

KIC 010162509

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})
010162509-01	OBS	No	533.518934	450.188918	1667.8	4.910	12.8	5.3	0.62	4776	2.49	0.15
010162509-02	OBS	No	0.961344	132.115589	50.5	3.692	10.1	3.6	0.62	4776	0.61	680.82
010162509-03	OBS	No	0.963380	132.287803	149.5	3.763	12.1	7.4	0.62	4776	0.79	678.90
010162509-06	OBS	No	63.403742	138.396612	1537.2	2.000	10.8	-1.0	0.62	4776	2.35	2.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010162509-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010162509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010162509-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010162509-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

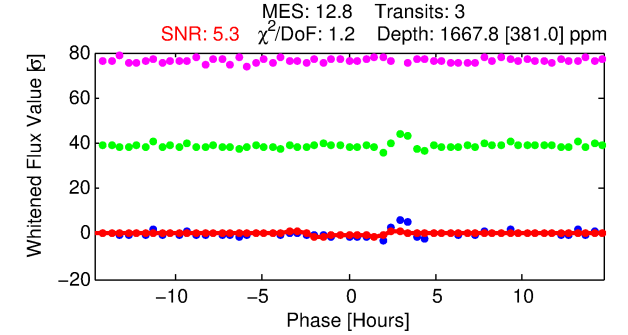
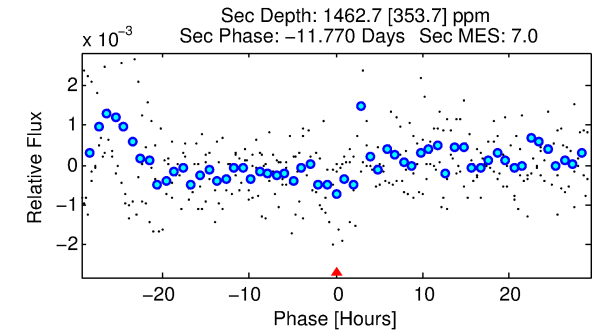
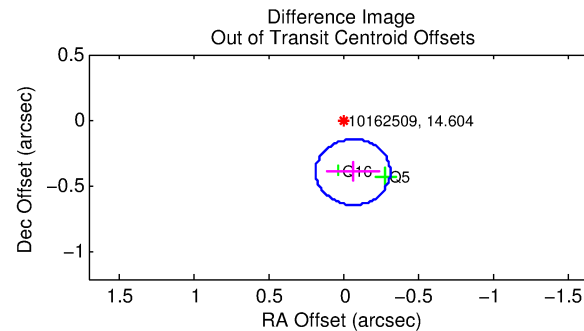
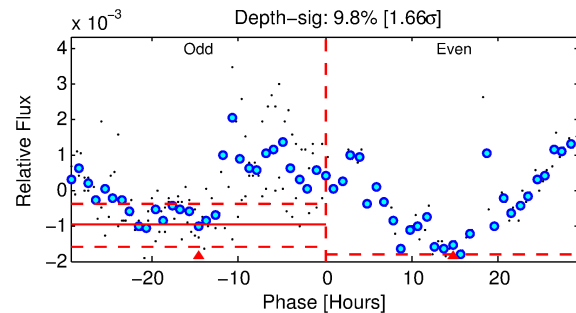
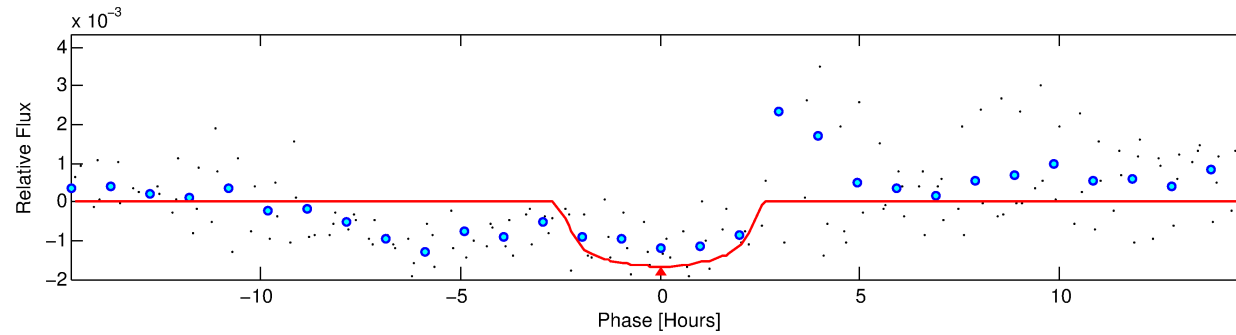
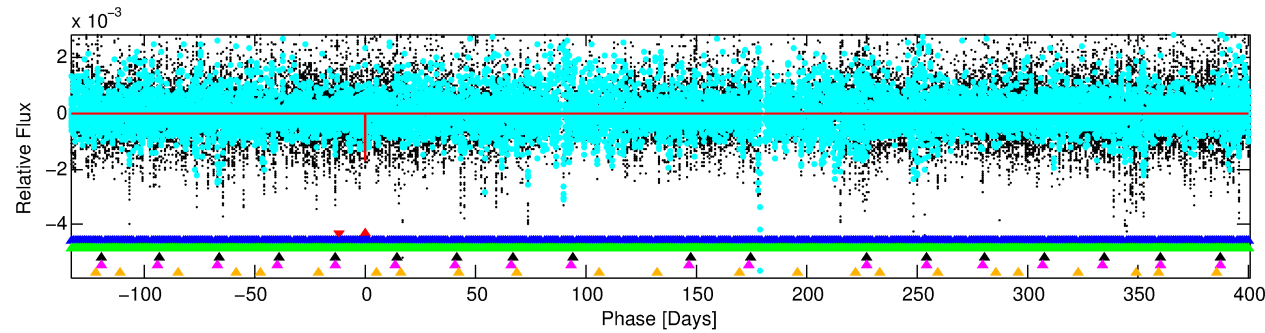
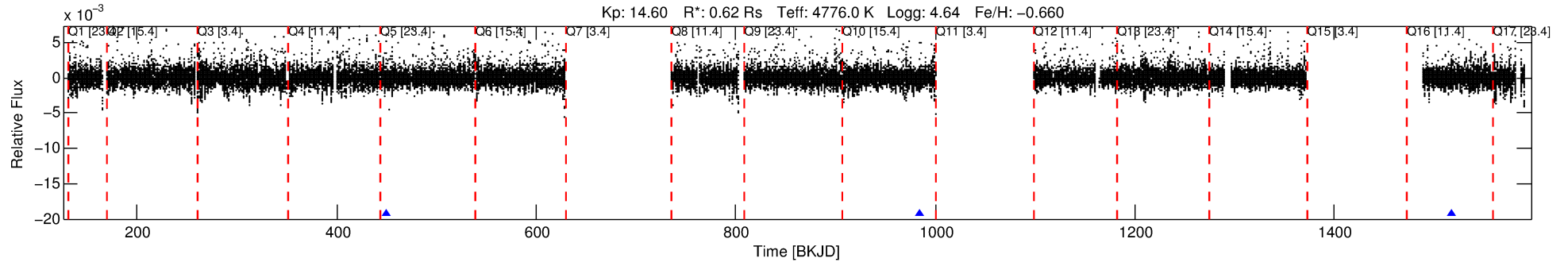
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010162509-01

No Significant Match Found

DV One-Page Summary

KIC: 10162509 Candidate: 1 of 6 Period: 533.519 d



DV Fit Results:

Period = 533.51893 [0.00732] d
Epoch = 450.1889 [0.0093] BKJD
Rp/R* = 0.0370 [0.0899]
a/R* = 803.07 [6677.74]
b = 0.37 [19.48]
Seff = 0.15 [0.02]
Teq = 158 [6] K
Rp = 2.49 [6.04] Re
a = 1.0886 [0.0781] AU
Ag = 153782.96 [747232.62] [0.21 σ]
Teffp = 4853 [5895] K [0.80 σ]

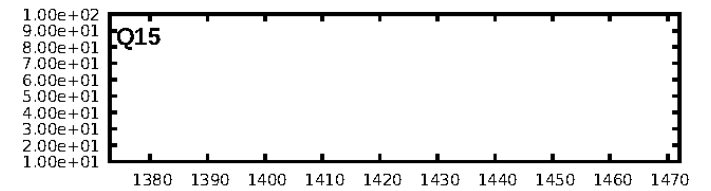
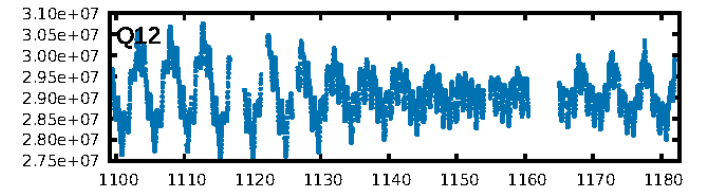
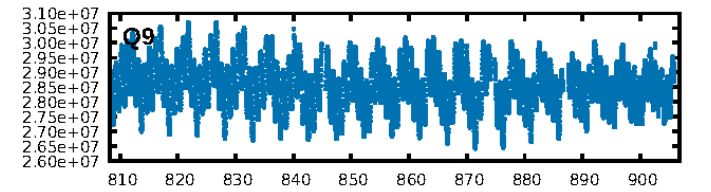
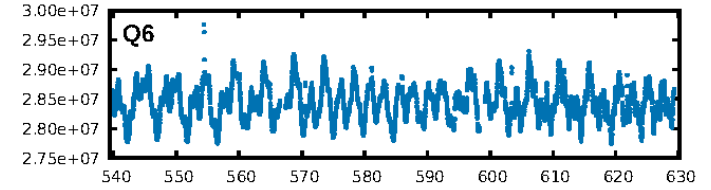
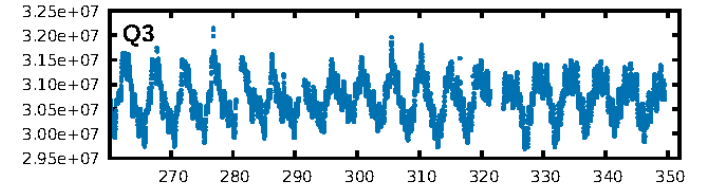
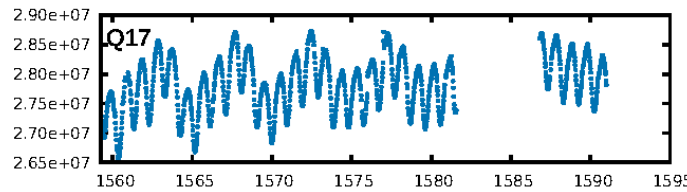
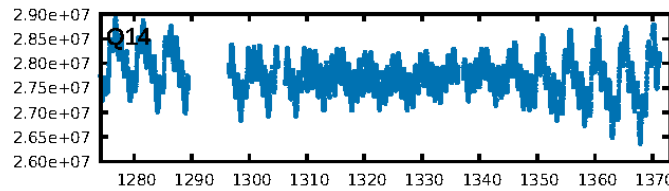
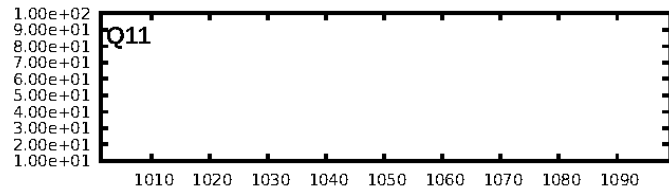
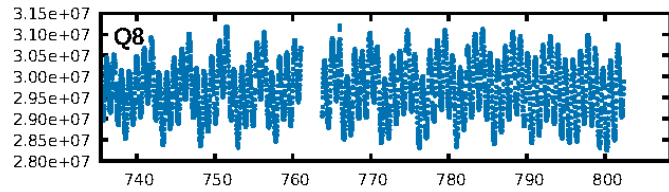
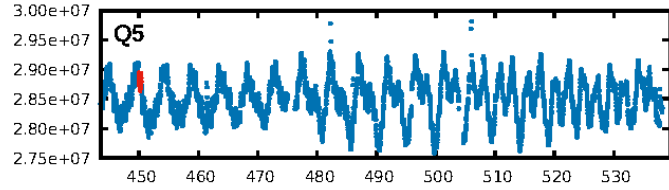
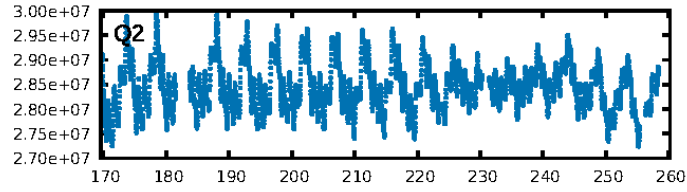
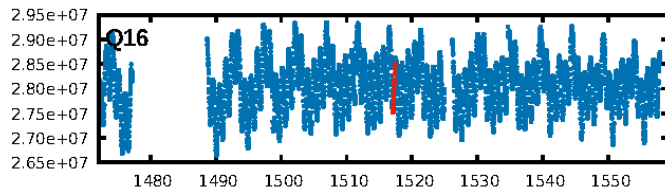
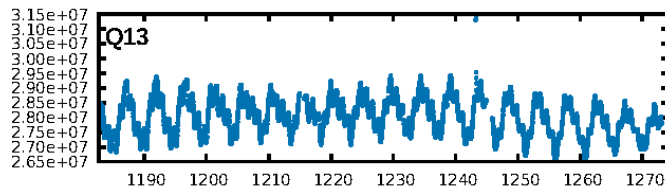
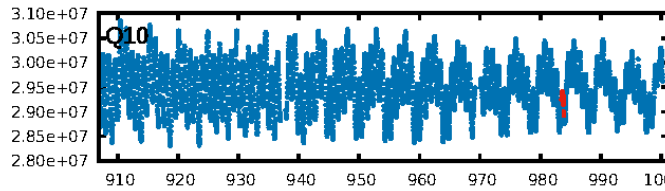
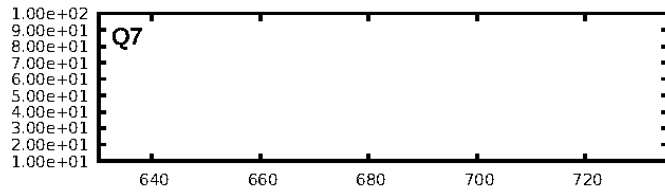
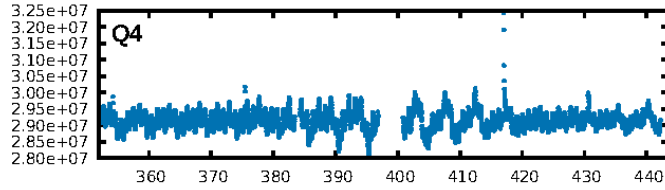
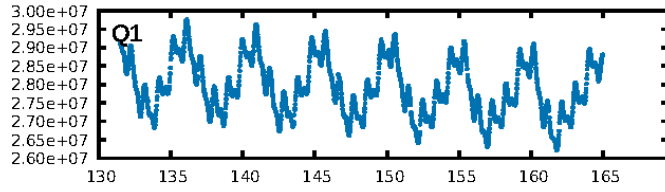
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1611.85 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 24.4%
ModelChiSquareGof-sig: 85.2%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.4669
Centroid-sig: N/A
Centroid-so: 0.992 arcsec [1.10 σ]
OotOffset-rm: 0.397 arcsec [4.79 σ]
KicOffset-rm: 0.244 arcsec [2.37 σ]
OotOffset-st: 0/0/1/1 [2]
KicOffset-st: 0/0/1/1 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 0.00 [0/3]

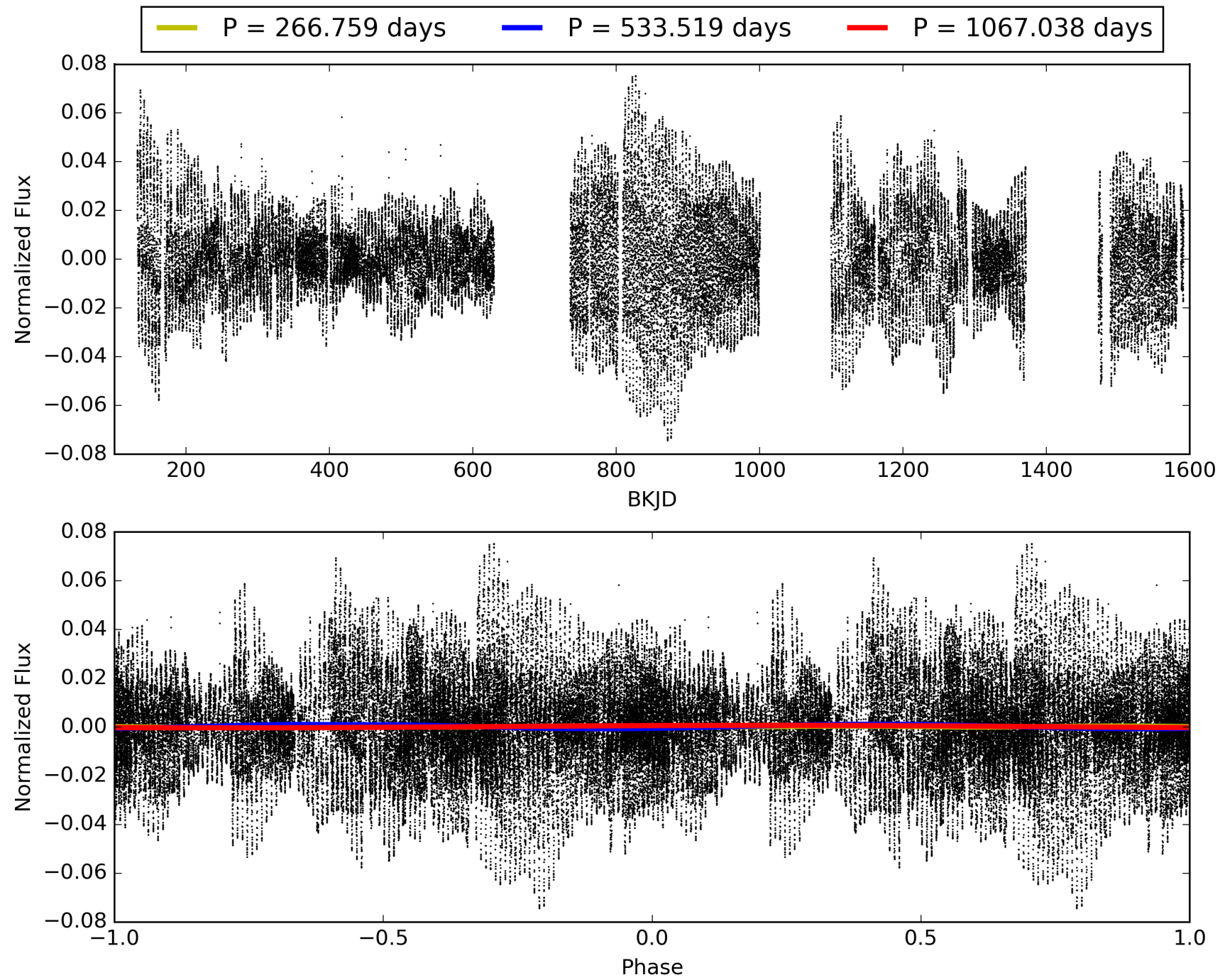
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:41 Z

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

TCE 010162509-01, PDC Light Curves

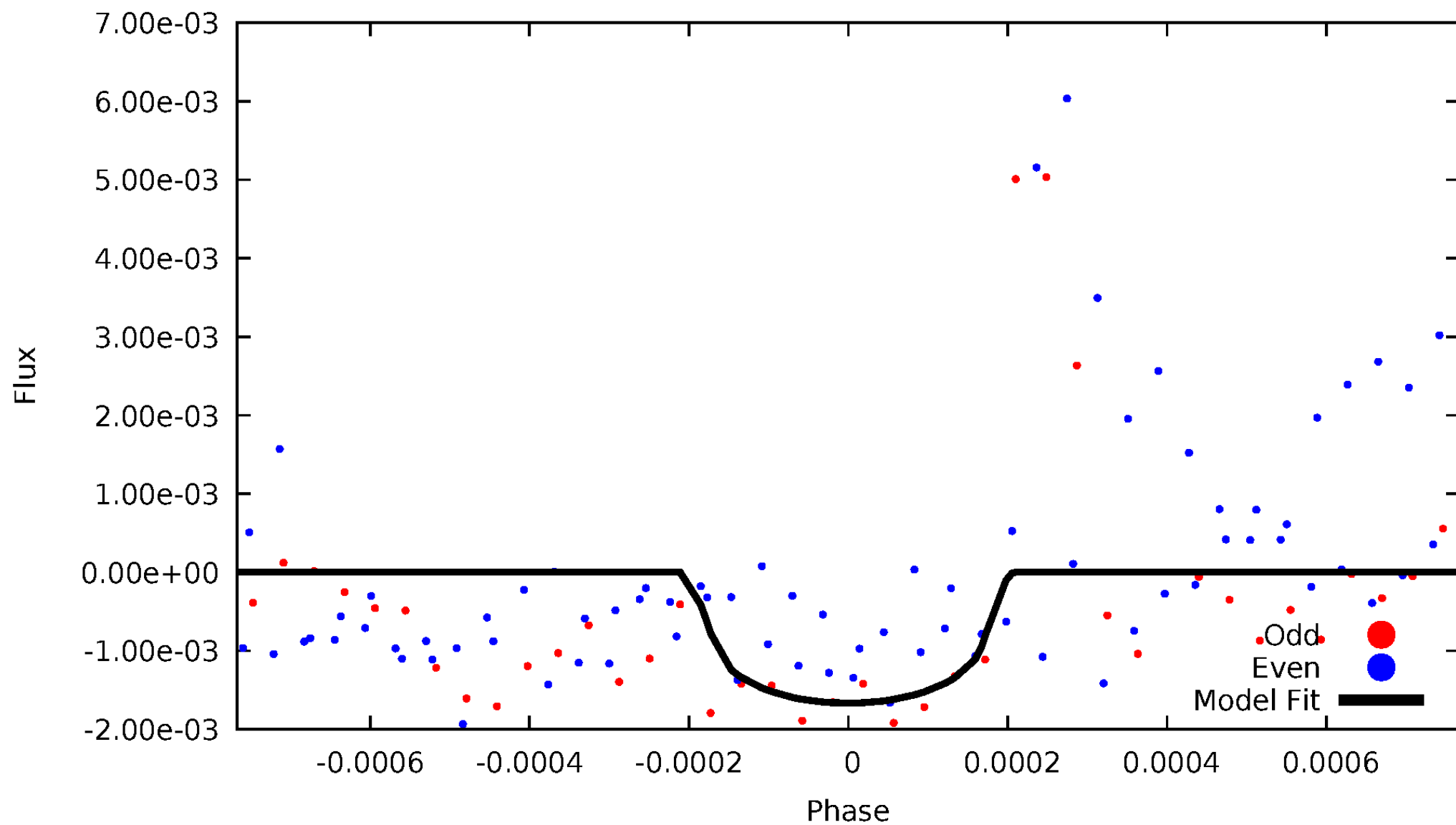


TCE 010162509-01



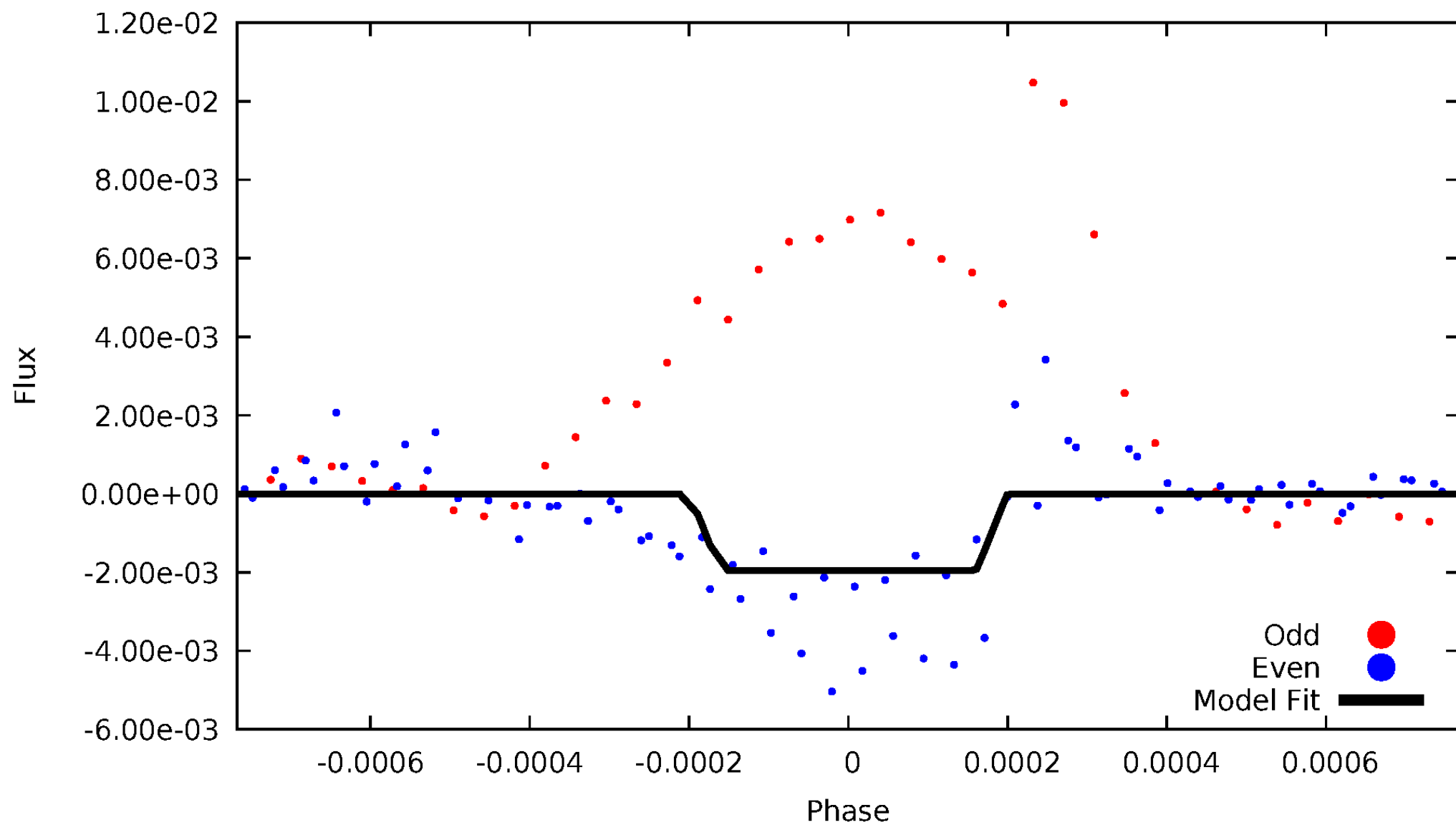
DV Odd/Even

TCE 010162509-01



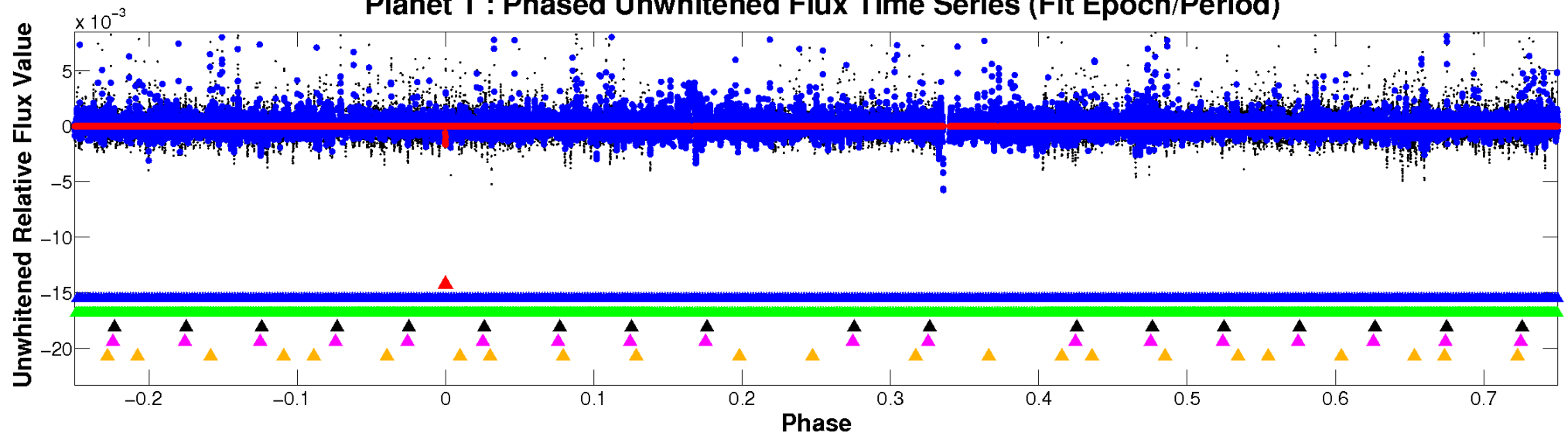
ALT Odd/Even

TCE 010162509-01

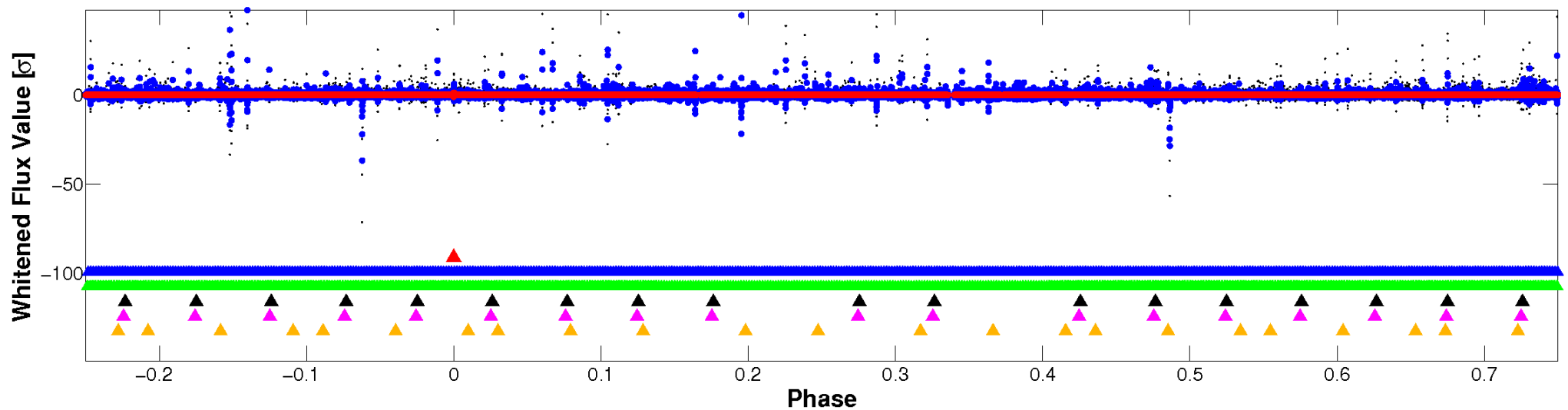


Non-Whitened Vs. Whitened Light Curve

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

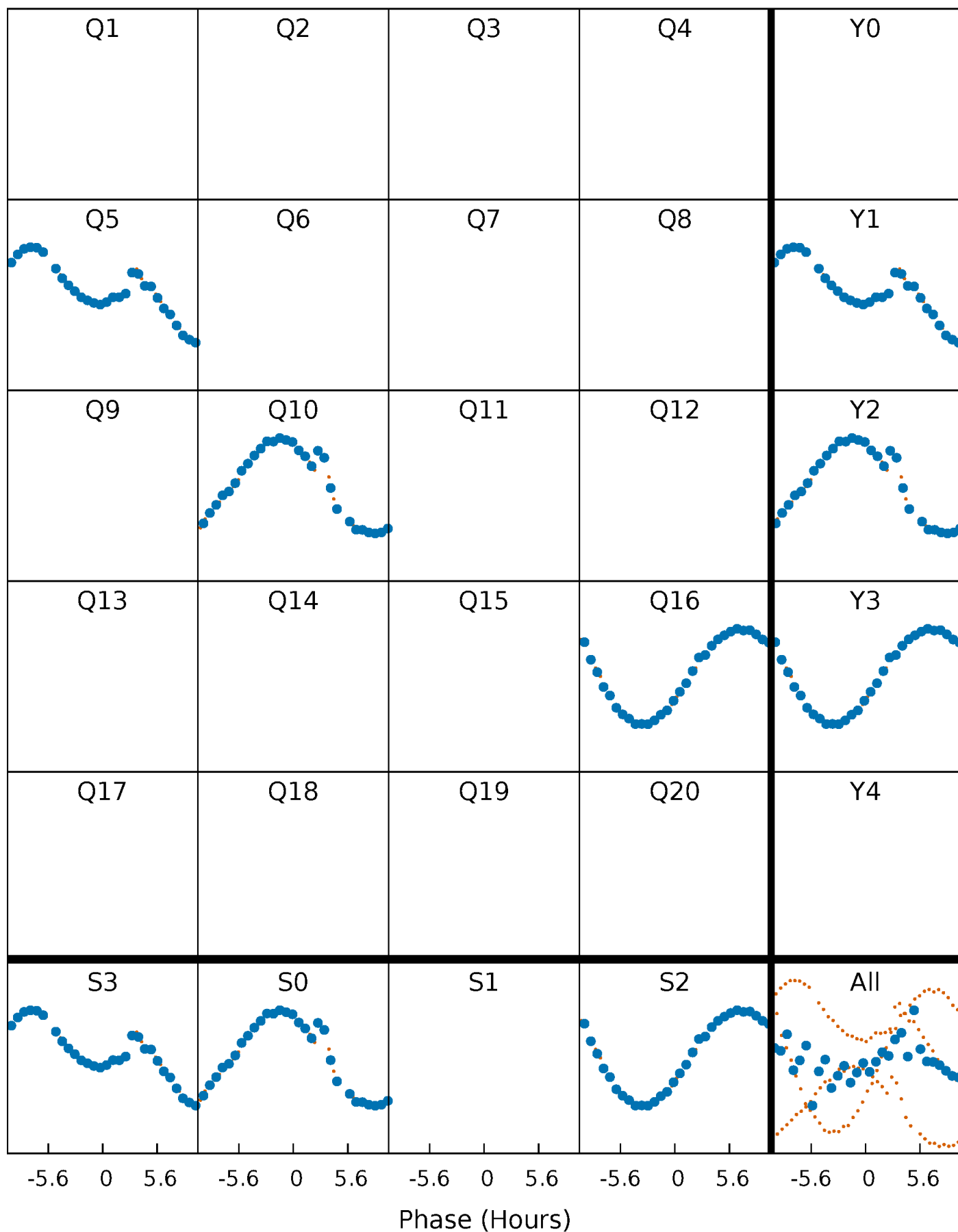


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



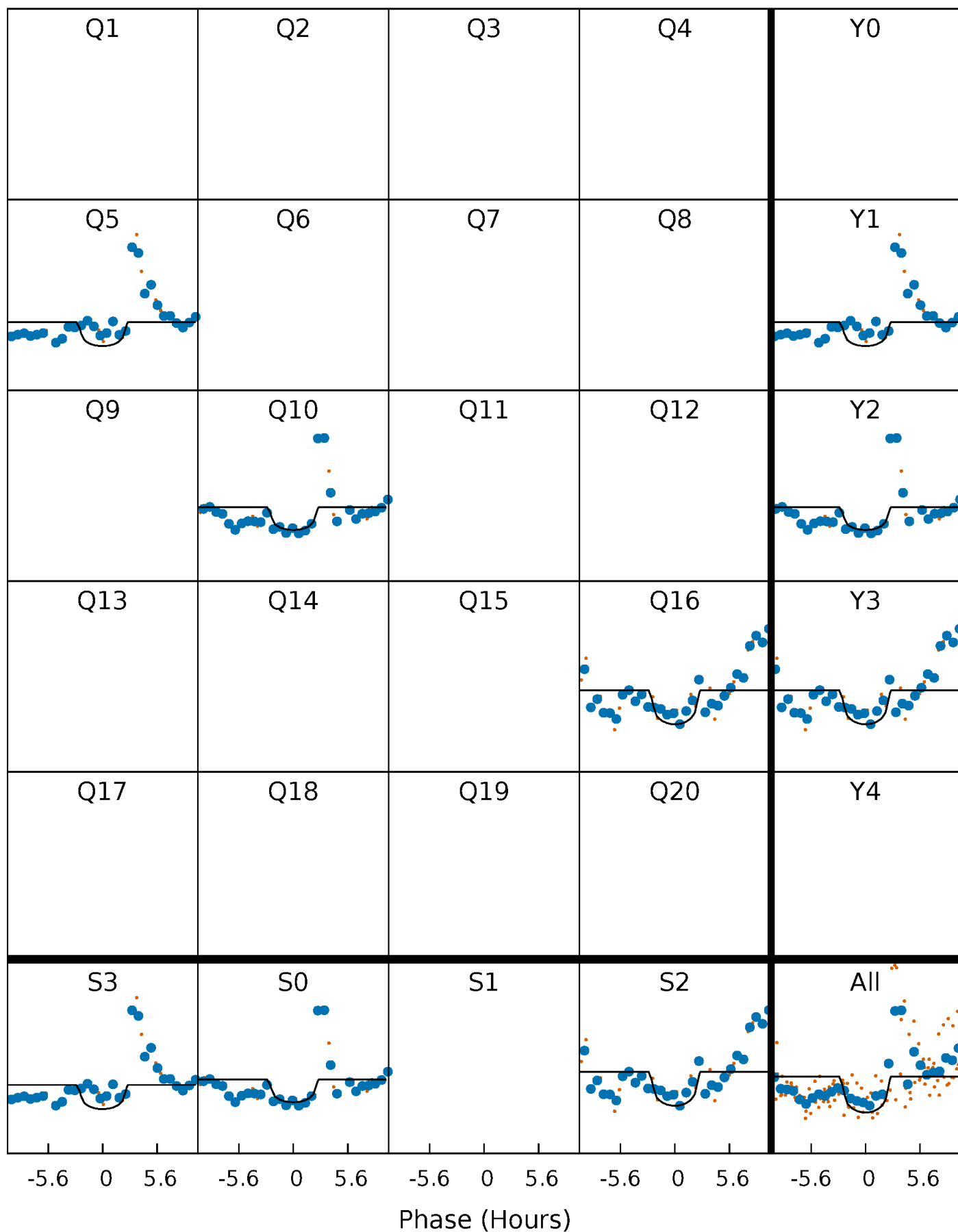
PDC Quarter-Phased Transit Curves

TCE 010162509-01 P=533.518934 Days $T_0=450.188918$ (BKJD)



