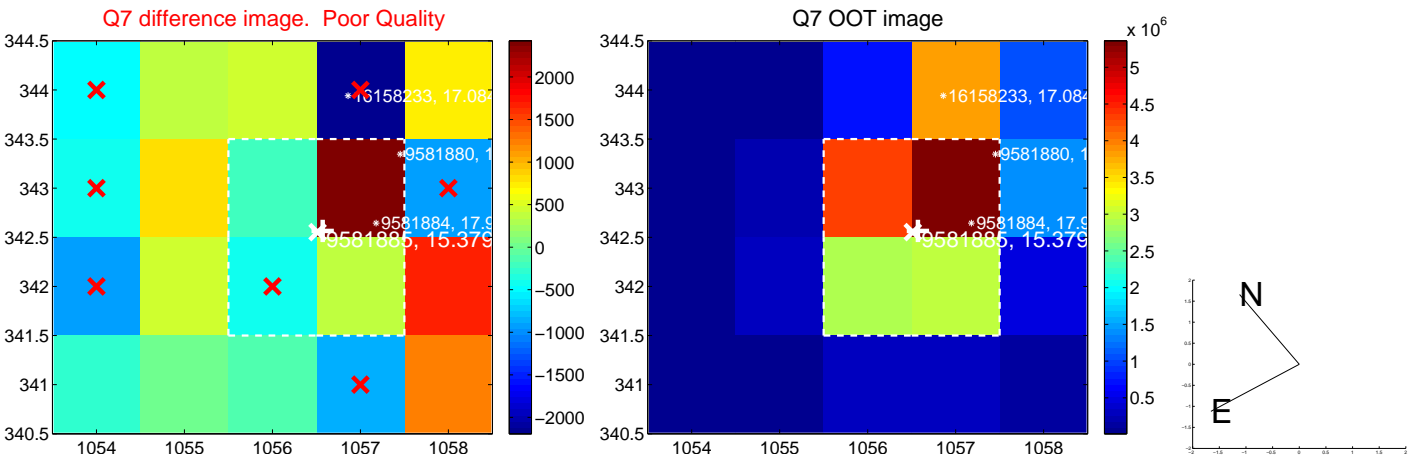
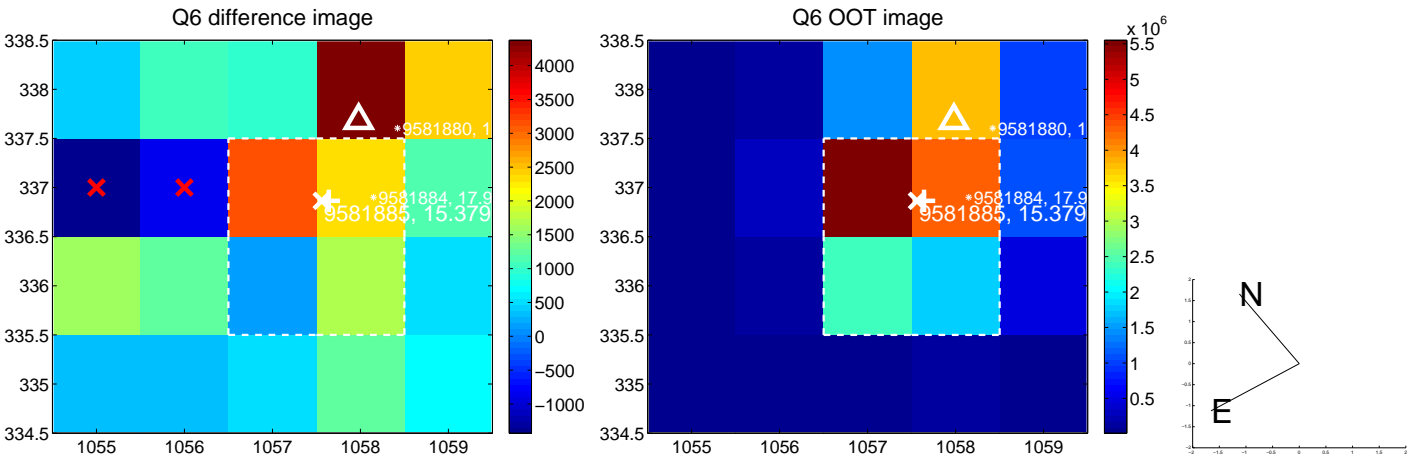
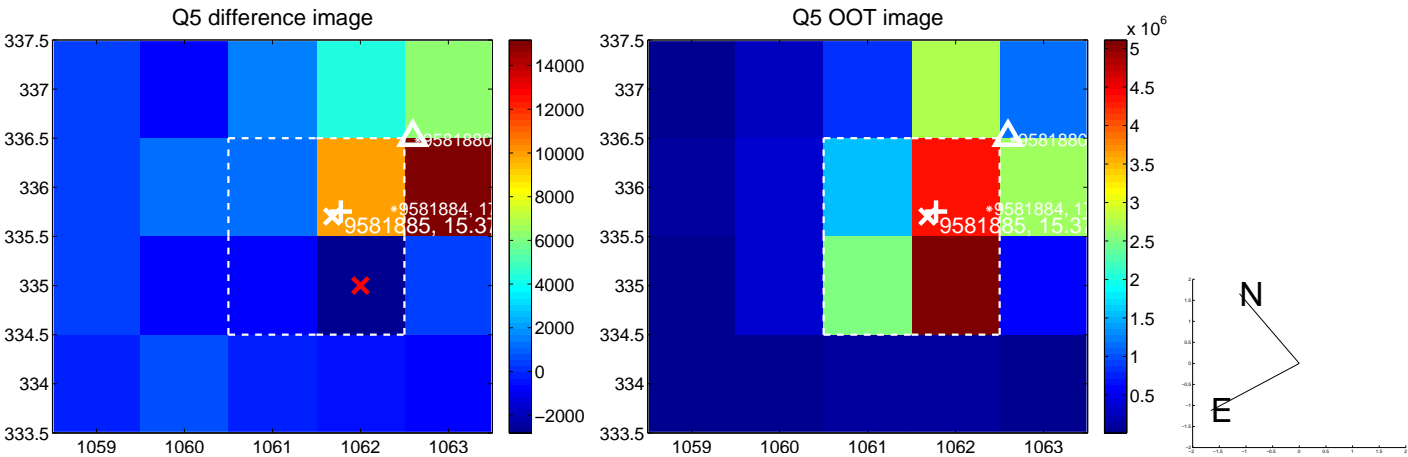


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

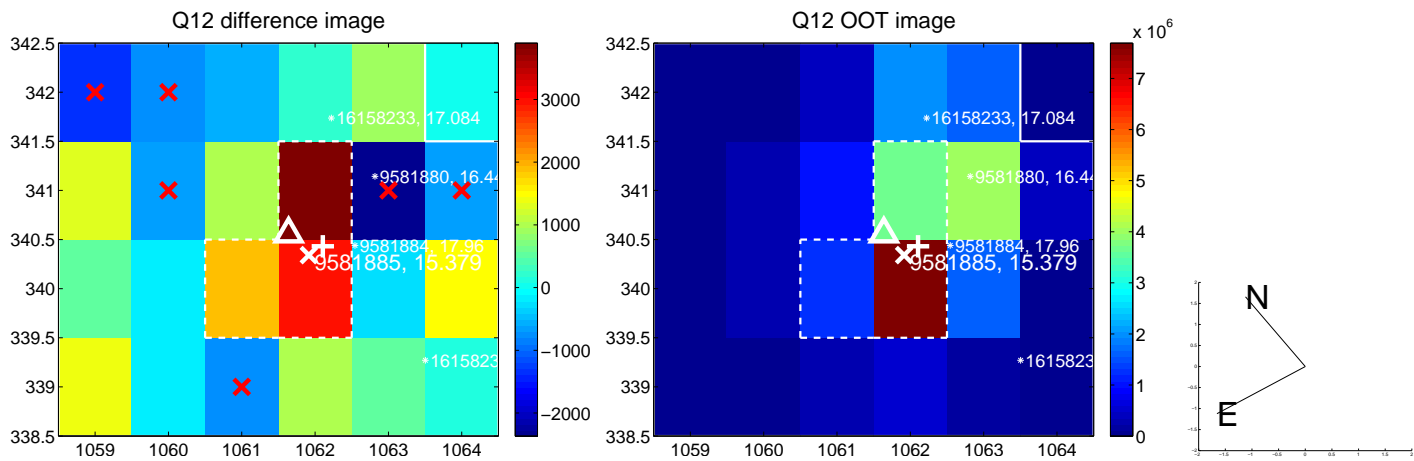
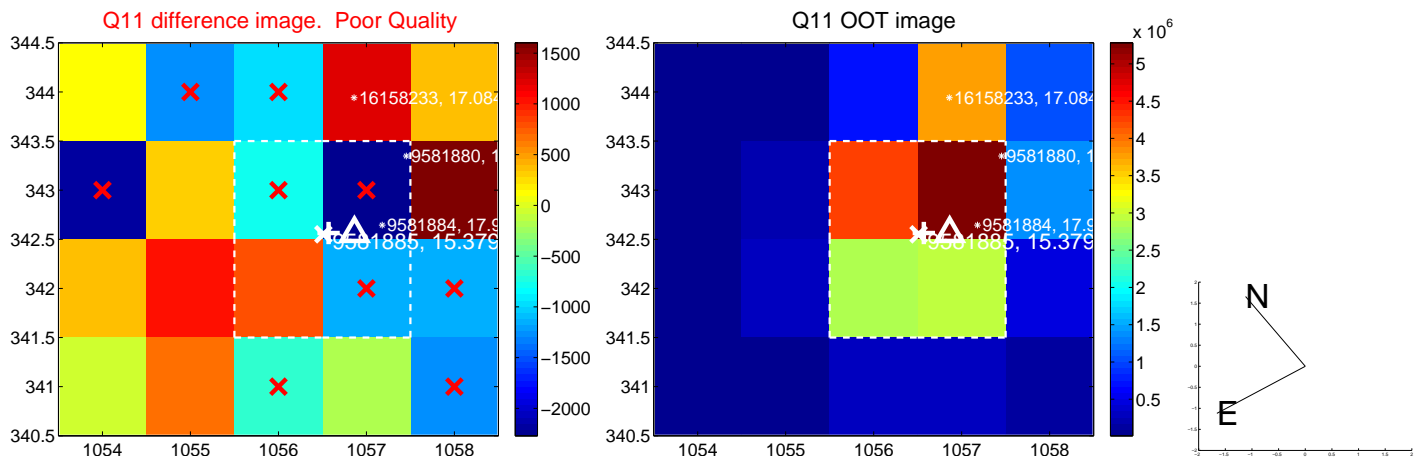
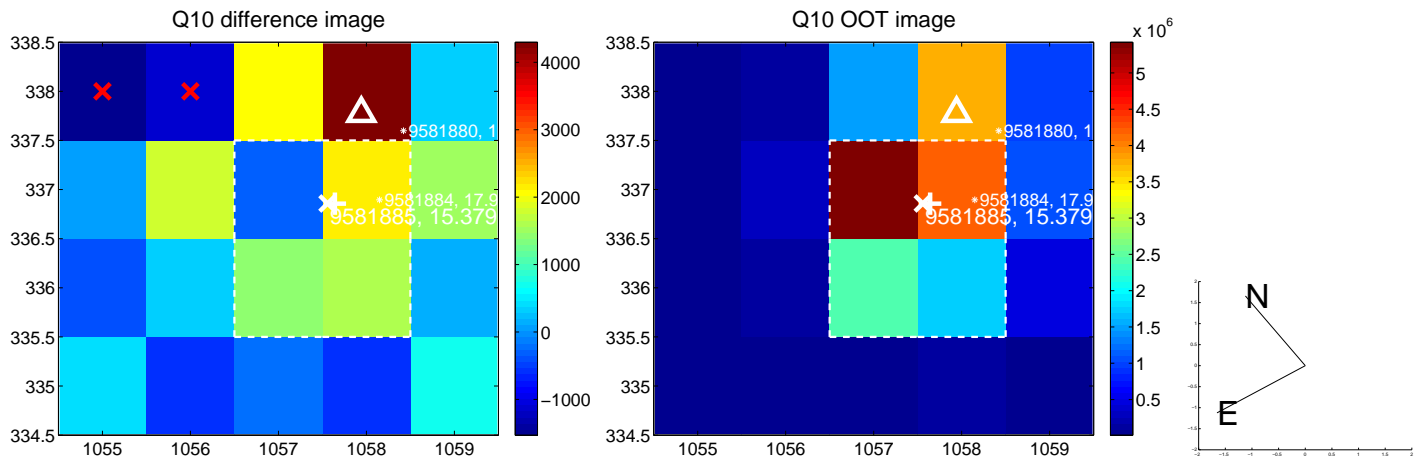
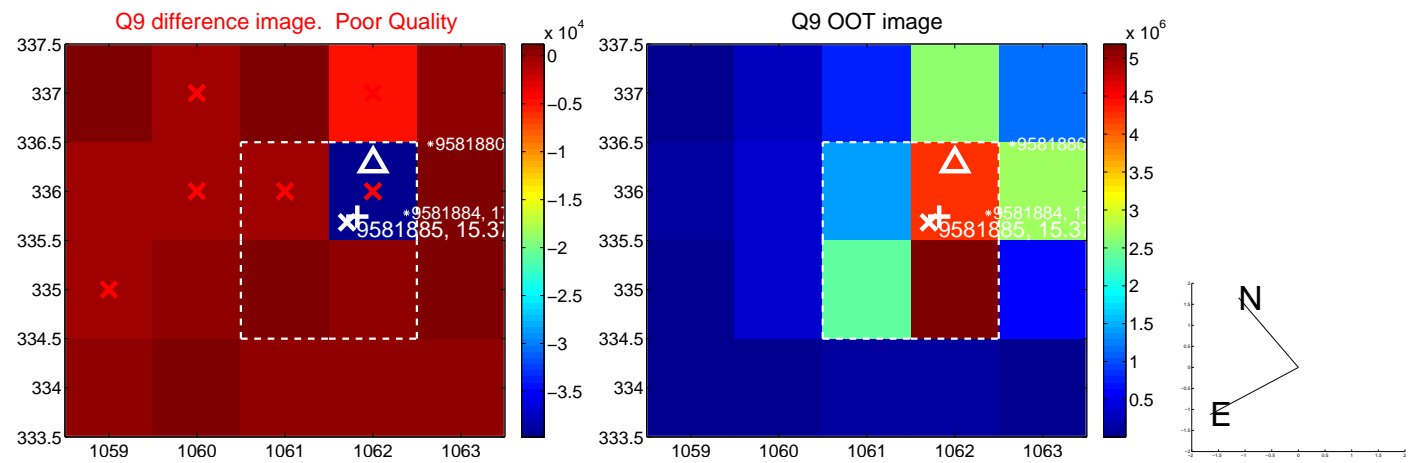
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