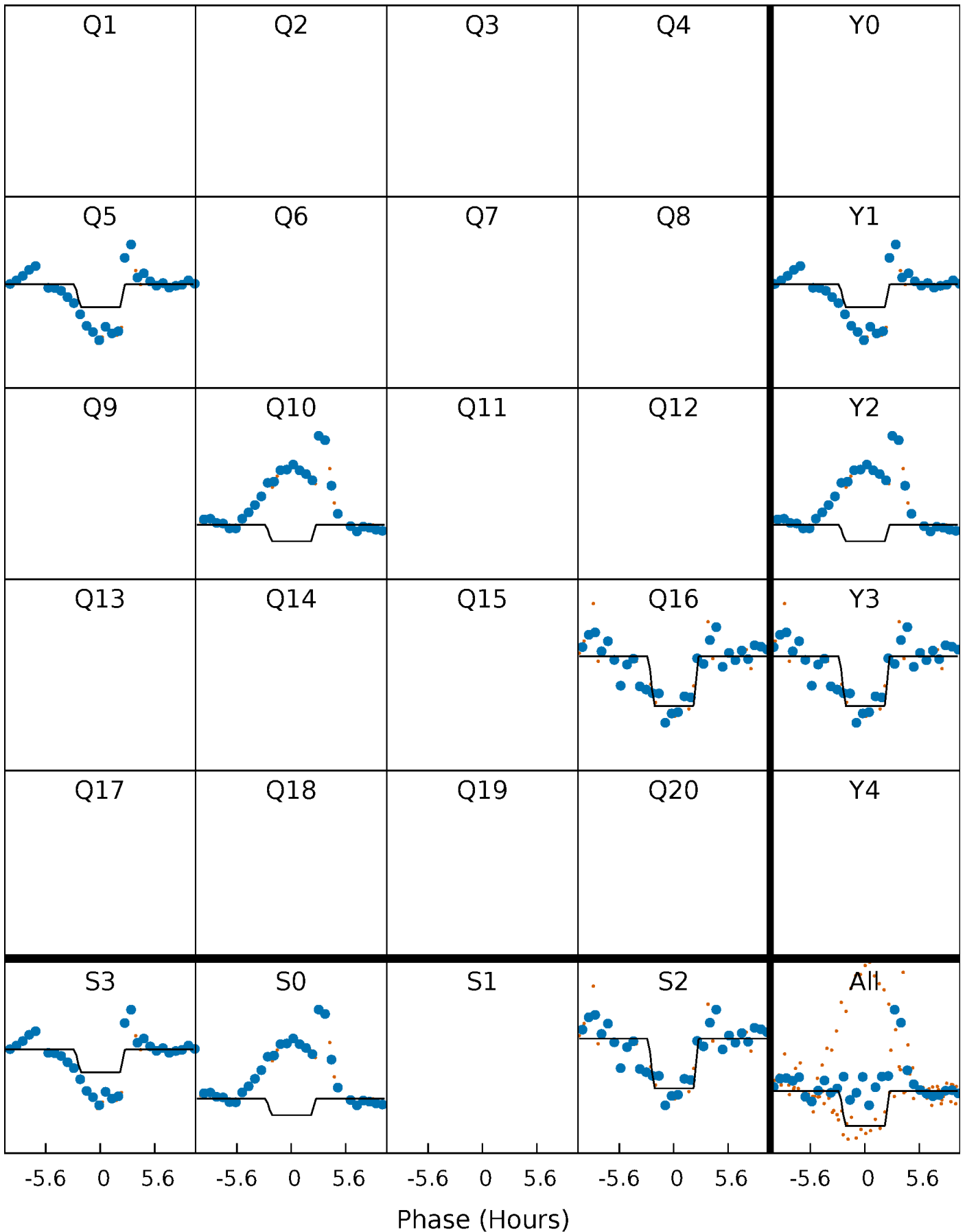
DV Quarter-Phased Transit Curves

TCE 010162509-01 P=533.518934 Days $T_0=450.188918$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

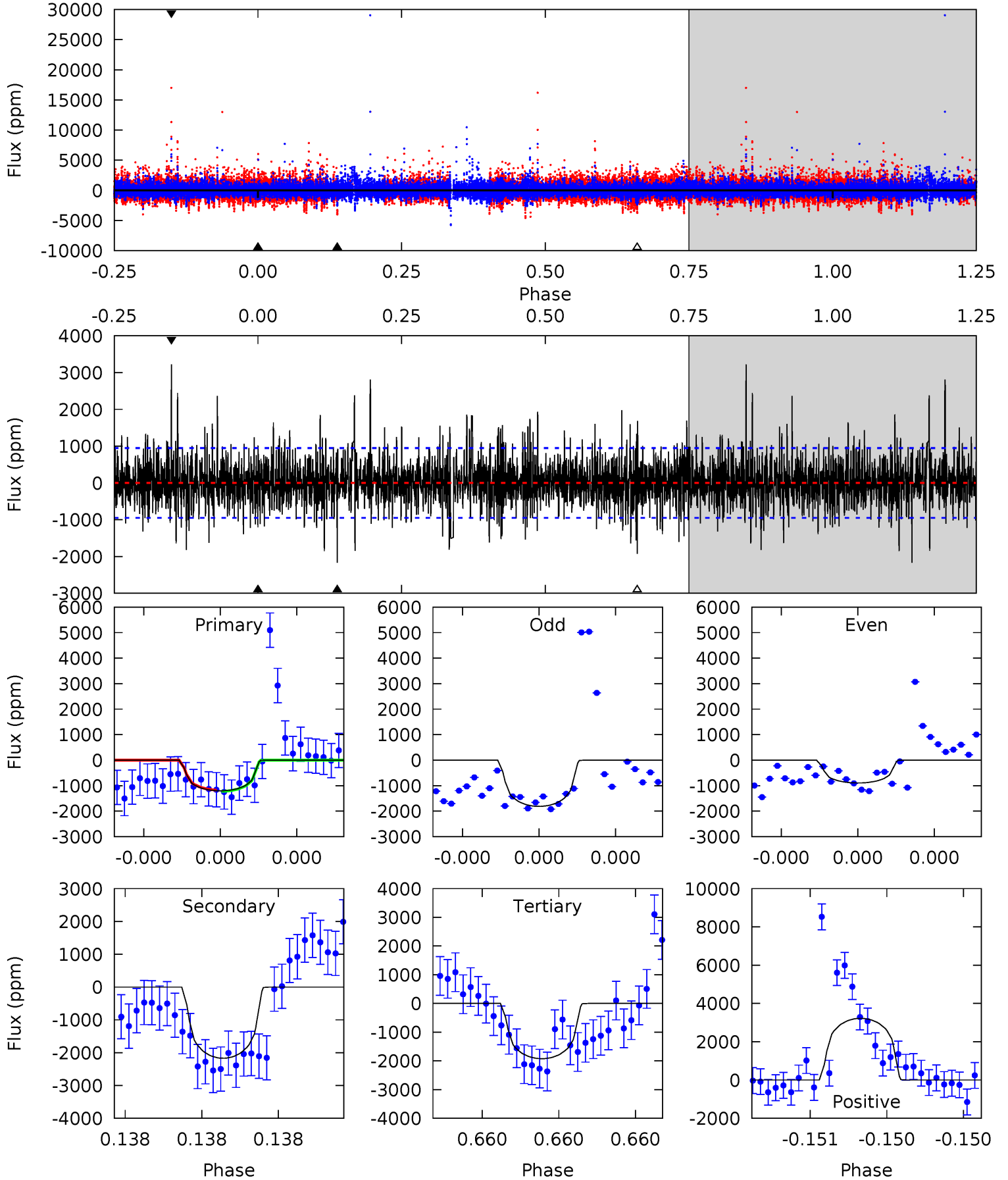
TCE 010162509-01 P=533.493007 Days $T_0=450.203210$ (BKJD)



DV Model-Shift Uniqueness Test

010162509-01, P = 533.518934 Days, E = 450.188918 Days

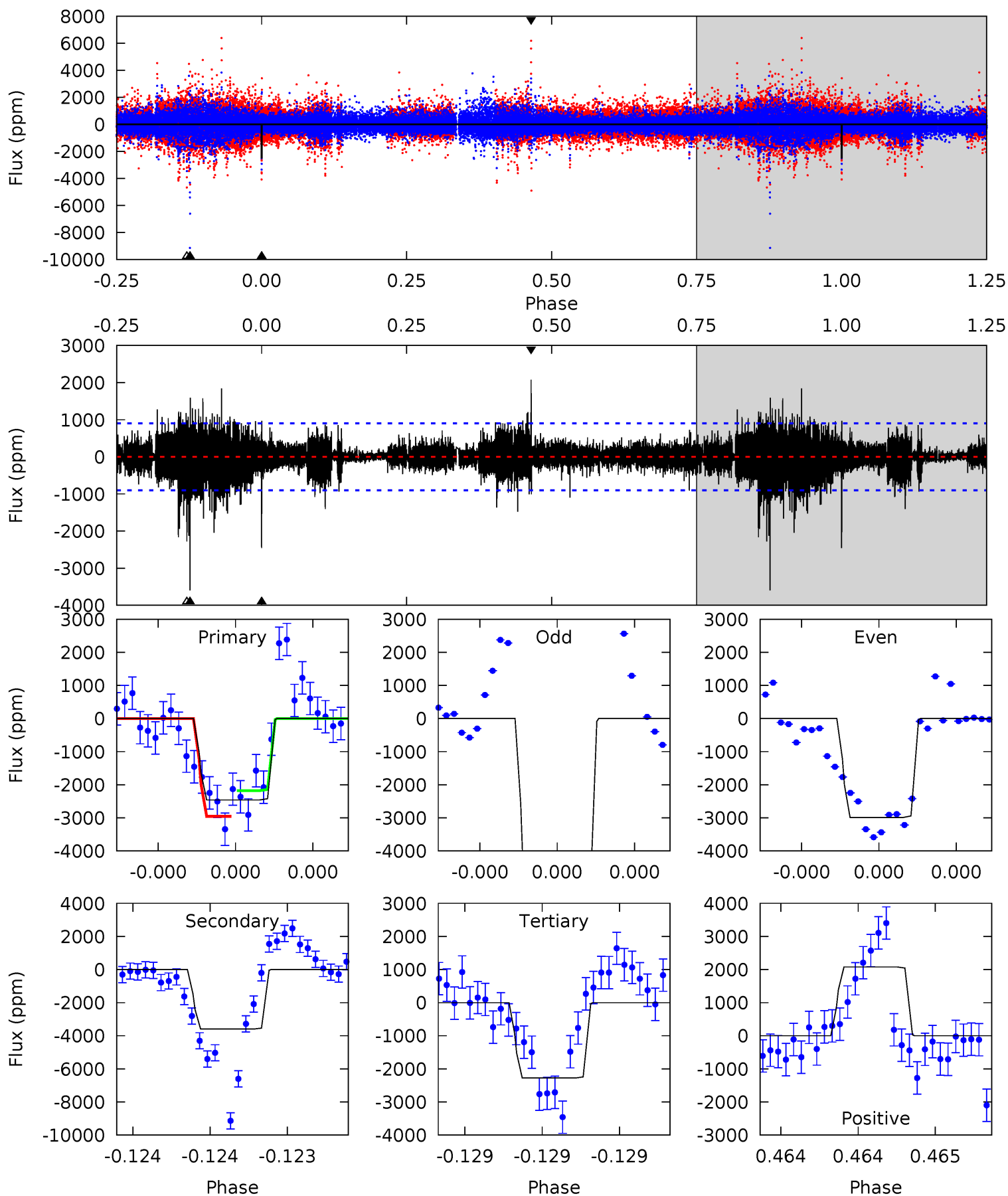
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.11	12.8	11.4	19.1	5.62	3.55	2.89	-4.27	-12.0	1.46	-6.23	2.19	1.02	0.60	0.14



Alt Model-Shift Uniqueness Test

010162509-01, P = 533.493007 Days, E = 450.203210 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	22.4	14.2	12.9	5.62	3.55	1.87	1.13	2.38	8.20	9.45	12.8	-0.05	0.37	2.48



Stellar Parameters For KIC 010162509

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4776^{+142}_{-142}	$4.640^{+0.058}_{-0.031}$	$-0.660^{+0.300}_{-0.300}$	$0.616^{+0.052}_{-0.052}$	$0.604^{+0.063}_{-0.034}$	$3.643^{+0.895}_{-0.496}$
	+3%/-3%	+1%/-1%	+45%/-45%	+8%/-8%	+10%/-6%	+25%/-14%
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 010162509-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-2169 ± 169	$4.98^{+5.31}_{-3.26}$	220^{+8}_{-7}	4001^{+2250}_{-833}	$57292^{+437178}_{-43185}$
Alt.	-3594 ± 161	$5.38^{+4.83}_{-3.67}$	220^{+7}_{-7}	4244^{+3003}_{-839}	$81938^{+738337}_{-59296}$

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

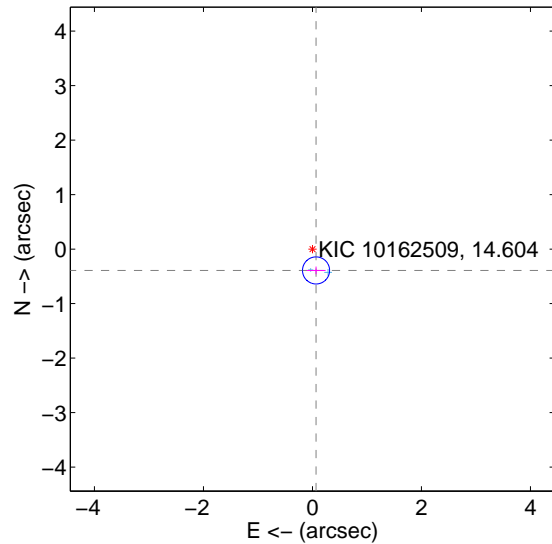
Supplemental centroid analysis for 010162509-01. Kepler magnitude: 14.60. Transit SNR 5.28

There are 2 quarters with good PRF difference image offsets

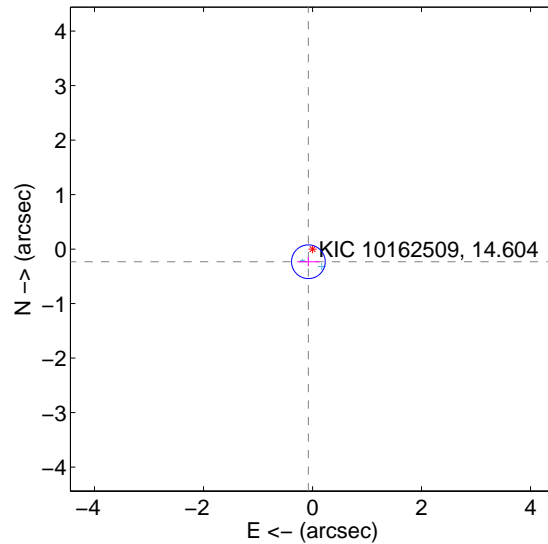
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.397 ± 0.083	4.79	-0.066 ± 0.173	-0.392 ± 0.070
PRF-fit source offset from KIC position	0.244 ± 0.103	2.37	0.076 ± 0.203	-0.232 ± 0.085
photometric centroid source offset	0.99 ± 0.90	1.10	-0.58 ± 0.70	-0.81 ± 0.99

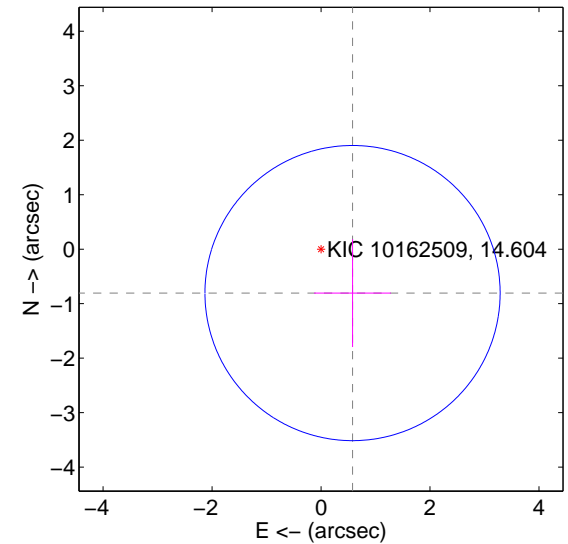
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

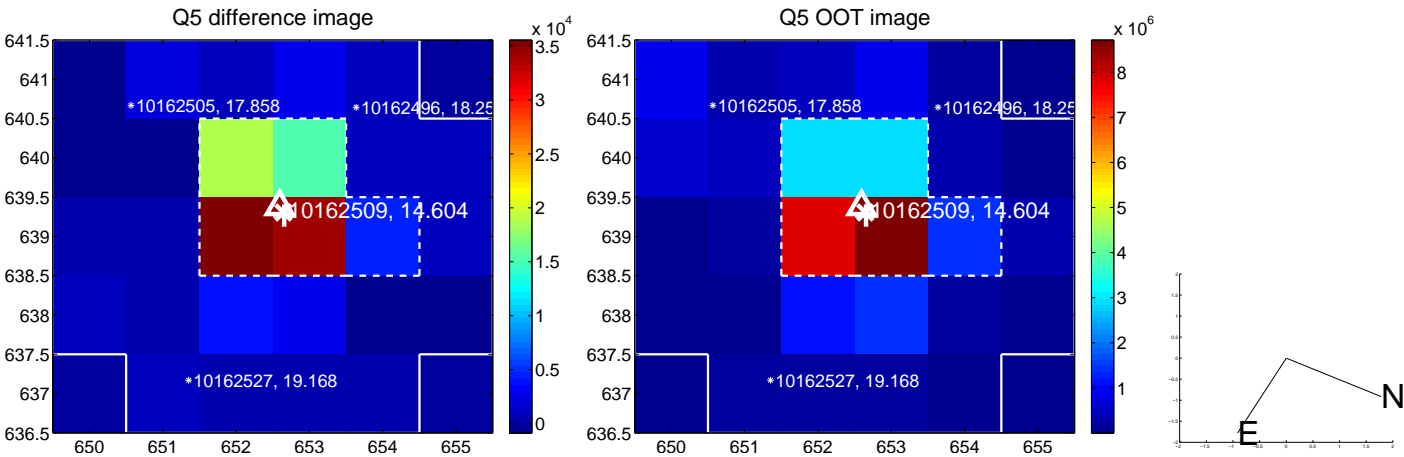


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

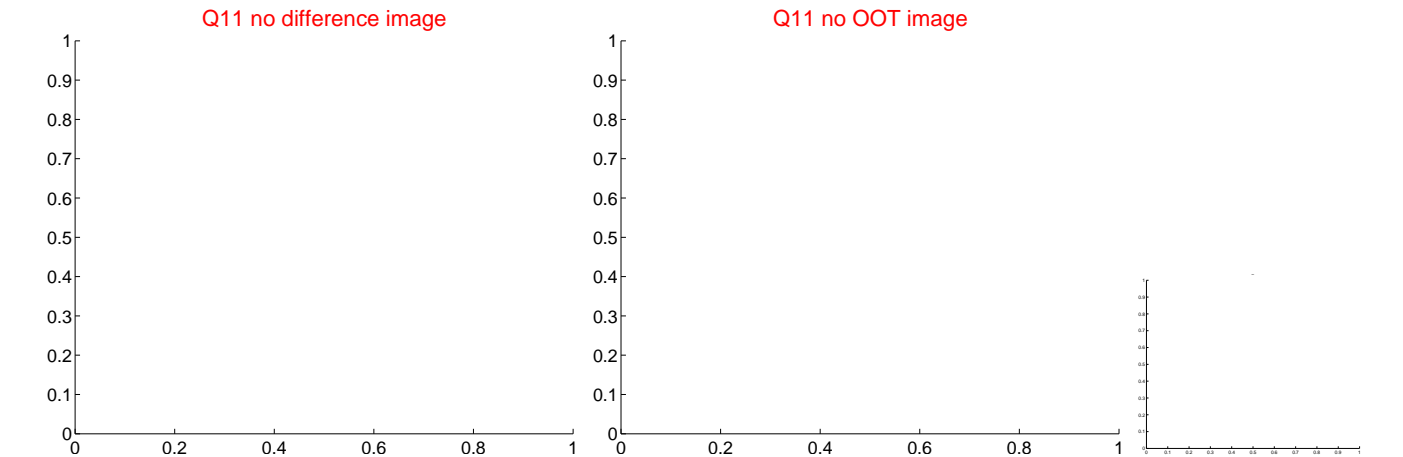
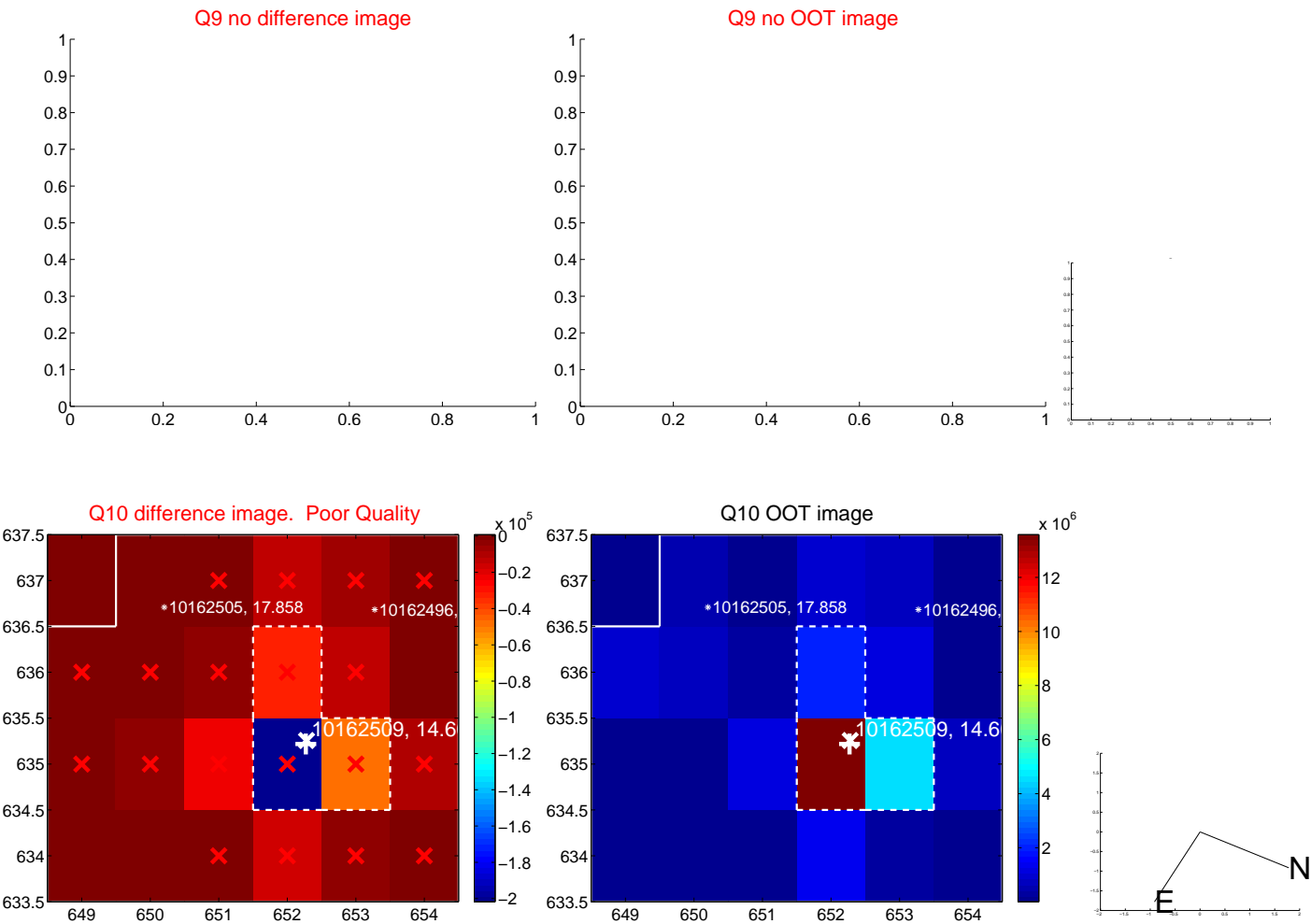
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



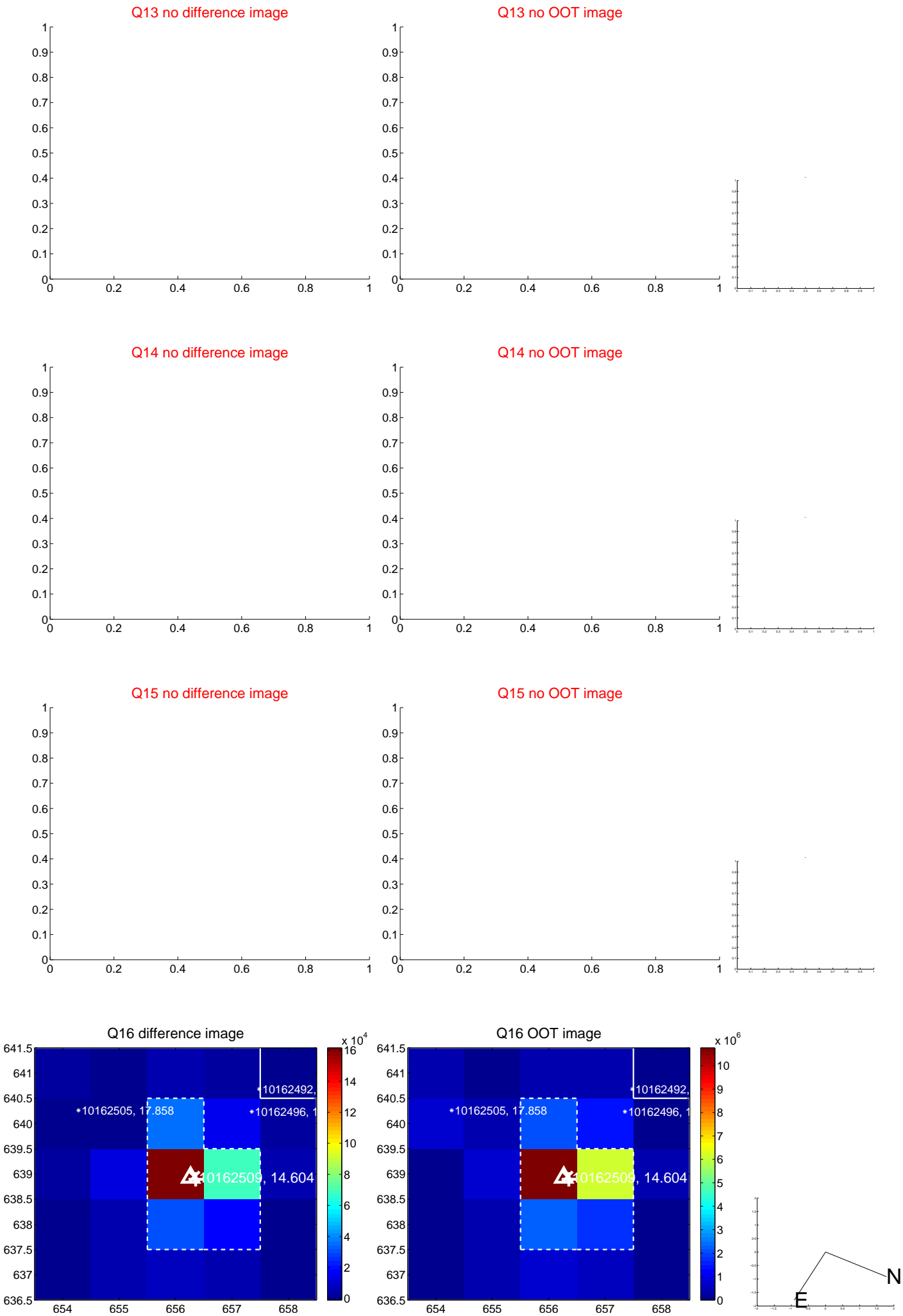
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



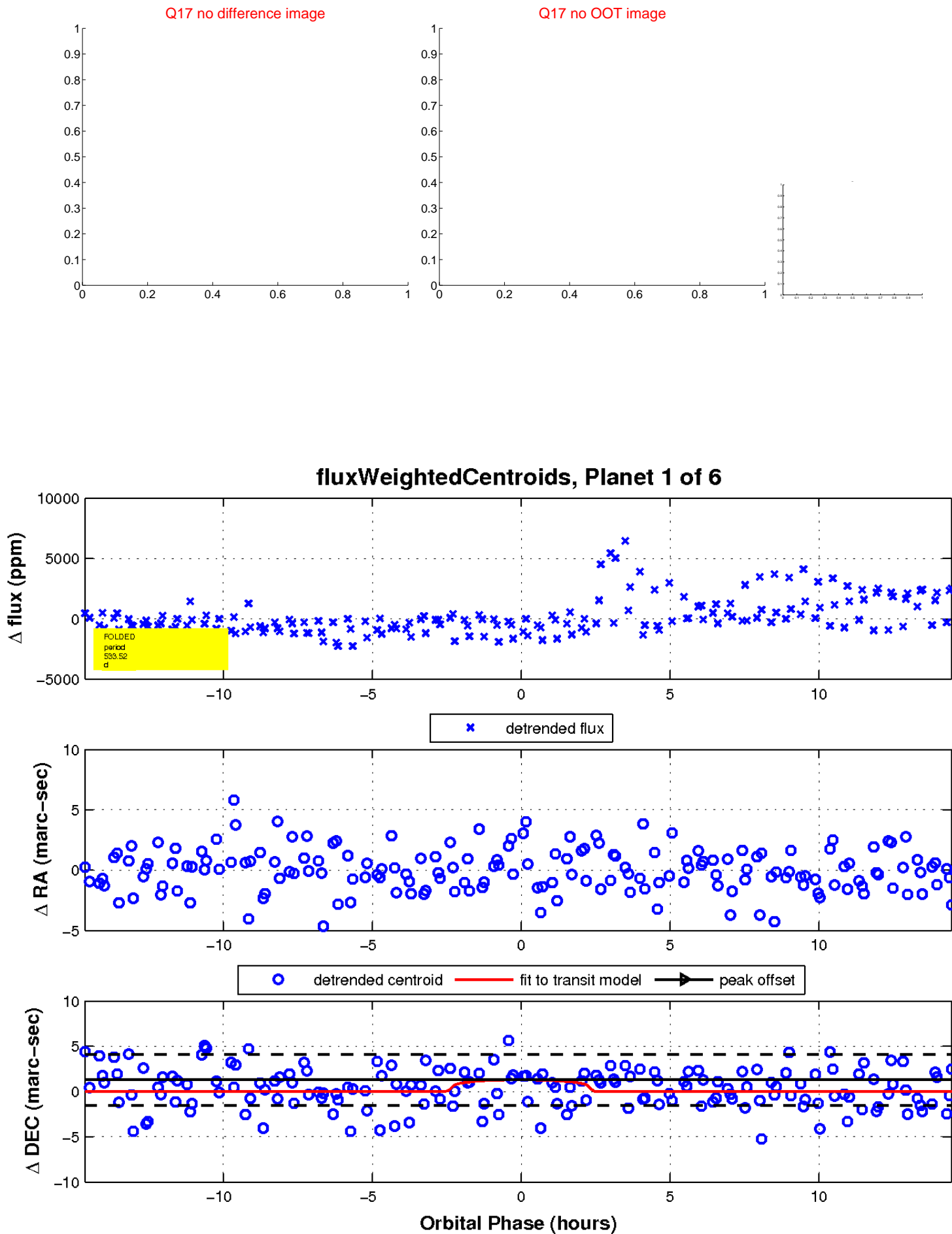
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

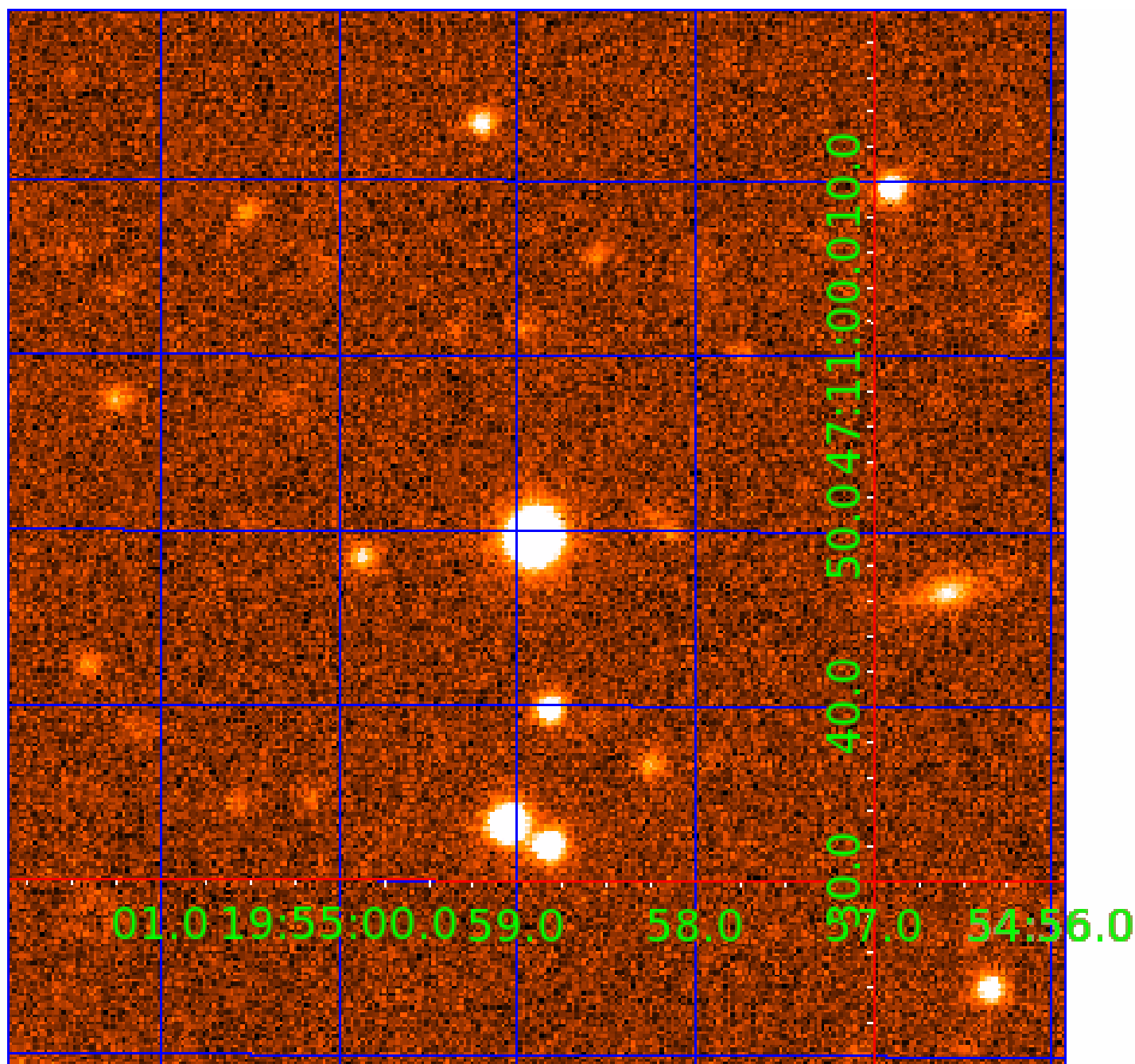


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010162509

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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010162509-06	OBS	No	63.403742	138.396612	1537.2	2.000	10.8	-1.0	0.62	4776	2.35	2.56

Robovetter Results

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010162509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010162509-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010162509-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

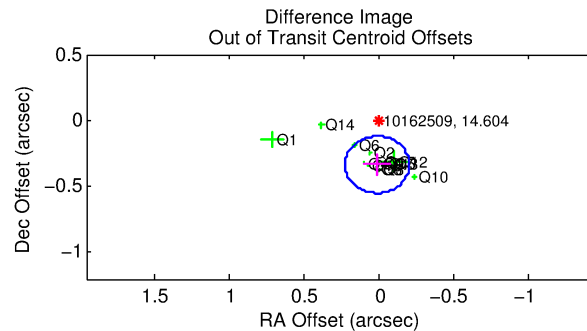
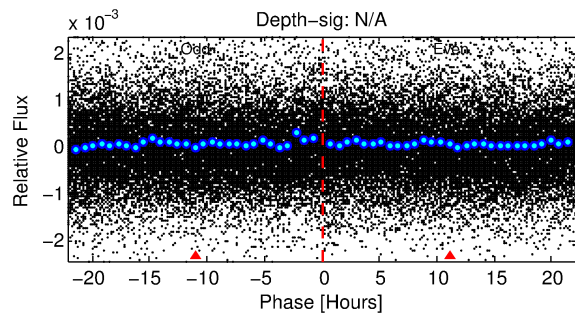
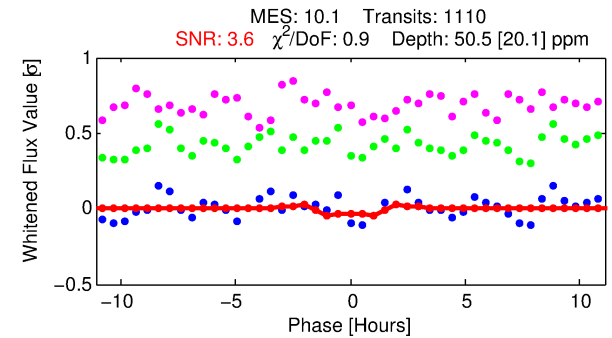
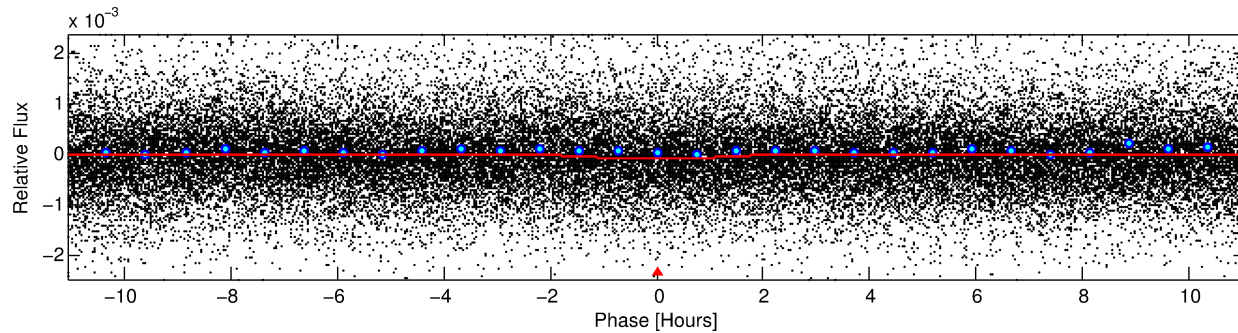
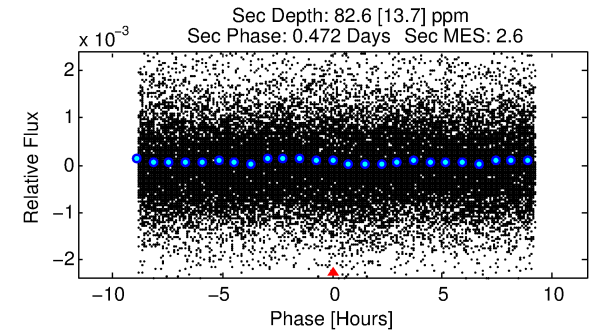
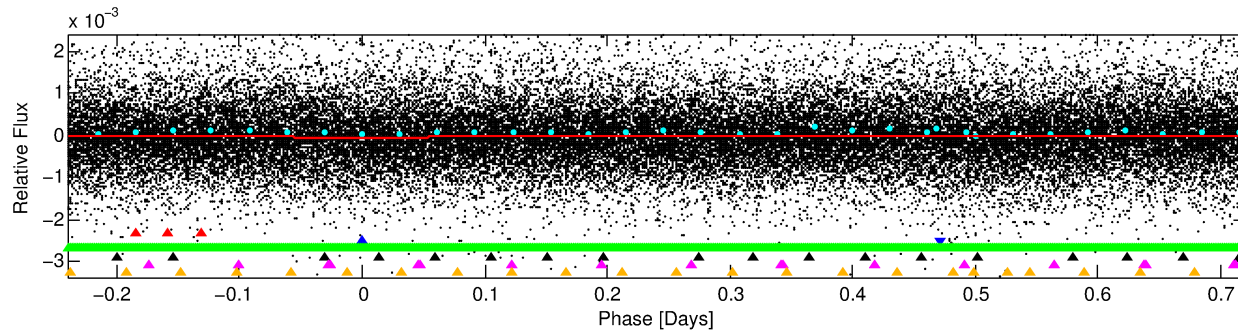
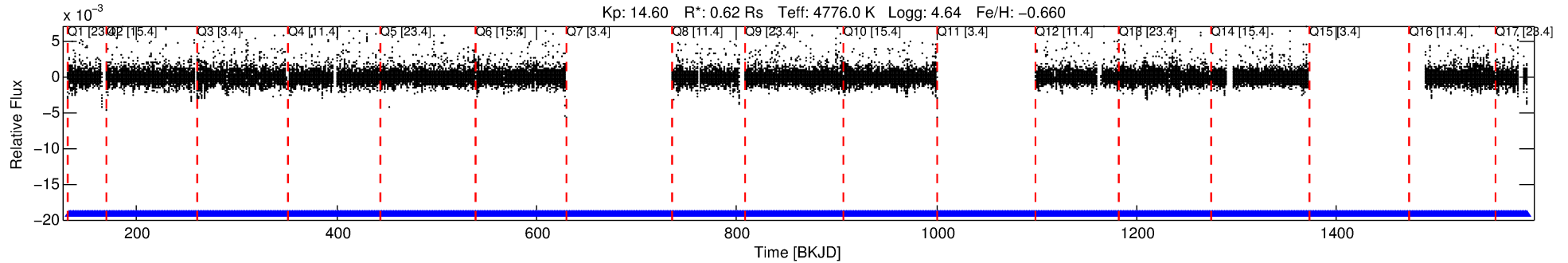
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010162509-02

No Significant Match Found

DV One-Page Summary

KIC: 10162509 Candidate: 2 of 6 Period: 0.961 d



DV Fit Results:

Period = 0.96134 [0.00003] d
Epoch = 132.1156 [0.0068] BKJD
Rp/R* = 0.0091 [0.0026]
a/R* = 1.12 [0.20]
b = 0.97 [0.05]
Seff = 680.82 [108.16]
Teq = 1303 [52] K
Rp = 0.61 [0.18] Re
a = 0.0161 [0.0012] AU
Ag = 31.55 [19.29] [1.58σ]
Teffp = 4773 [733] K [4.72σ]

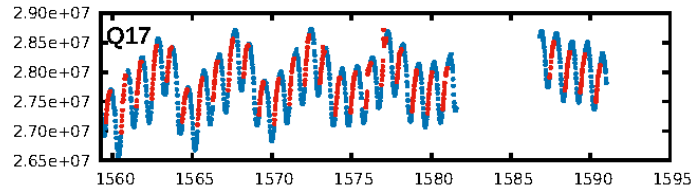
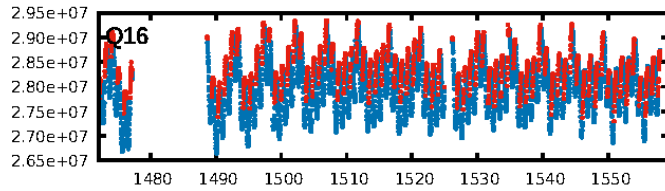
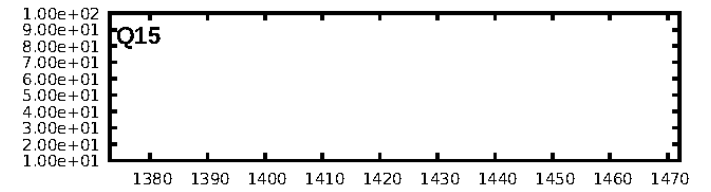
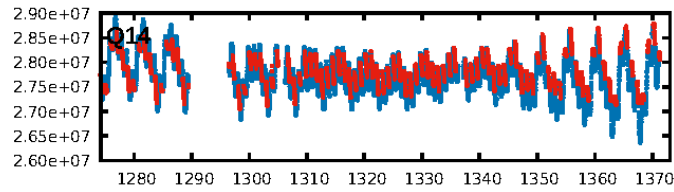
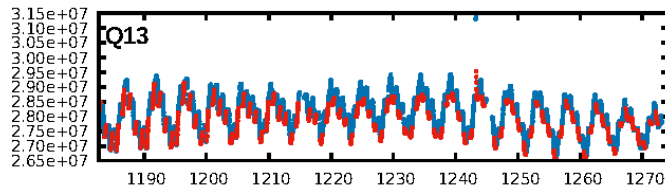
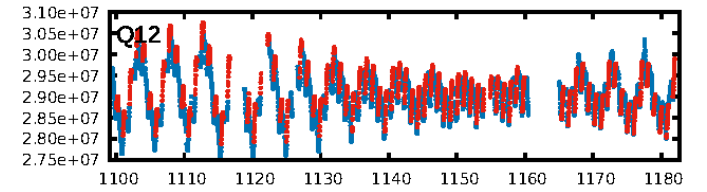
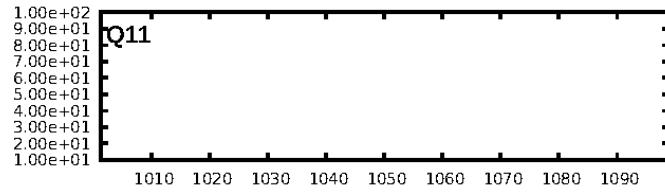
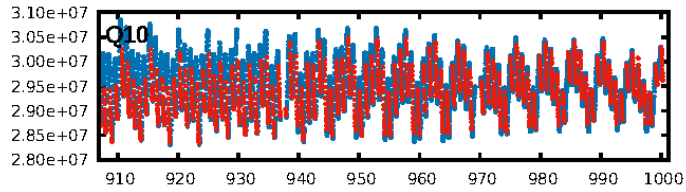
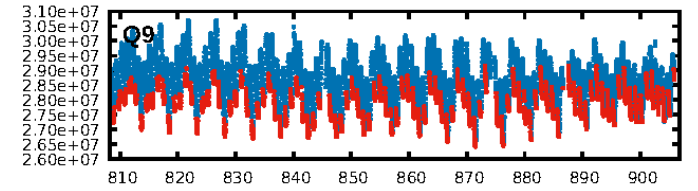
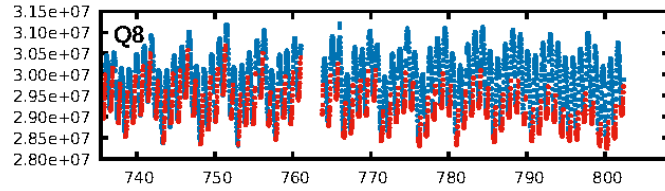
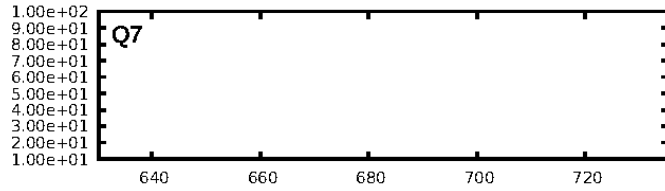
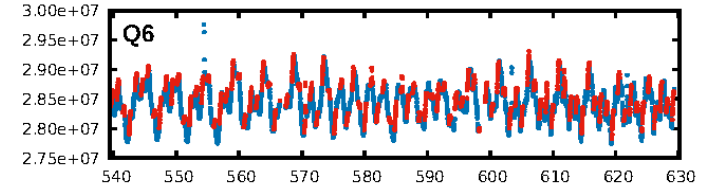
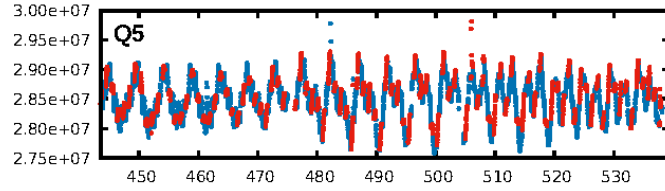
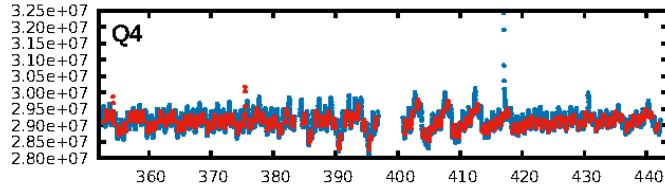
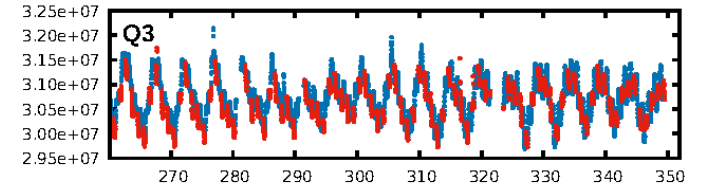
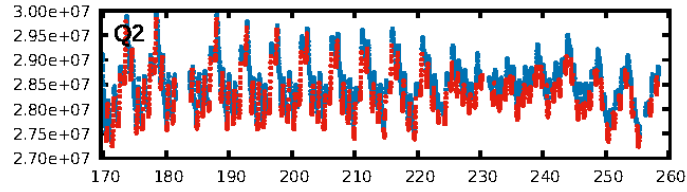
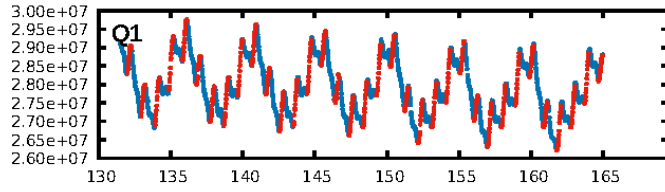
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.7% [0.01σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGo-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1048/1048]
GhostDiagnostic-chr: 2.851
Centroid-sig: N/A
Centroid-so: 2.409 arcsec [1.30σ]
OotOffset-rm: 0.336 arcsec [4.69σ]
KicOffset-rm: 0.217 arcsec [3.09σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 0.50 [7/14]
DiffImageOverlap-fno: 0.29 [4/14]

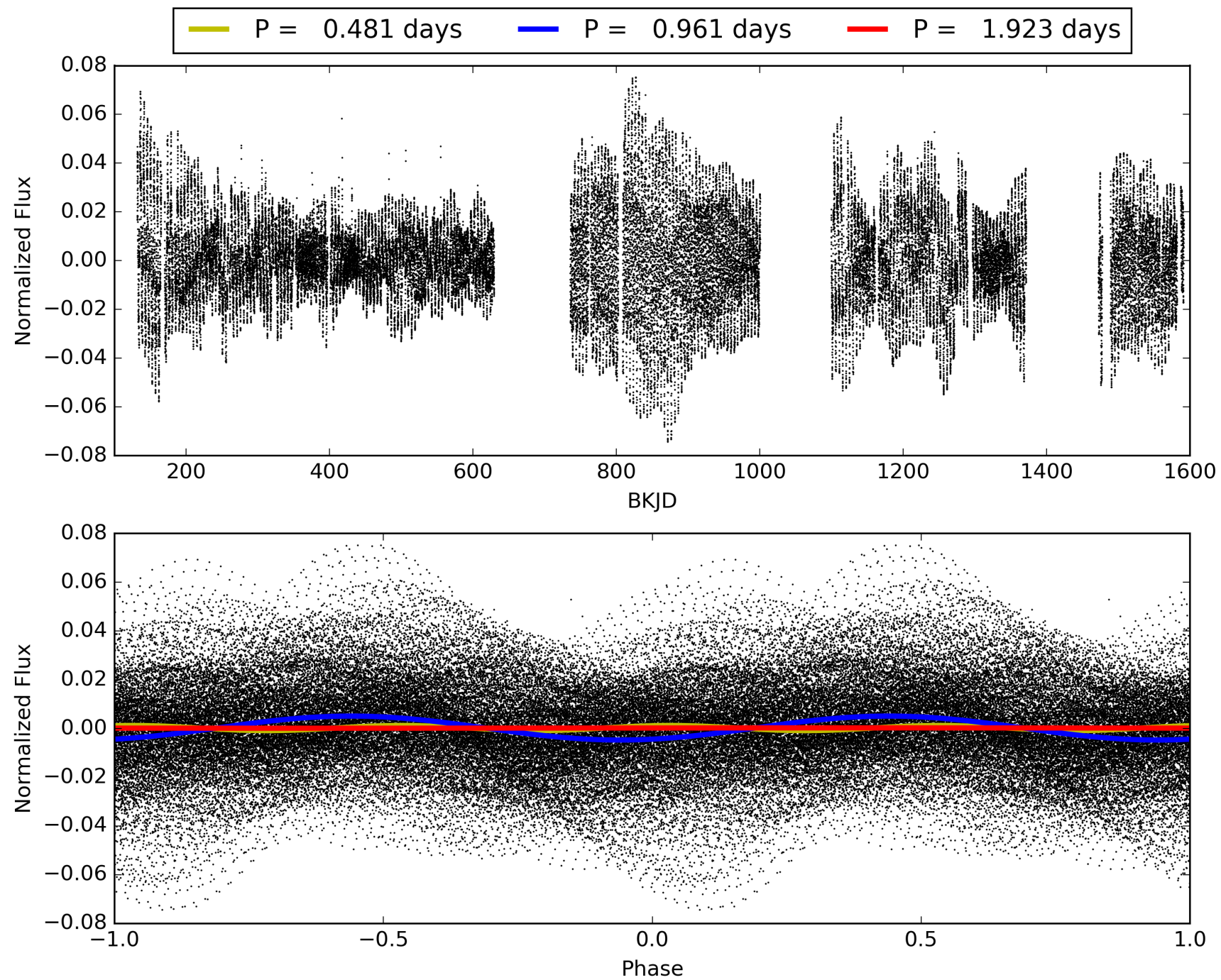
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:49 Z

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

TCE 010162509-02, PDC Light Curves

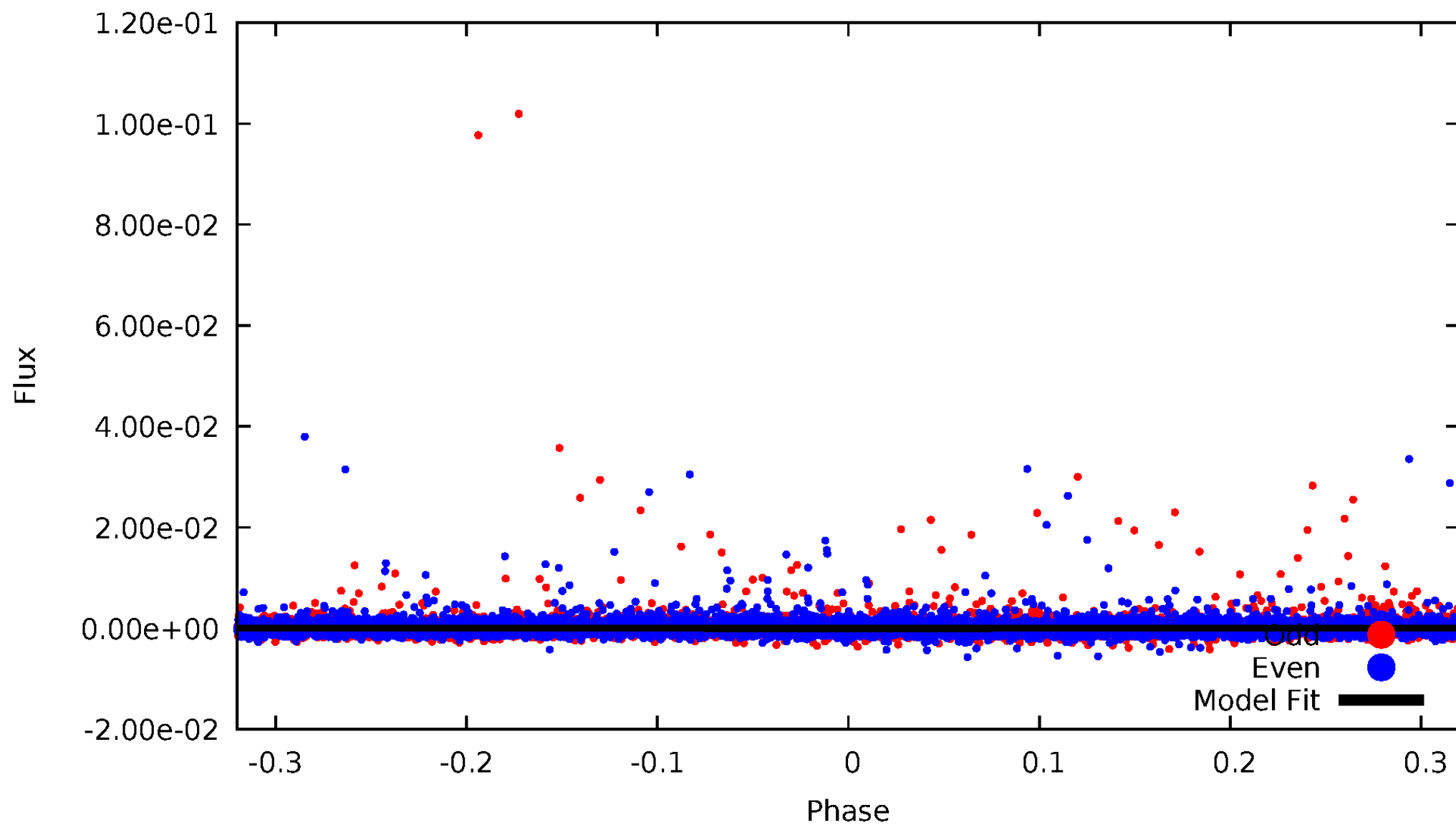


TCE 010162509-02



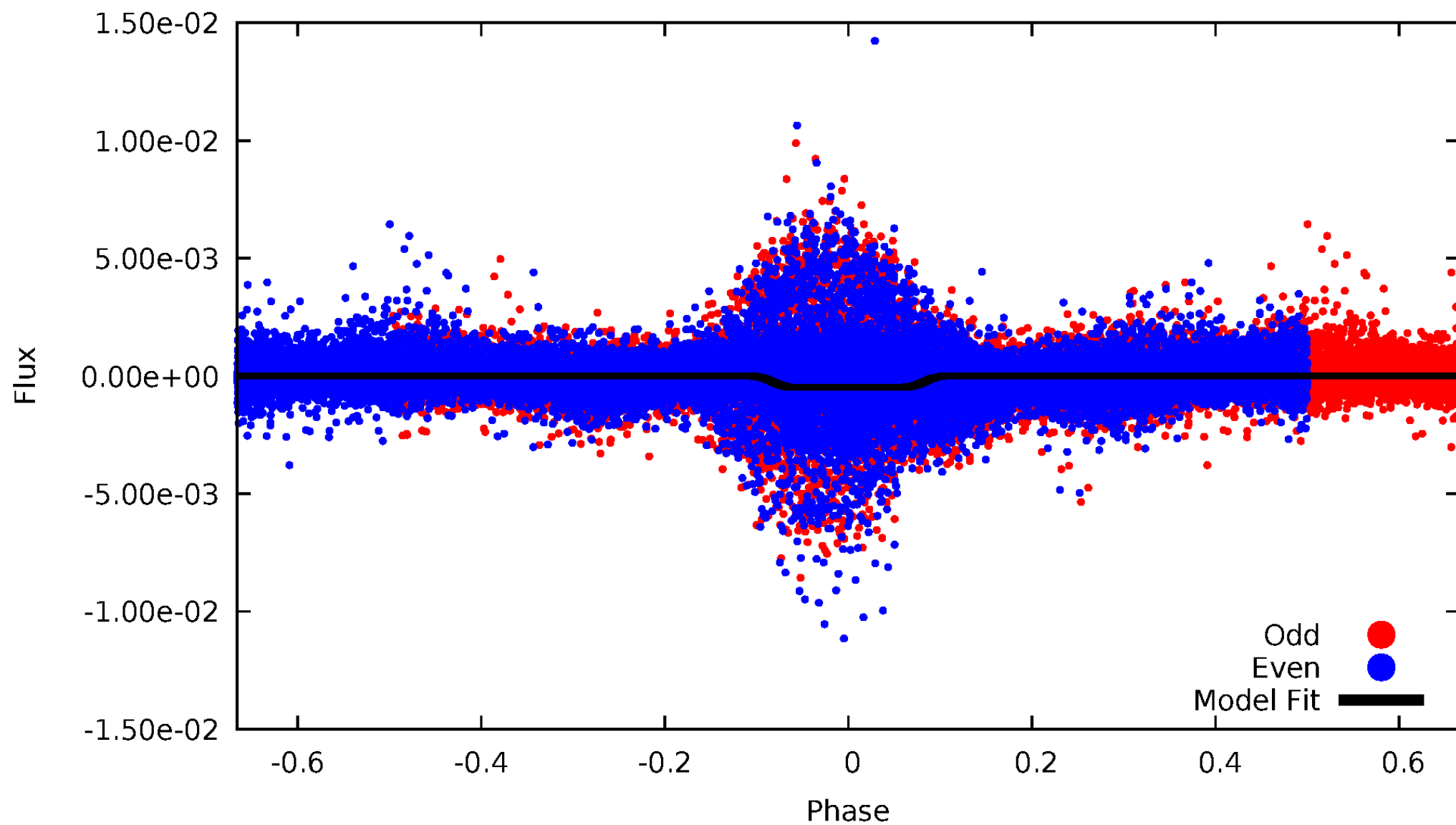
DV Odd/Even

TCE 010162509-02



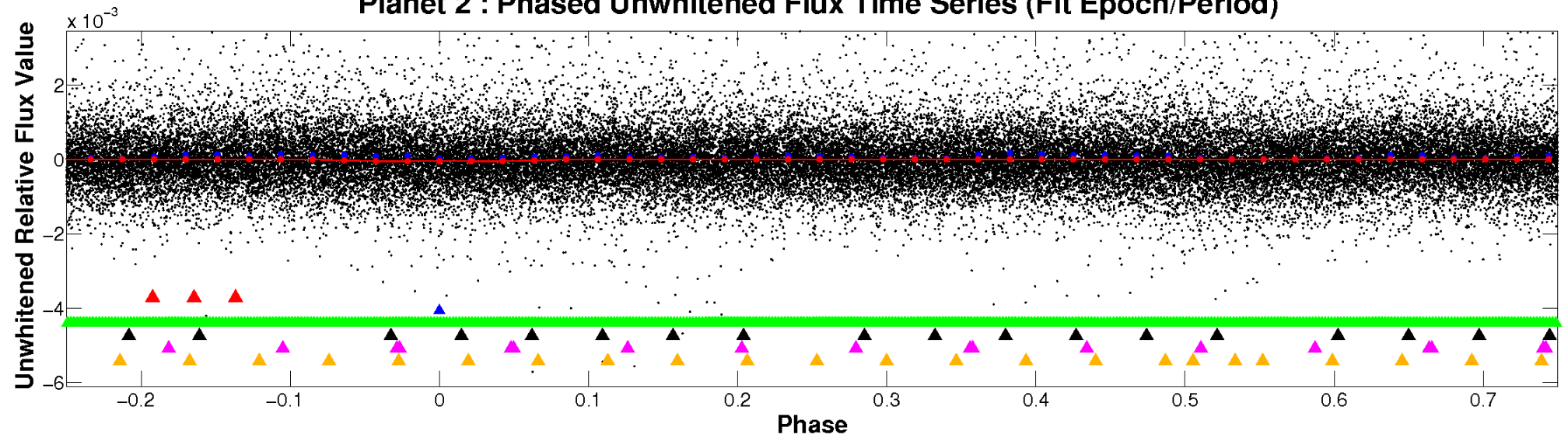
ALT Odd/Even

TCE 010162509-02

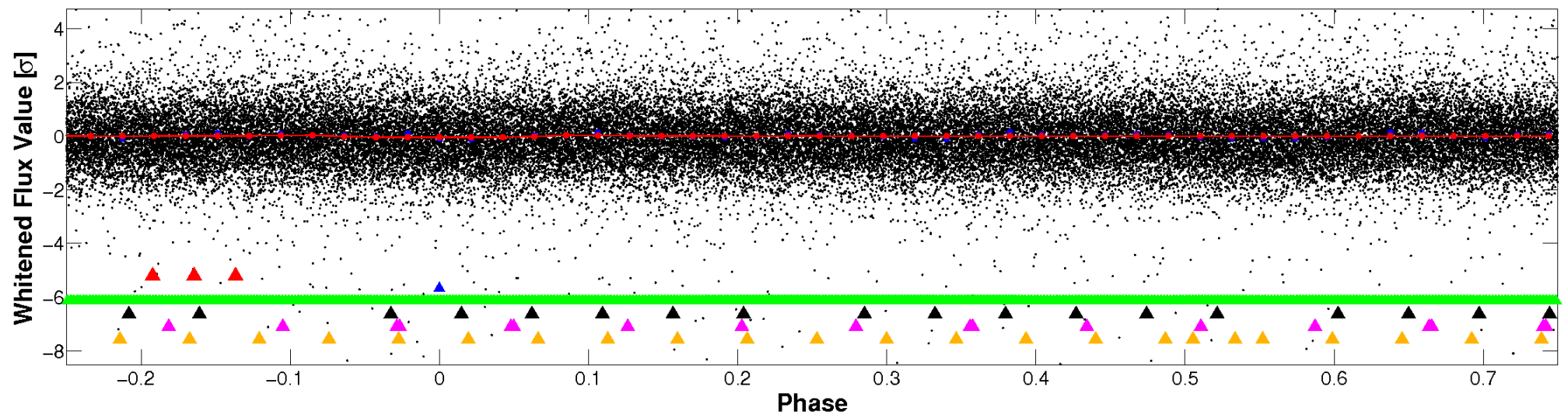


Non-Whitened Vs. Whitened Light Curve

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

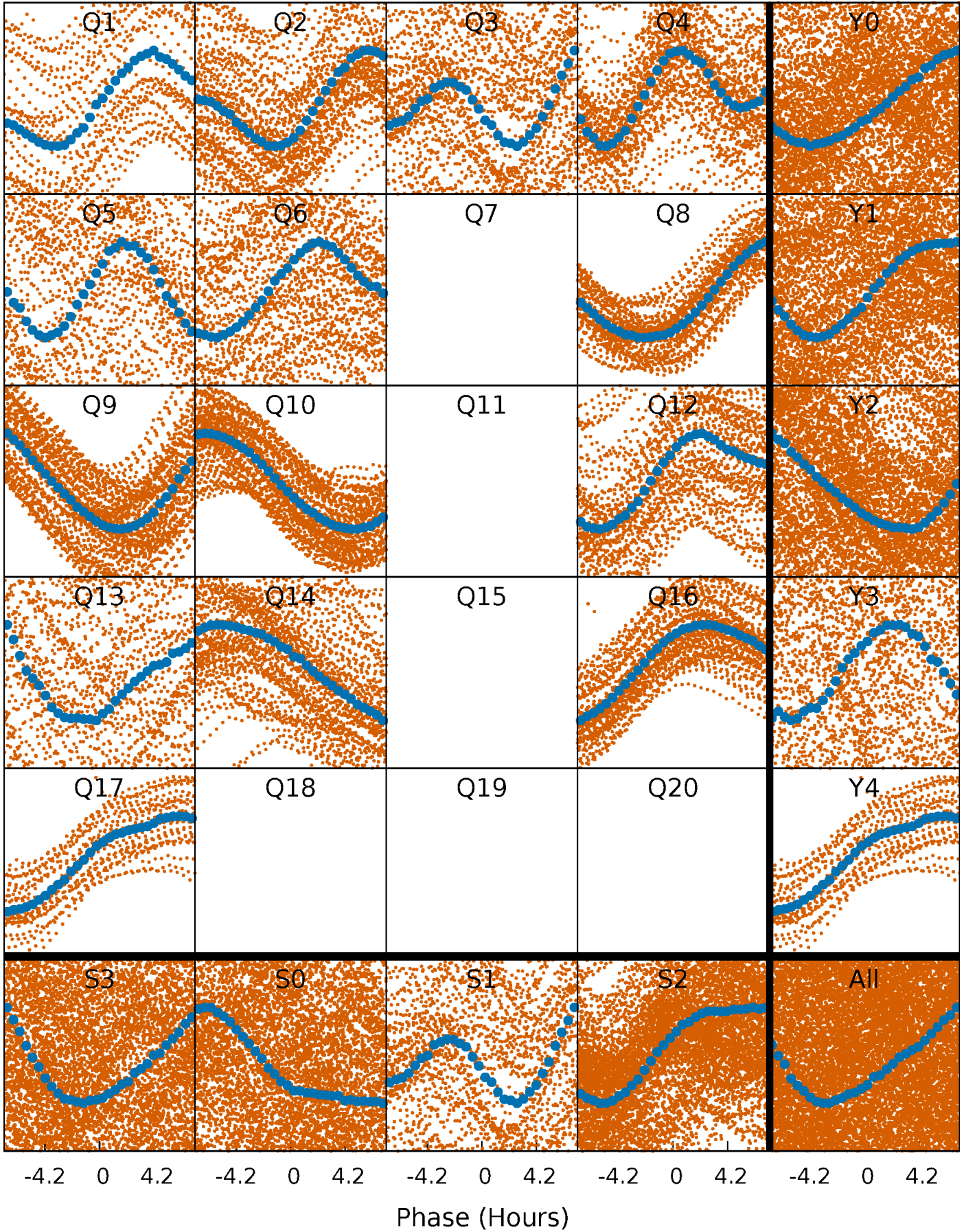


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



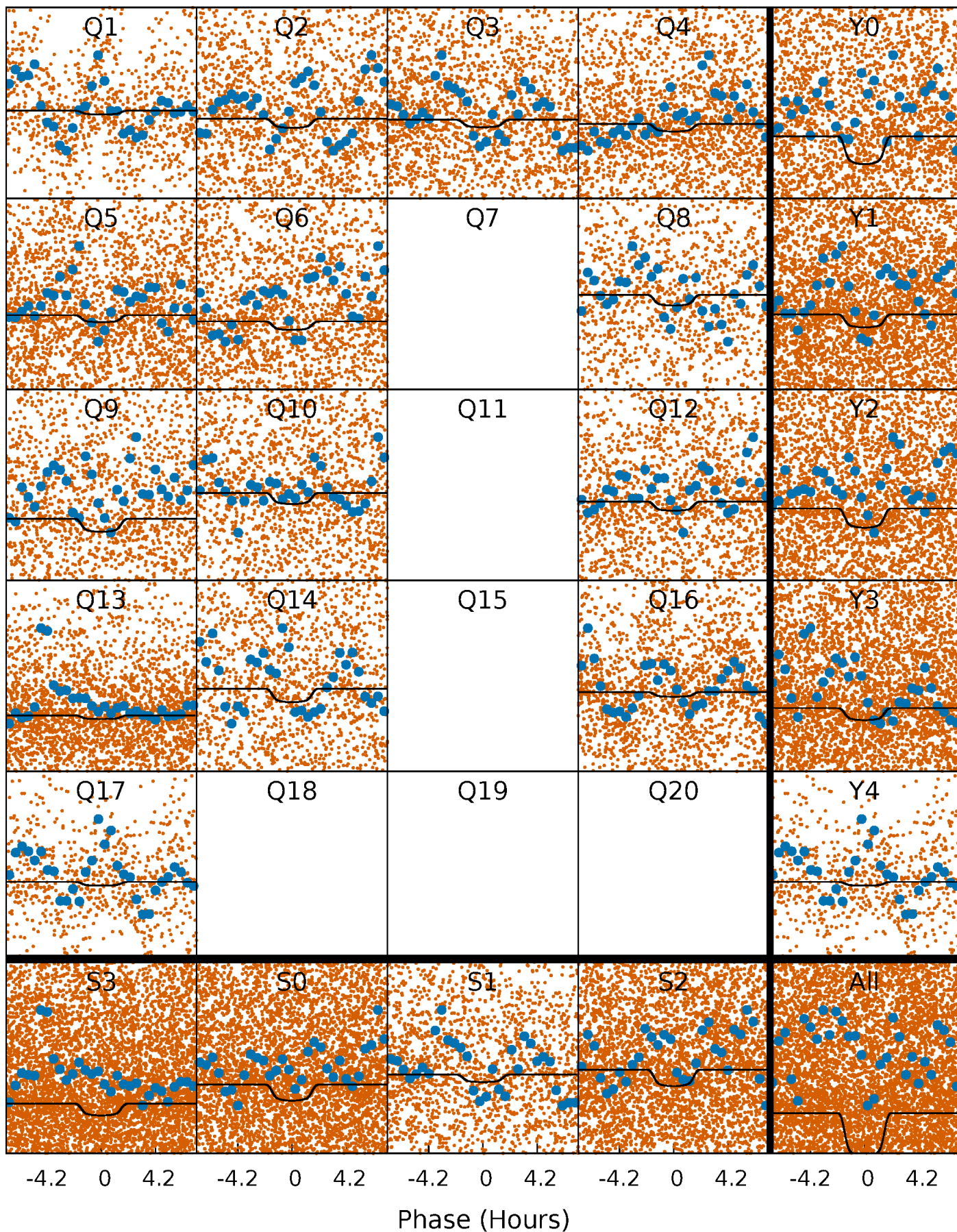
PDC Quarter-Phased Transit Curves

TCE 010162509-02 P= 0.961344 Days $T_0=132.115589$ (BKJD)