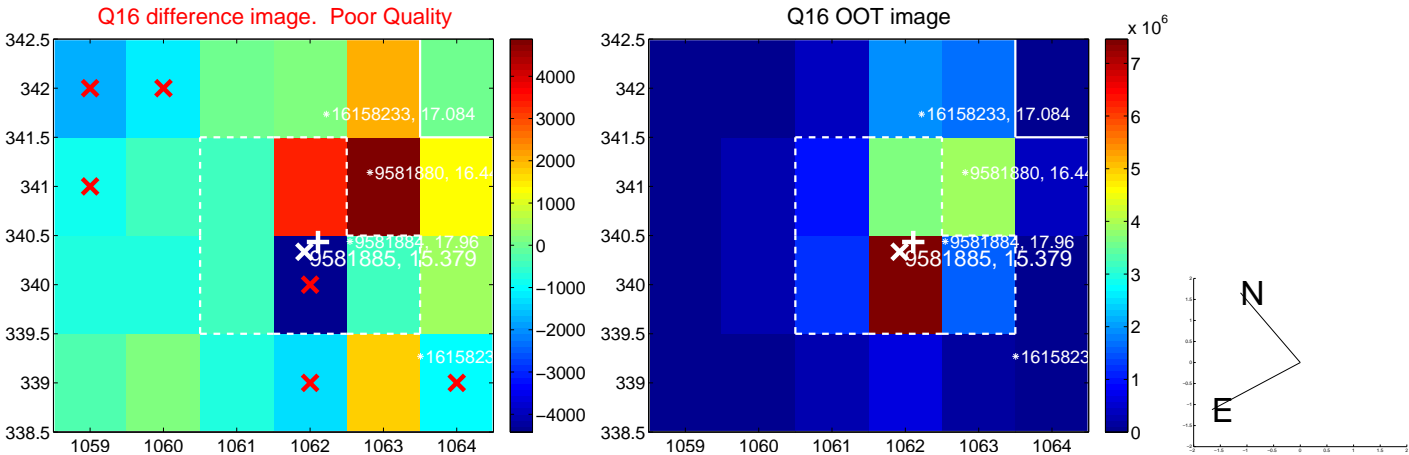
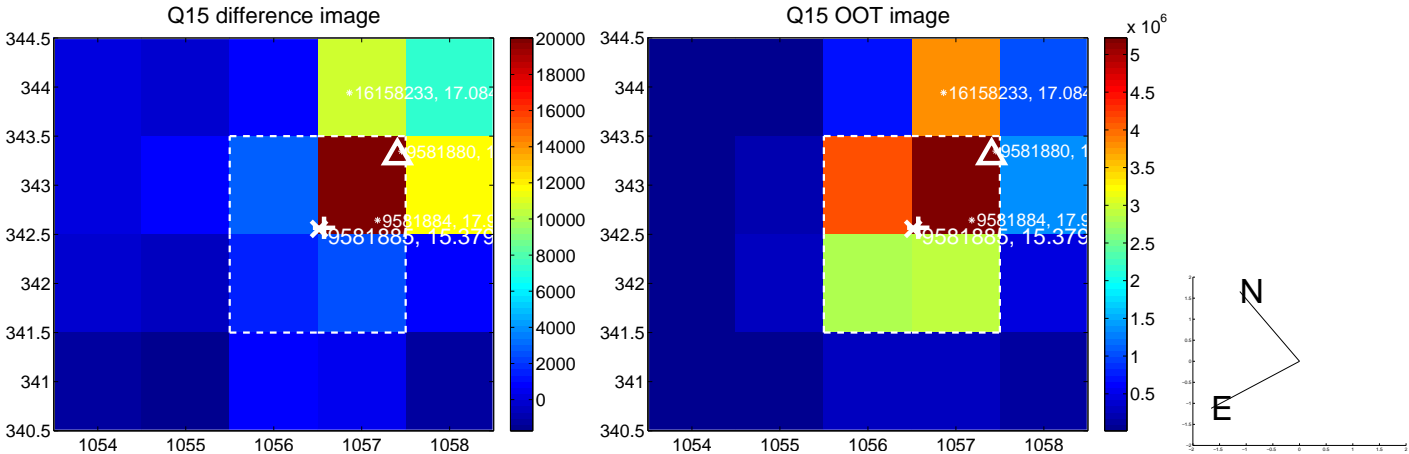
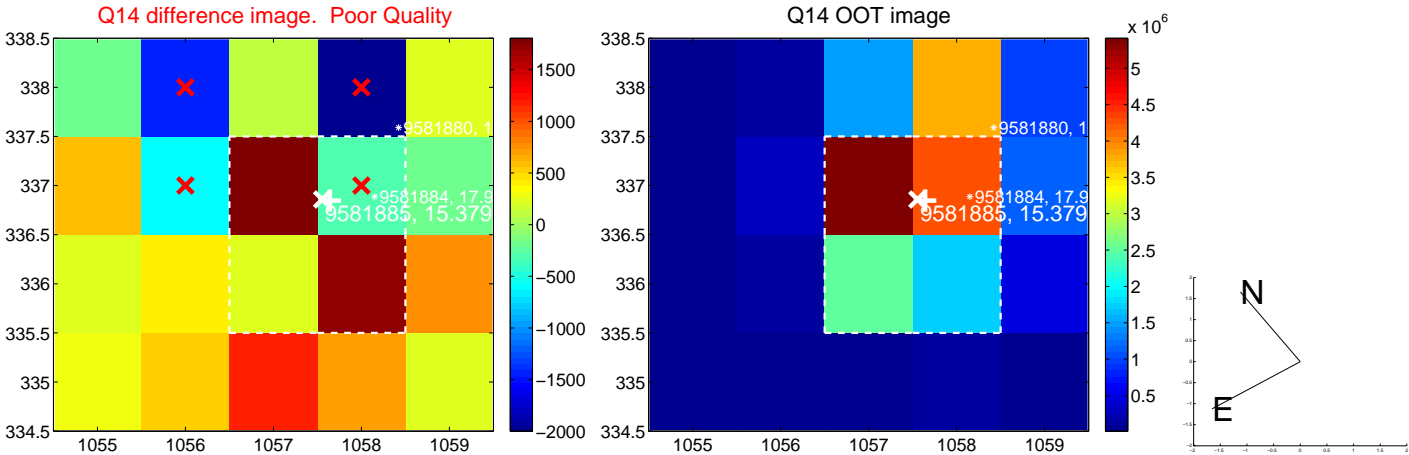
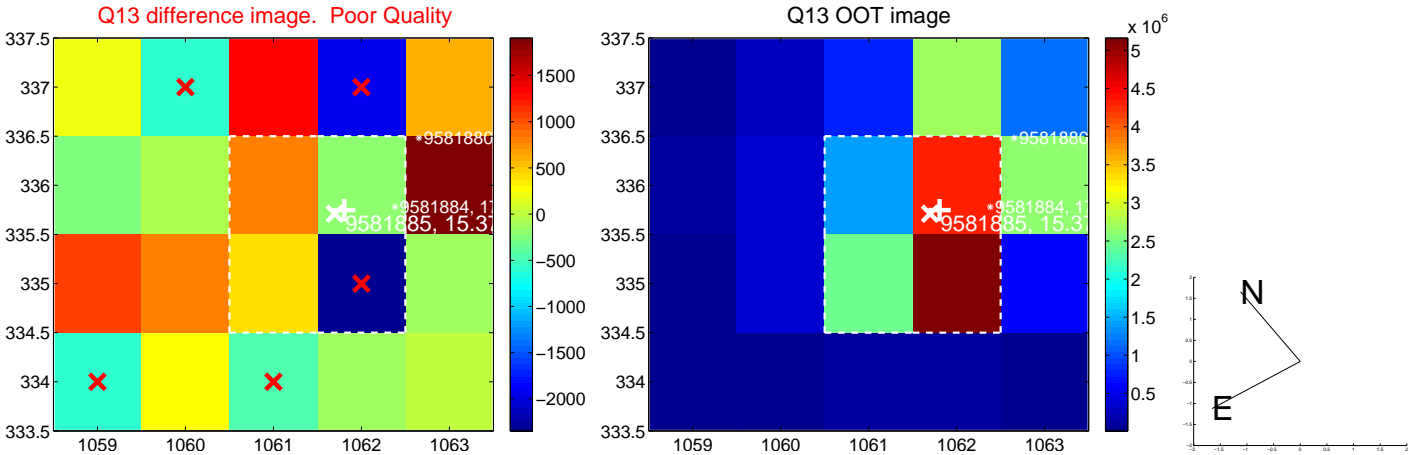
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



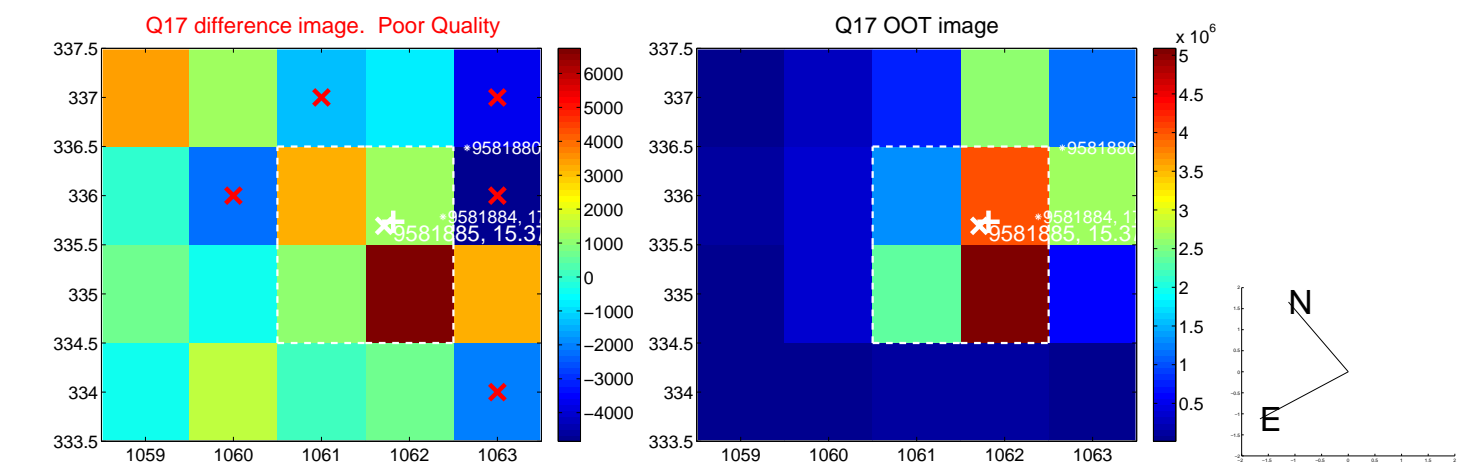
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



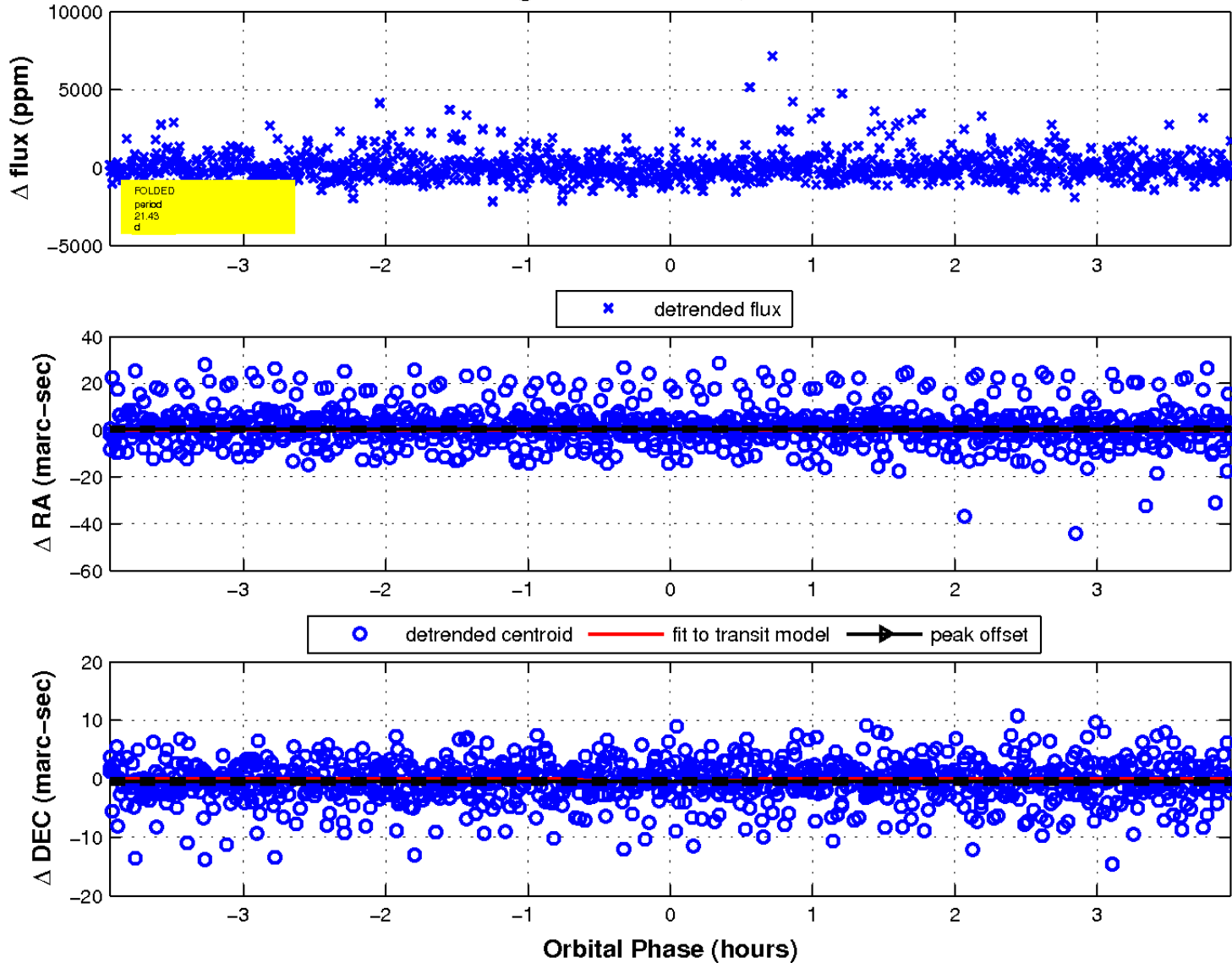
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