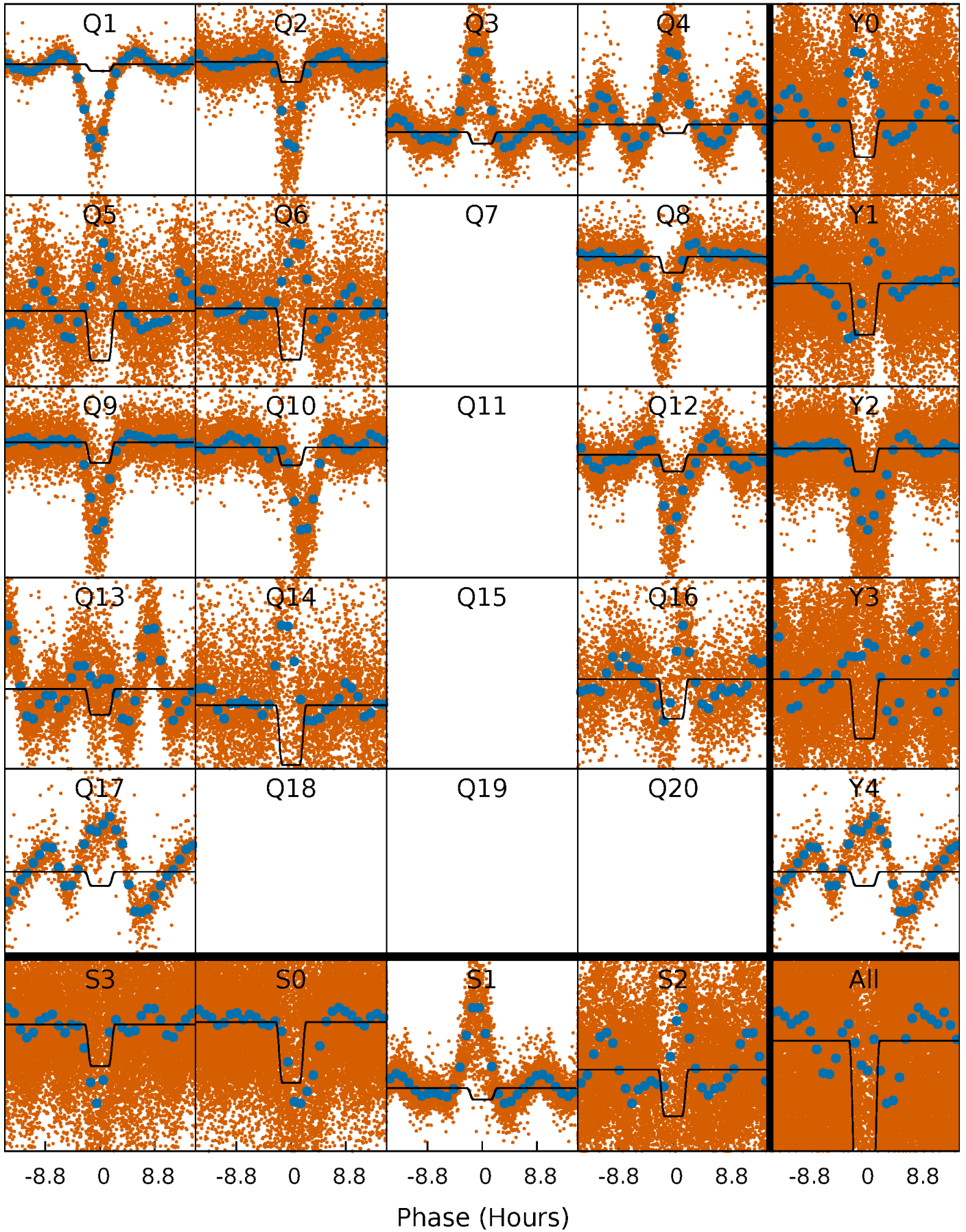
DV Quarter-Phased Transit Curves

TCE 010162509-02 P= 0.961344 Days $T_0=132.115589$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

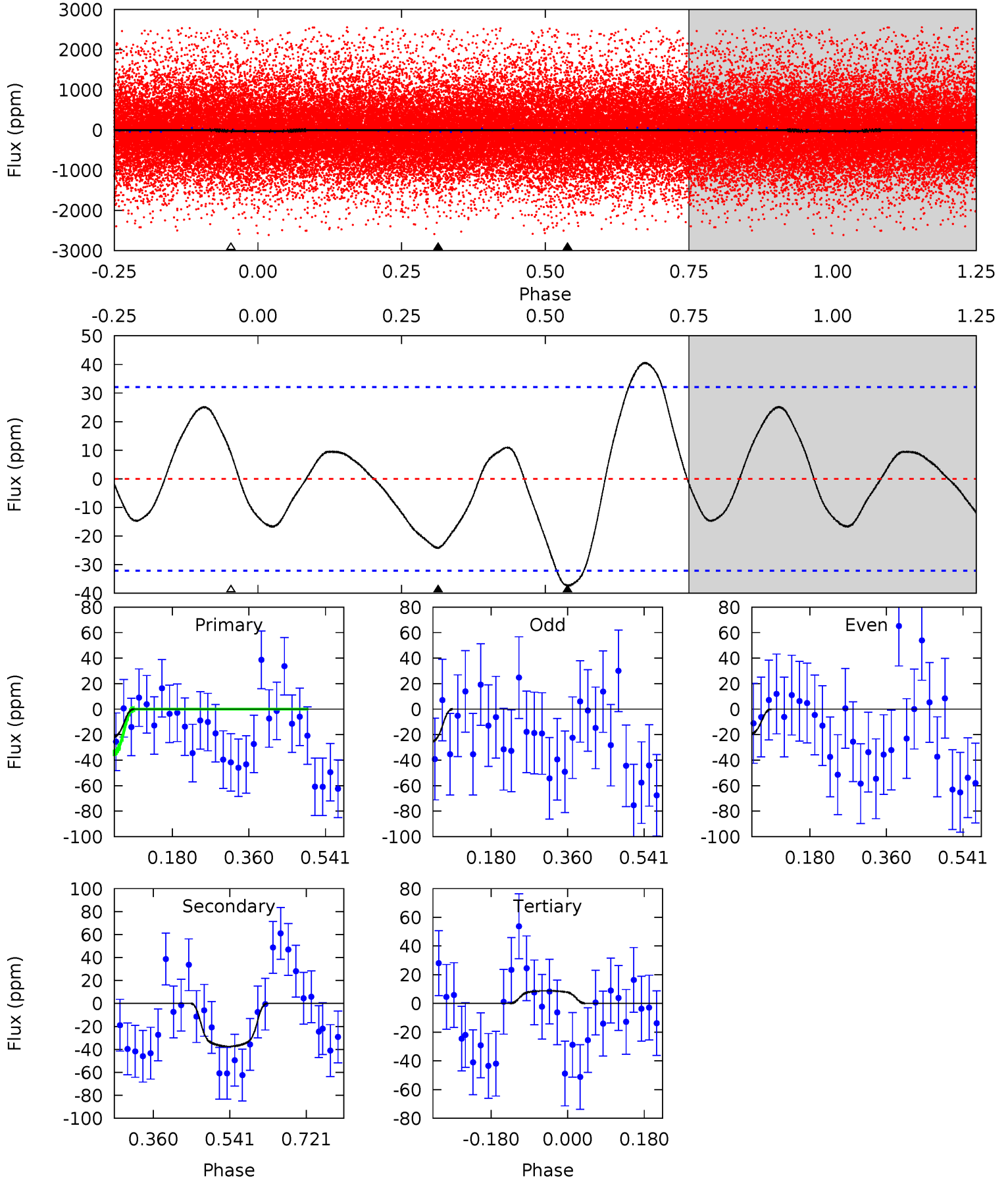
TCE 010162509-02 P= 0.961636 Days $T_0=132.030169$ (BKJD)



DV Model-Shift Uniqueness Test

010162509-02, P = 0.961344 Days, E = 131.154245 Days

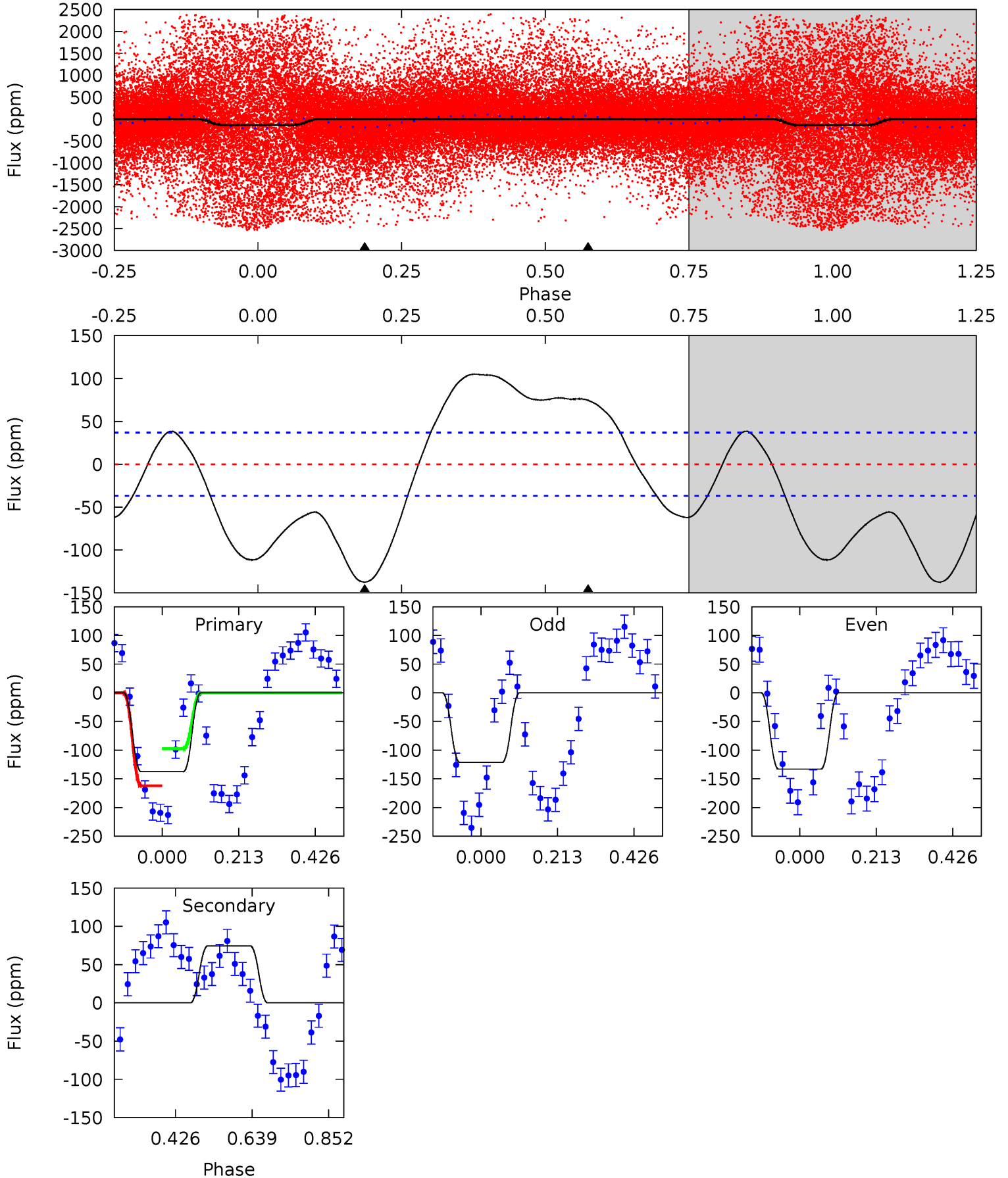
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.34	5.18	-1.22	0	4.44	1.34	1.79	4.56	3.34	6.40	5.18	0.47	-6.25	0.52	1.93



Alt Model-Shift Uniqueness Test

010162509-02, P = 0.961636 Days, E = 131.068533 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.4	-8.93	0	0	4.40	1.25	5.35	16.4	16.4	-8.93	-8.93	0.73	0.47	0.43	0



Stellar Parameters For KIC 010162509

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4776^{+142}_{-142}	$4.640^{+0.058}_{-0.031}$	$-0.660^{+0.300}_{-0.300}$	$0.616^{+0.052}_{-0.052}$	$0.604^{+0.063}_{-0.034}$	$3.643^{+0.895}_{-0.496}$
	+3%/-3%	+1%/-1%	+45%/-45%	+8%/-8%	+10%/-6%	+25%/-14%
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 010162509-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-37 ± 7	$0.61^{+0.18}_{-0.18}$	1812^{+68}_{-65}	4088^{+613}_{-405}	15^{+15}_{-6}
Alt.	75 ± 8	$1.47^{+0.20}_{-0.18}$	1812^{+61}_{-65}	-3460^{+153}_{-185}	$-4.937^{+1.155}_{-1.807}$

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

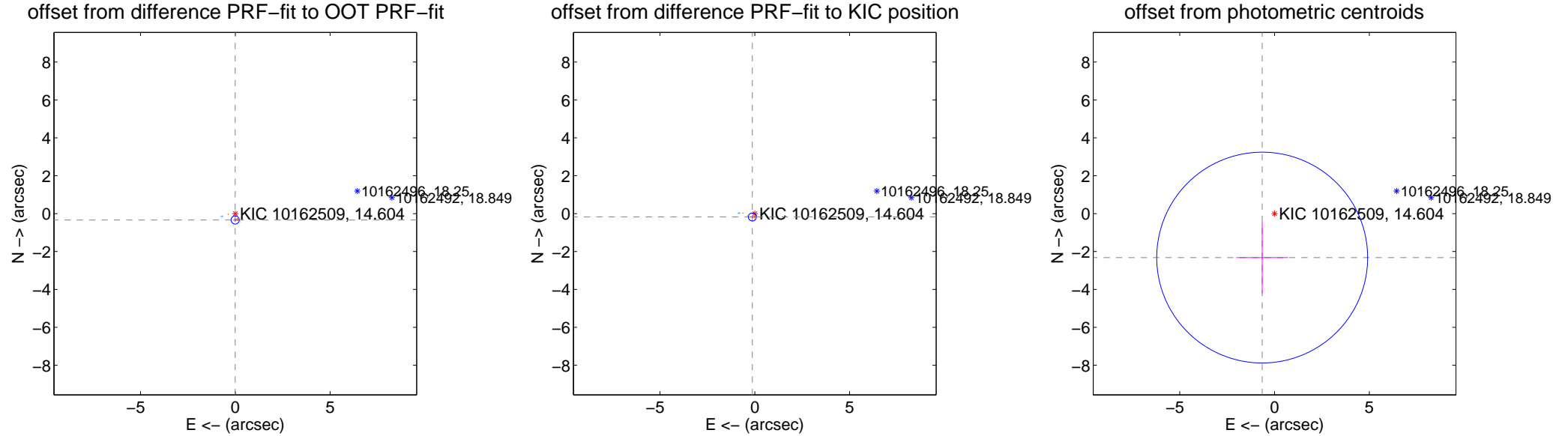
DV Centroid Data

Supplemental centroid analysis for 010162509-02. Kepler magnitude: 14.60. Transit SNR 3.60

There are 7 quarters with good PRF difference image offsets

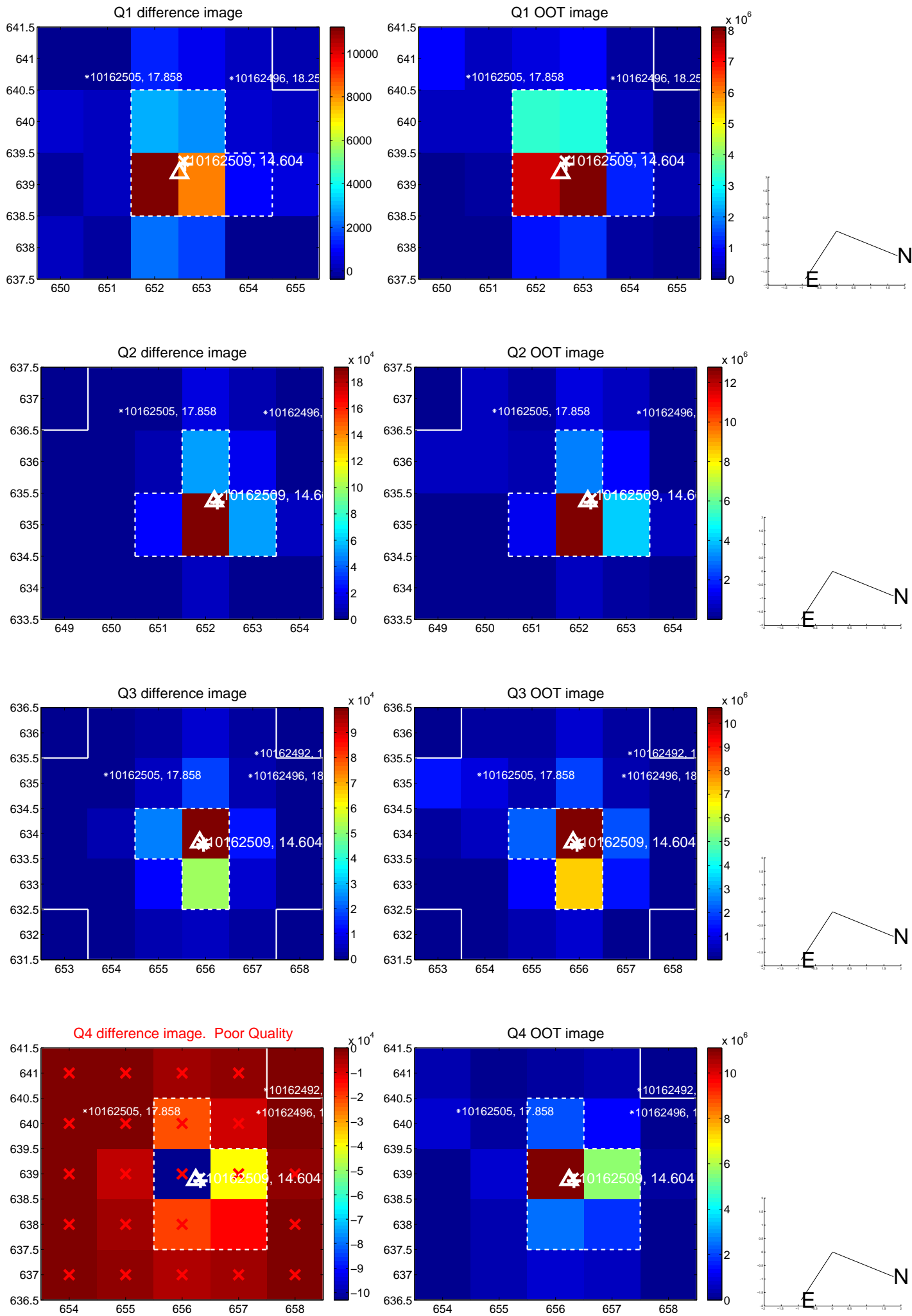
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.336 ± 0.072	4.69	0.007 ± 0.088	-0.336 ± 0.072
PRF-fit source offset from KIC position	0.217 ± 0.070	3.09	0.128 ± 0.094	-0.176 ± 0.071
photometric centroid source offset	2.41 ± 1.85	1.30	0.65 ± 1.37	-2.32 ± 1.89

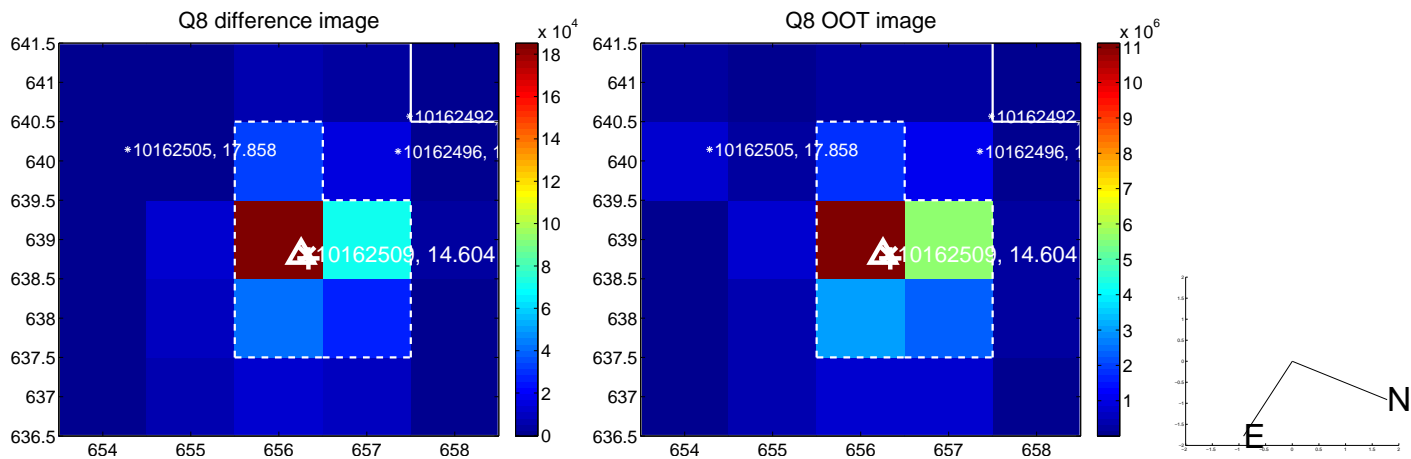
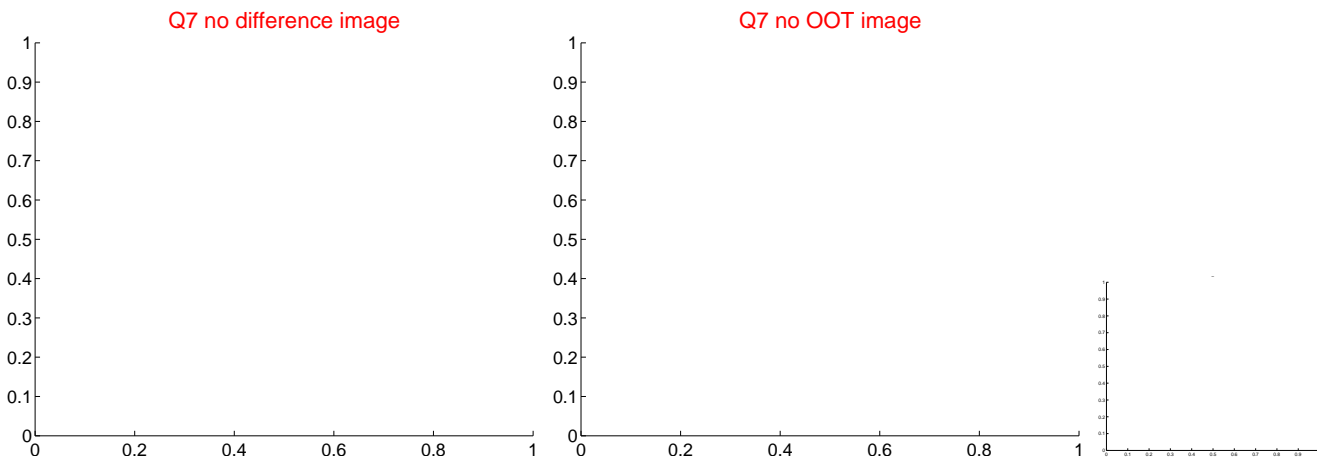
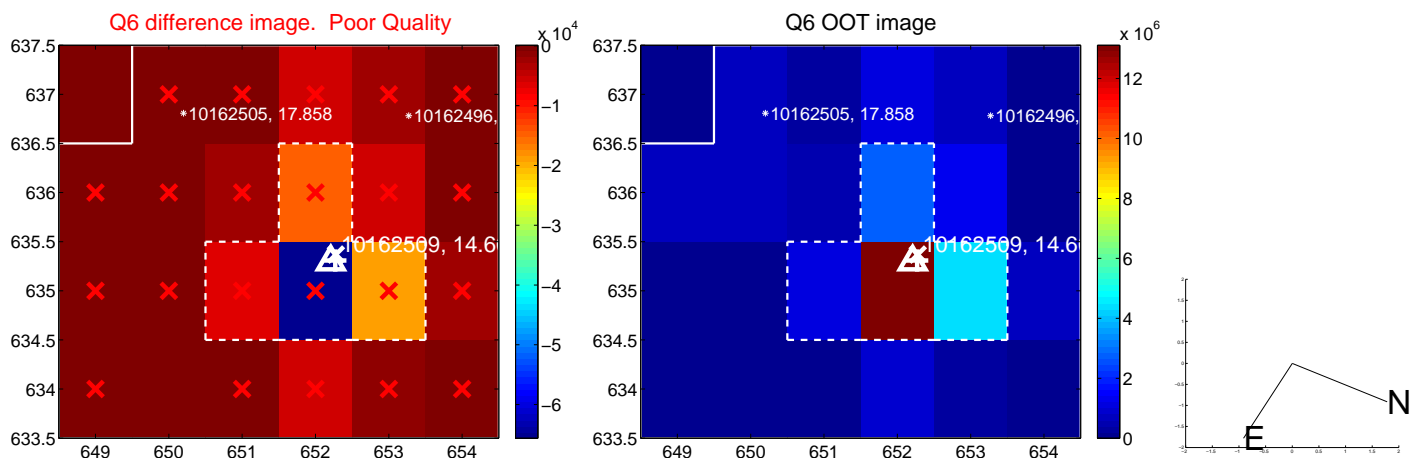
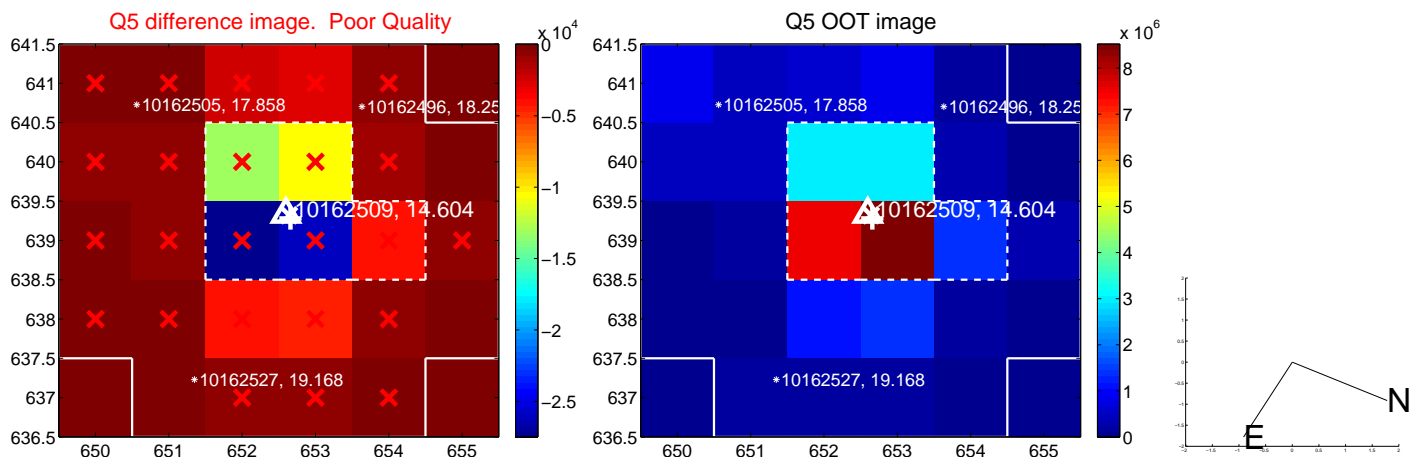


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

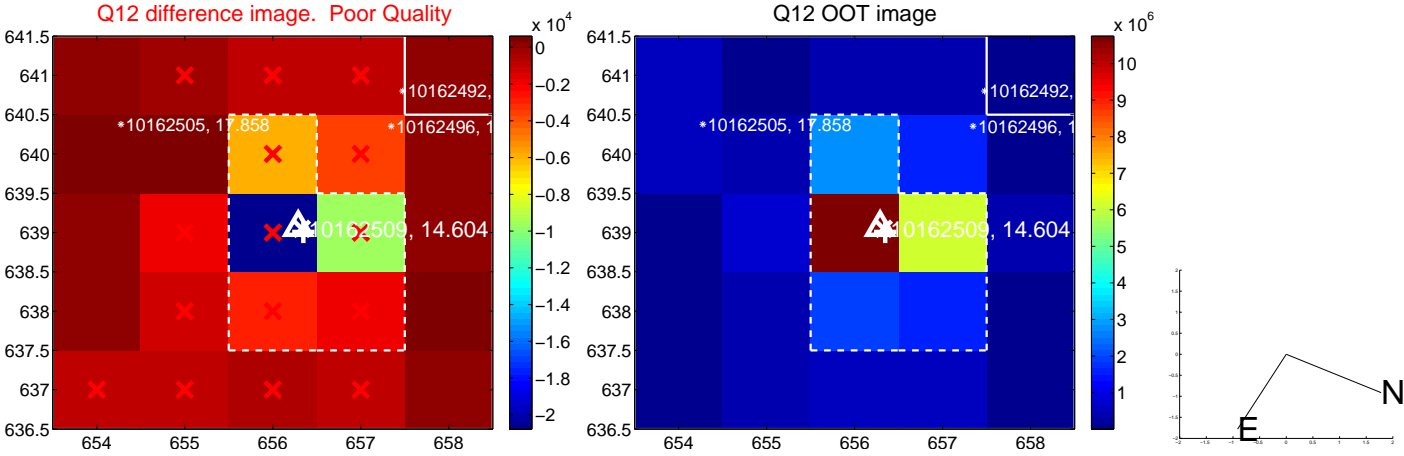
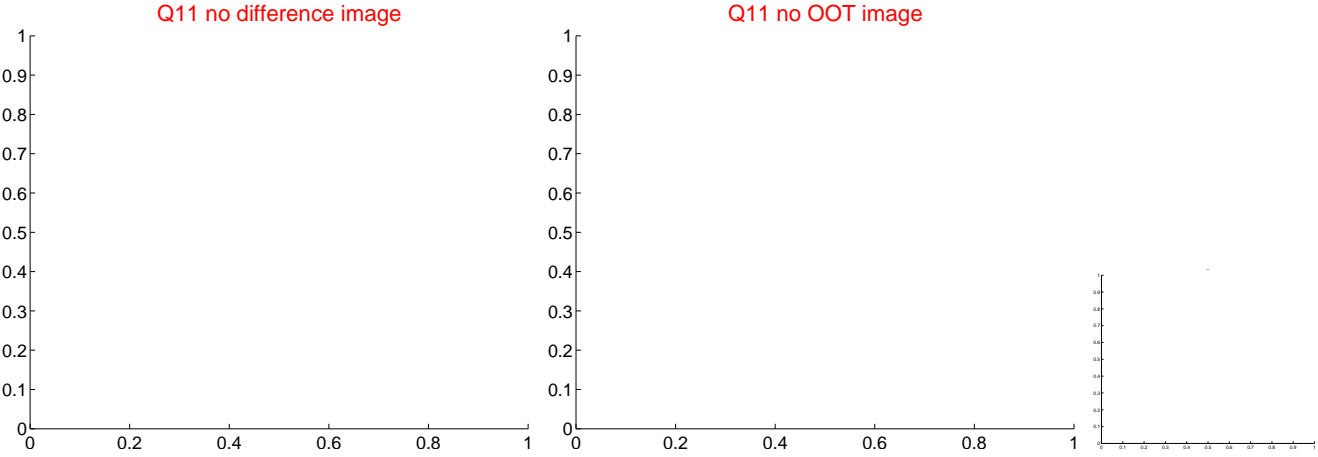
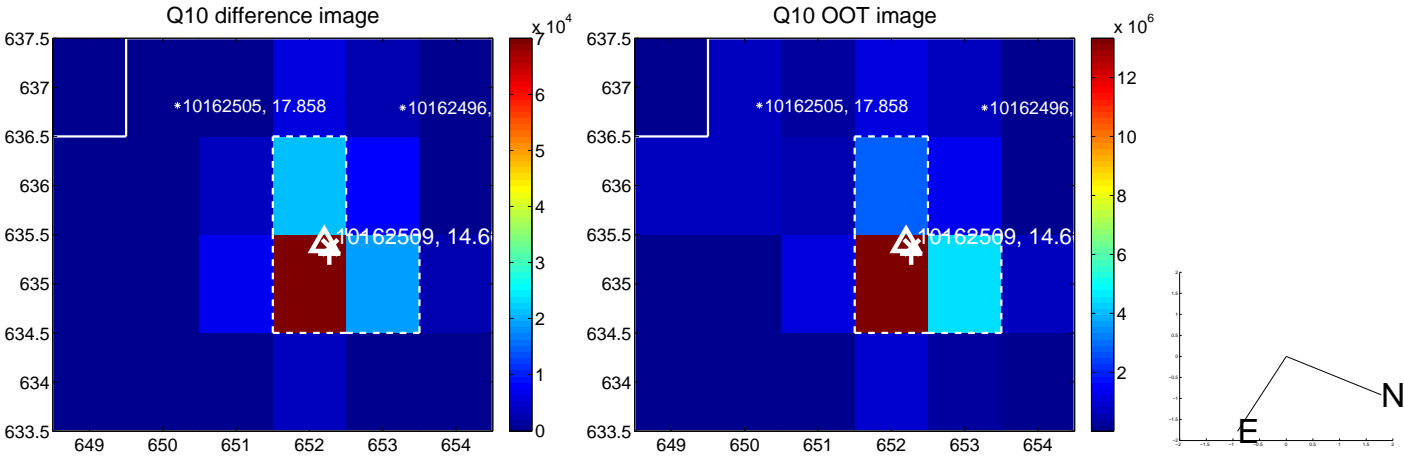
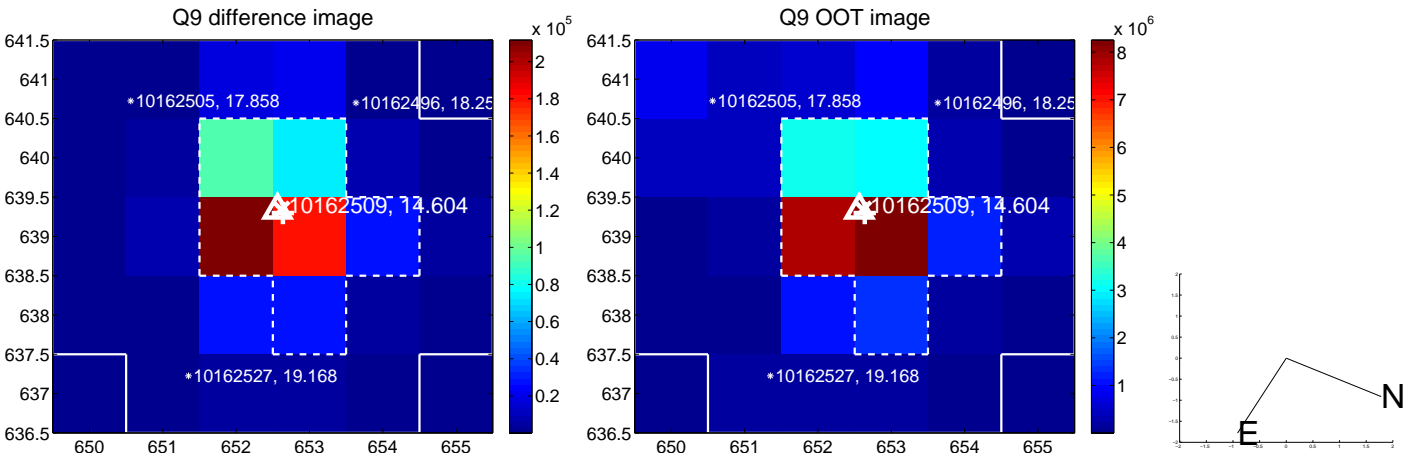
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