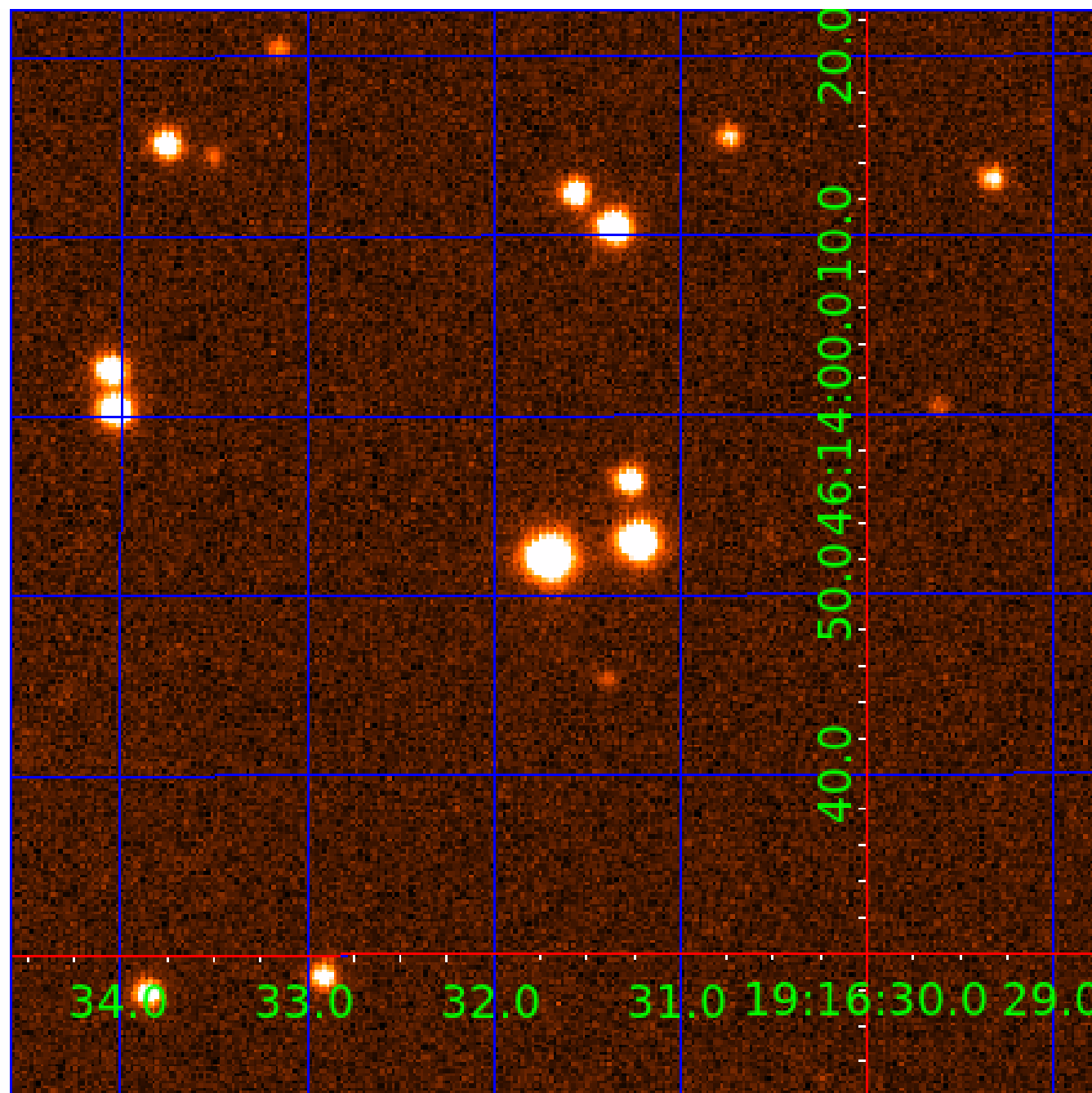


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 009581885

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})
009581885-01	OBS	No	331.372592	350.438432	3002.9	5.453	14.1	9.3	0.41	3587	2.21	0.05
009581885-02	OBS	No	587.705174	331.630355	2315.6	13.014	12.3	7.5	0.41	3587	2.31	0.02
009581885-03	OBS	No	21.427847	144.343293	451.7	1.315	8.5	6.1	0.41	3587	0.94	1.93
009581885-04	OBS	No	366.592709	273.153354	2289.2	3.044	9.6	6.7	0.41	3587	1.96	0.04

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009581885-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009581885-02	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
009581885-03	OBS	FP	0.00	1	0	0	0	MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009581885-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—CENT_FEW_MEAS

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

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

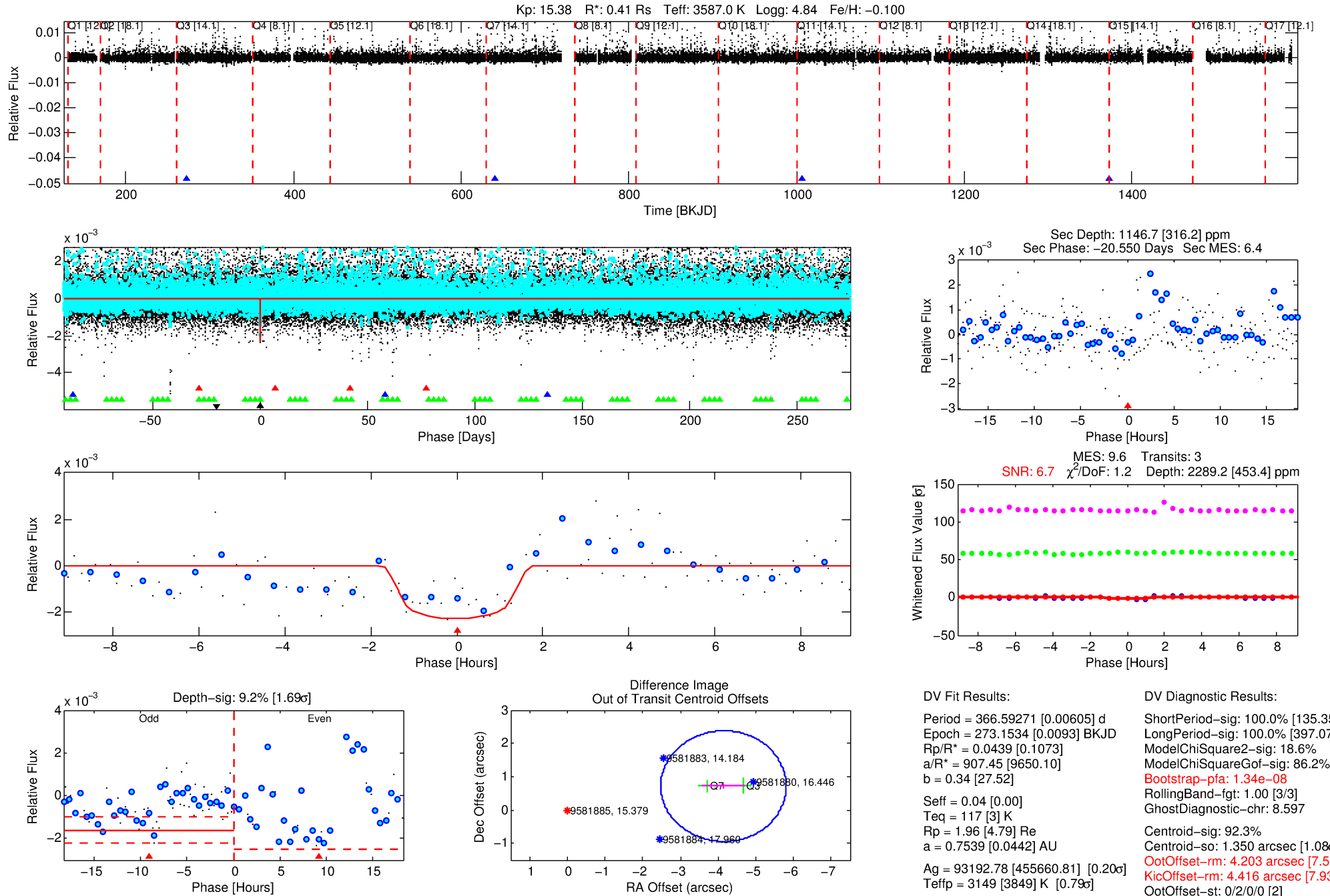
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009581885-04

No Significant Match Found

DV One-Page Summary

KIC: 9581885 Candidate: 4 of 4 Period: 366.593 d



DV Fit Results:

Period = 366.59271 [0.00605] d
Epoch = 273.1534 [0.0093] BKJD
Rp/R* = 0.0439 [0.1073]
a/R* = 907.45 [9650.10]
b = 0.34 [27.52]
Seff = 0.04 [0.00]
Teq = 117 [3] K
Rp = 1.96 [4.79] Re
a = 0.7539 [0.0442] AU
Ag = 93192.78 [455660.81] [0.20σ]
Teffp = 3149 [3849] K [0.79σ]

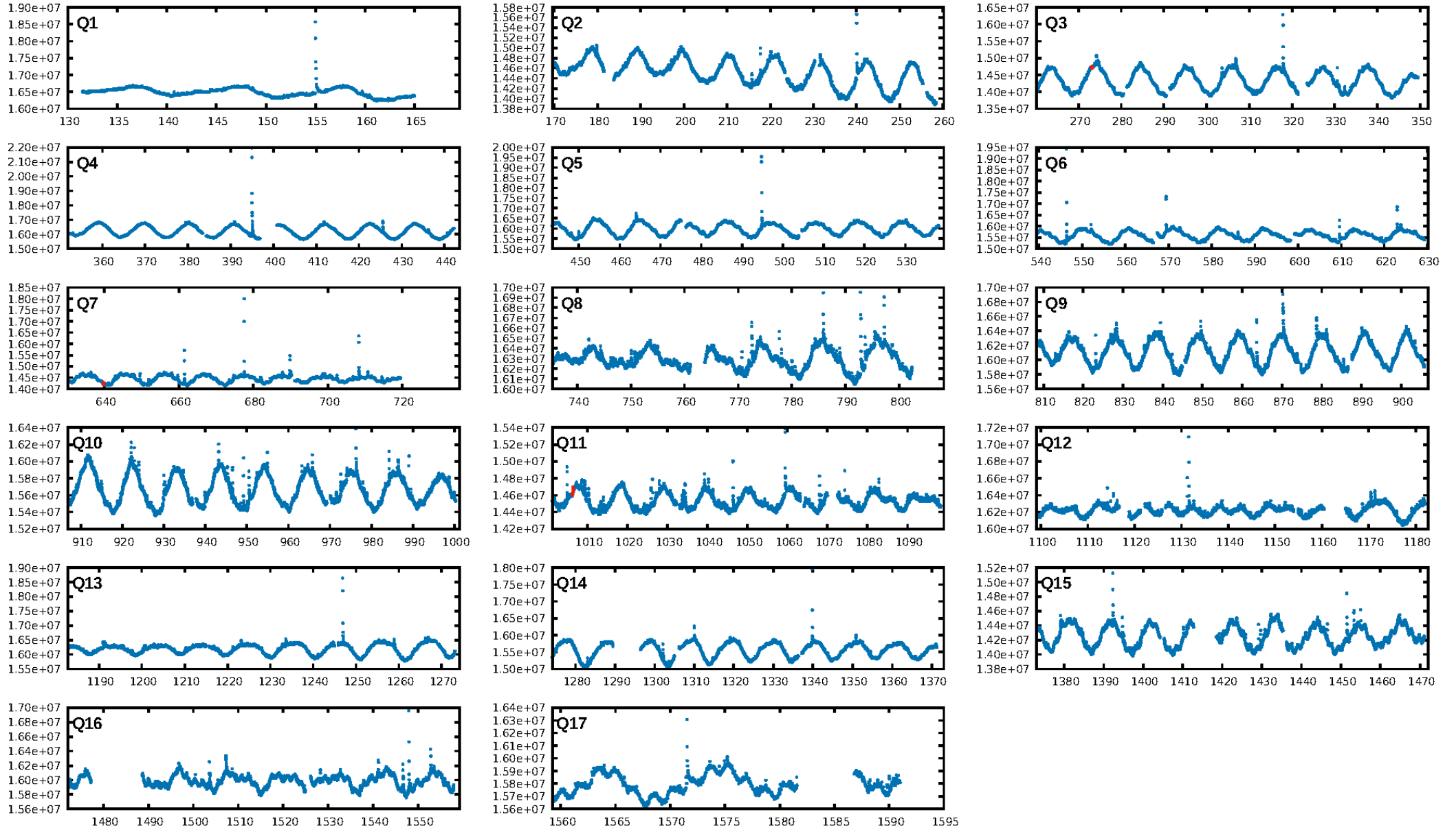
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [135.35σ]
LongPeriod-sig: 100.0% [397.07σ]
ModelChiSquare2-sig: 18.6%
ModelChiSquareGof-sig: 86.2%
Bootstrap-pfa: 1.34e-08
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 8.597
Centroid-sig: 92.3%
Centroid-so: 1.350 arcsec [1.08σ]
OotOffset-rm: 4.203 arcsec [7.59σ]
KicOffset-rm: 4.416 arcsec [7.93σ]
OotOffset-st: 0/2/0/0 [2]
KicOffset-st: 0/2/0/0 [2]
DiffImageQuality-figm: 1.00 [2/2]
DiffImageOverlap-fno: 0.67 [2/3]