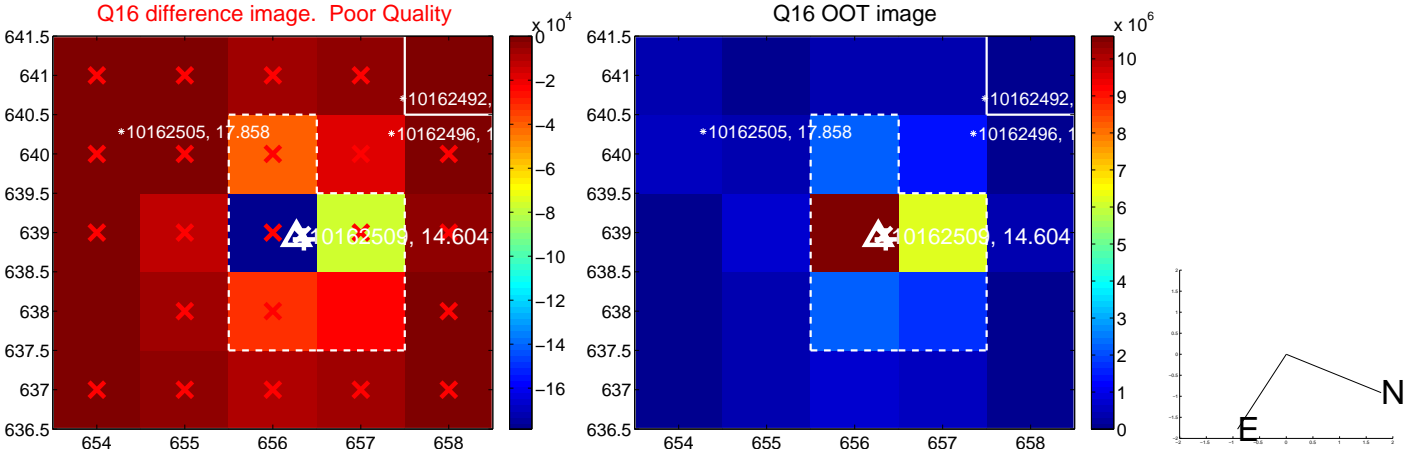
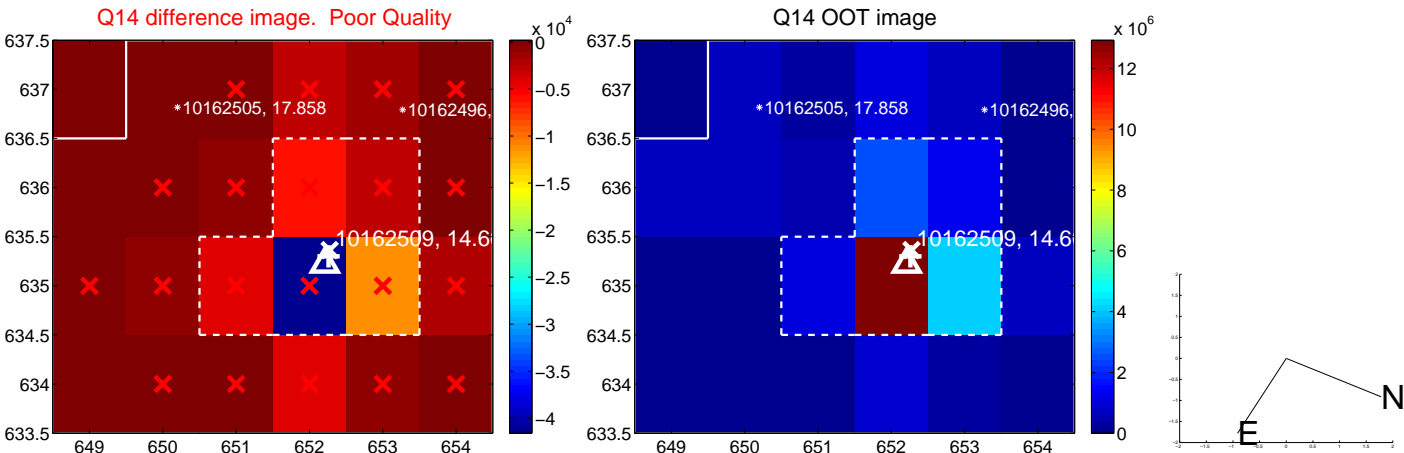
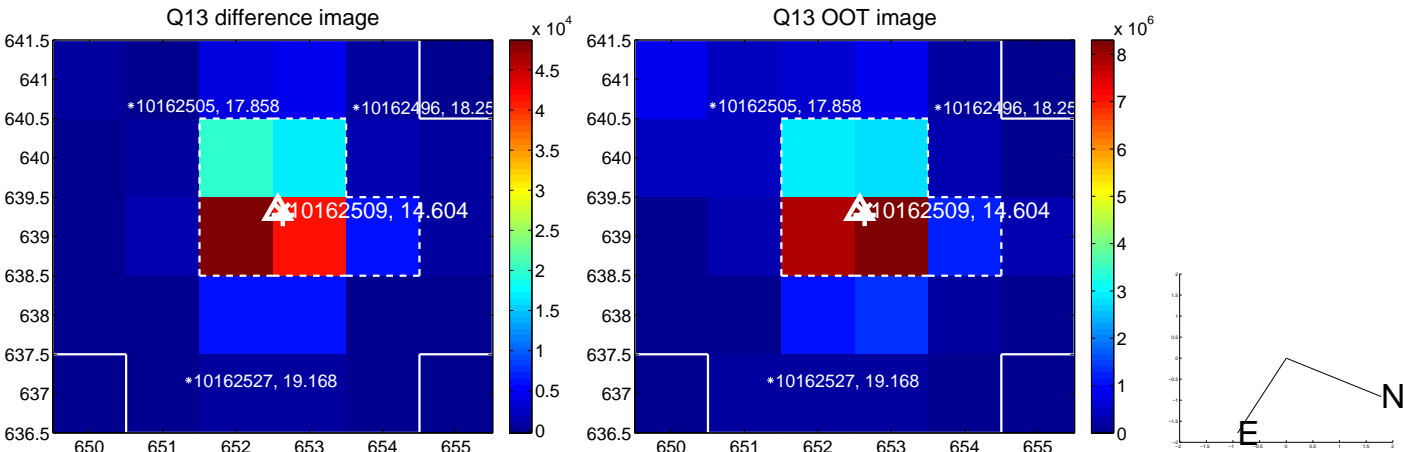
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



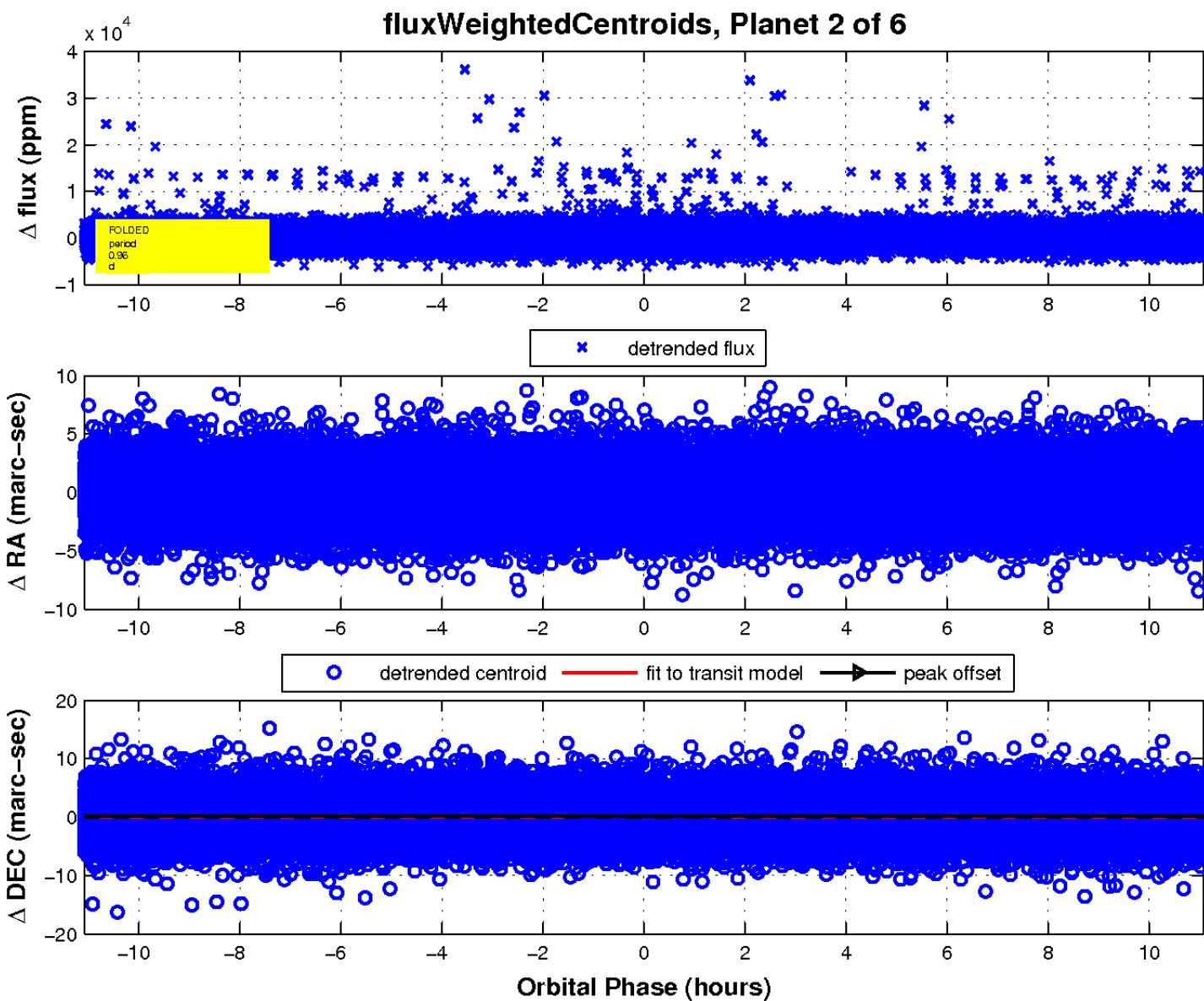
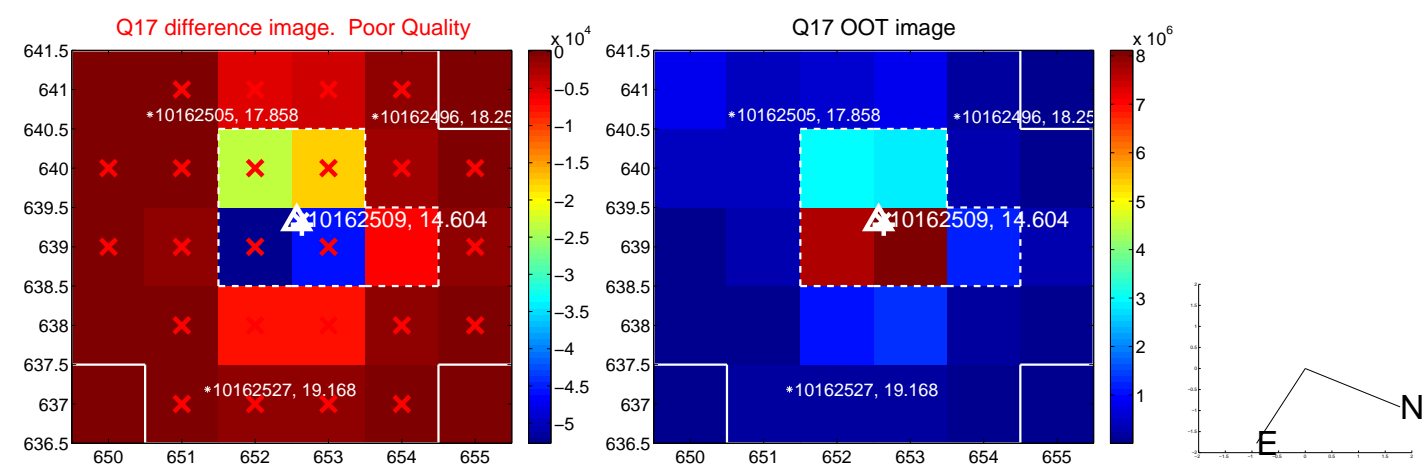
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

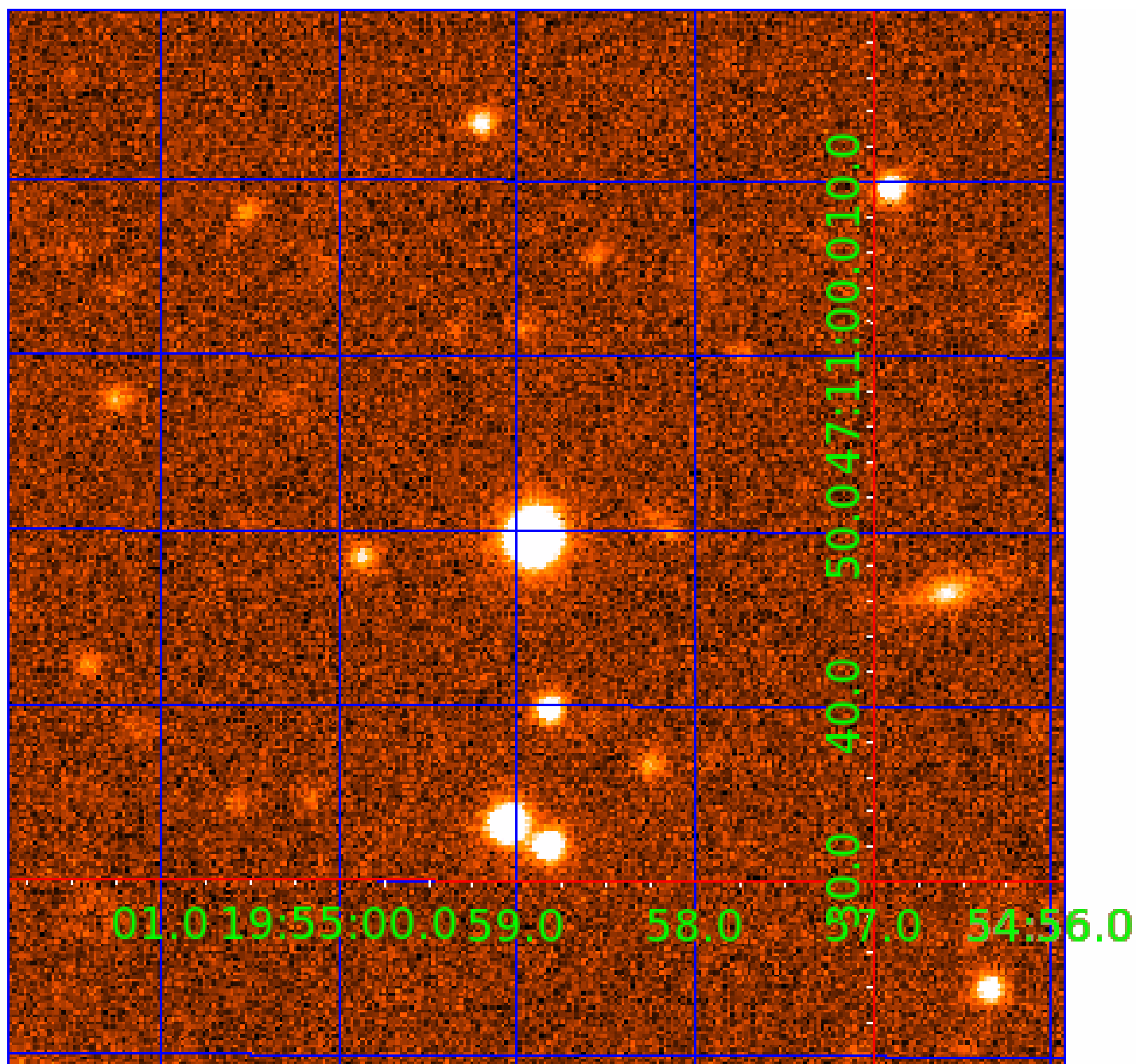


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010162509

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})
010162509-01	OBS	No	533.518934	450.188918	1667.8	4.910	12.8	5.3	0.62	4776	2.49	0.15
010162509-02	OBS	No	0.961344	132.115589	50.5	3.692	10.1	3.6	0.62	4776	0.61	680.82
010162509-03	OBS	No	0.963380	132.287803	149.5	3.763	12.1	7.4	0.62	4776	0.79	678.90
010162509-06	OBS	No	63.403742	138.396612	1537.2	2.000	10.8	-1.0	0.62	4776	2.35	2.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010162509-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010162509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010162509-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010162509-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

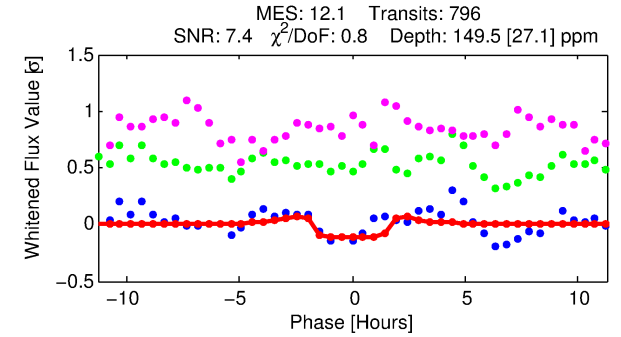
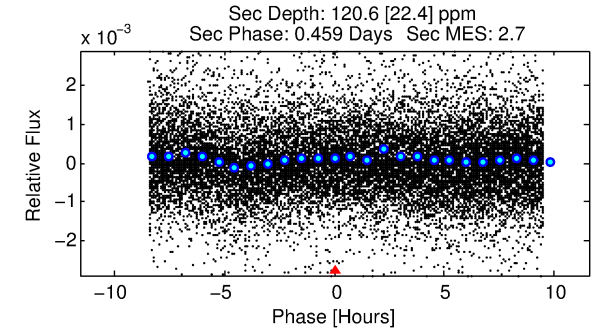
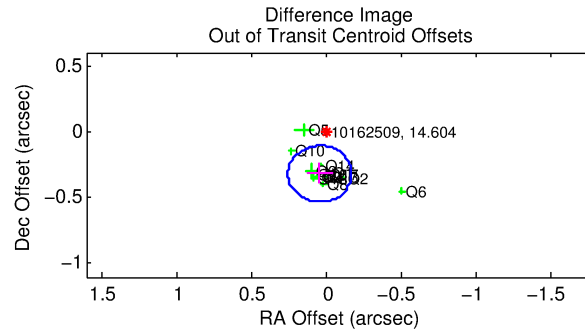
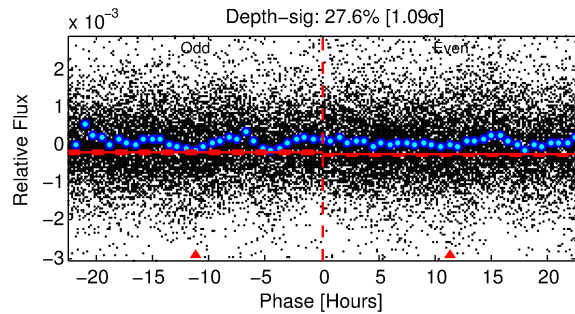
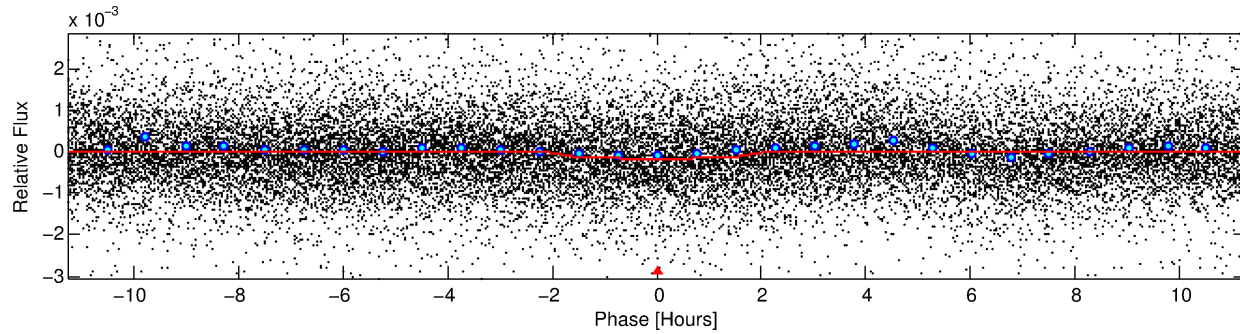
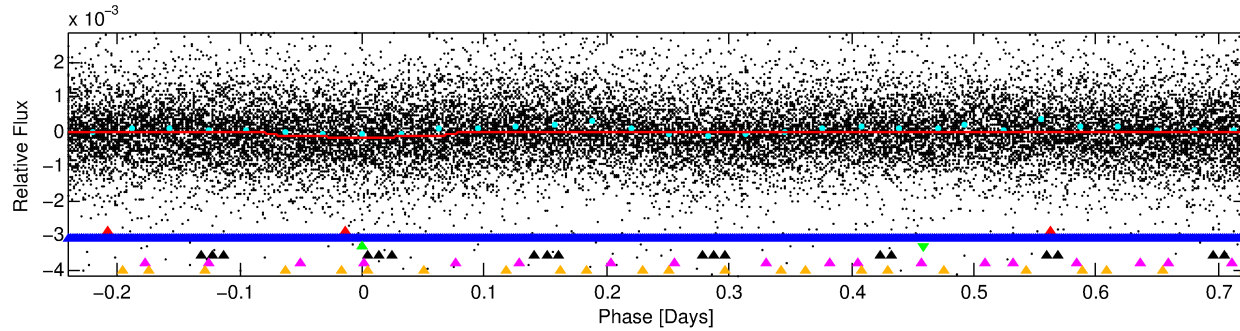
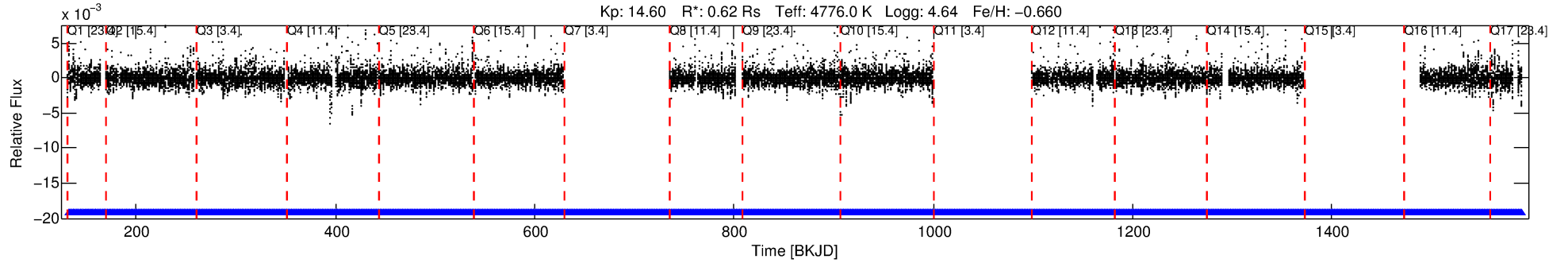
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010162509-03

No Significant Match Found

DV One-Page Summary

KIC: 10162509 Candidate: 3 of 6 Period: 0.963 d



DV Fit Results:

Period = 0.96338 [0.00001] d
Epoch = 132.2878 [0.0033] BKJD
Rp/R* = 0.0117 [0.0091]
a/R* = 1.72 [3.14]
b = 0.64 [2.58]
Seff = 678.90 [107.85]
Teq = 1302 [52] K
Rp = 0.79 [0.62] Re
a = 0.0161 [0.0012] AU
Ag = 27.90 [43.97] [0.61 σ]
Teffp = 4625 [1823] K [1.82 σ]

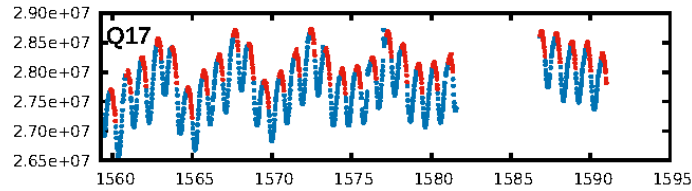
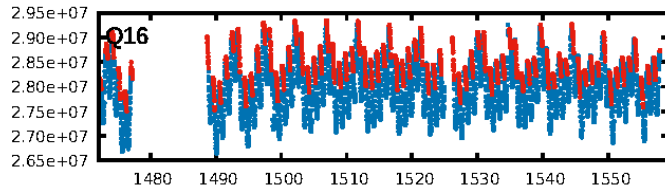
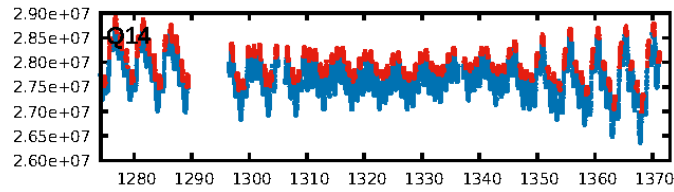
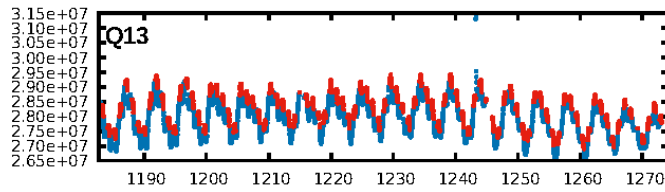
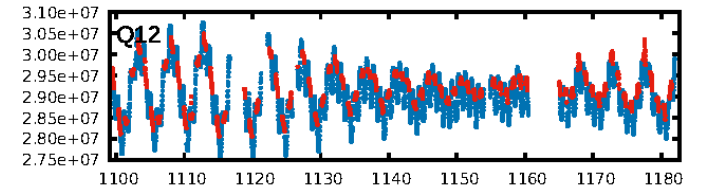
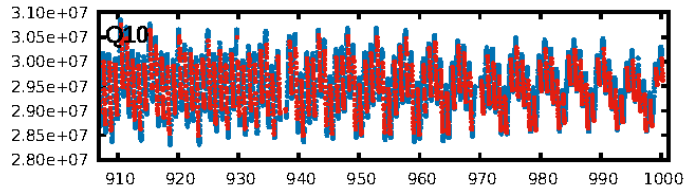
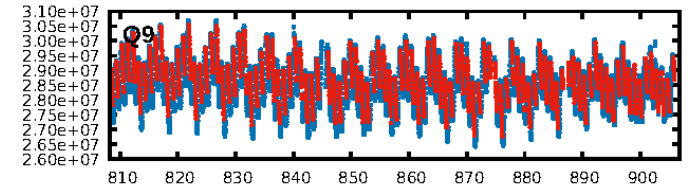
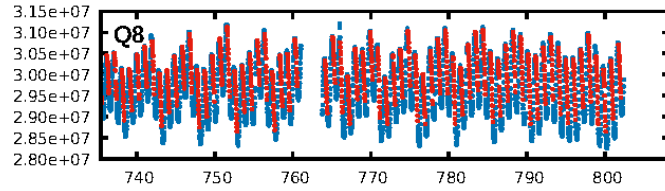
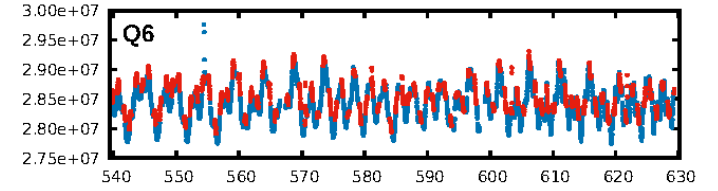
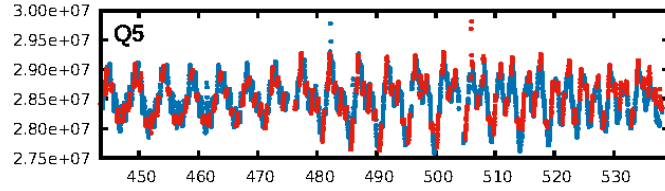
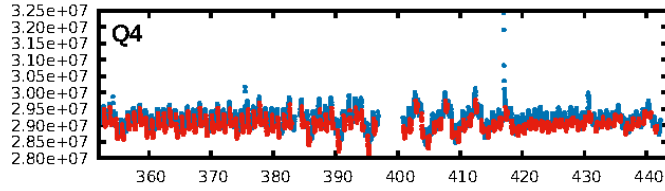
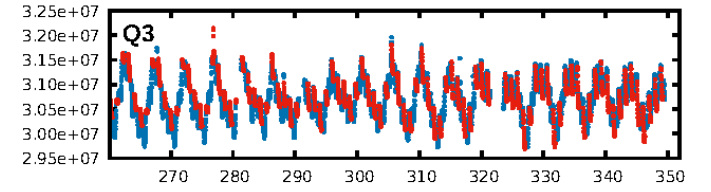
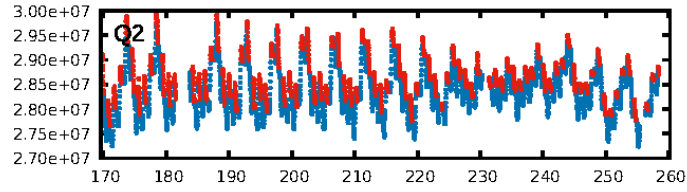
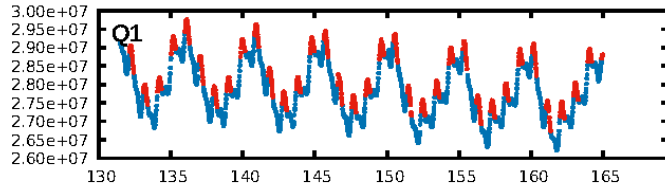
DV Diagnostic Results:

ShortPeriod-sig: 0.7% [0.01 σ]
LongPeriod-sig: 100.0% [351.68 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [734/734]
GhostDiagnostic-chr: 0.2609
Centroid-sig: N/A
Centroid-so: 1.603 arcsec [2.75 σ]
OotOffset-rm: 0.322 arcsec [4.53 σ]
KicOffset-rm: 0.231 arcsec [3.28 σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 0.21 [3/14]
DiffImageOverlap-fno: 0.29 [4/14]

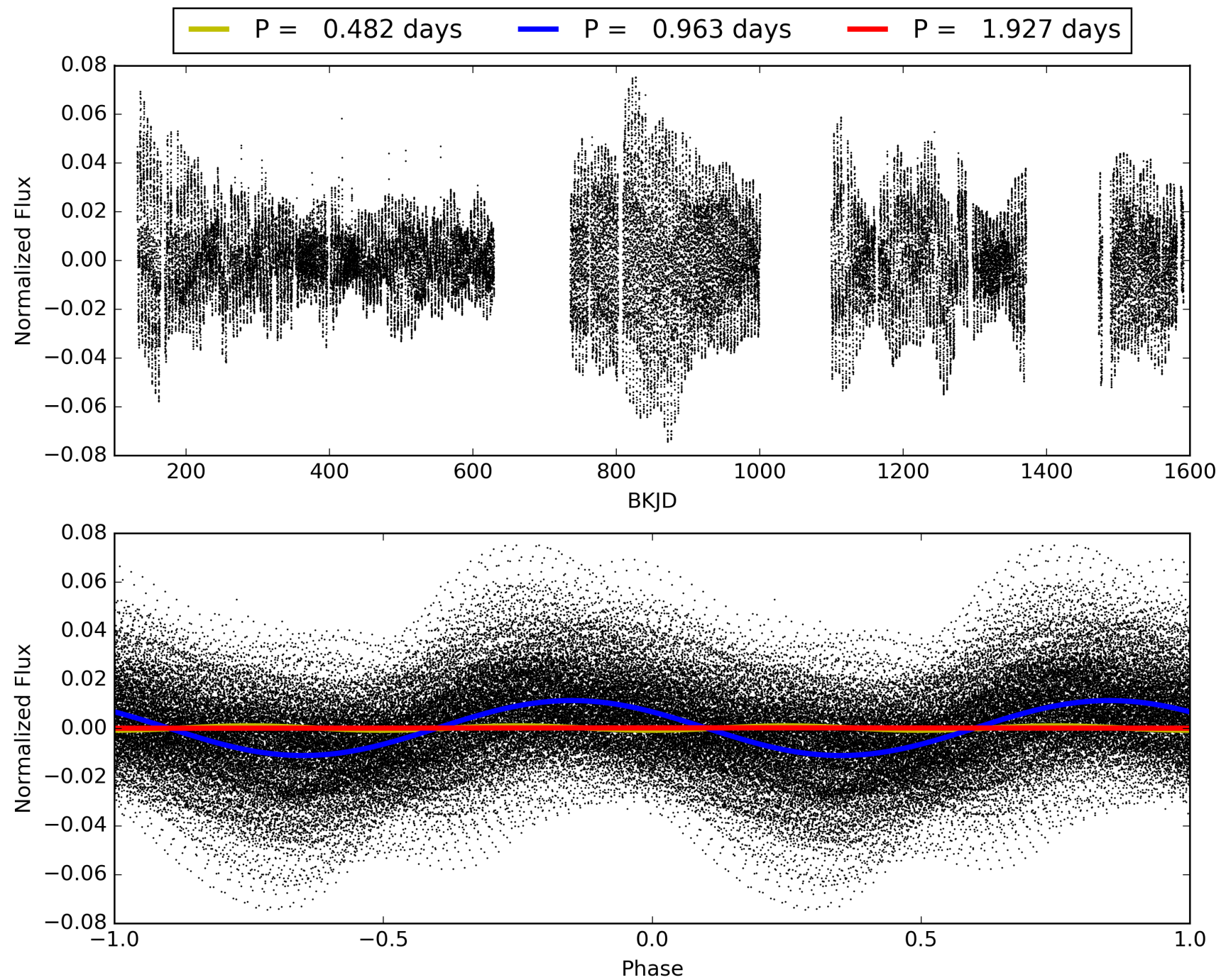
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:13:00 Z