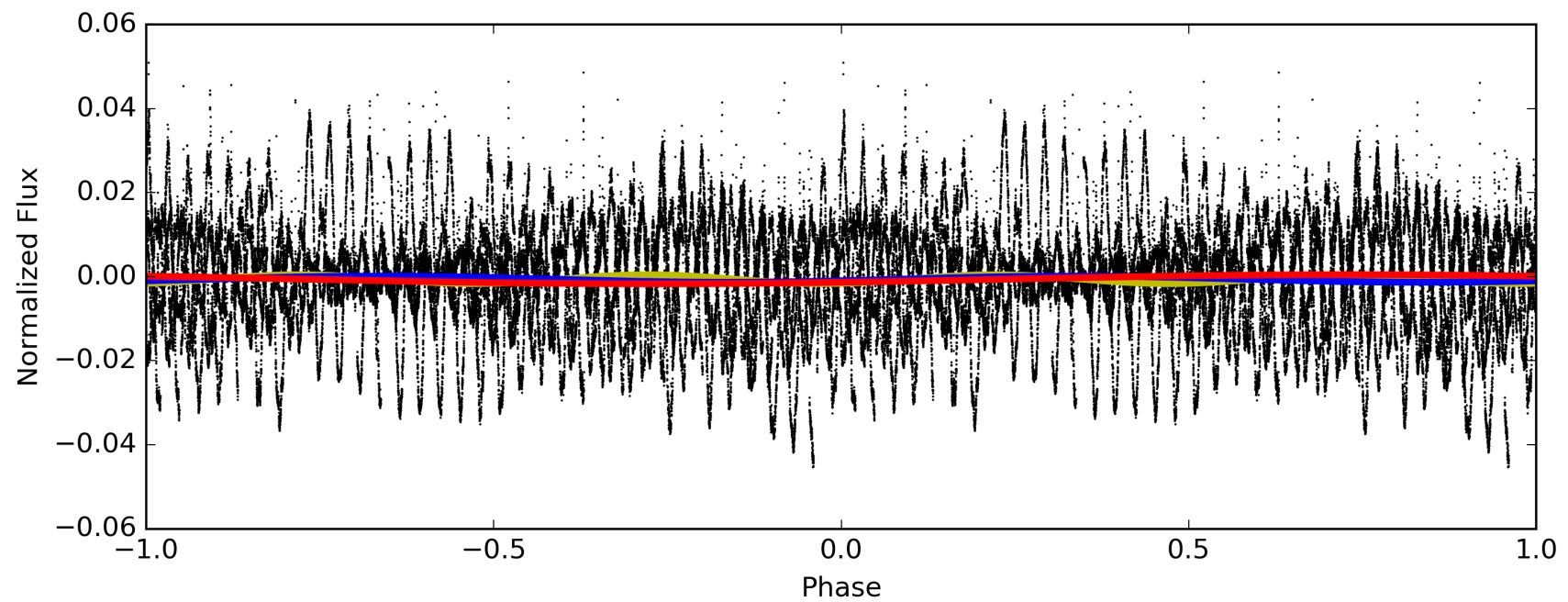
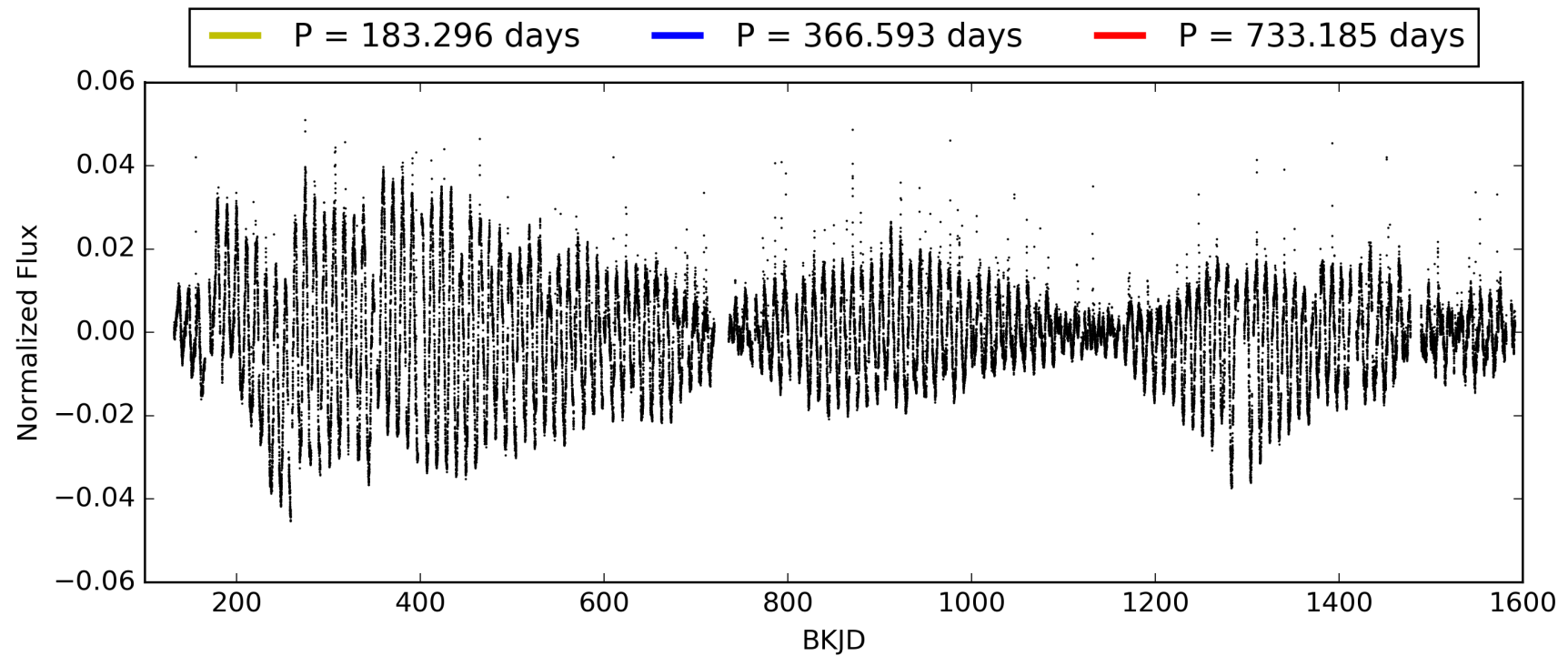
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:29:59 Z

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

TCE 009581885-04, PDC Light Curves

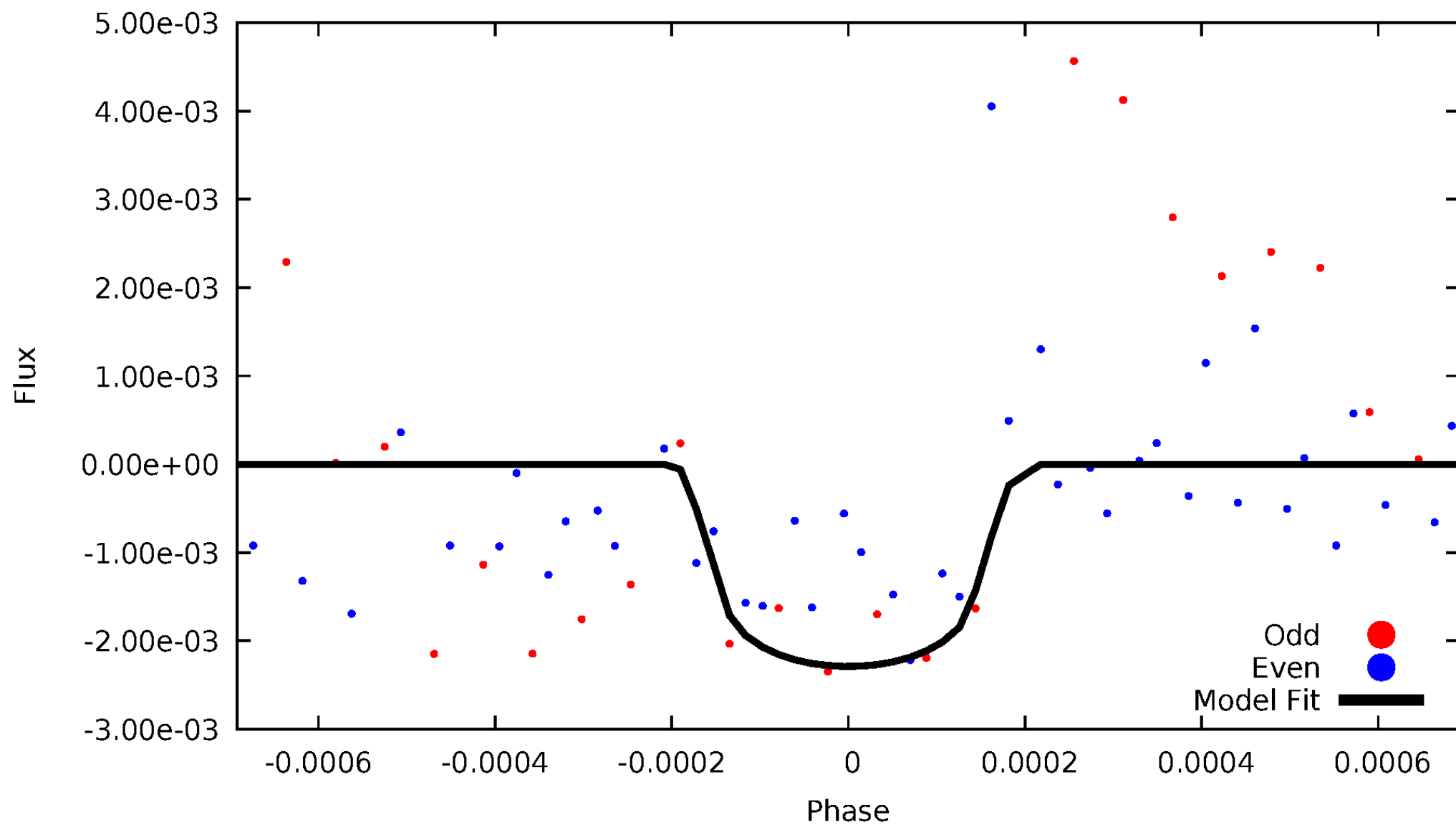


TCE 009581885-04



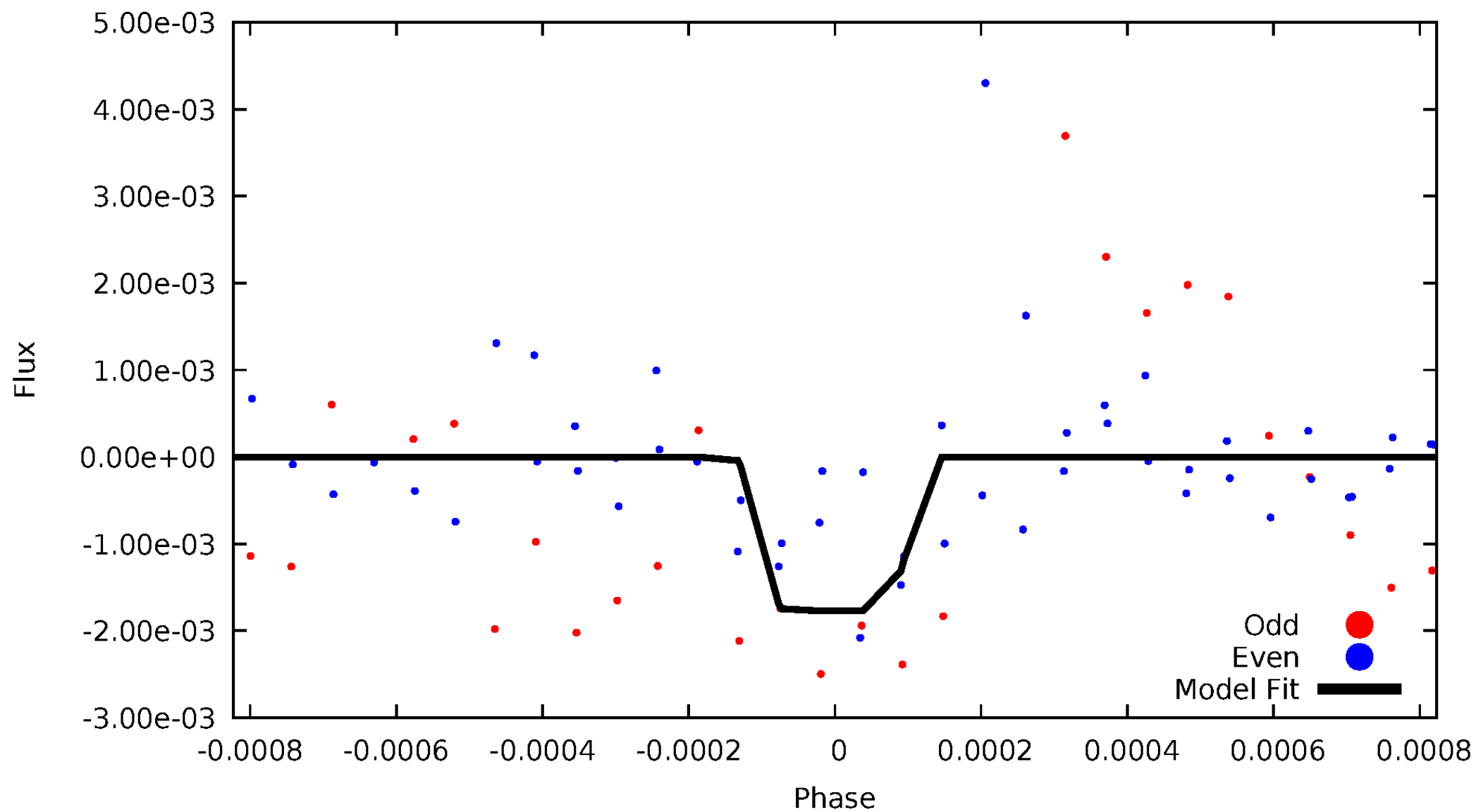
DV Odd/Even

TCE 009581885-04



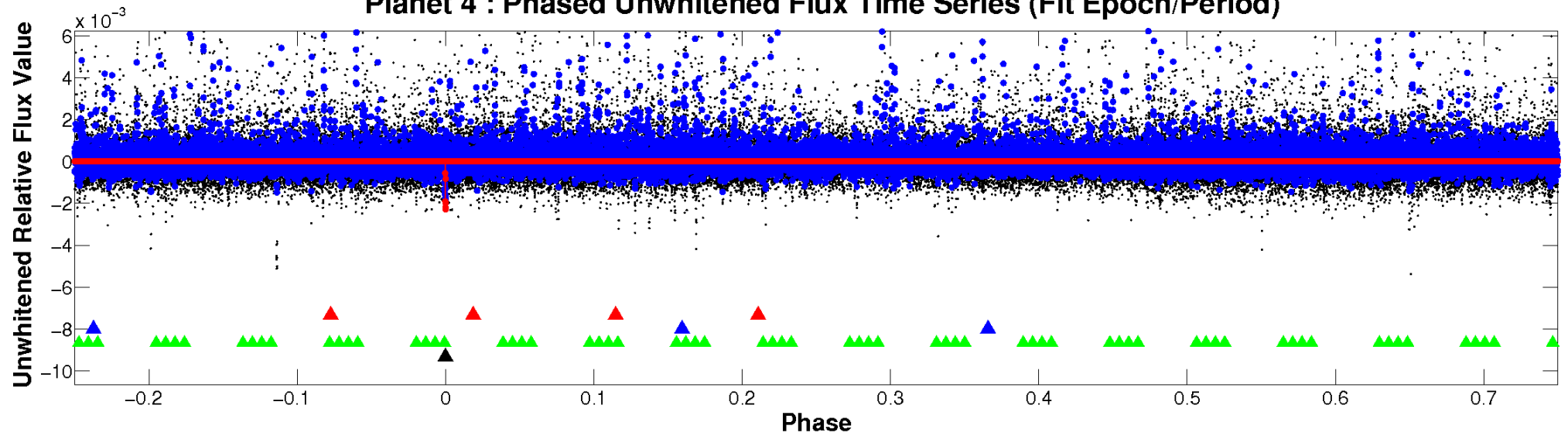
ALT Odd/Even

TCE 009581885-04

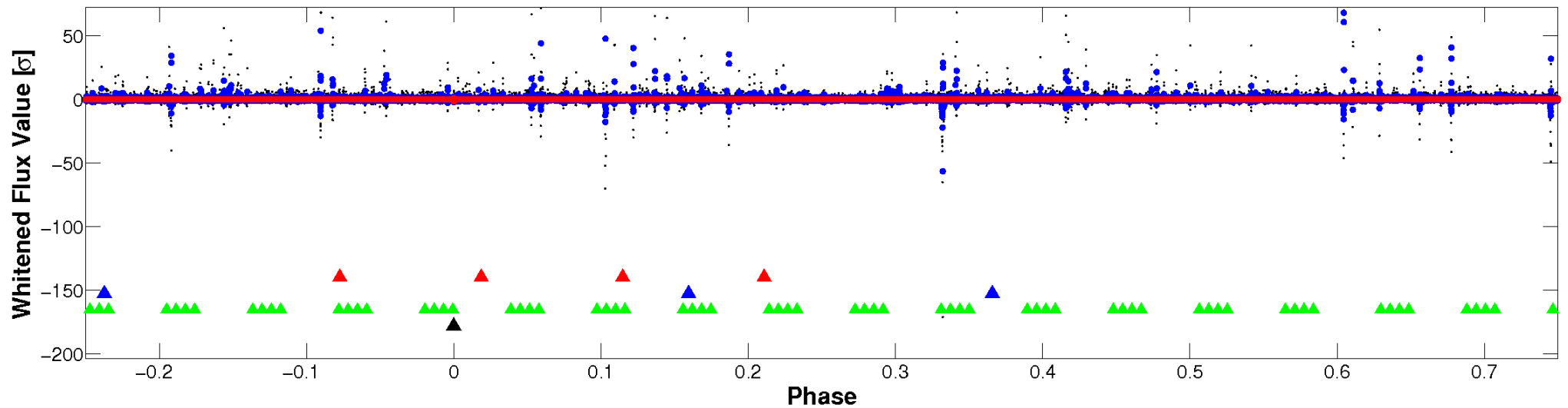


Non-Whitened Vs. Whitened Light Curve

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

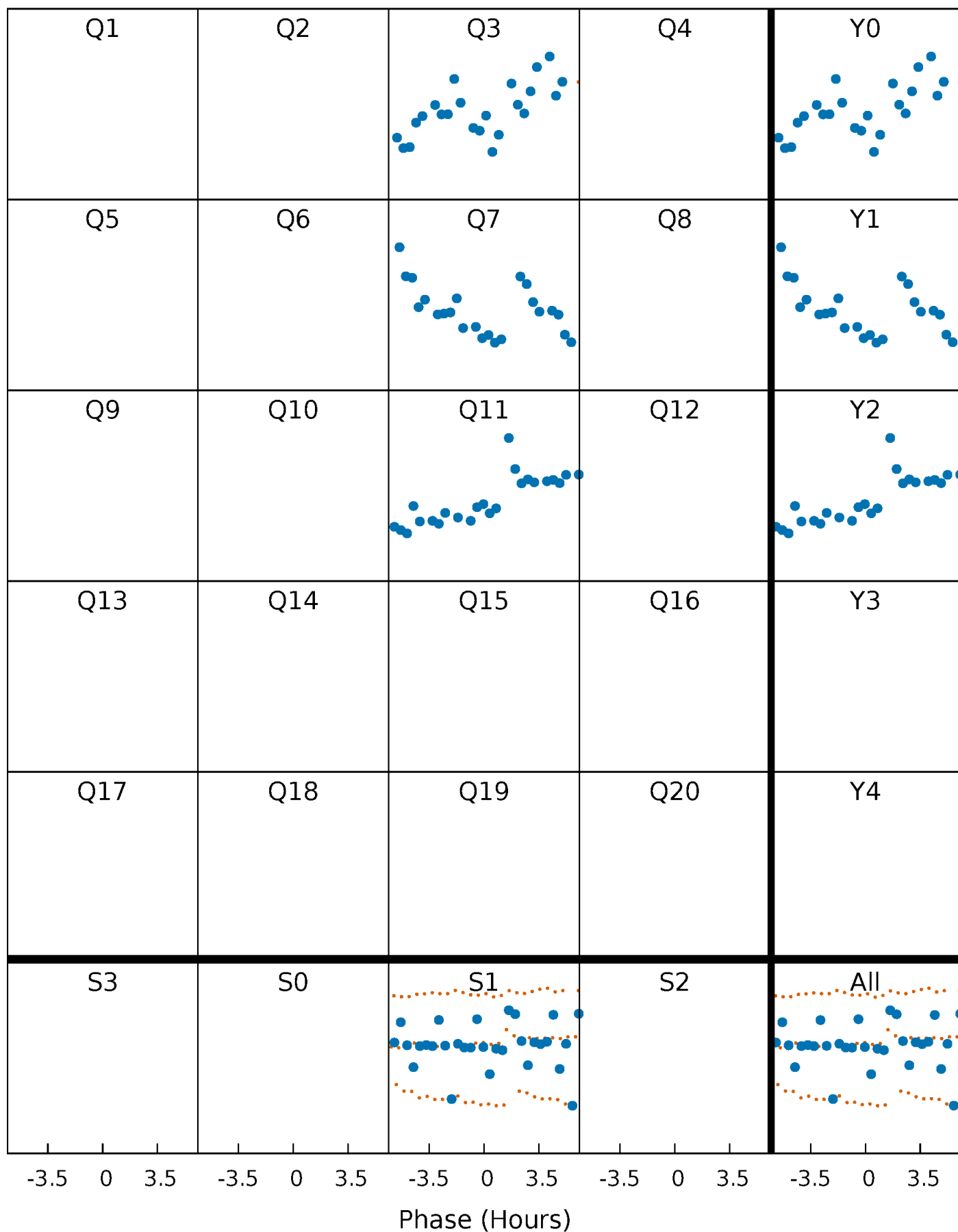


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



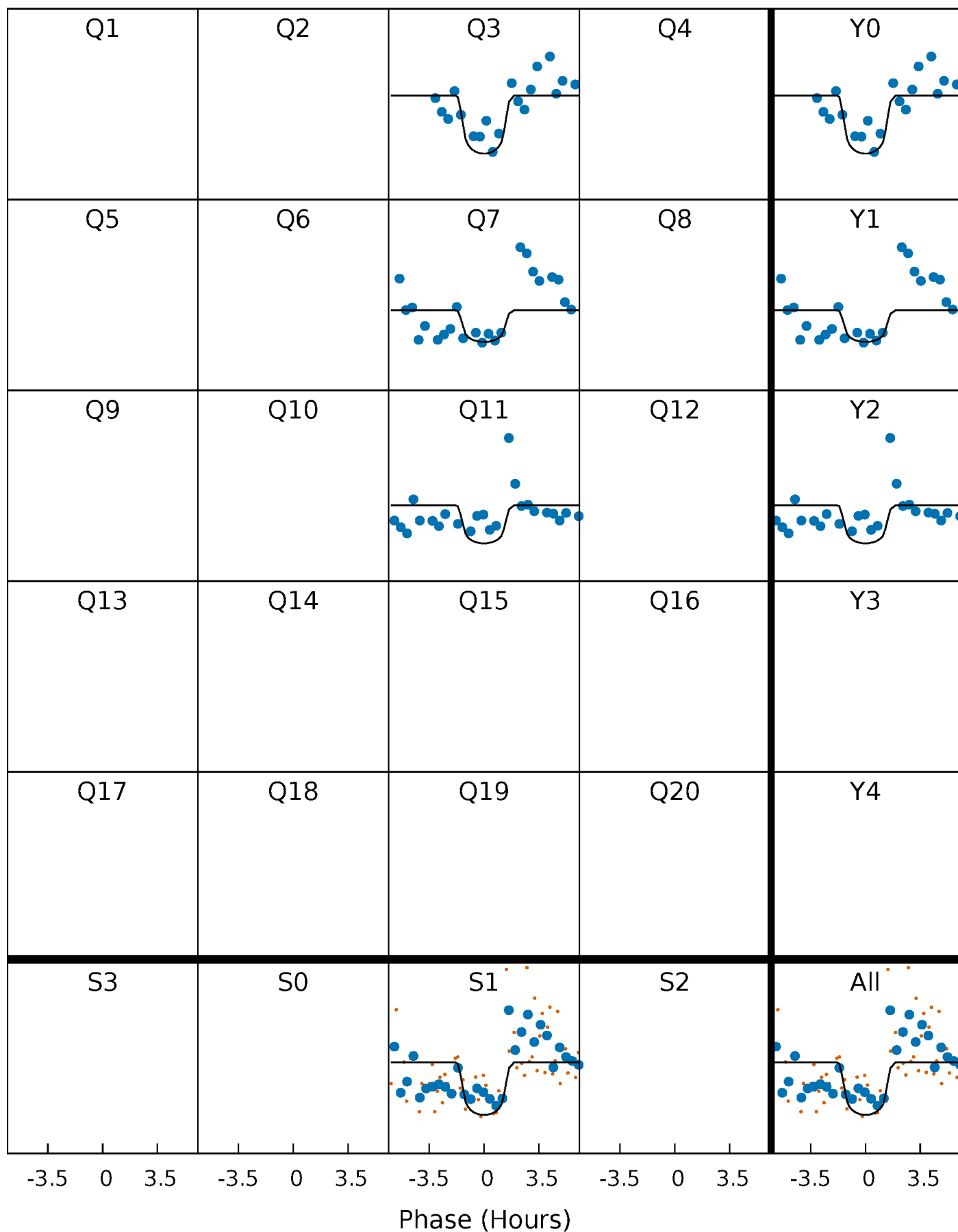
PDC Quarter-Phased Transit Curves

TCE 009581885-04 $P=366.592709$ Days $T_0=273.153354$ (BKJD)



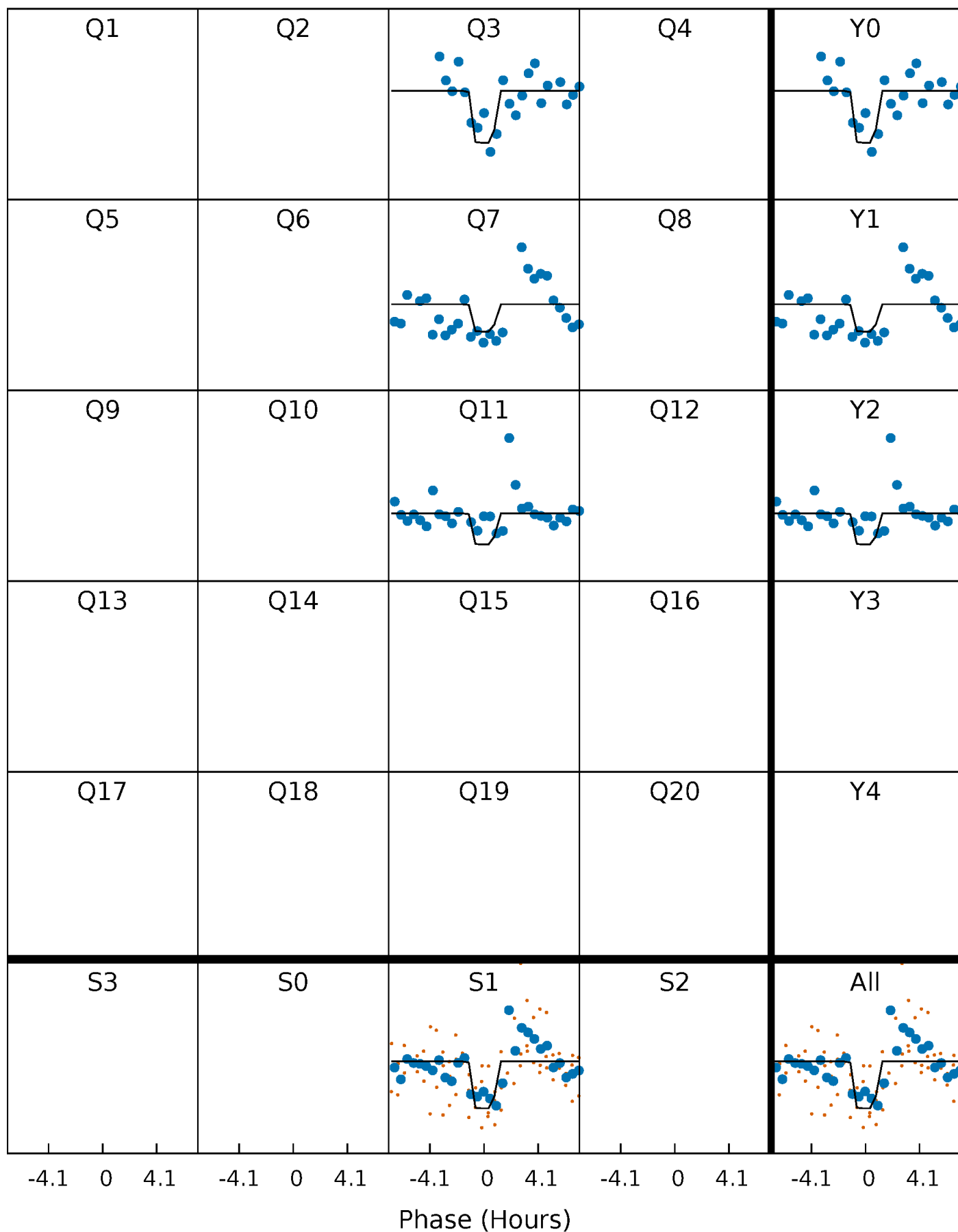
DV Quarter-Phased Transit Curves

TCE 009581885-04 $P=366.592709$ Days $T_0=273.153354$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