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

TCE 010162509-03, PDC Light Curves

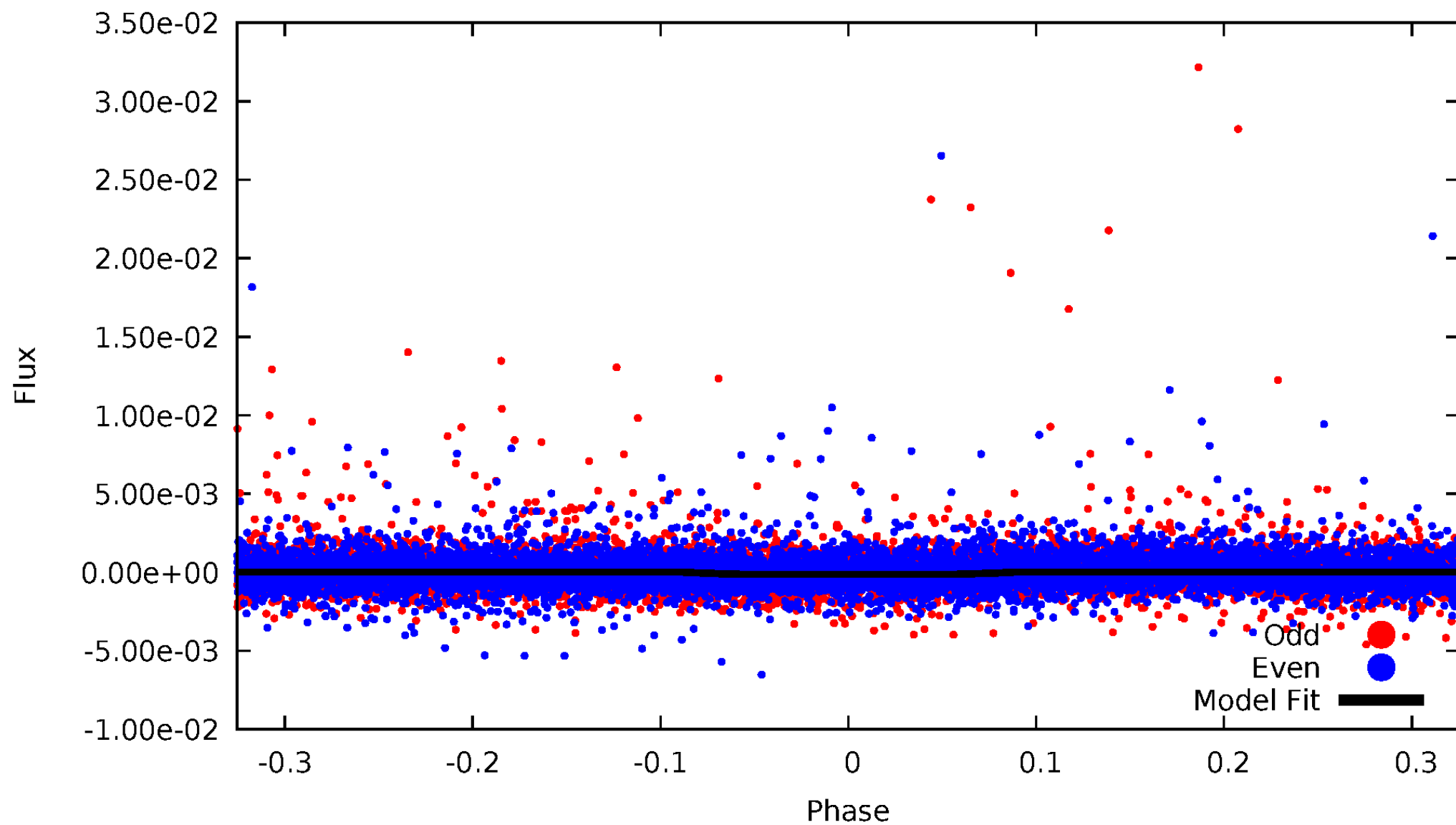


TCE 010162509-03



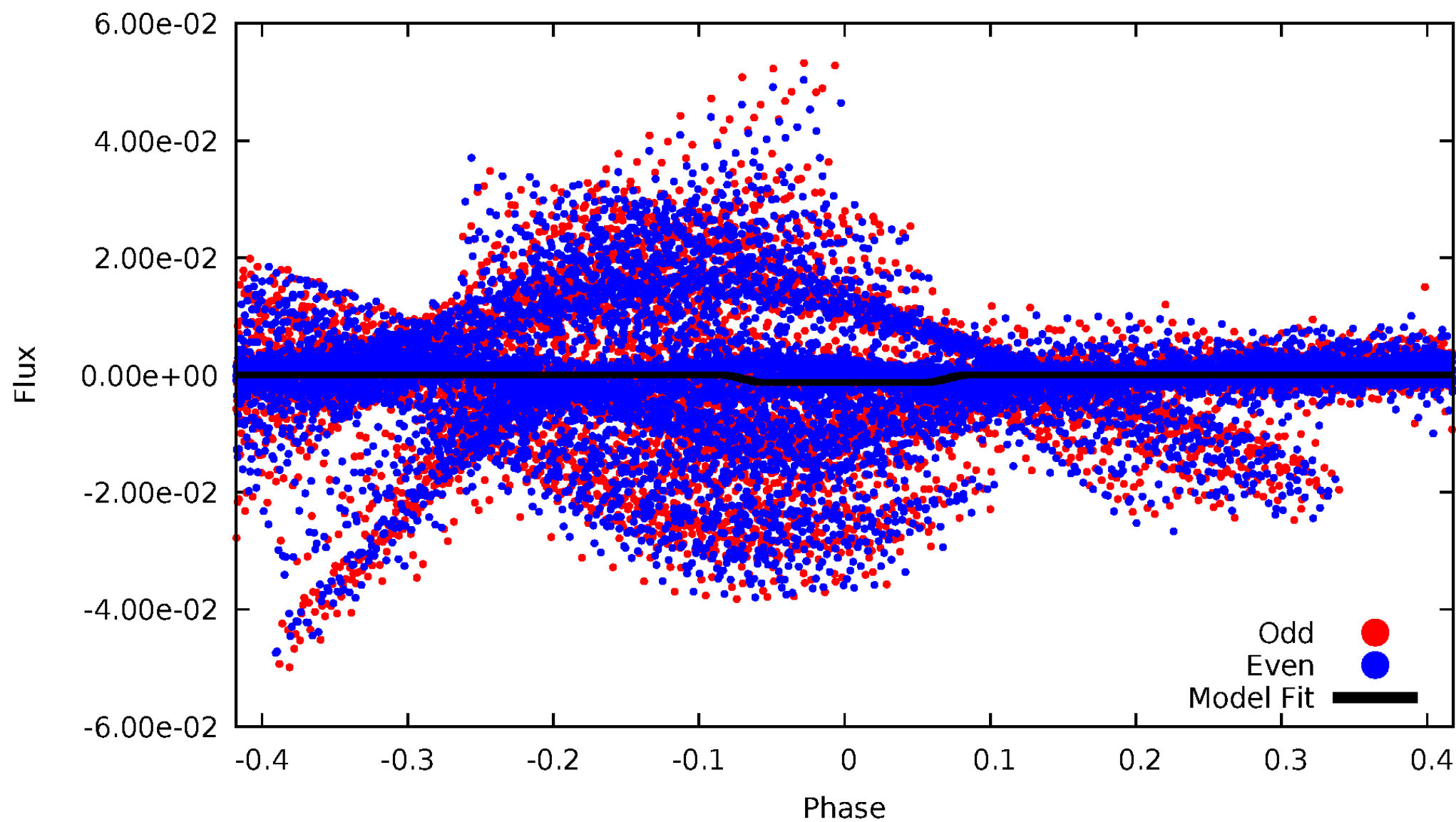
DV Odd/Even

TCE 010162509-03



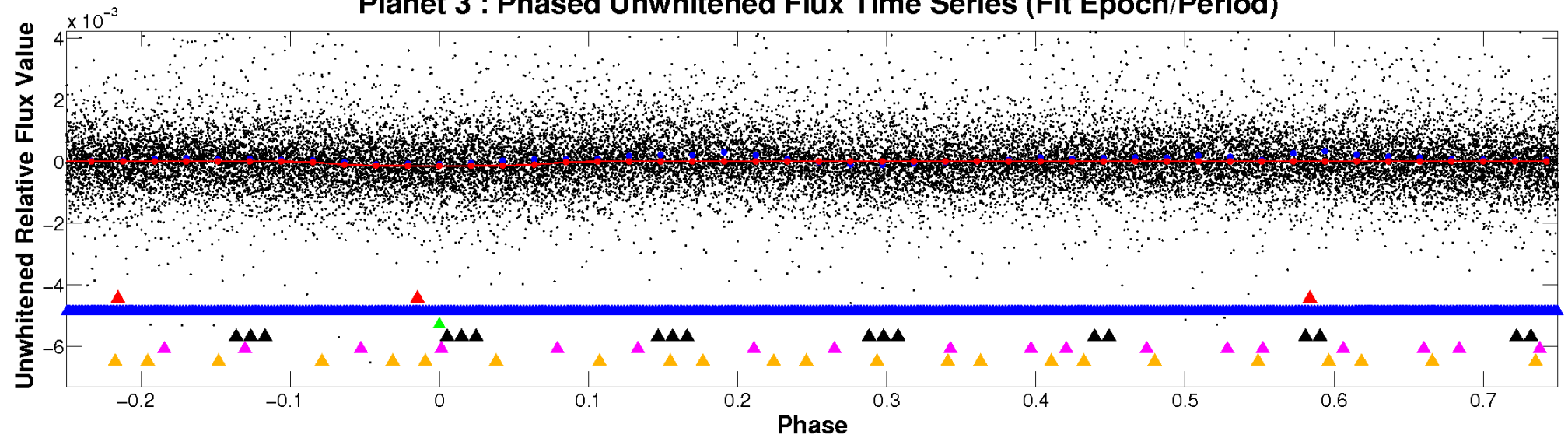
ALT Odd/Even

TCE 010162509-03

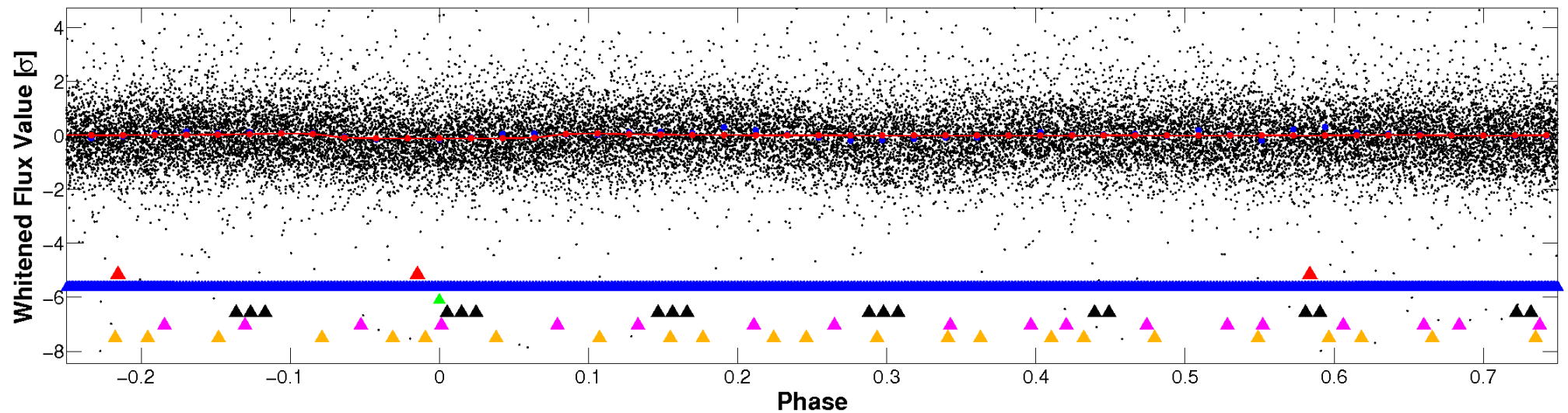


Non-Whitened Vs. Whitened Light Curve

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

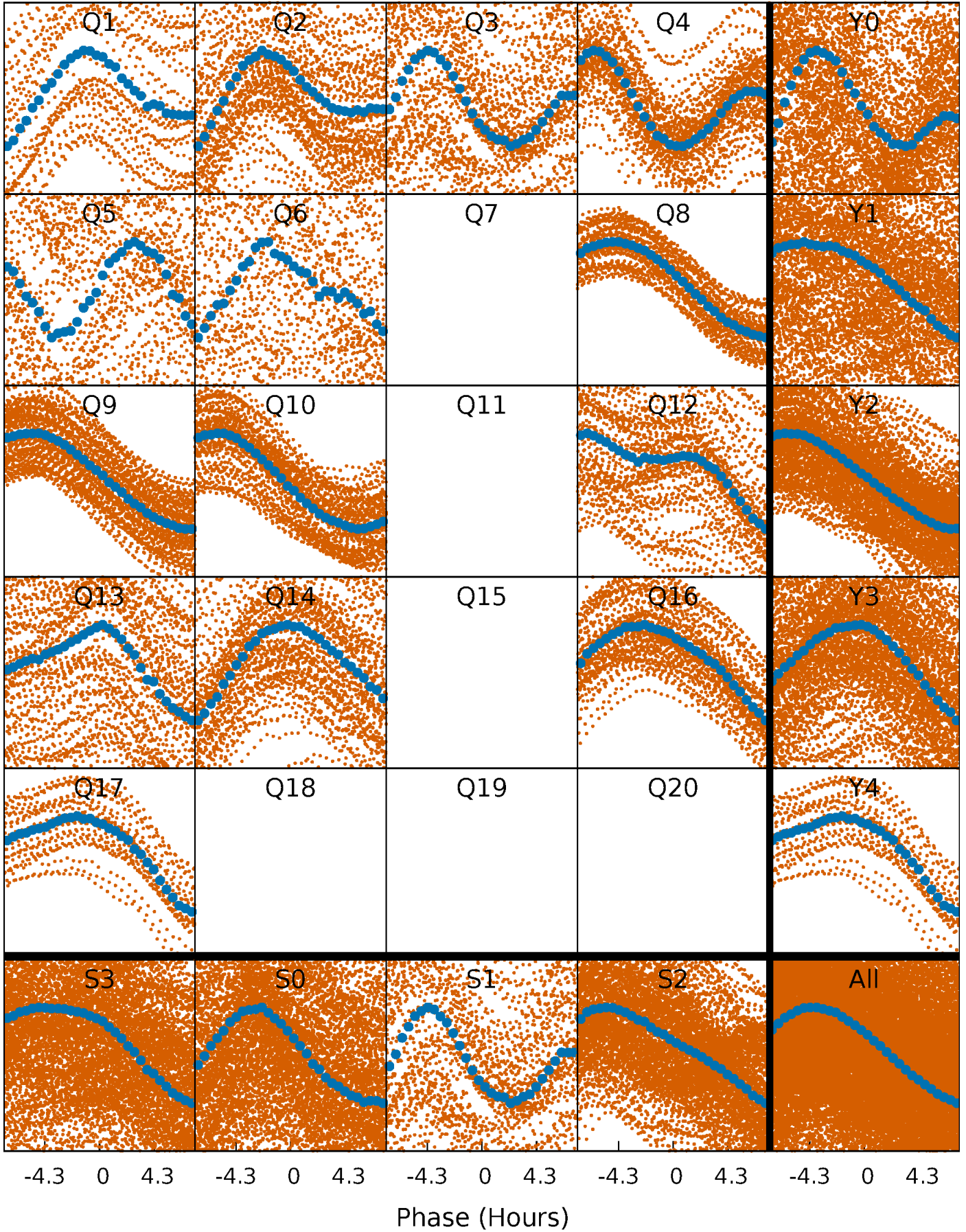


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



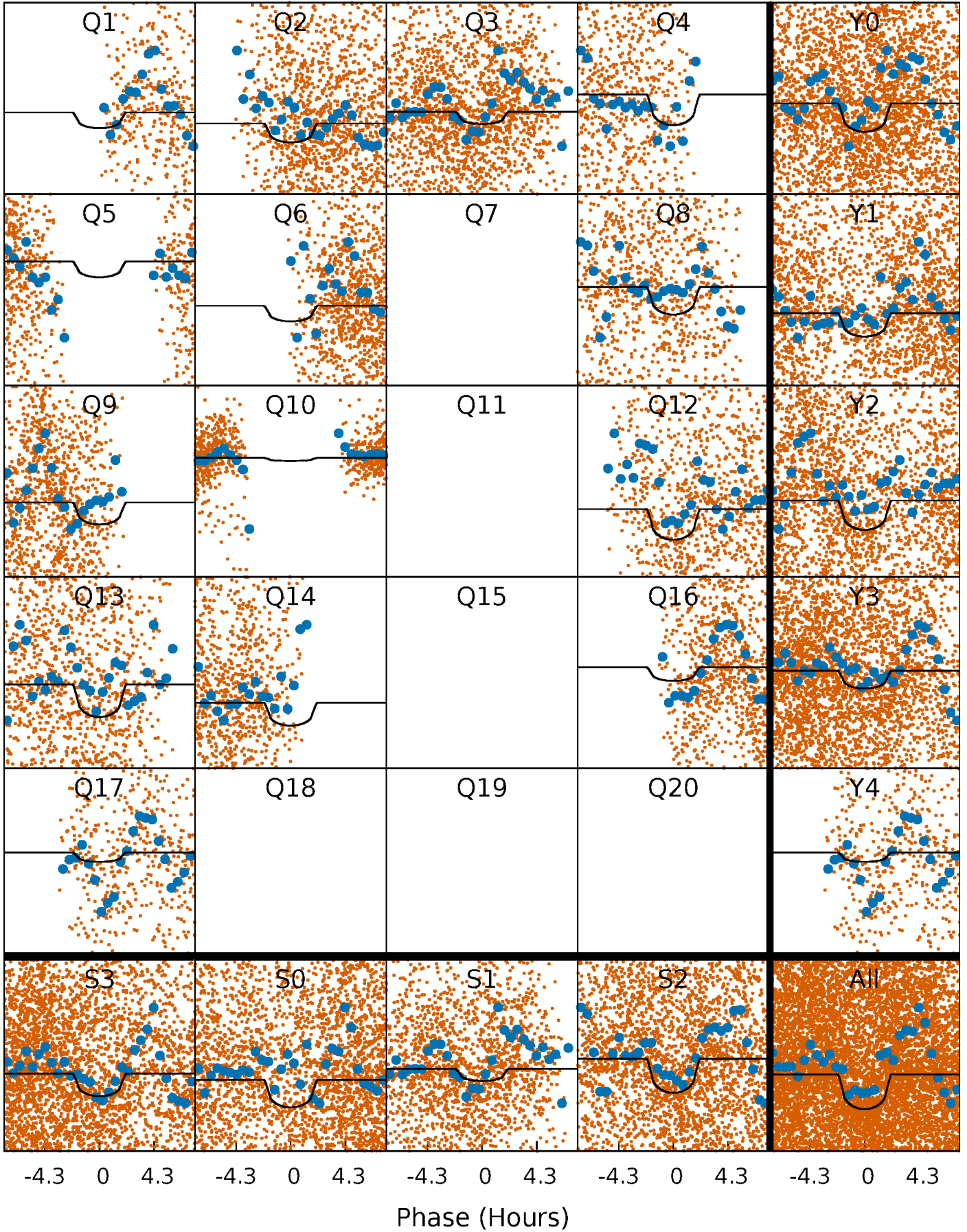
PDC Quarter-Phased Transit Curves

TCE 010162509-03 P= 0.963380 Days $T_0=132.287803$ (BKJD)



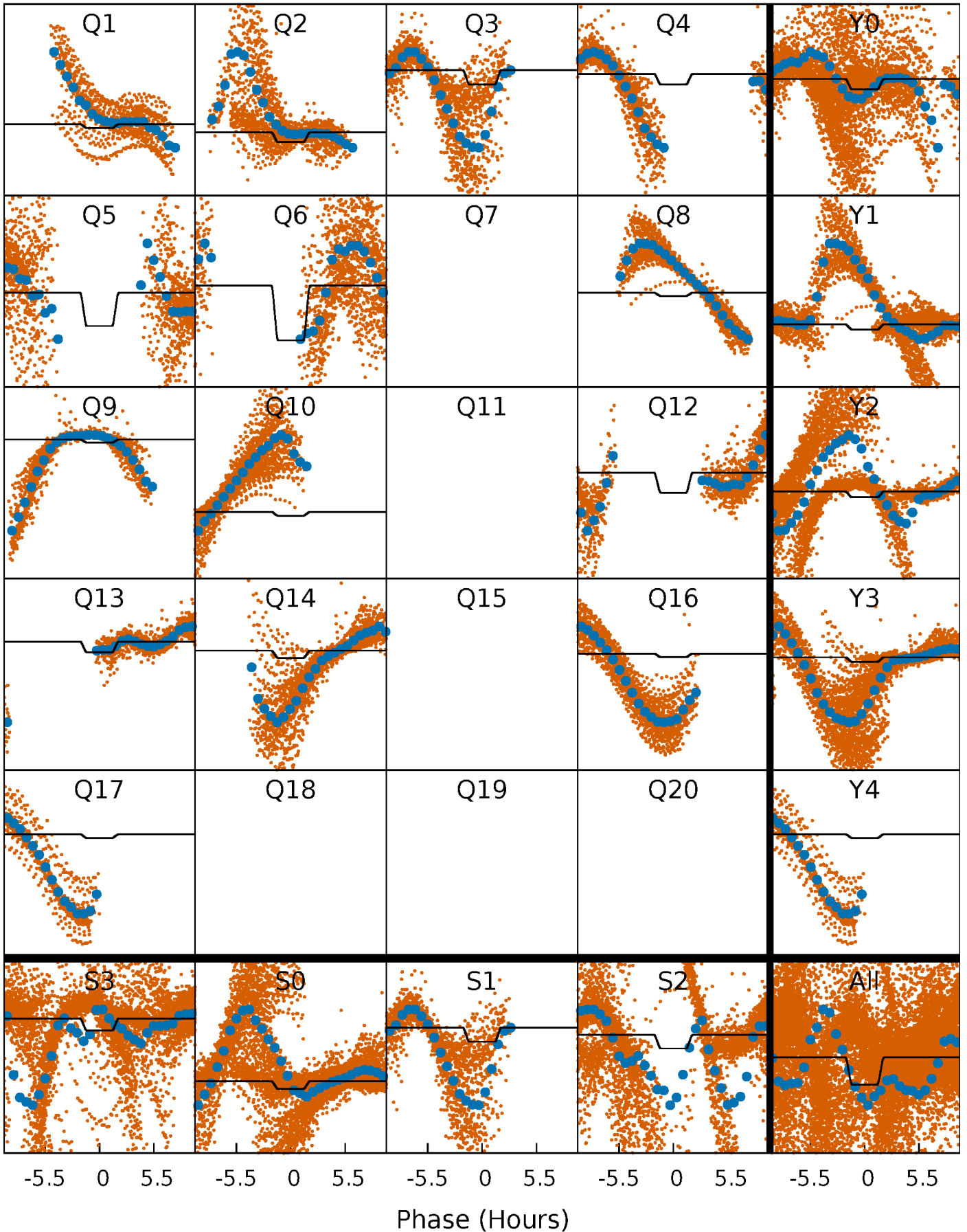
DV Quarter-Phased Transit Curves

TCE 010162509-03 P= 0.963380 Days $T_0=132.287803$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

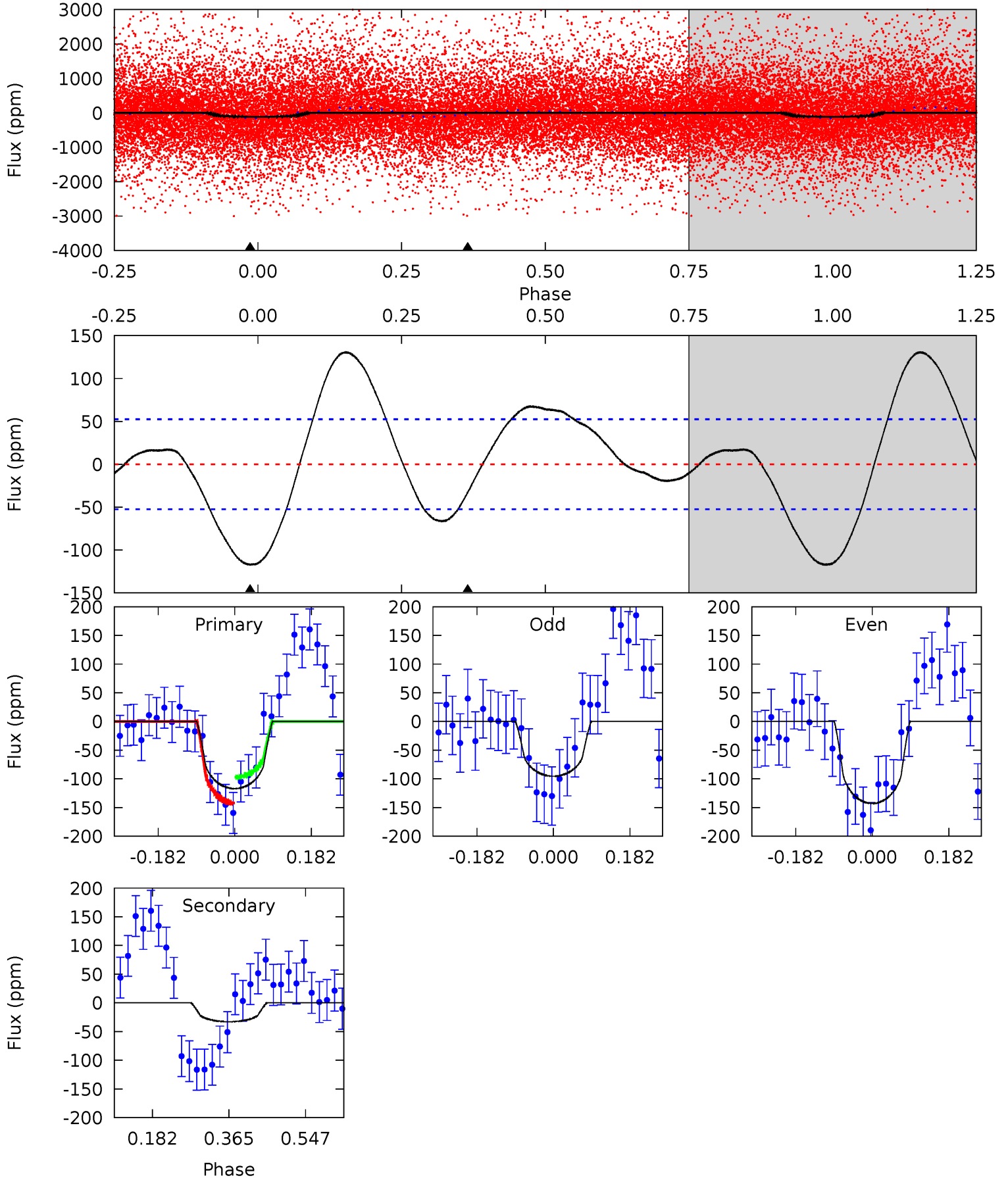
TCE 010162509-03 $P = 0.962856$ Days $T_0 = 132.514004$ (BKJD)



DV Model-Shift Uniqueness Test

010162509-03, P = 0.963380 Days, E = 131.324423 Days

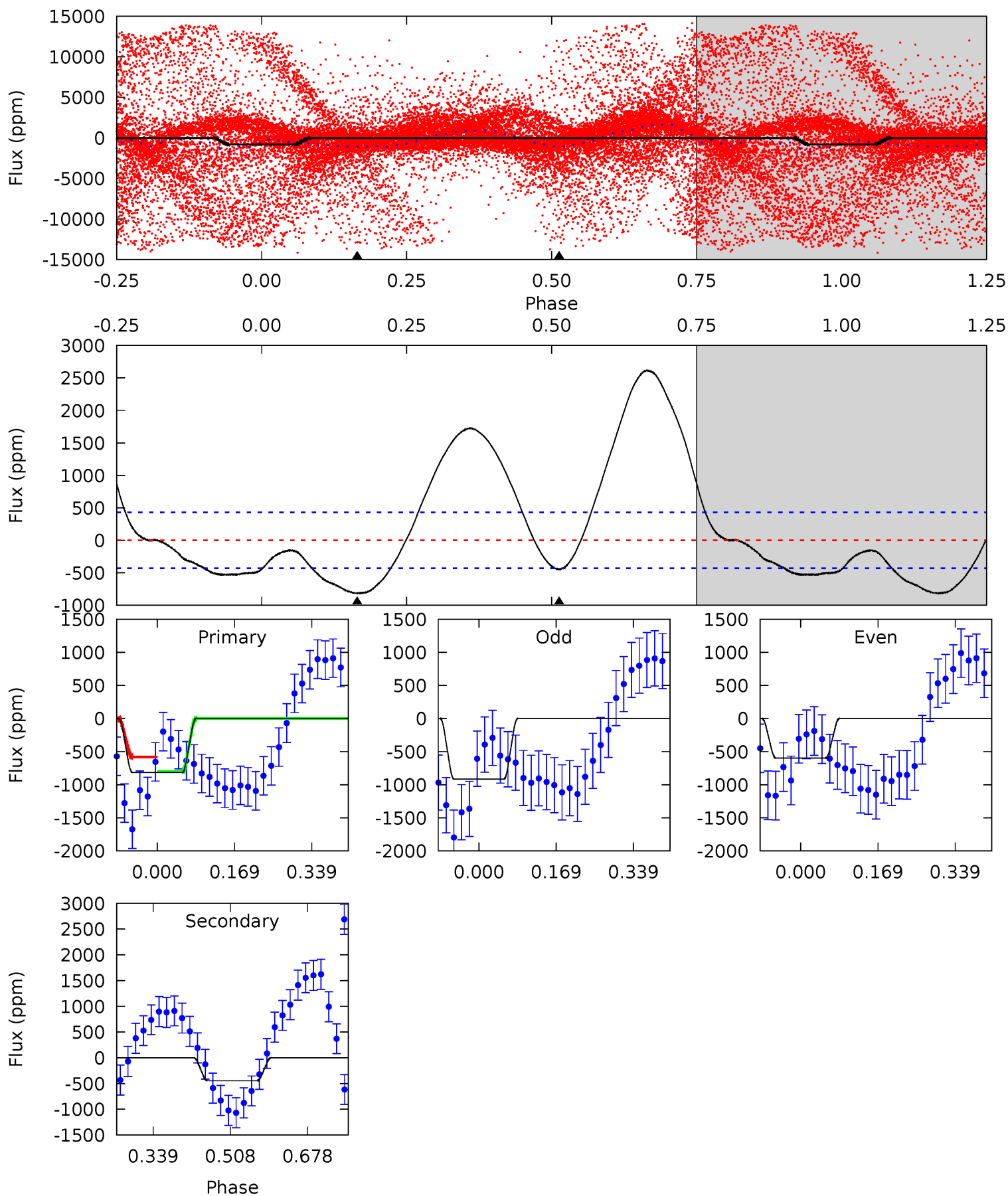
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.90	2.78	0	0	4.44	1.33	2.71	9.90	9.90	2.78	2.78	2.04	0.42	0.53	1.90



Alt Model-Shift Uniqueness Test

010162509-03, P = 0.962856 Days, E = 130.588292 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.44	4.61	0	0	4.45	1.37	9.79	8.44	8.44	4.61	4.61	1.71	3.23	0.76	1.13



Stellar Parameters For KIC 010162509

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4776^{+142}_{-142}	$4.640^{+0.058}_{-0.031}$	$-0.660^{+0.300}_{-0.300}$	$0.616^{+0.052}_{-0.052}$	$0.604^{+0.063}_{-0.034}$	$3.643^{+0.895}_{-0.496}$
	+3%/-3%	+1%/-1%	+45%/-45%	+8%/-8%	+10%/-6%	+25%/-14%
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 010162509-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-33 ± 12	$0.85^{+0.58}_{-0.49}$	1808^{+64}_{-62}	3506^{+1414}_{-578}	$6.140^{+30.616}_{-4.073}$
Alt.	-445 ± 96	$2.44^{+0.56}_{-0.63}$	1812^{+57}_{-68}	3856^{+489}_{-324}	11^{+9}_{-4}

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

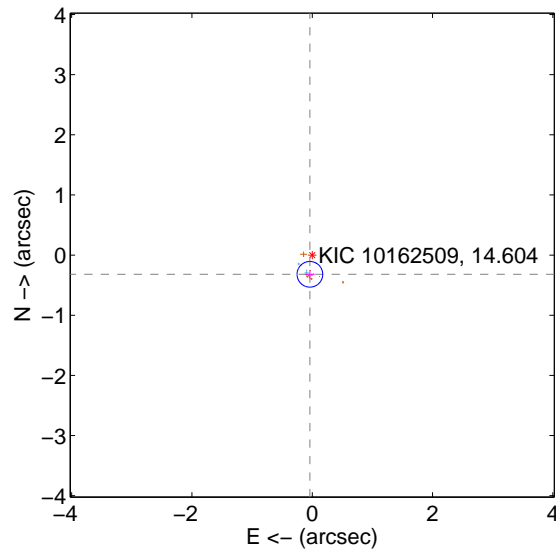
Supplemental centroid analysis for 010162509-03. Kepler magnitude: 14.60. Transit SNR 7.38

There are 3 quarters with good PRF difference image offsets

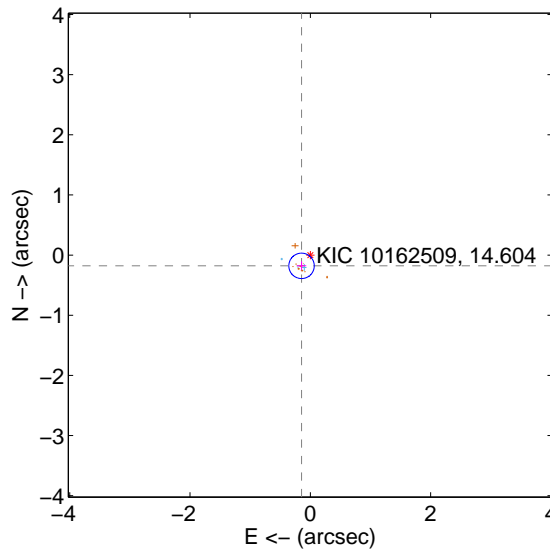
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.322 ± 0.071	4.53	0.039 ± 0.079	-0.319 ± 0.072
PRF-fit source offset from KIC position	0.231 ± 0.070	3.28	0.146 ± 0.079	-0.179 ± 0.074
photometric centroid source offset	1.60 ± 0.58	2.75	0.77 ± 0.44	1.40 ± 0.62

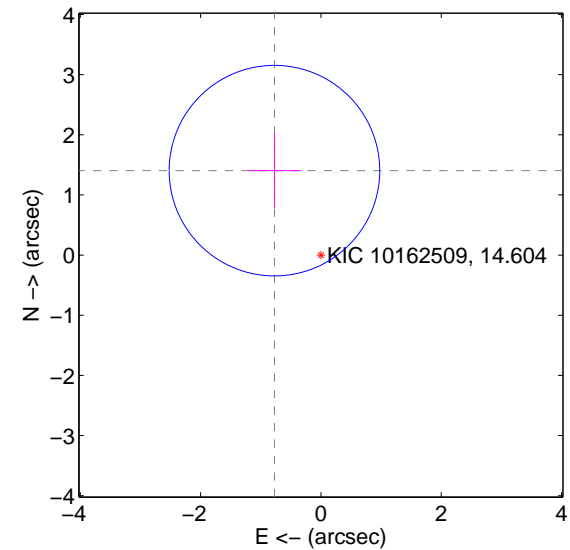
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

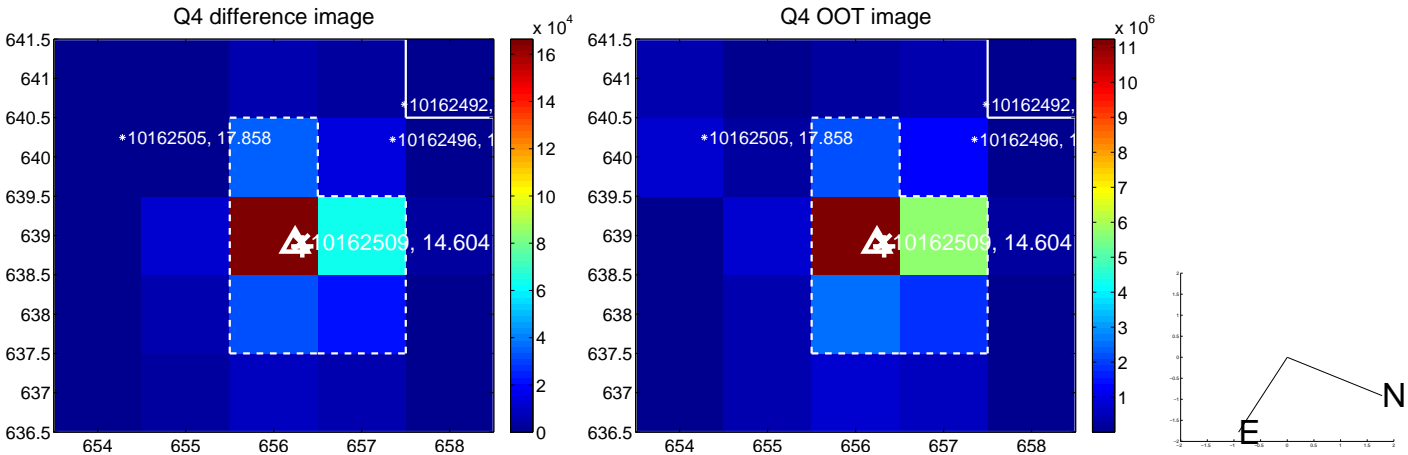
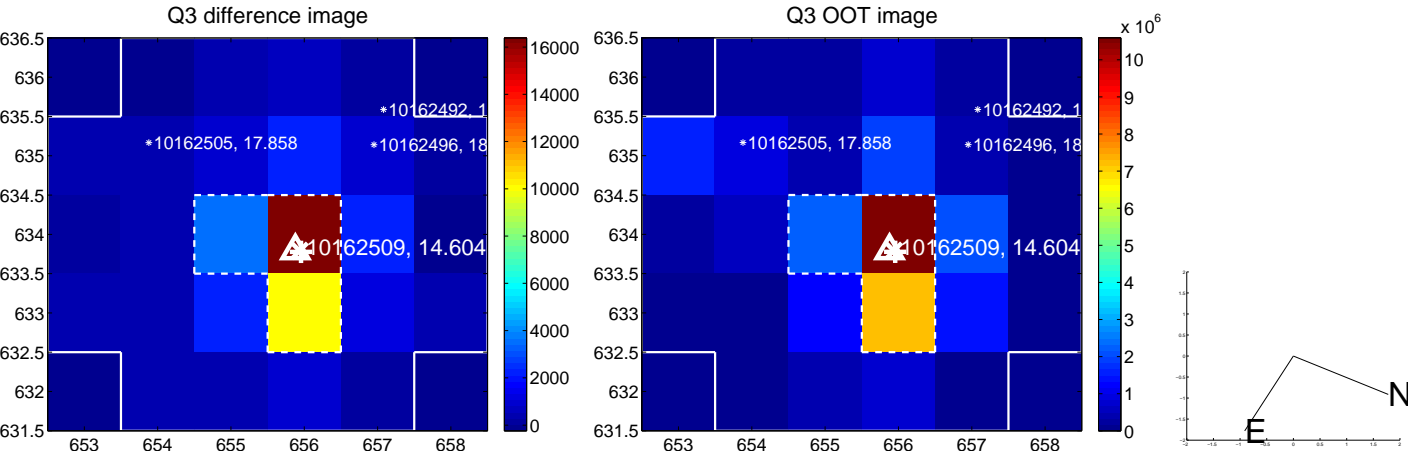
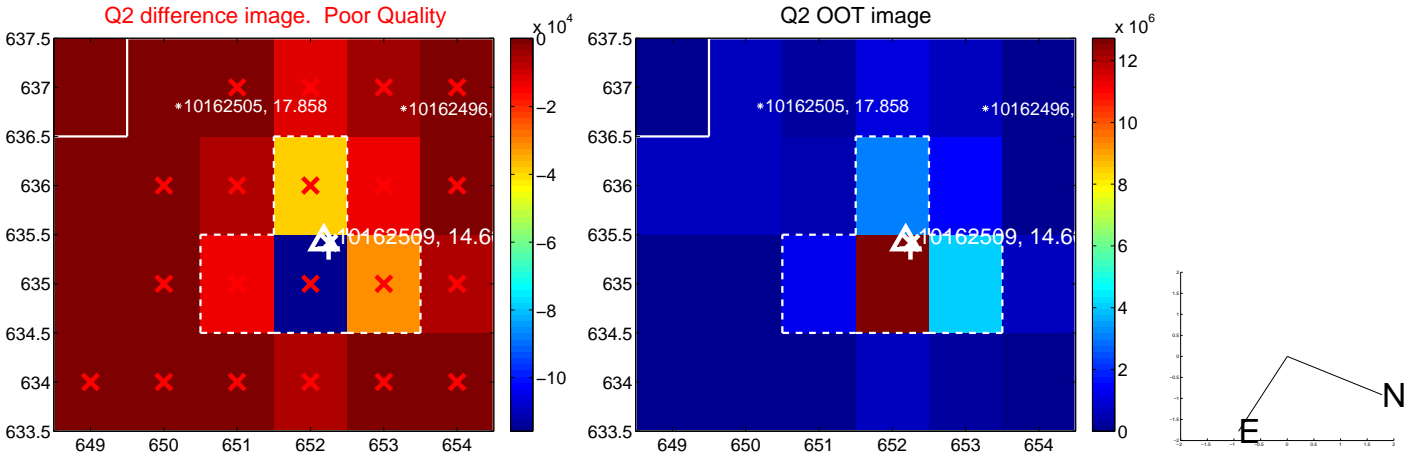
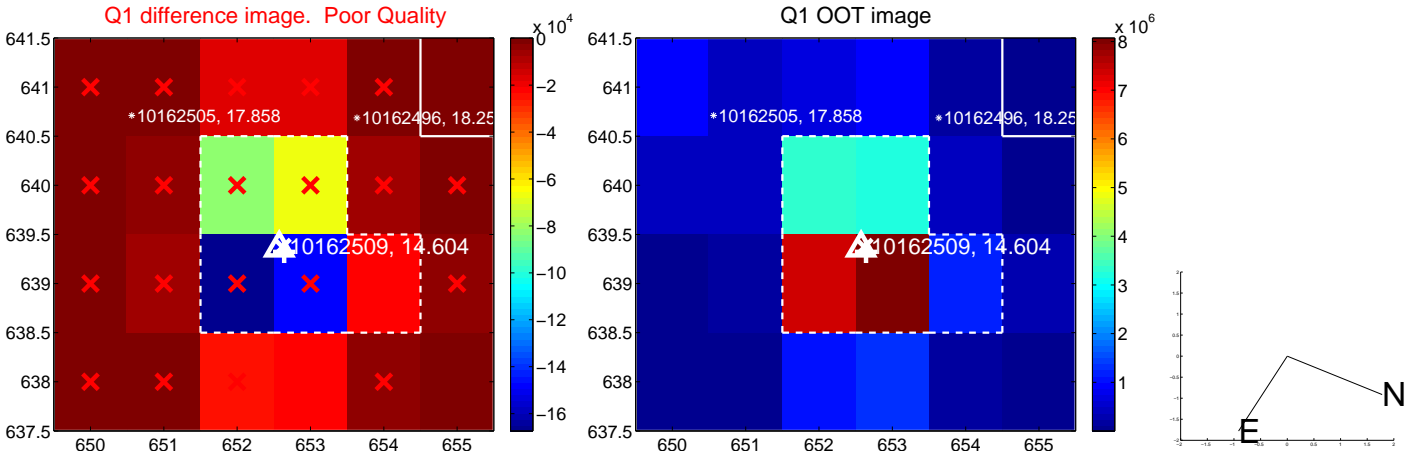