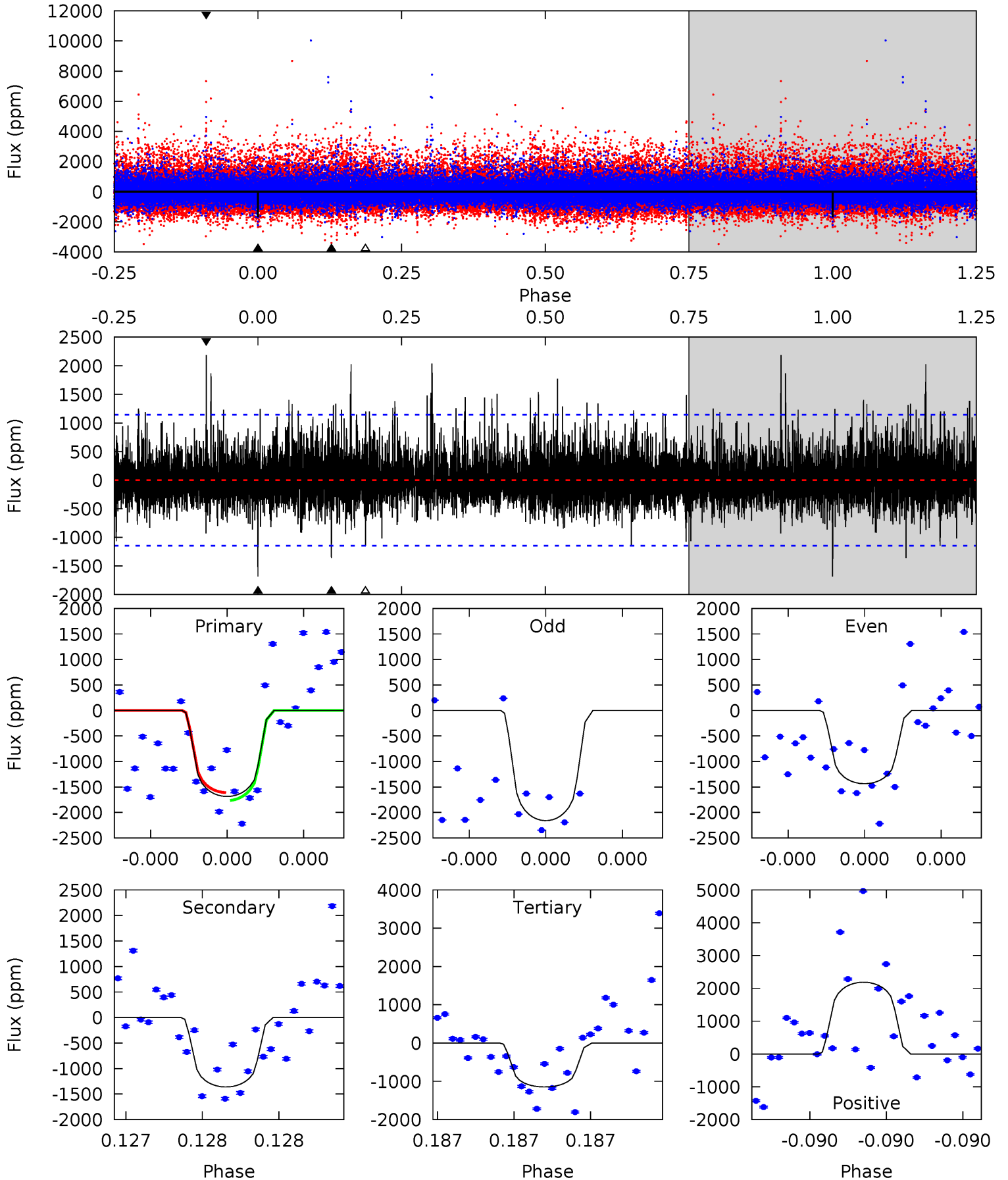
TCE 009581885-04 $P=366.578187$ Days $T_0=273.166464$ (BKJD)



DV Model-Shift Uniqueness Test

009581885-04, P = 366.592709 Days, E = 273.153354 Days

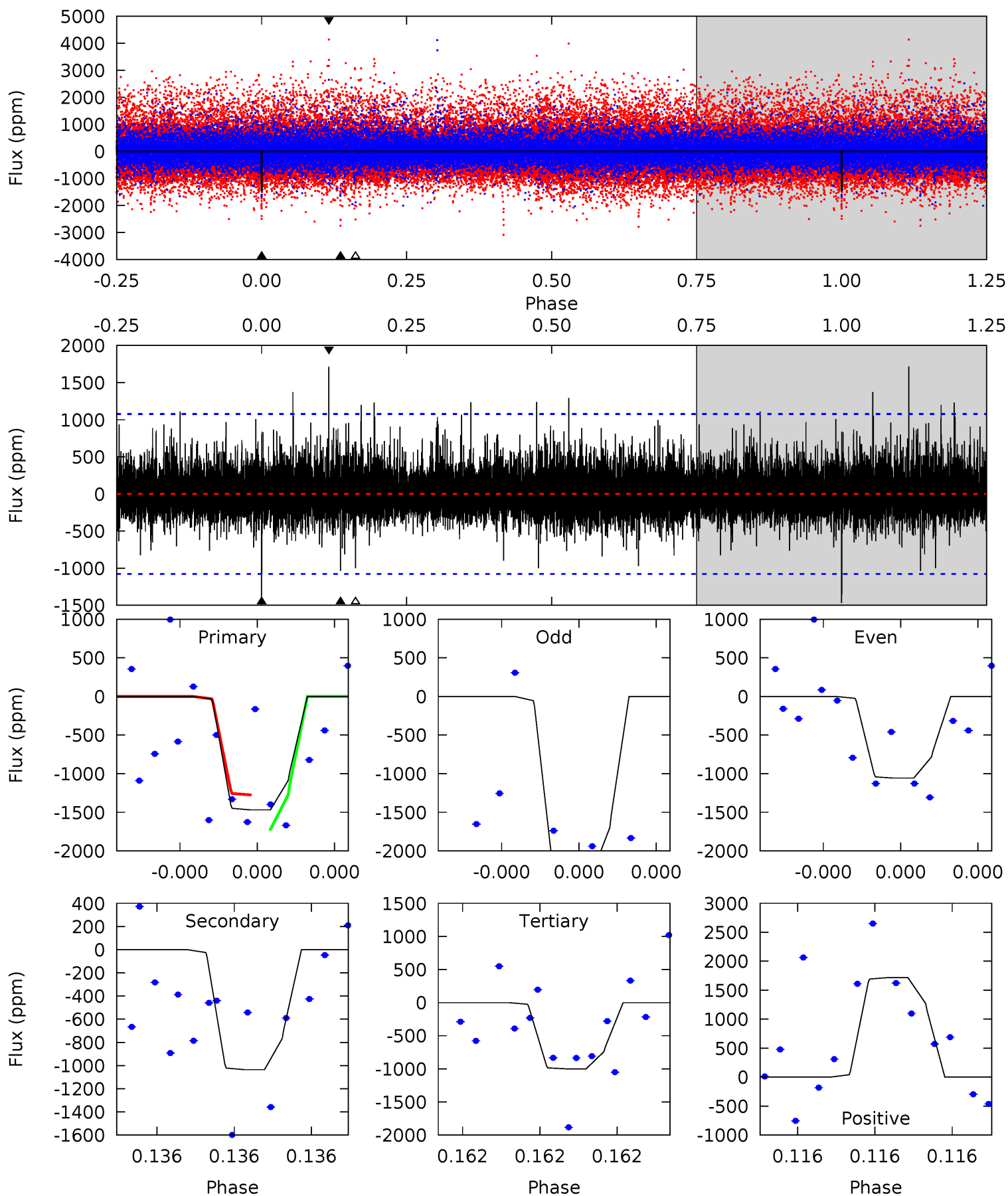
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.29	6.69	5.64	10.8	5.63	3.57	1.63	2.65	-2.47	1.05	-4.07	1.36	0.93	0.56	0.38



Alt Model-Shift Uniqueness Test

009581885-04, P = 366.578187 Days, E = 273.166464 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.79	5.49	5.30	9.10	5.71	3.69	1.22	2.49	-1.31	0.19	-3.61	2.92	0.98	0.54	1.18



Stellar Parameters For KIC 009581885

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	3587^{+43}_{-48}	$4.843^{+0.035}_{-0.028}$	$-0.100^{+0.100}_{-0.100}$	$0.409^{+0.029}_{-0.032}$	$0.427^{+0.030}_{-0.036}$	$8.764^{+1.697}_{-1.058}$
	+1%/-1%	+1%/-1%	+100%/-100%	+7%/-8%	+7%/-8%	+19%/-12%
Source	PHO2	PHO2	PHO2	DSEP		

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

Secondary Eclipse Parameters for KIC 009581885-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1361 ± 203	$4.25^{+3.98}_{-2.86}$	163^{+3}_{-3}	2724^{+1003}_{-412}	$23368^{+186891}_{-17124}$
Alt.	-1036 ± 189	$4.06^{+3.56}_{-2.80}$	163^{+3}_{-3}	2652^{+1016}_{-368}	$19379^{+168877}_{-13909}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

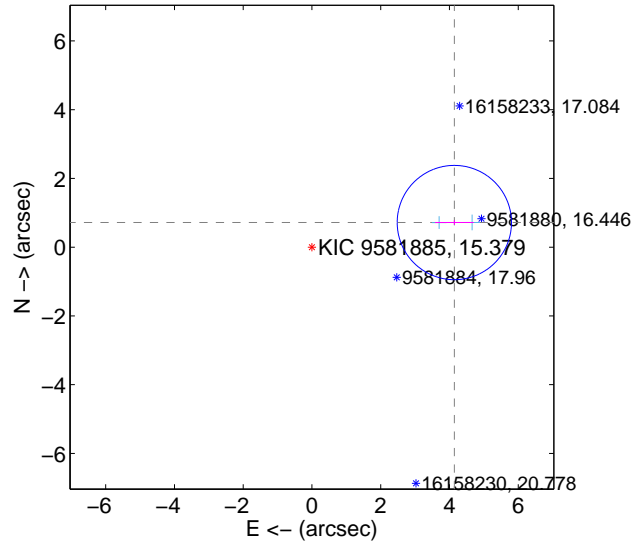
Supplemental centroid analysis for 009581885-04. Kepler magnitude: 15.38. Transit SNR 6.72

There are 2 quarters with good PRF difference image offsets

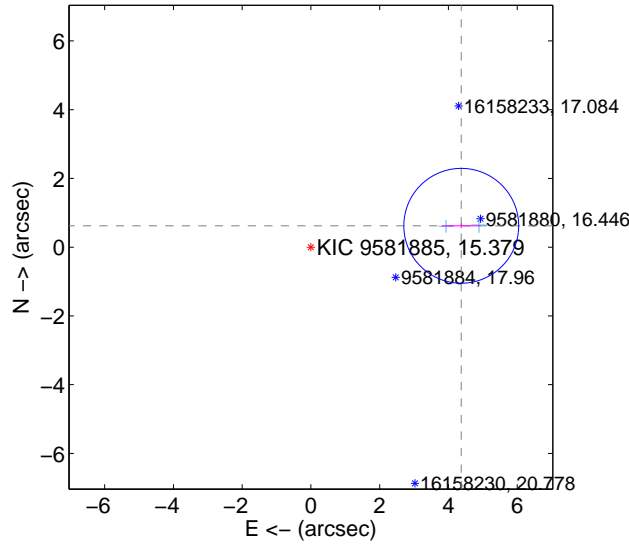
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.203 ± 0.554	7.59	-4.141 ± 0.562	0.716 ± 0.067
PRF-fit source offset from KIC position	4.416 ± 0.557	7.93	-4.372 ± 0.562	0.622 ± 0.070
photometric centroid source offset	1.35 ± 1.25	1.08	-1.26 ± 1.31	0.48 ± 0.72

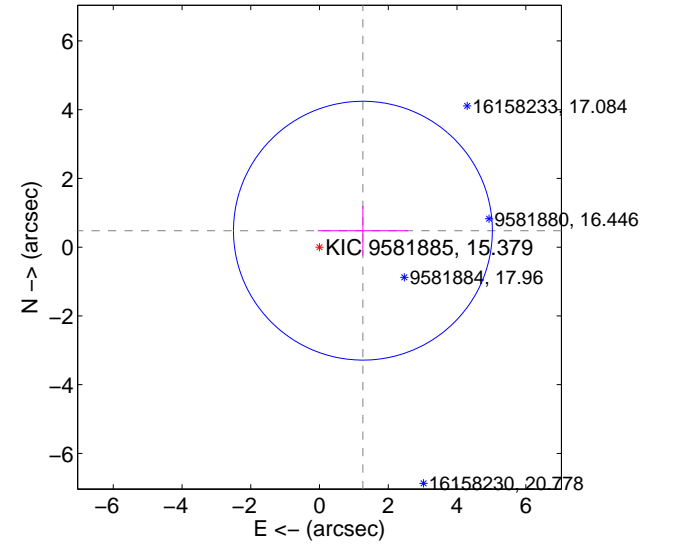
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