offset from photometric centroids

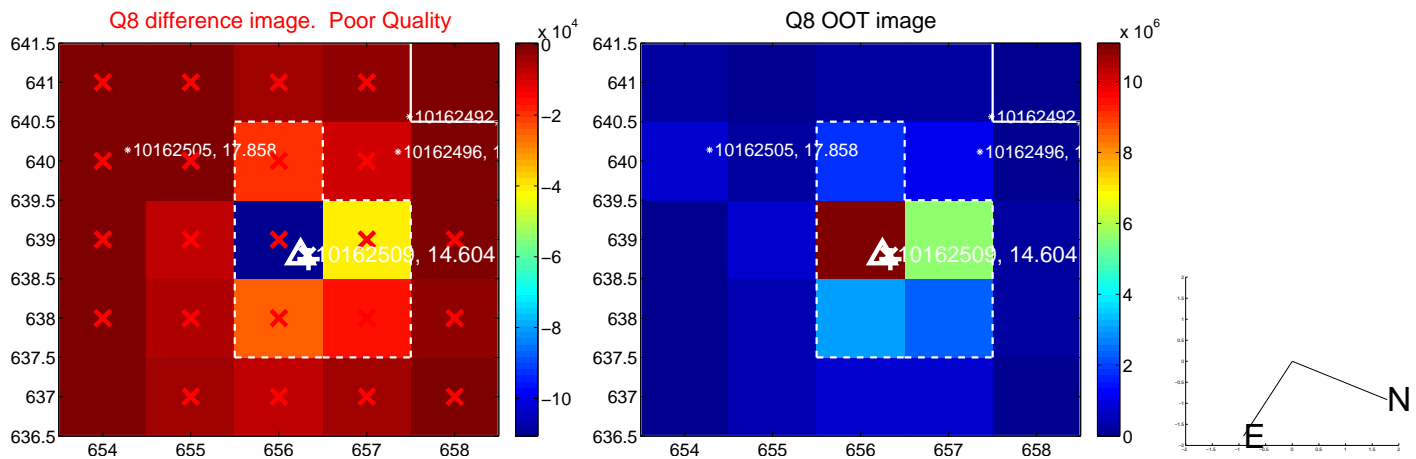
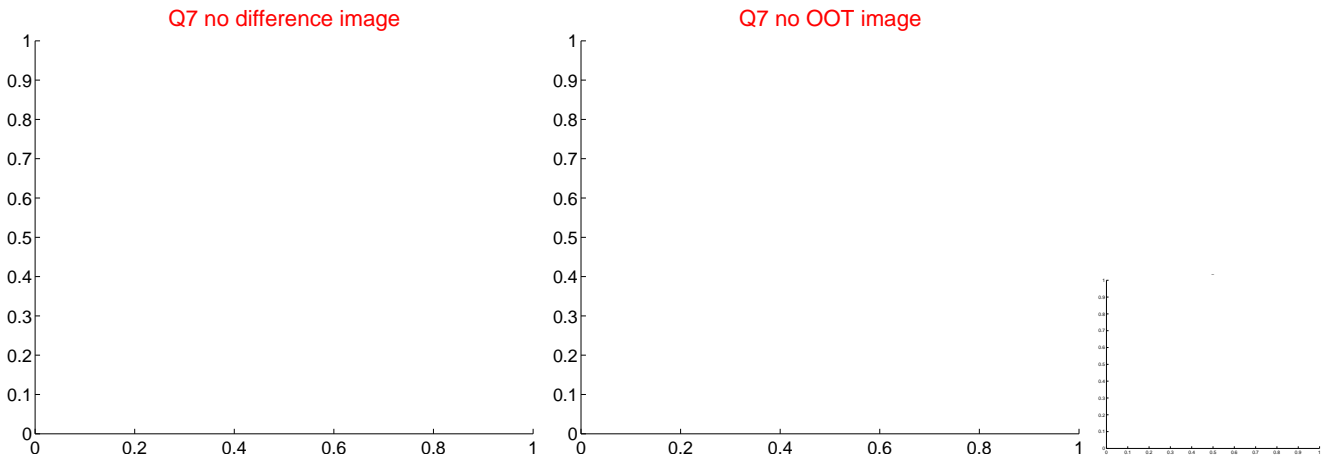
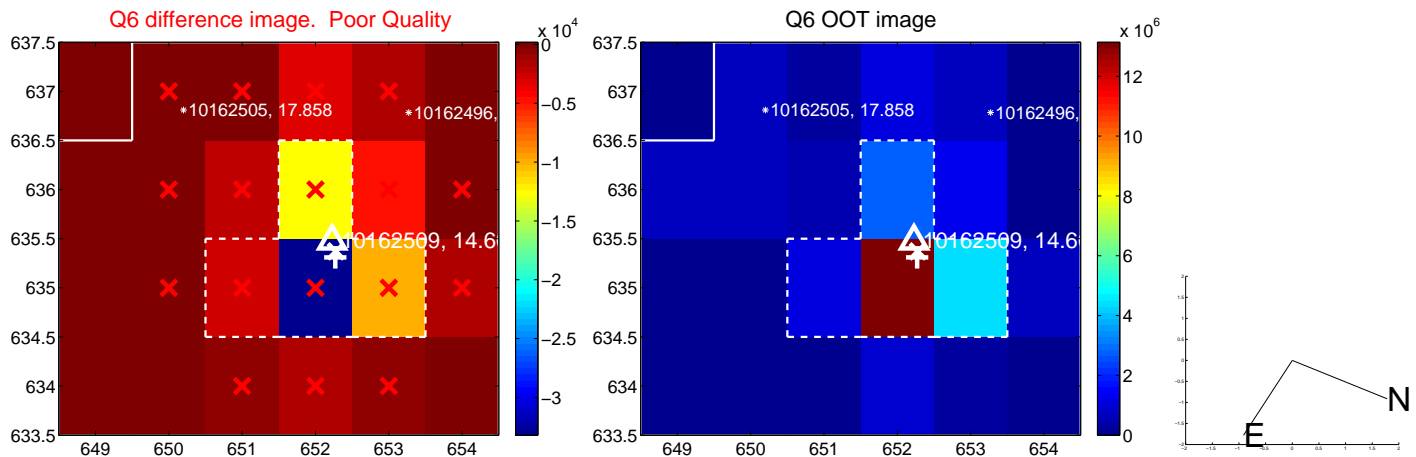
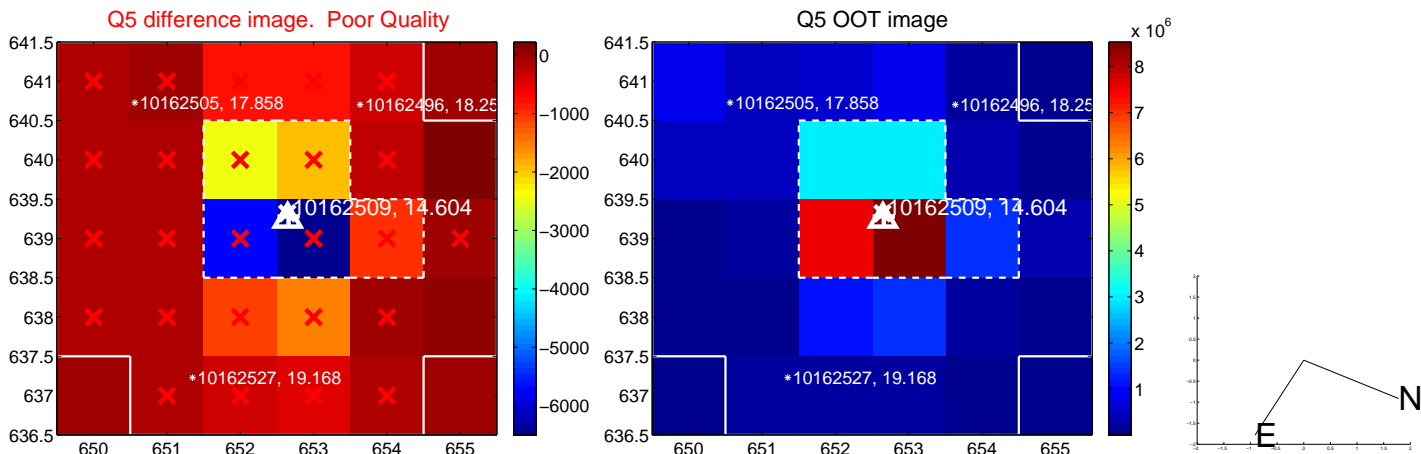


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

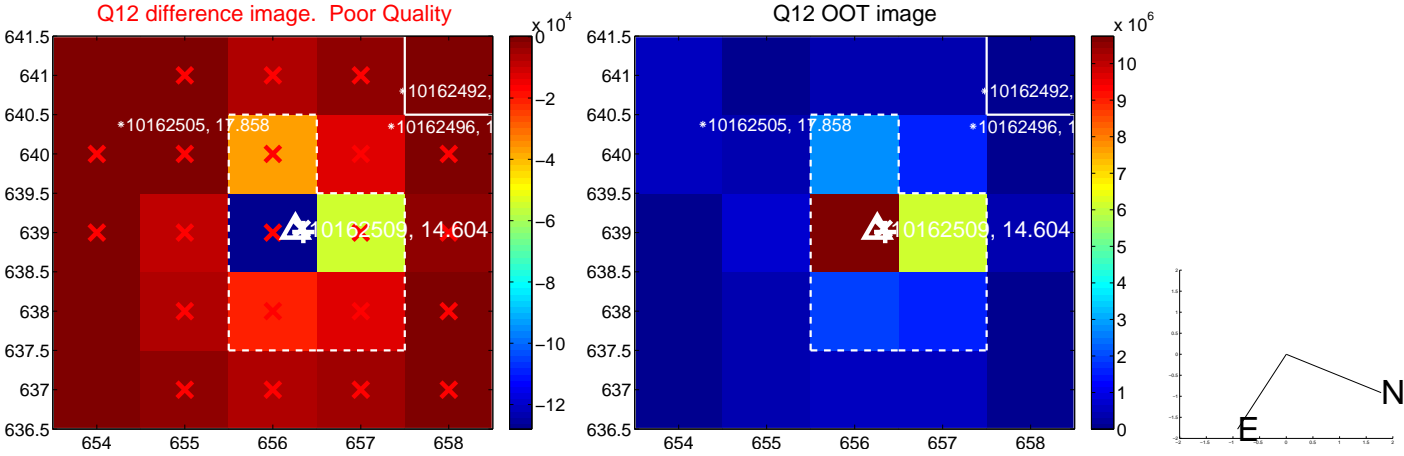
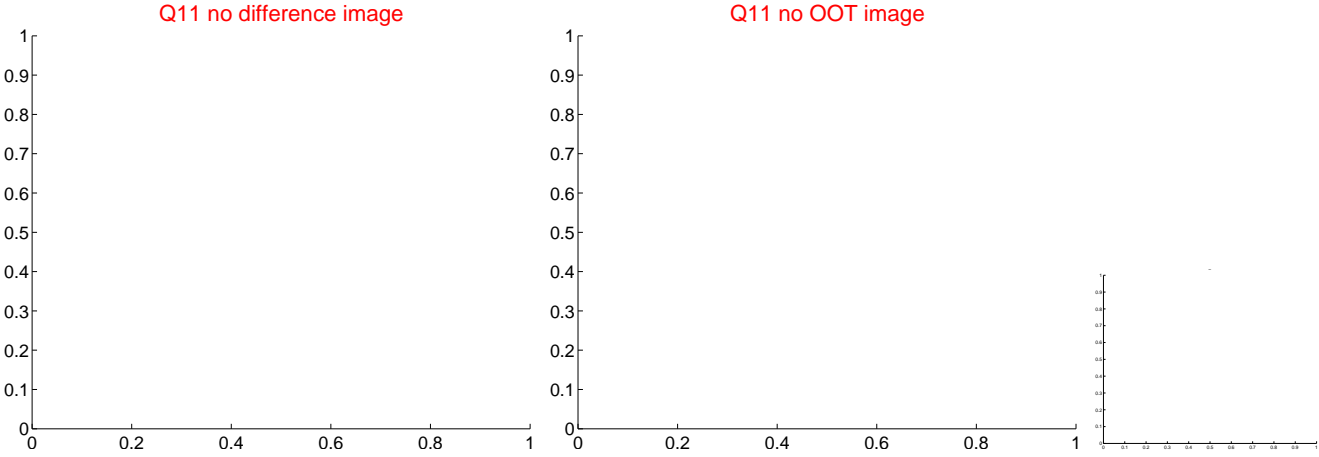
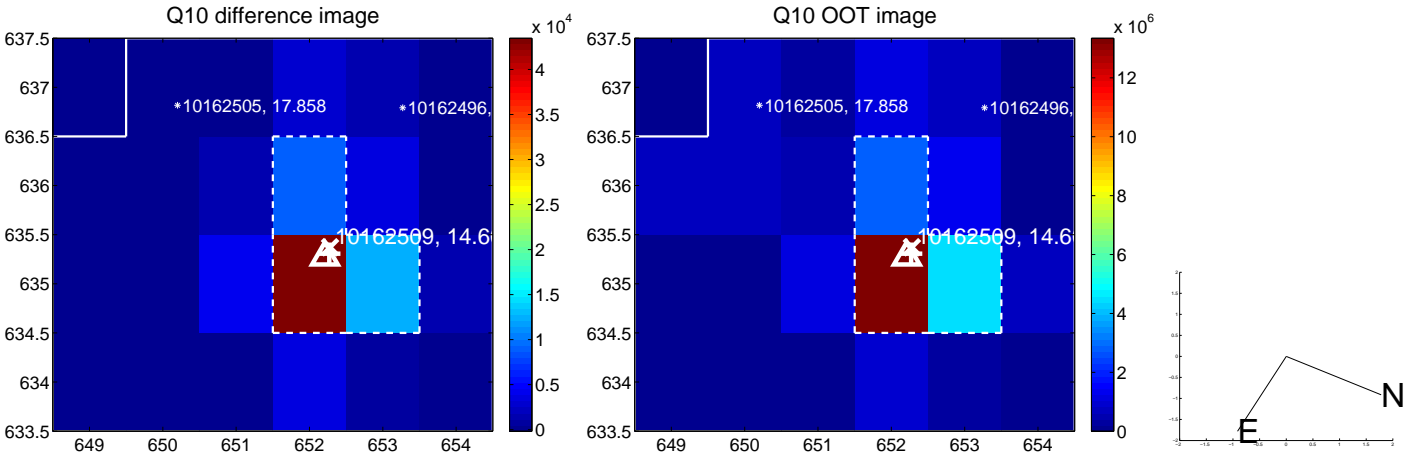
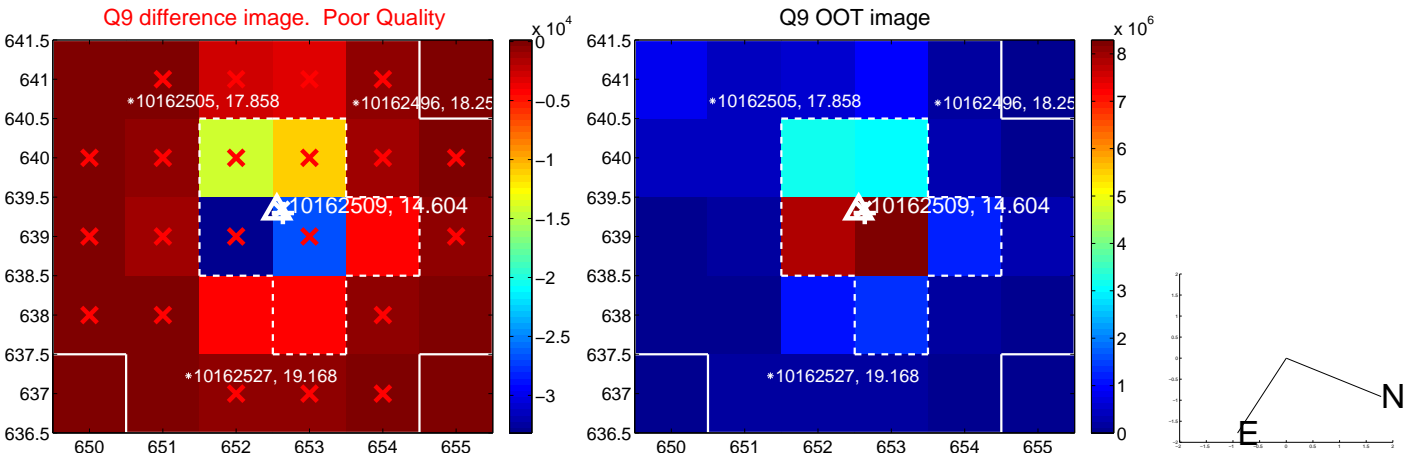
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



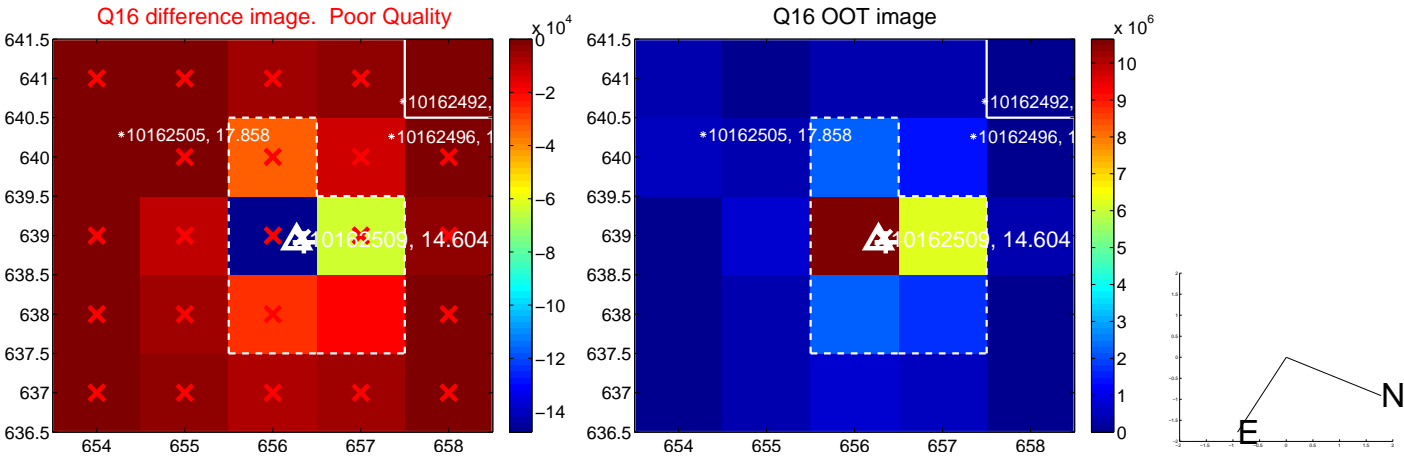
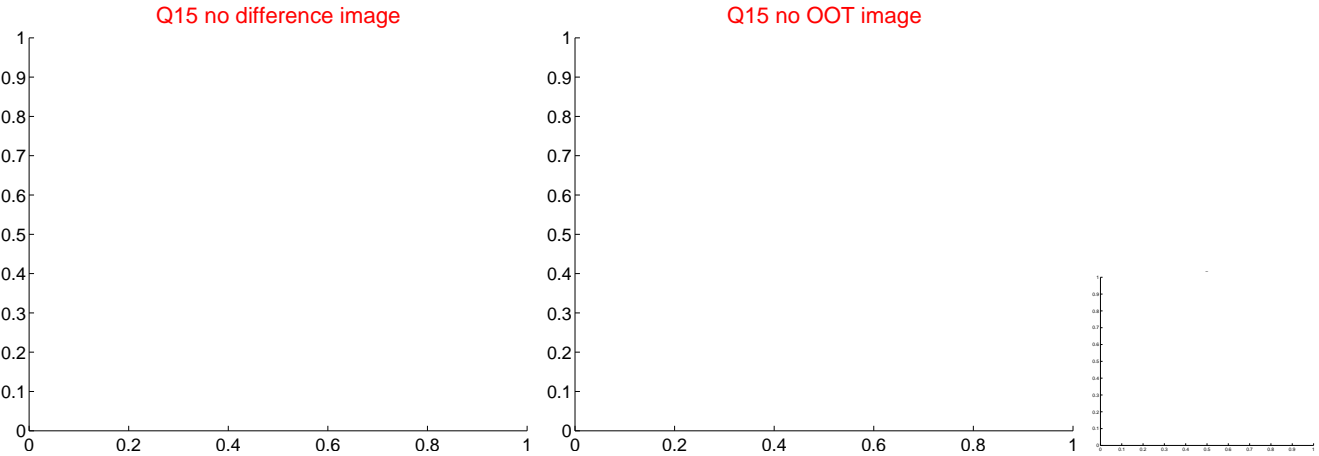
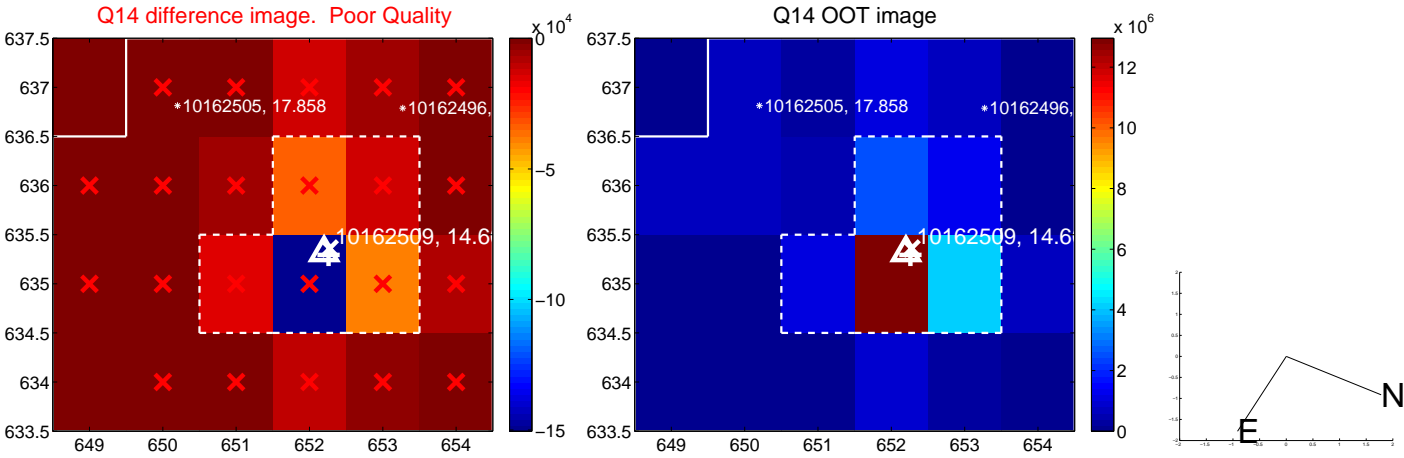
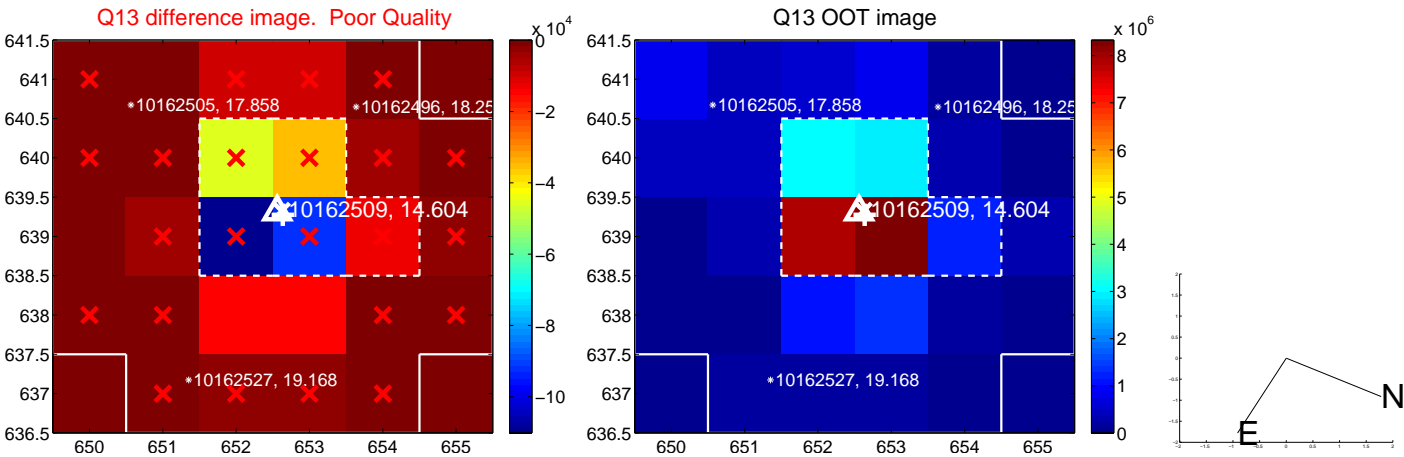
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



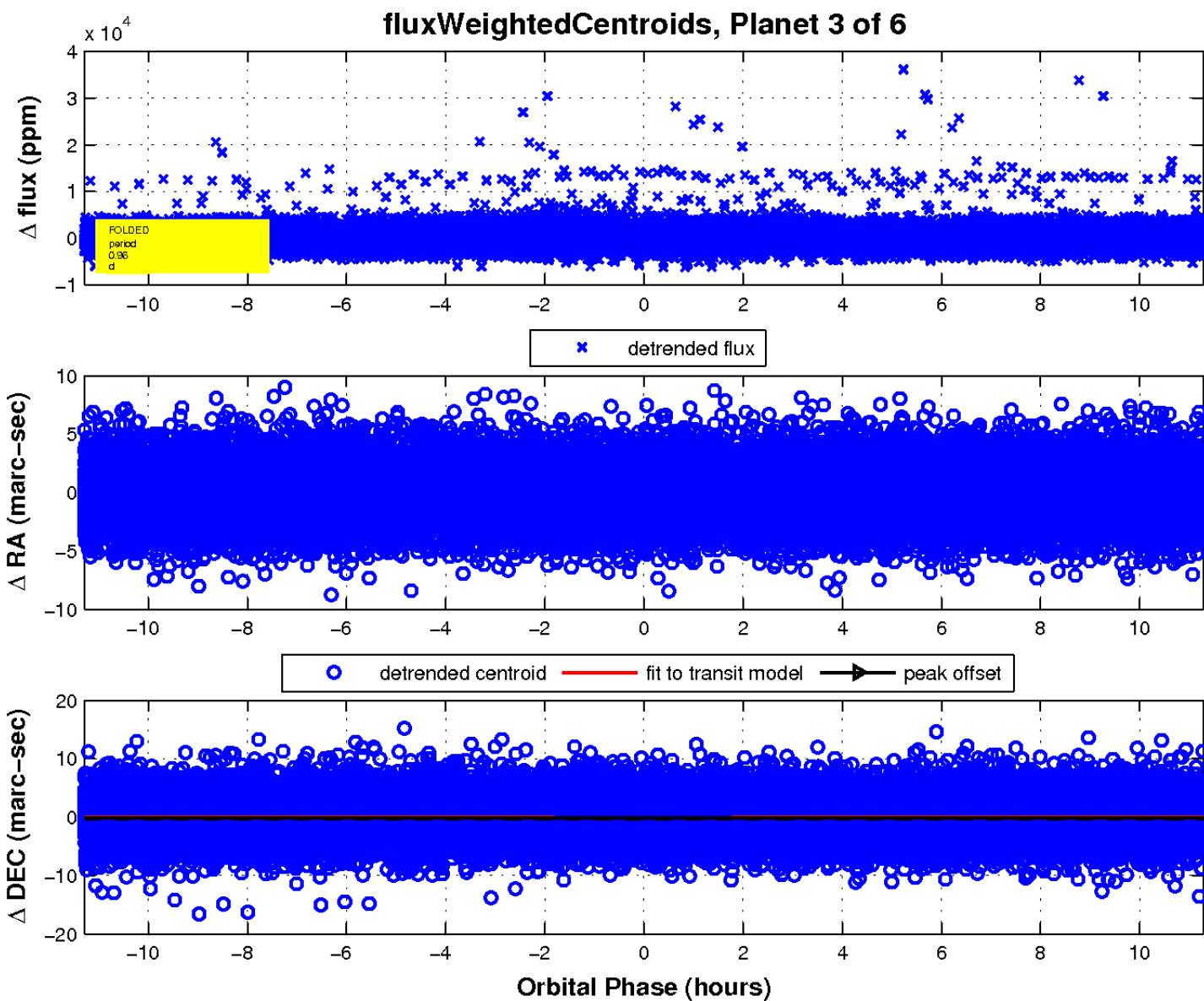
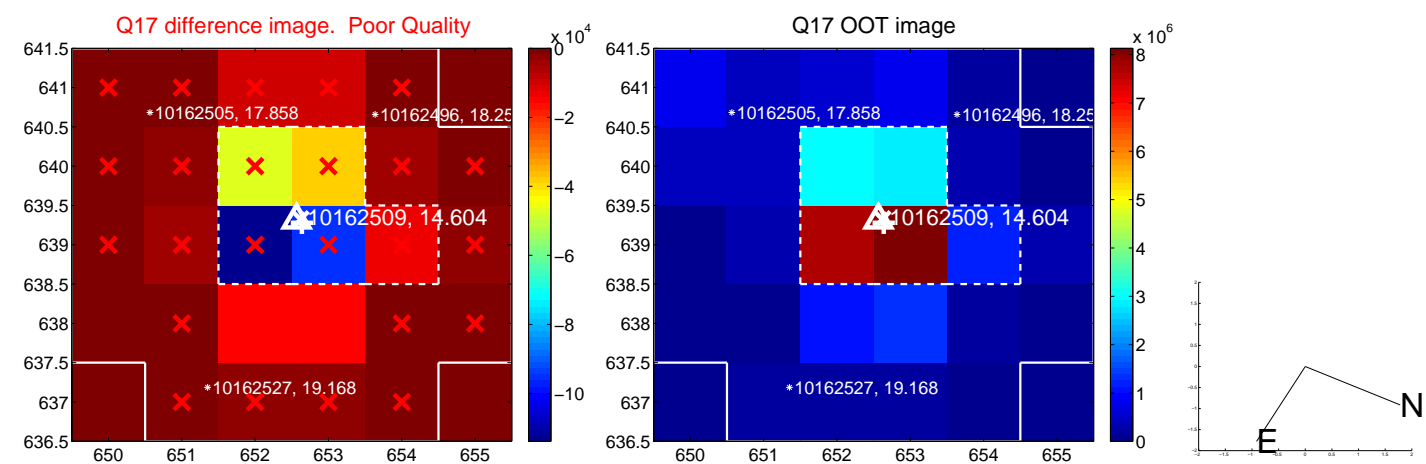
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

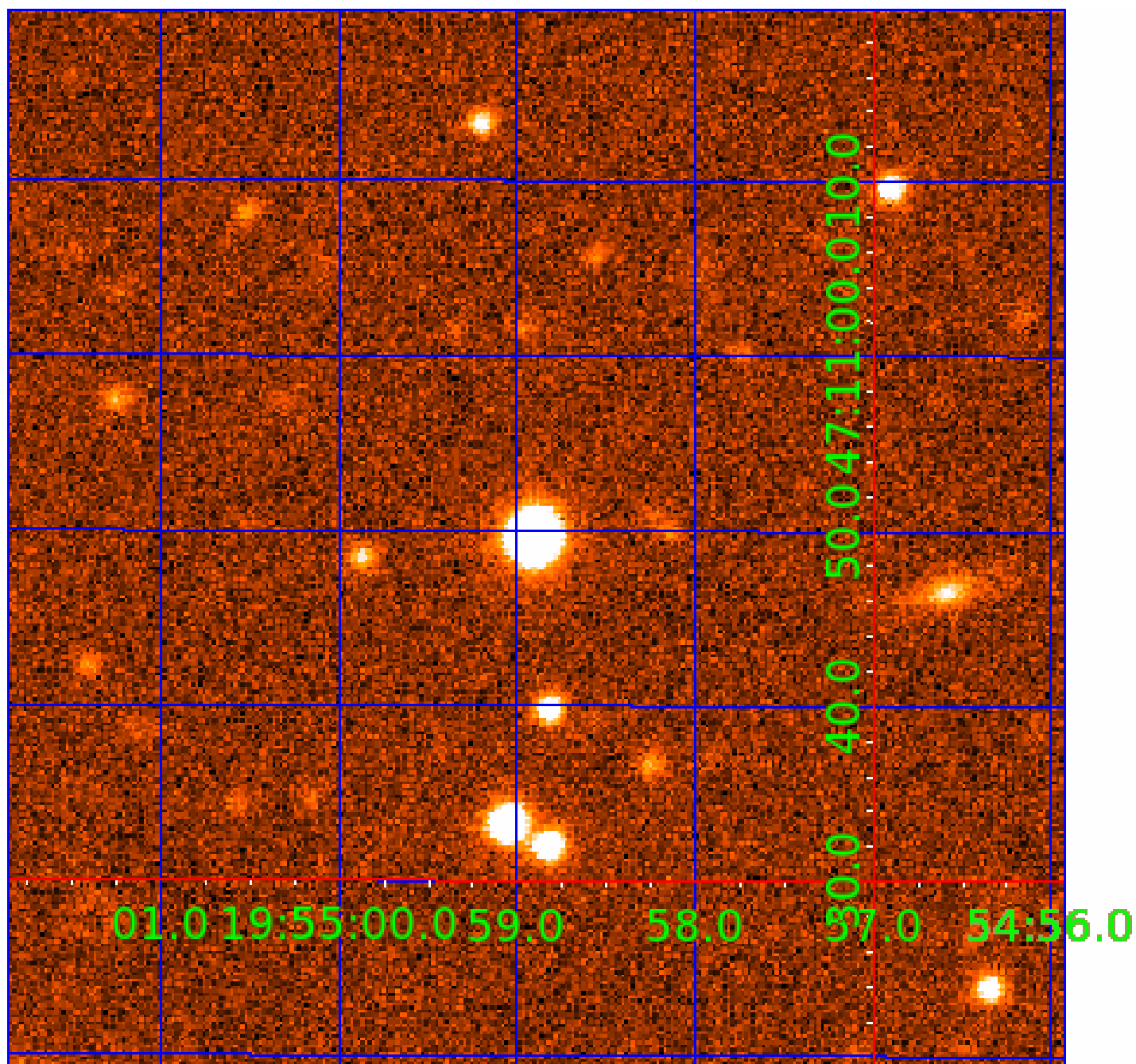


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010162509

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})
010162509-01	OBS	No	533.518934	450.188918	1667.8	4.910	12.8	5.3	0.62	4776	2.49	0.15
010162509-02	OBS	No	0.961344	132.115589	50.5	3.692	10.1	3.6	0.62	4776	0.61	680.82
010162509-03	OBS	No	0.963380	132.287803	149.5	3.763	12.1	7.4	0.62	4776	0.79	678.90
010162509-06	OBS	No	63.403742	138.396612	1537.2	2.000	10.8	-1.0	0.62	4776	2.35	2.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010162509-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010162509-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010162509-03	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
010162509-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