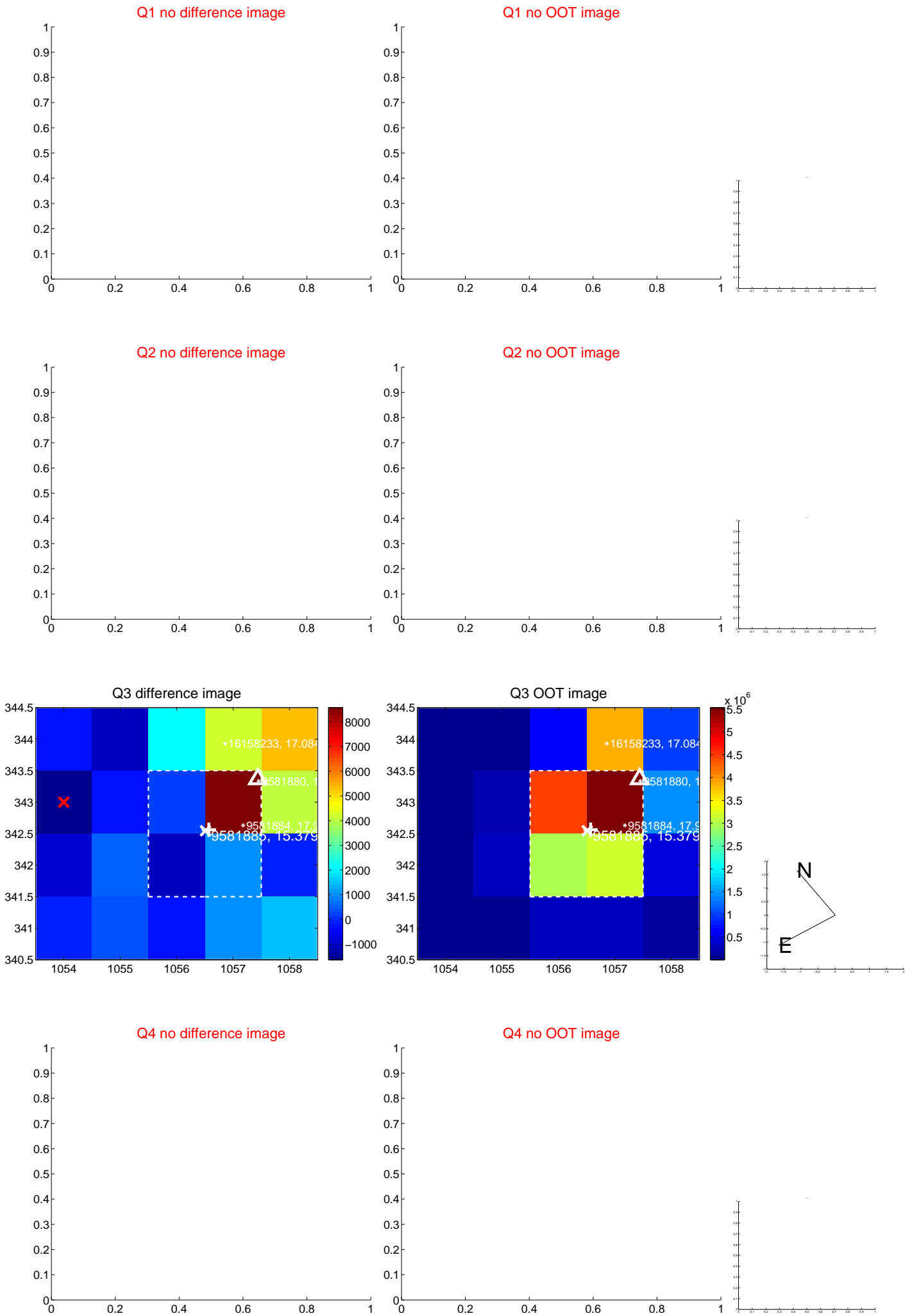


offset from photometric centroids

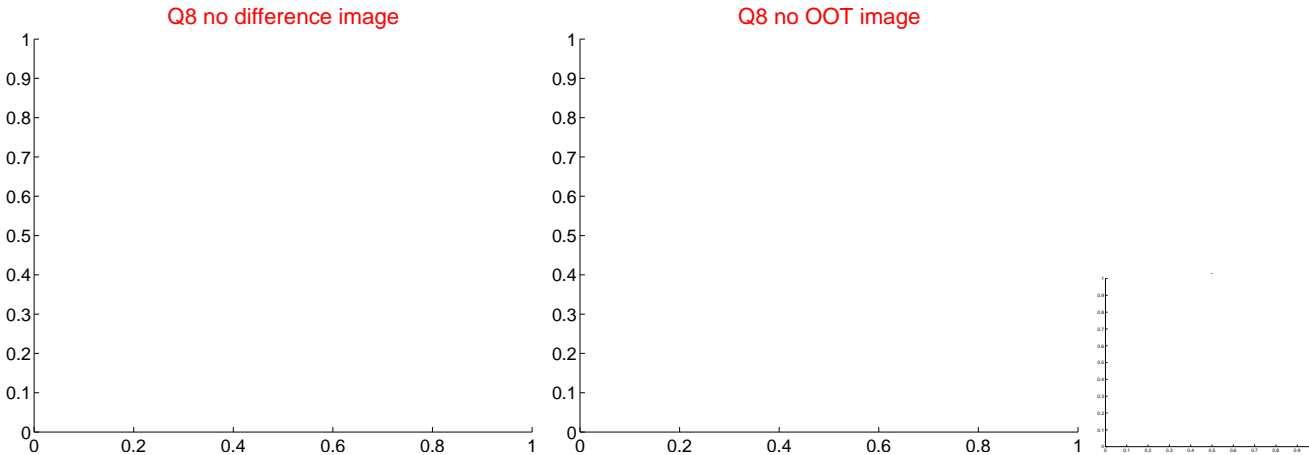
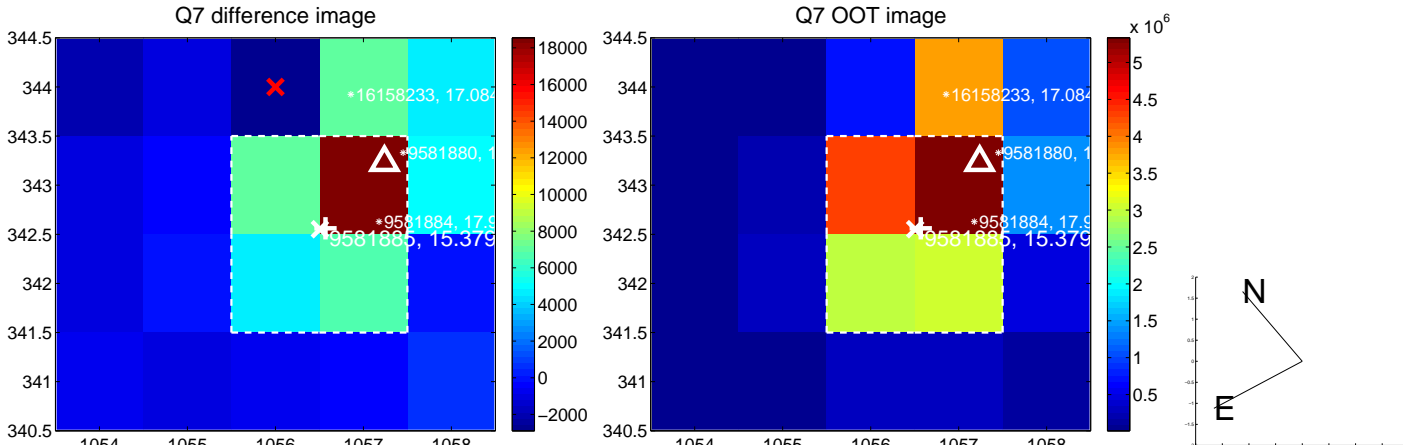
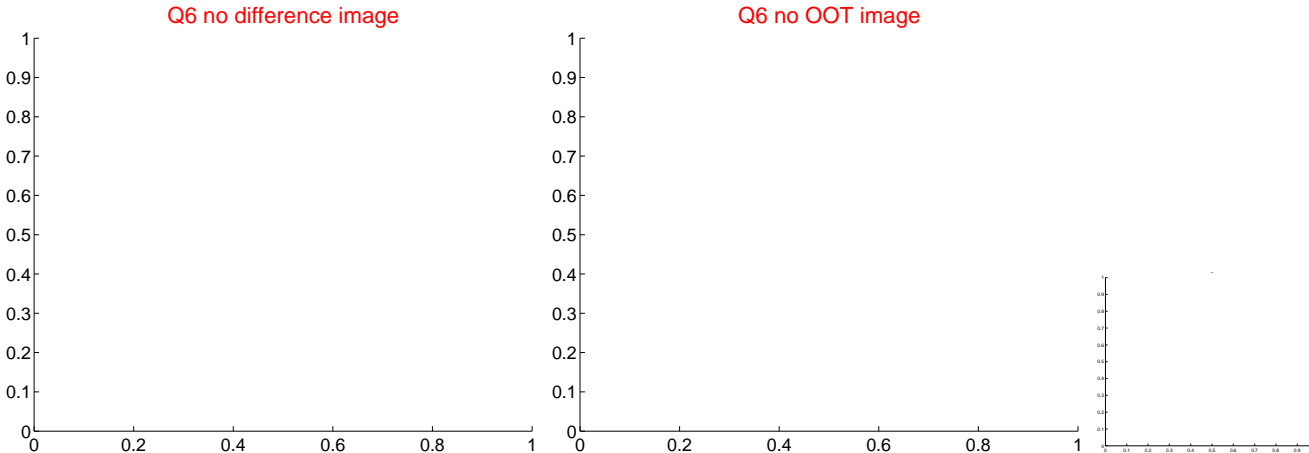
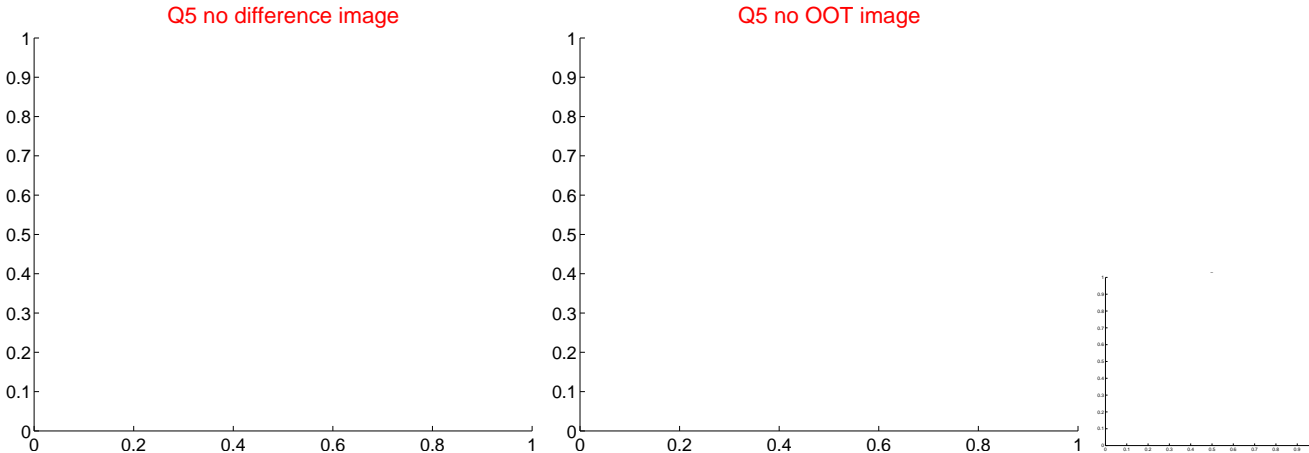


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

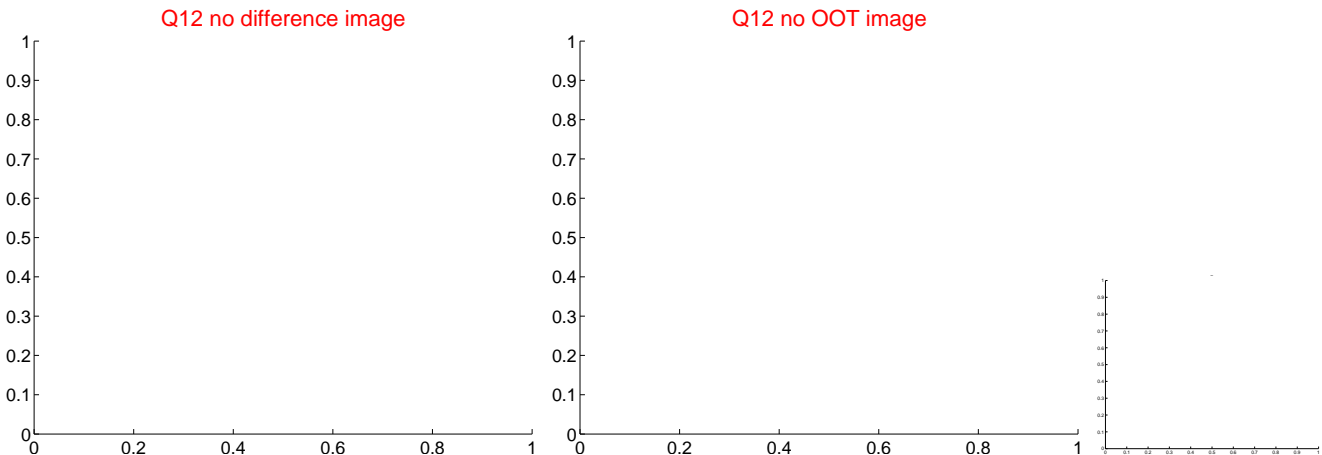
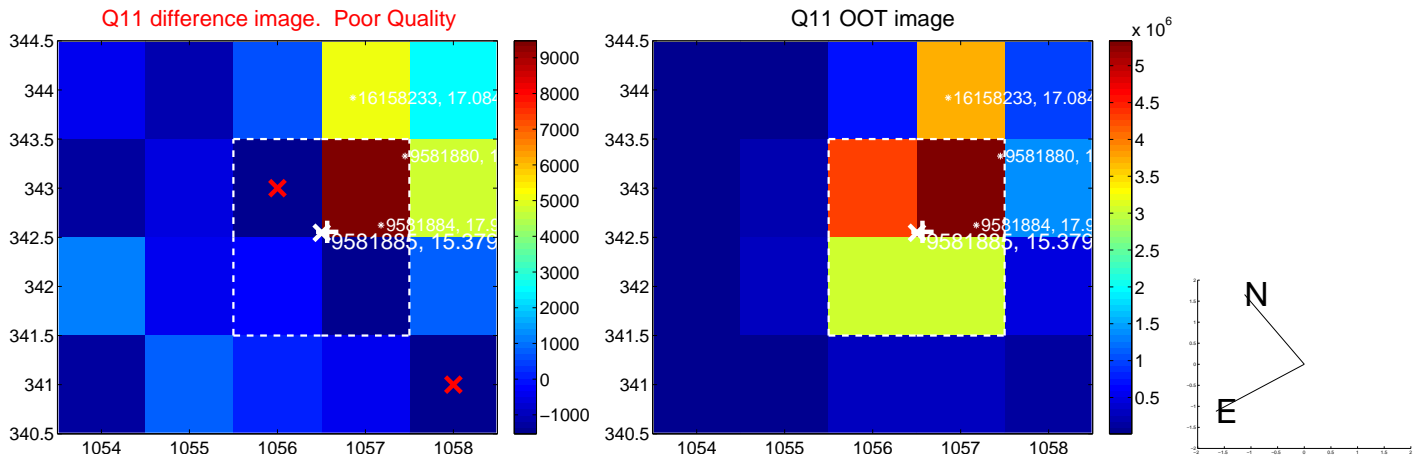
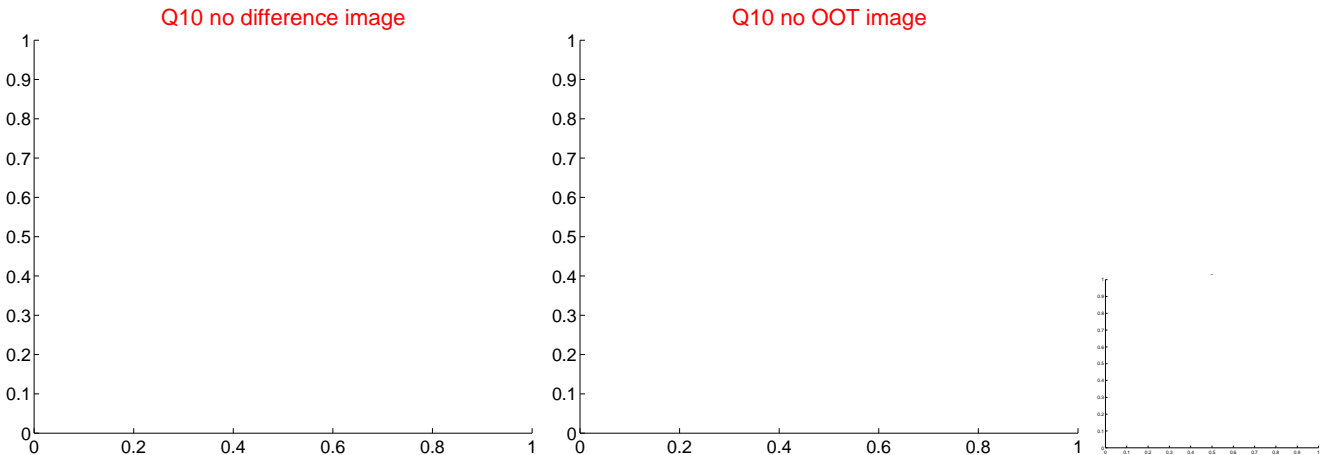
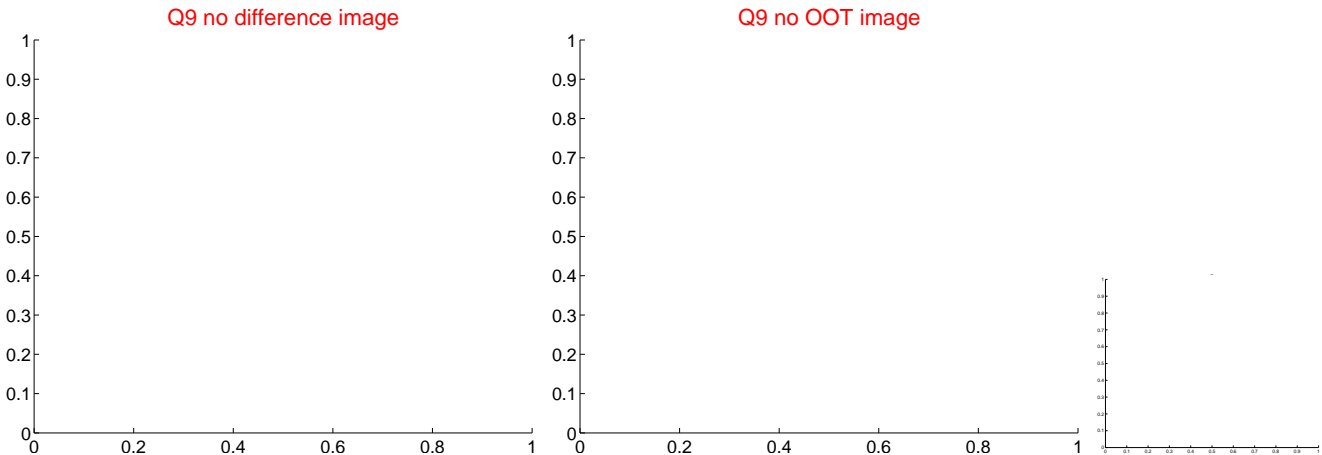
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



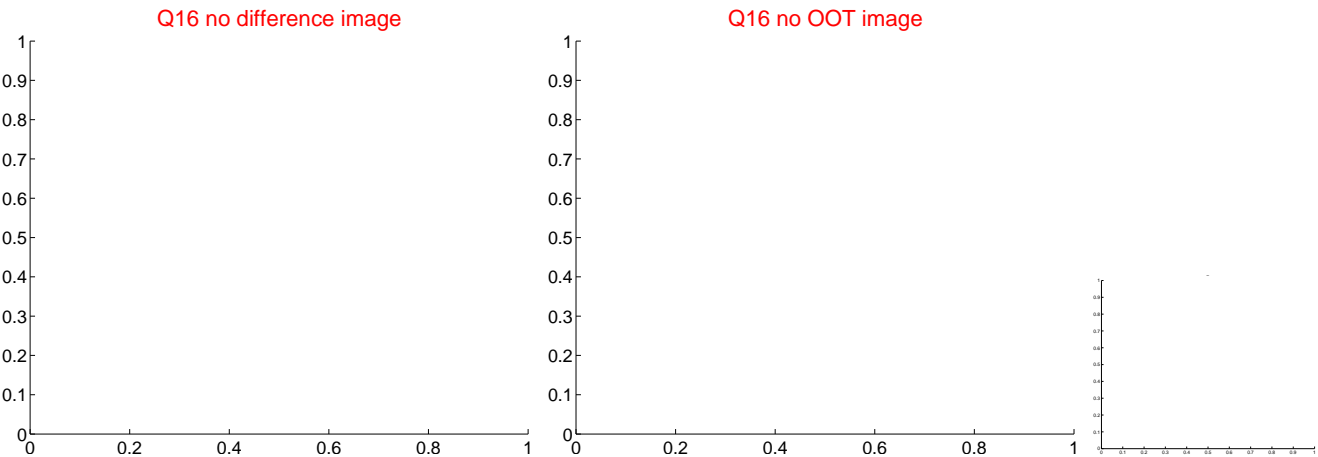
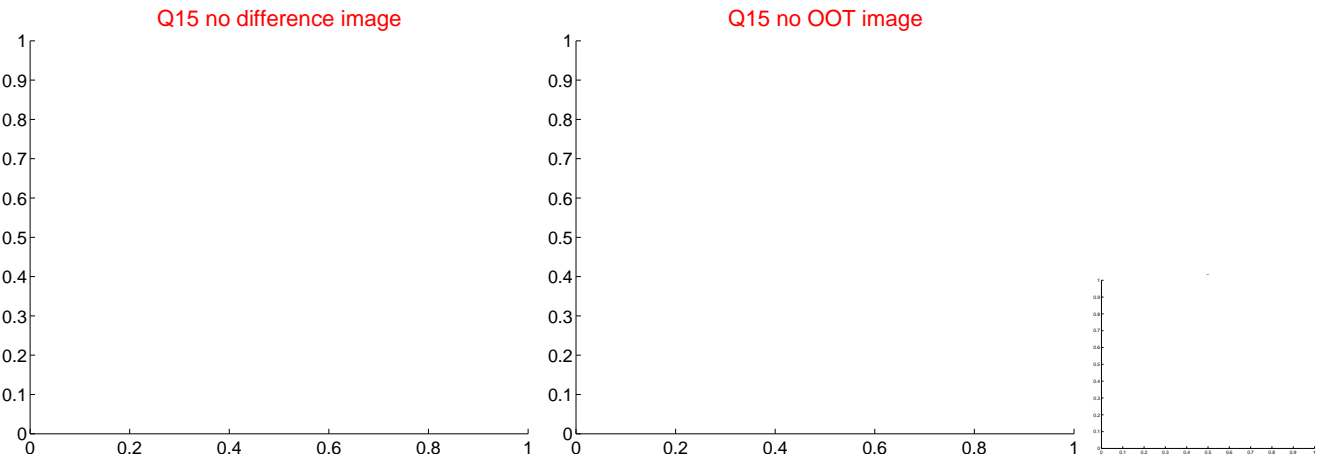
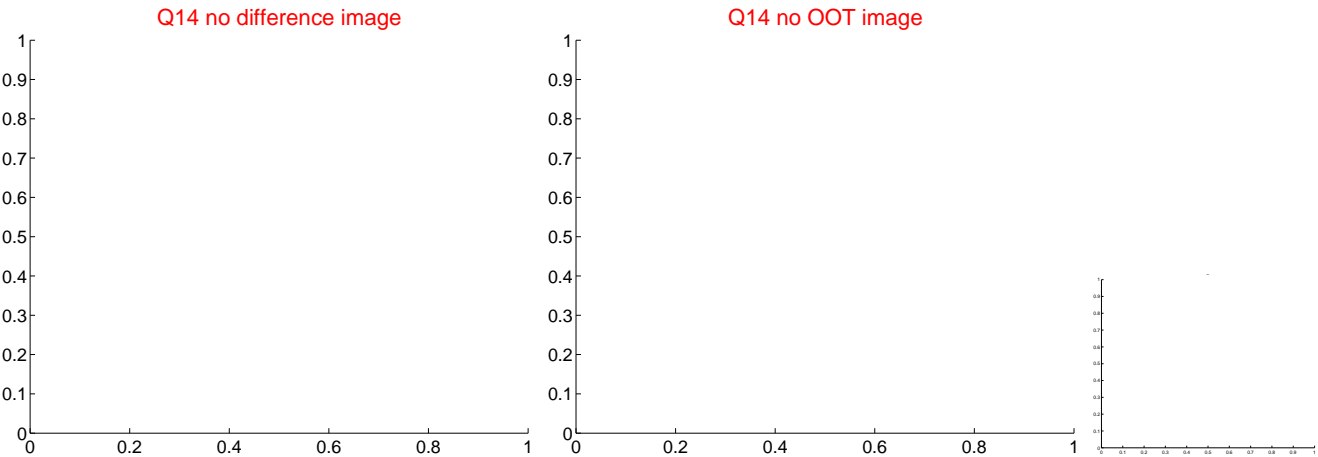
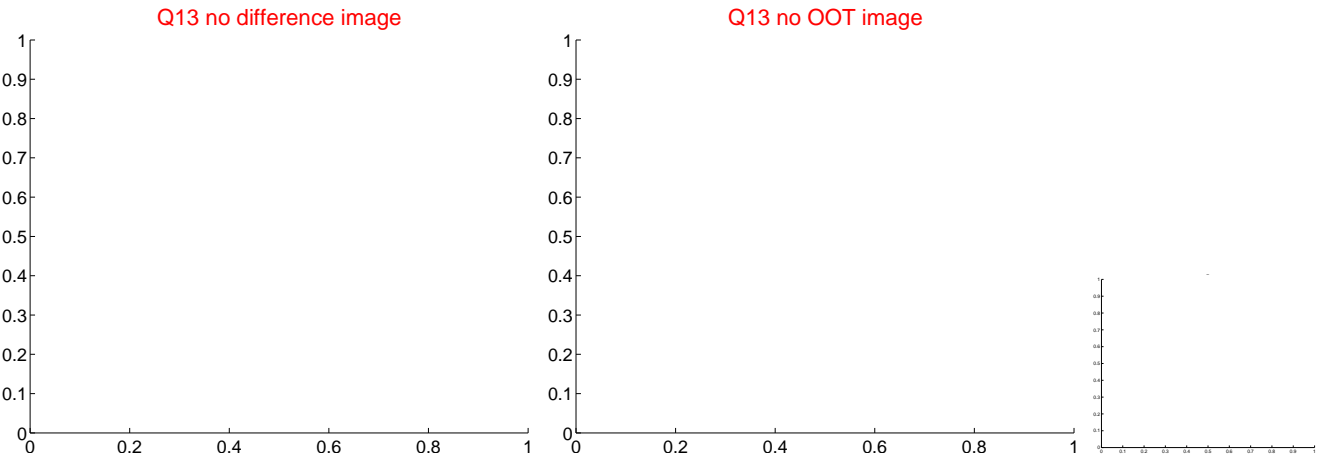
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



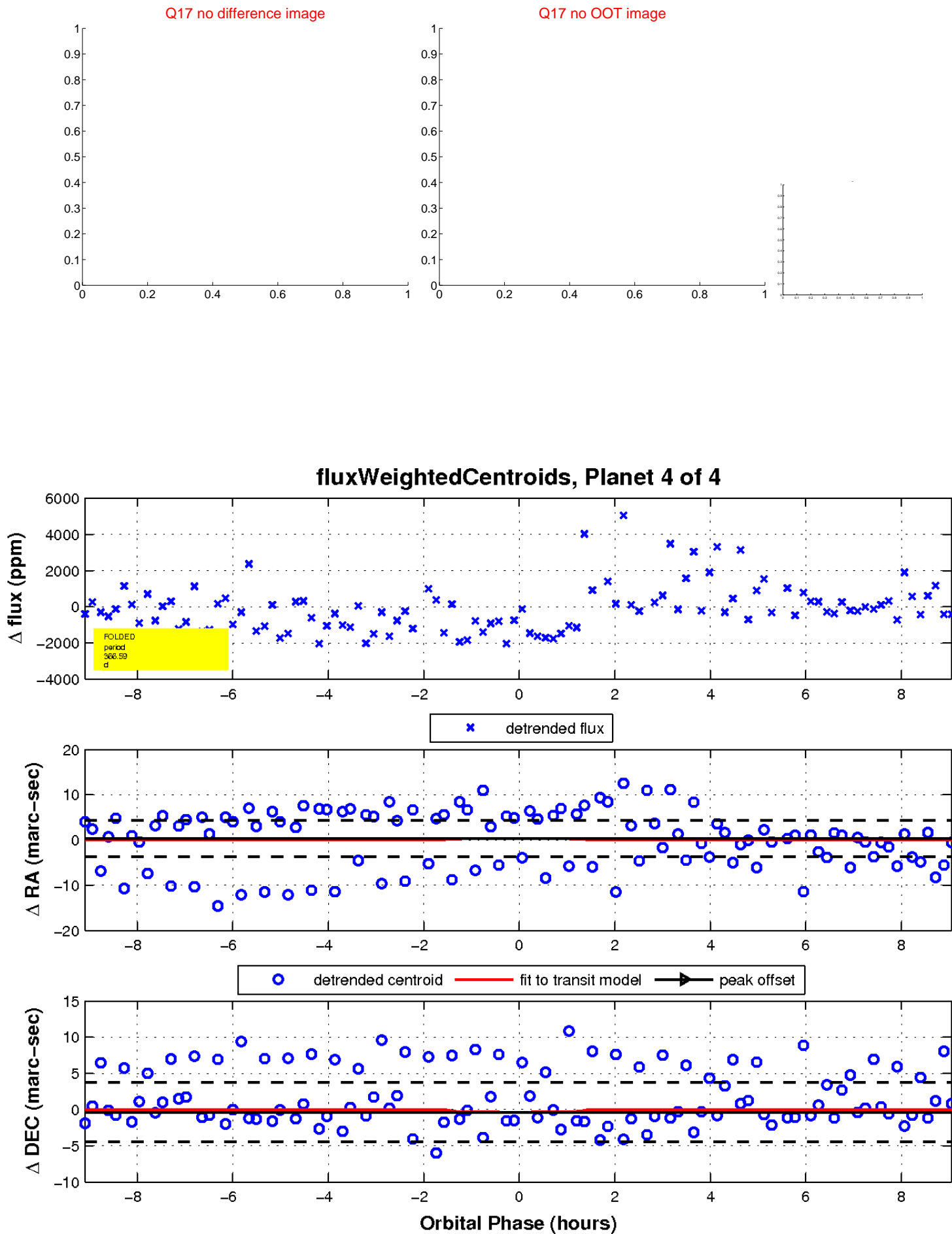
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



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



UKIRT Image

Declination