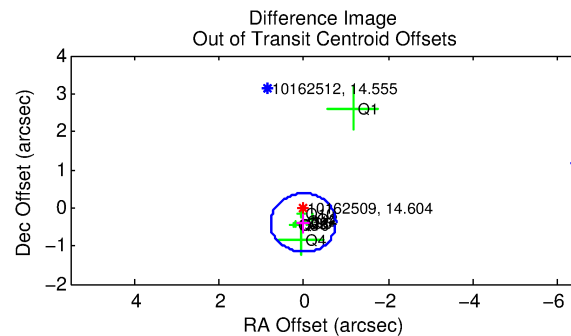
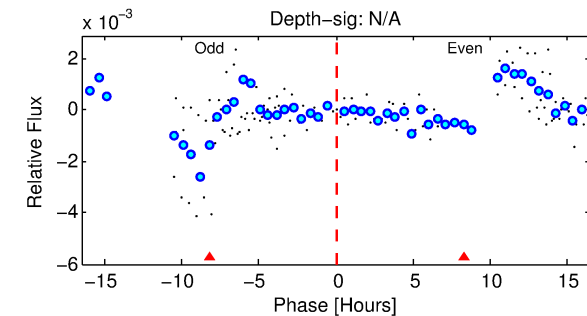
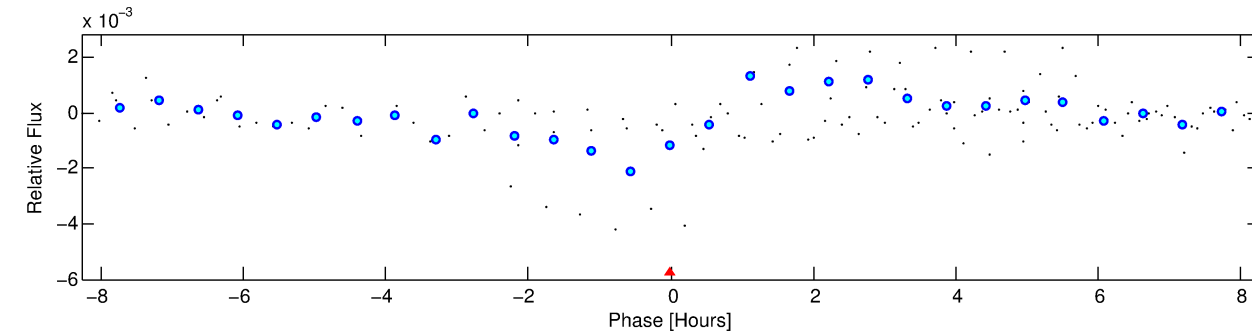
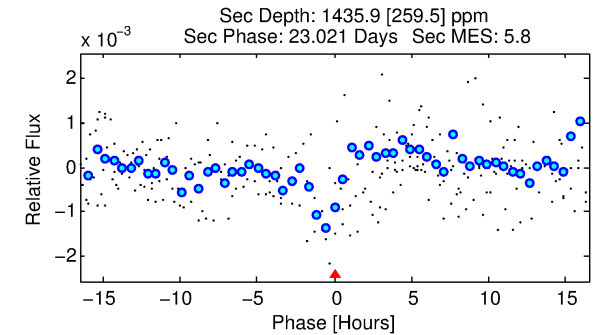
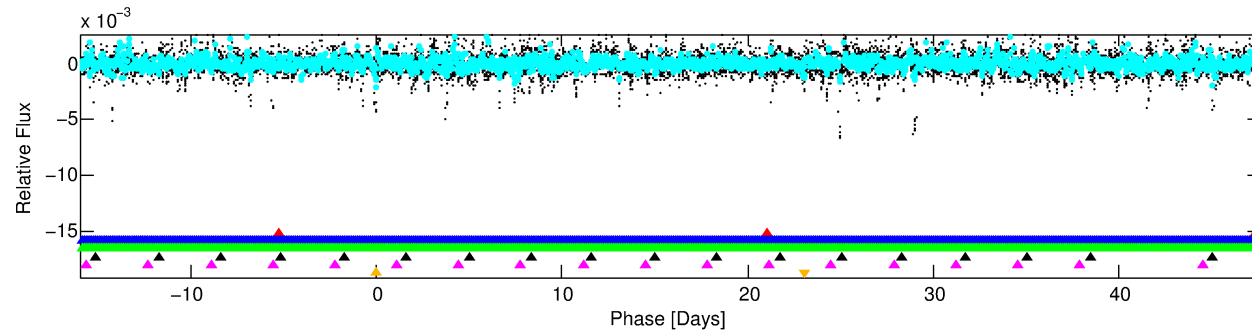
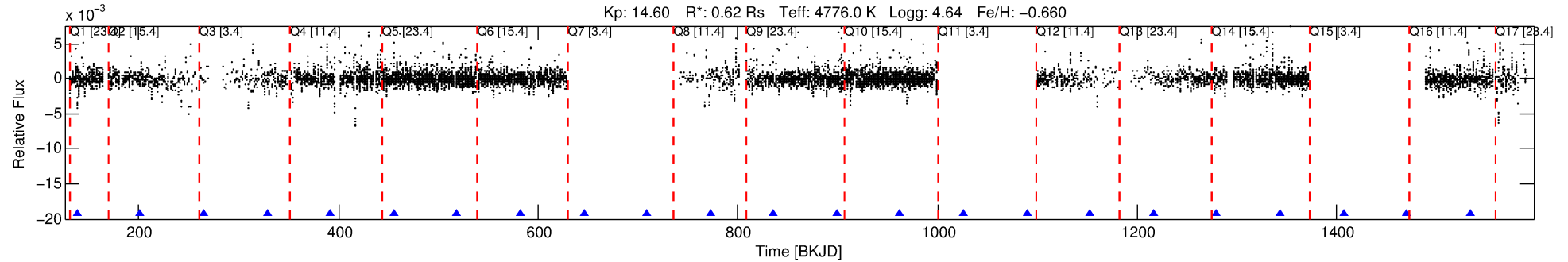
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010162509-06

No Significant Match Found

DV One-Page Summary

KIC: 10162509 Candidate: 6 of 6 Period: 63.404 d



TPS TCE Results:

Period = 63.40374 d
Epoch = 138.3966 BKJD

DV fit results are unavailable

DV Diagnostic Results:

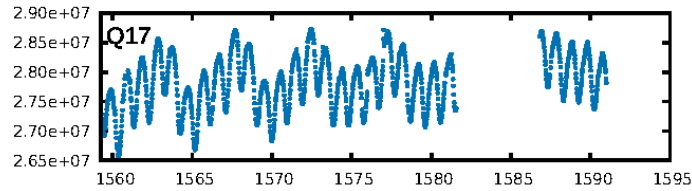
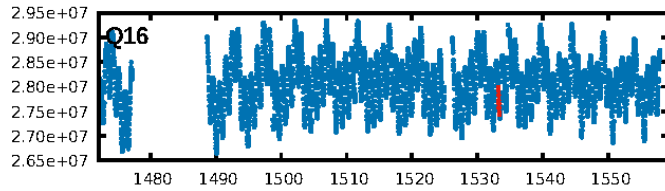
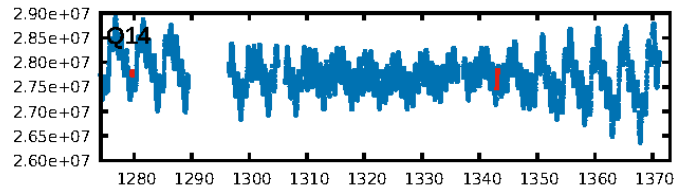
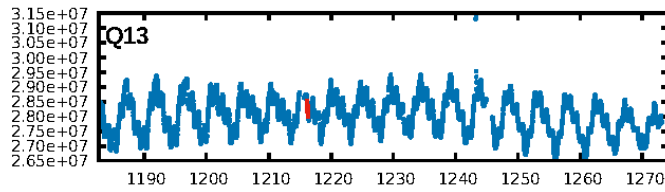
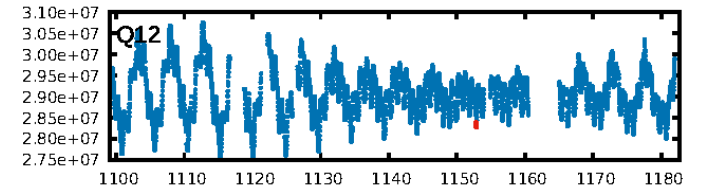
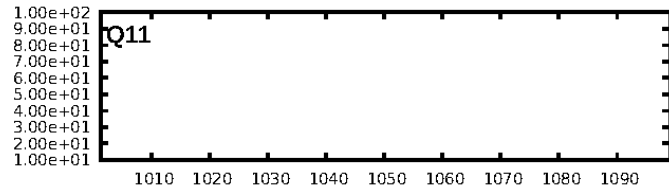
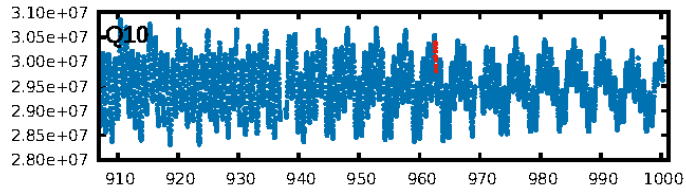
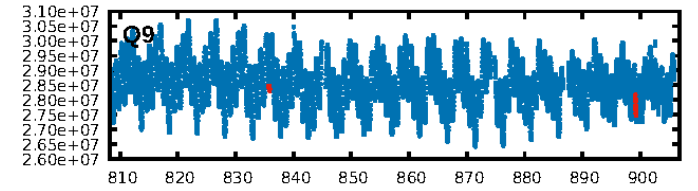
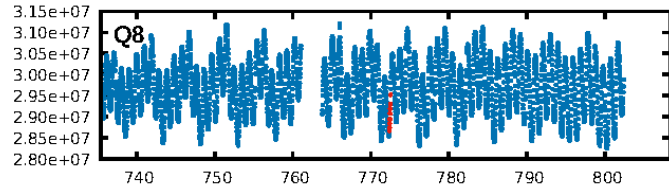
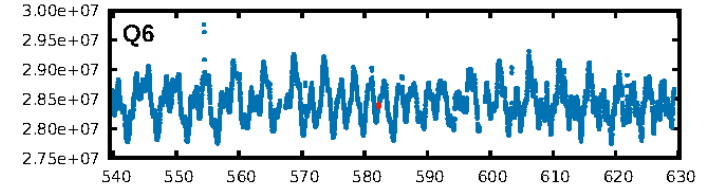
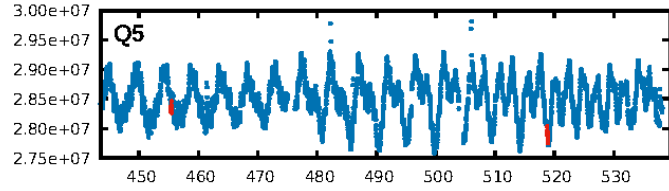
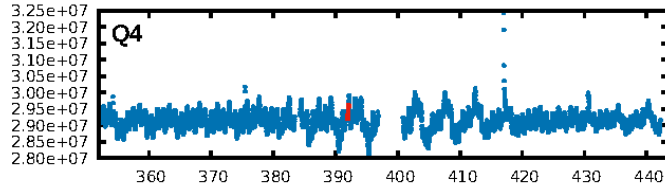
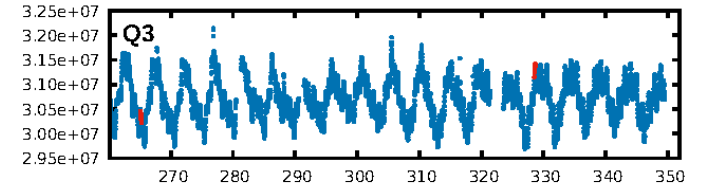
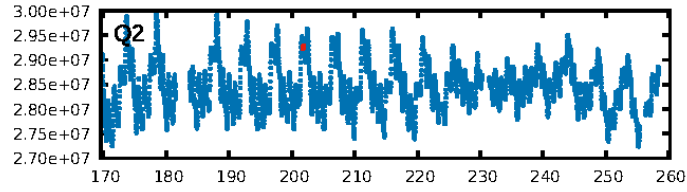
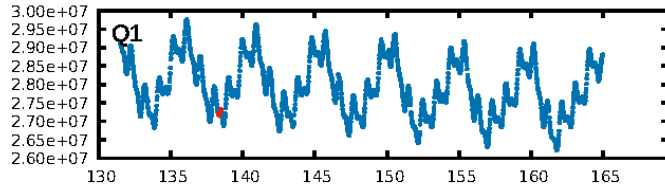
ShortPeriod-sig: 100.0% [351.68 σ]
LongPeriod-sig: 100.0% [49.70 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -0.5555

Centroid-sig: N/A
Centroid-so: 0.321 arcsec [6.79 σ]
OotOffset-rm: 0.392 arcsec [1.53 σ]
KicOffset-rm: 0.261 arcsec [0.87 σ]
OotOffset-st: 3/1/4/3 [11]
KicOffset-st: 3/1/4/3 [11]
DiffImageQuality-fgm: 0.64 [7/11]
DiffImageOverlap-fno: 0.00 [0/12]

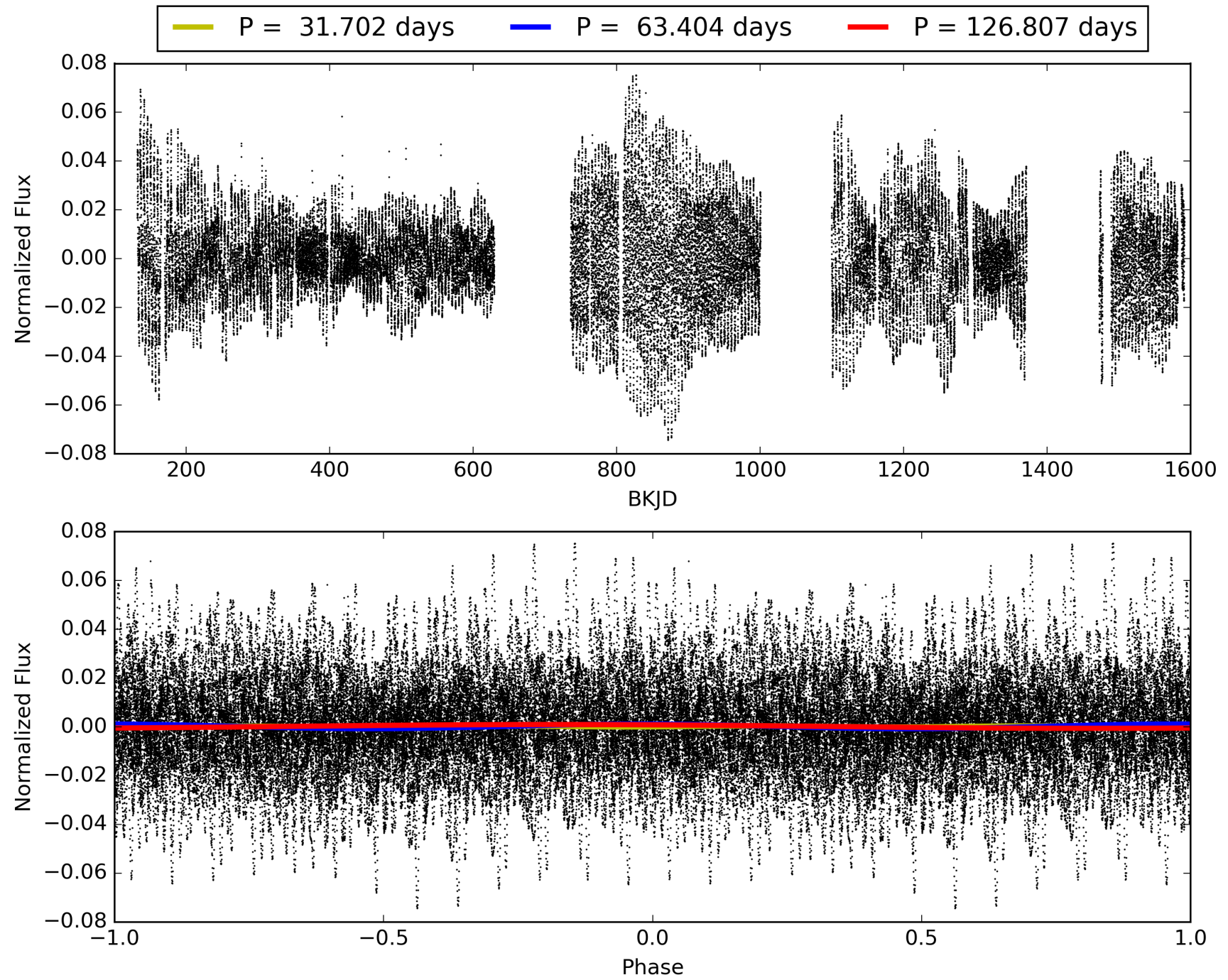
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:13:13 Z

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

TCE 010162509-06, PDC Light Curves

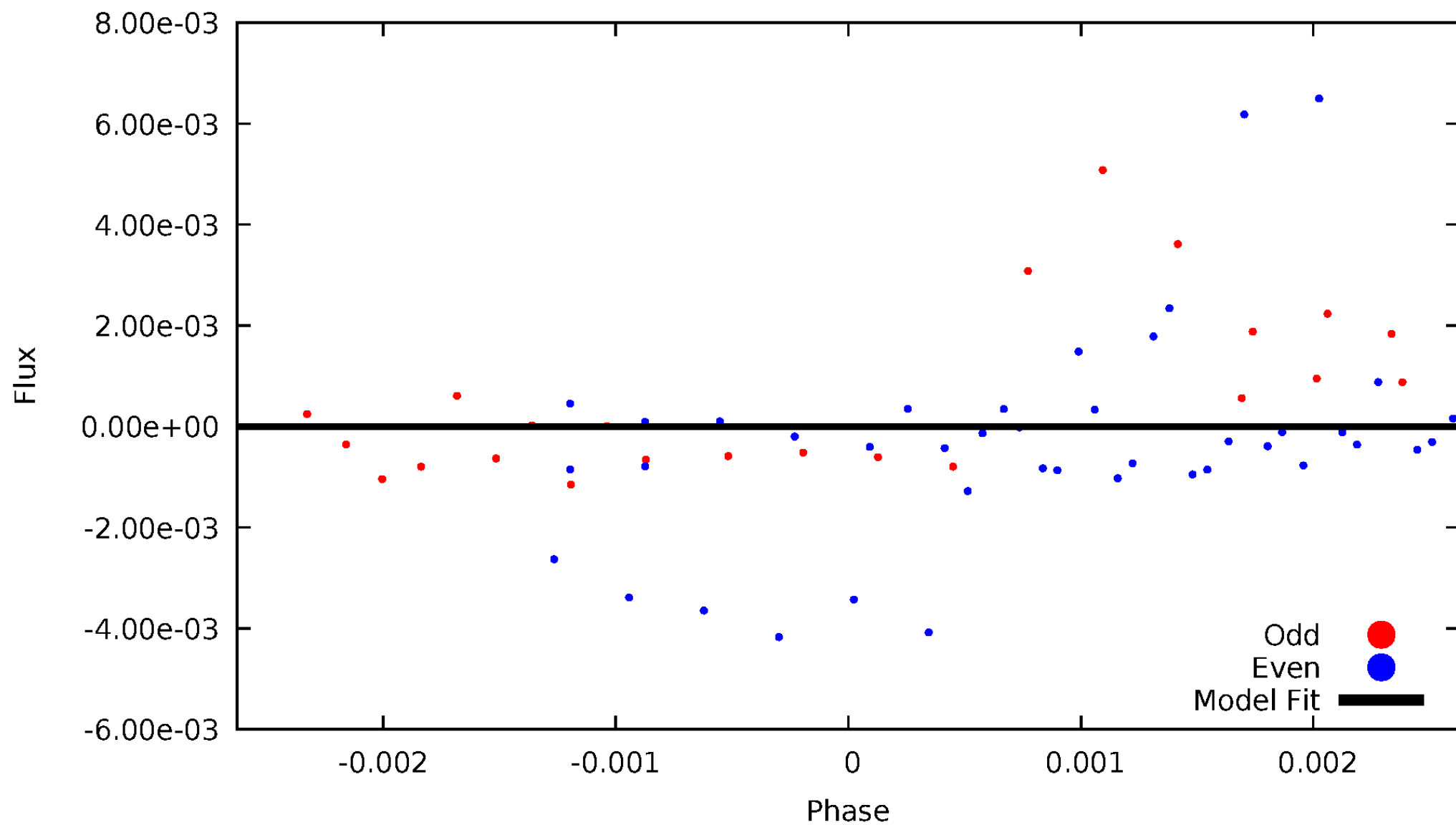


TCE 010162509-06



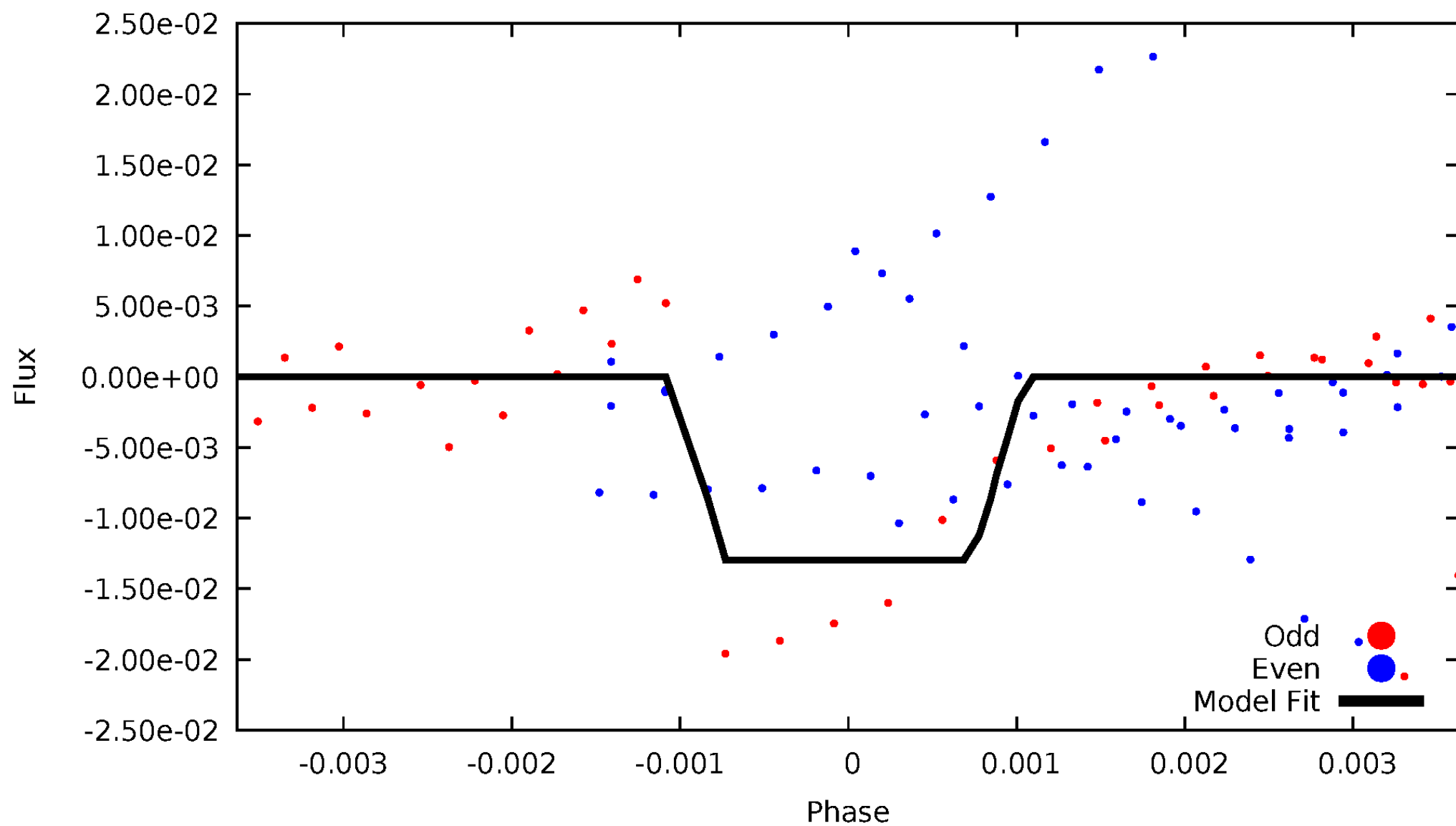
DV Odd/Even

TCE 010162509-06



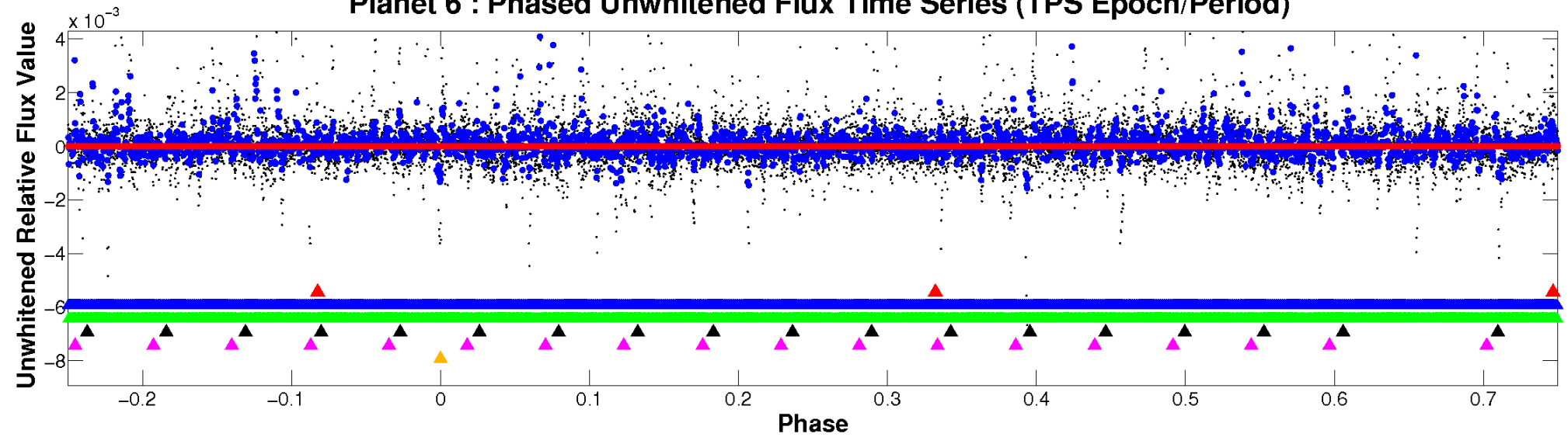
ALT Odd/Even

TCE 010162509-06



Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

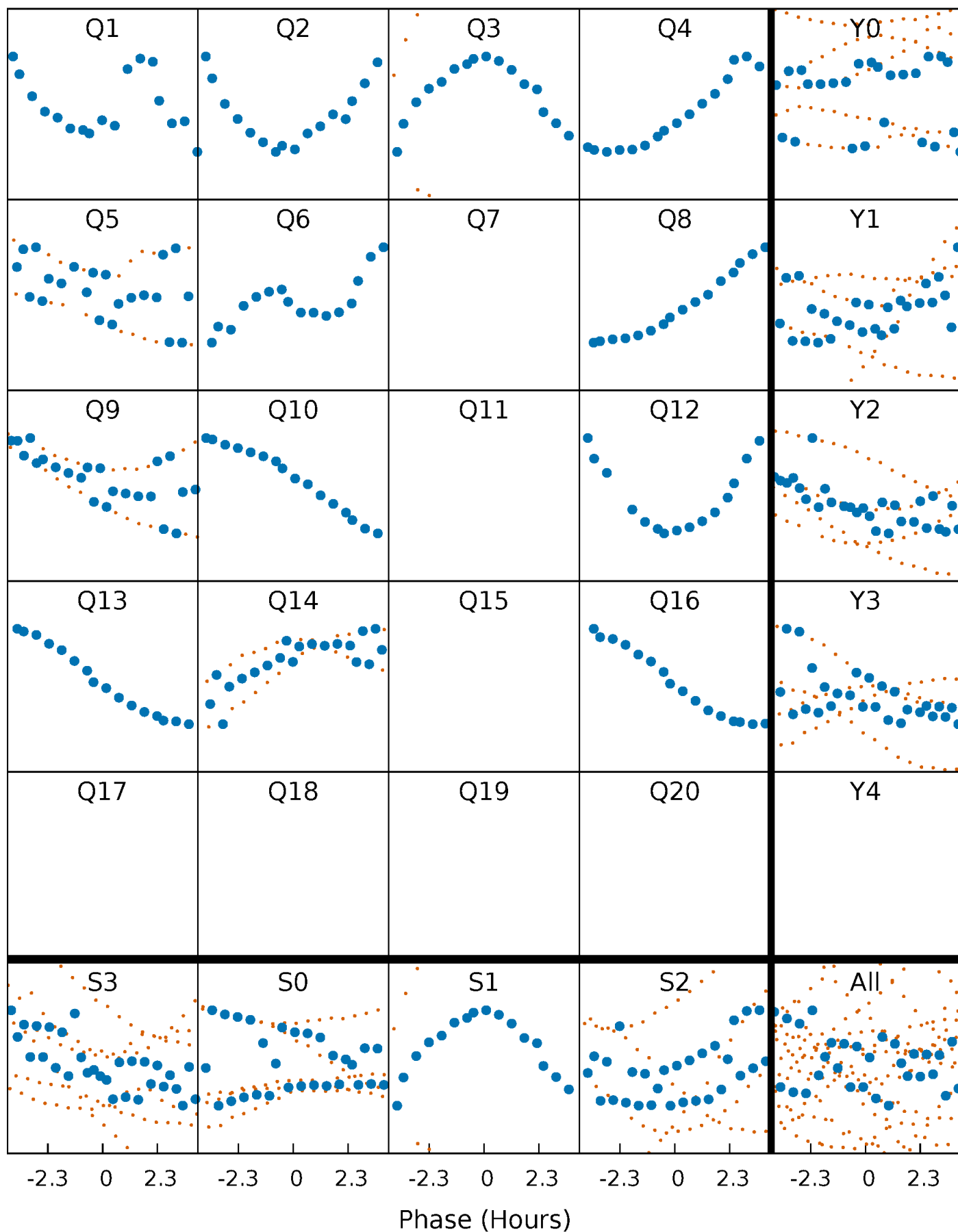


Planet 6 : Phased Whitened Flux Time Series (TPS Epoch/Period)



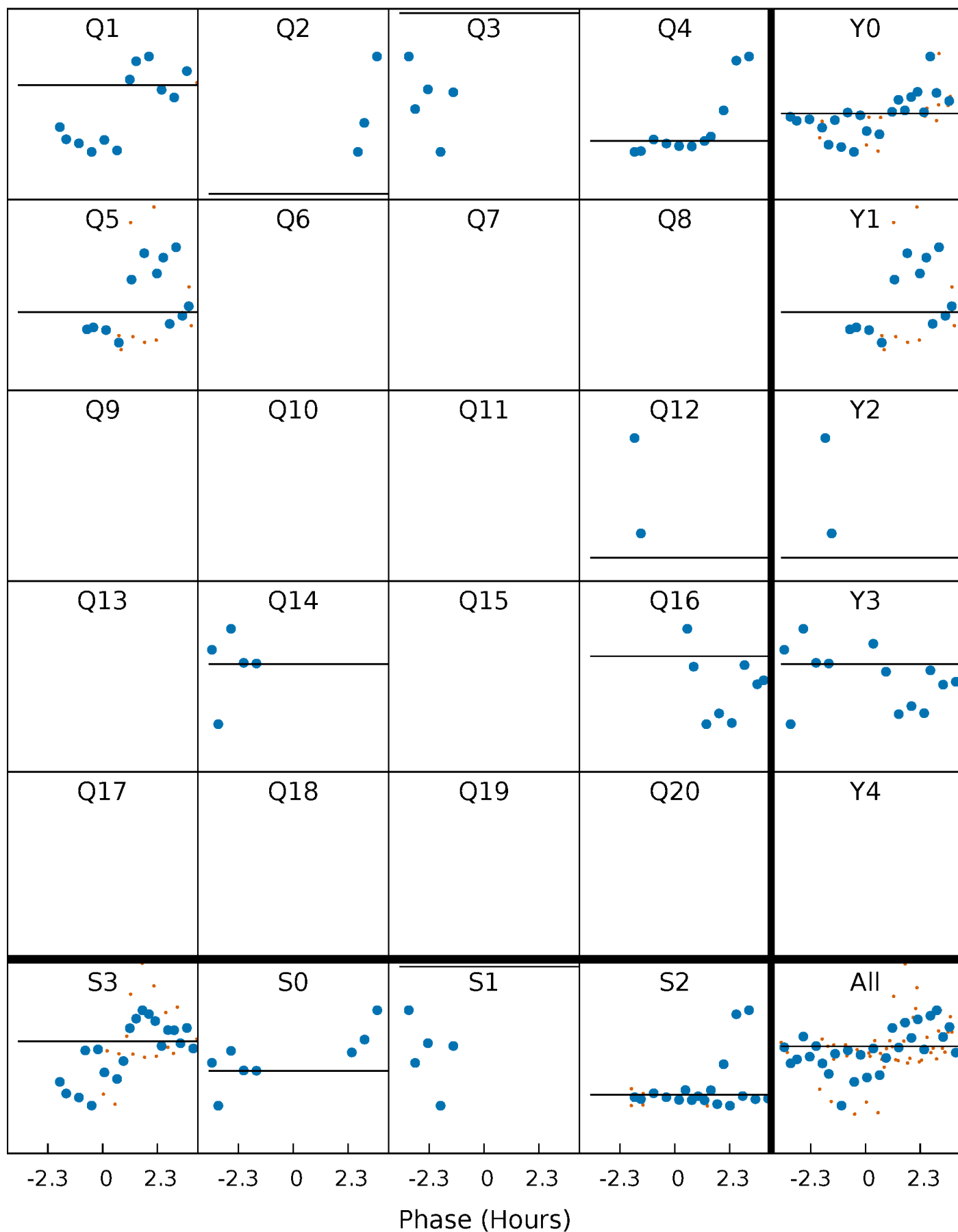
PDC Quarter-Phased Transit Curves

TCE 010162509-06 P= 63.403742 Days $T_0=138.396612$ (BKJD)



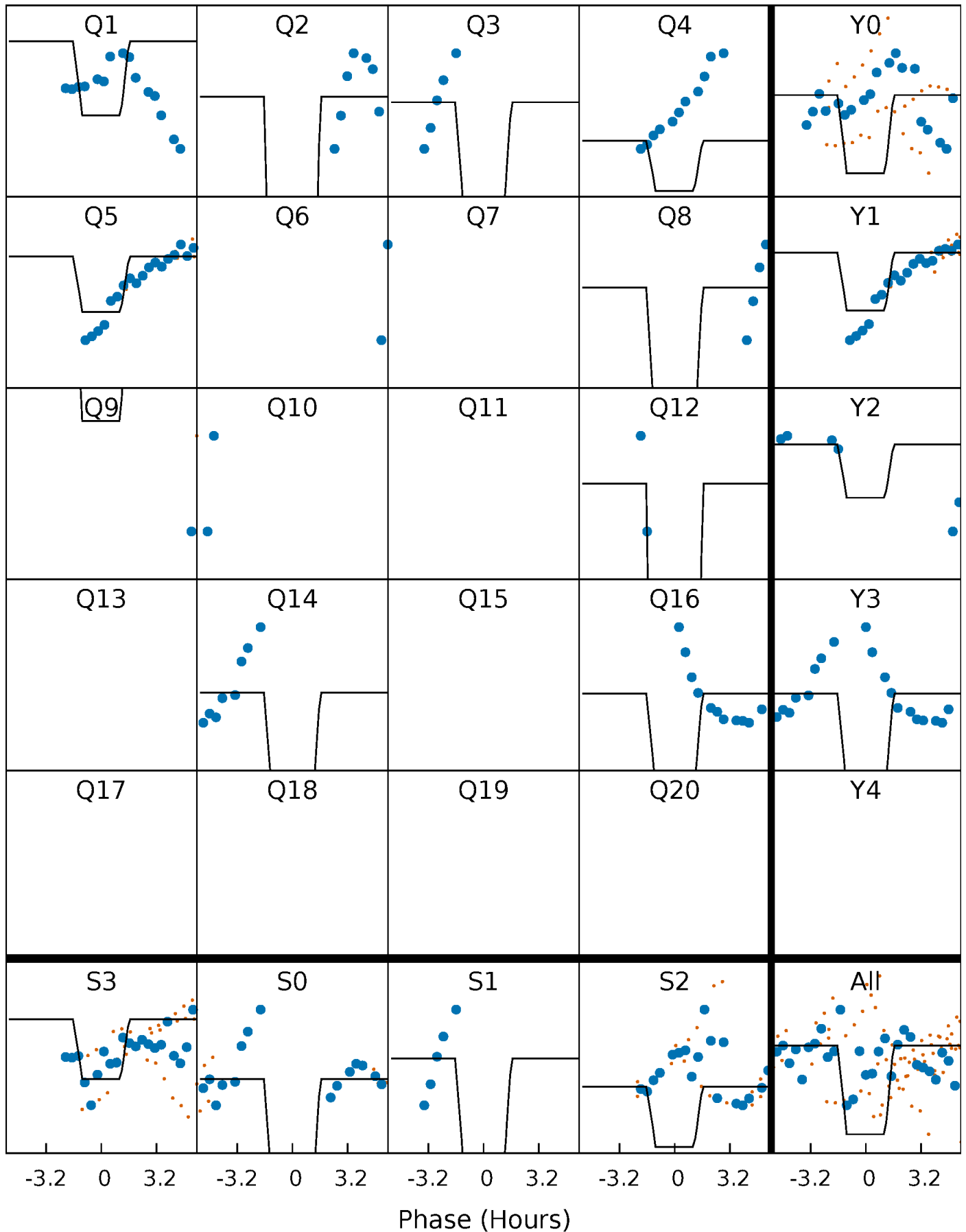
DV Quarter-Phased Transit Curves

TCE 010162509-06 P= 63.403742 Days $T_0=138.396612$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

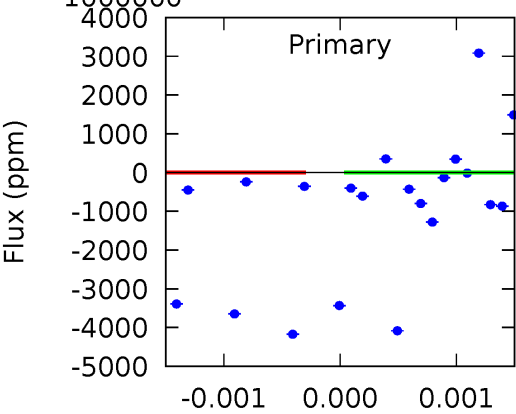
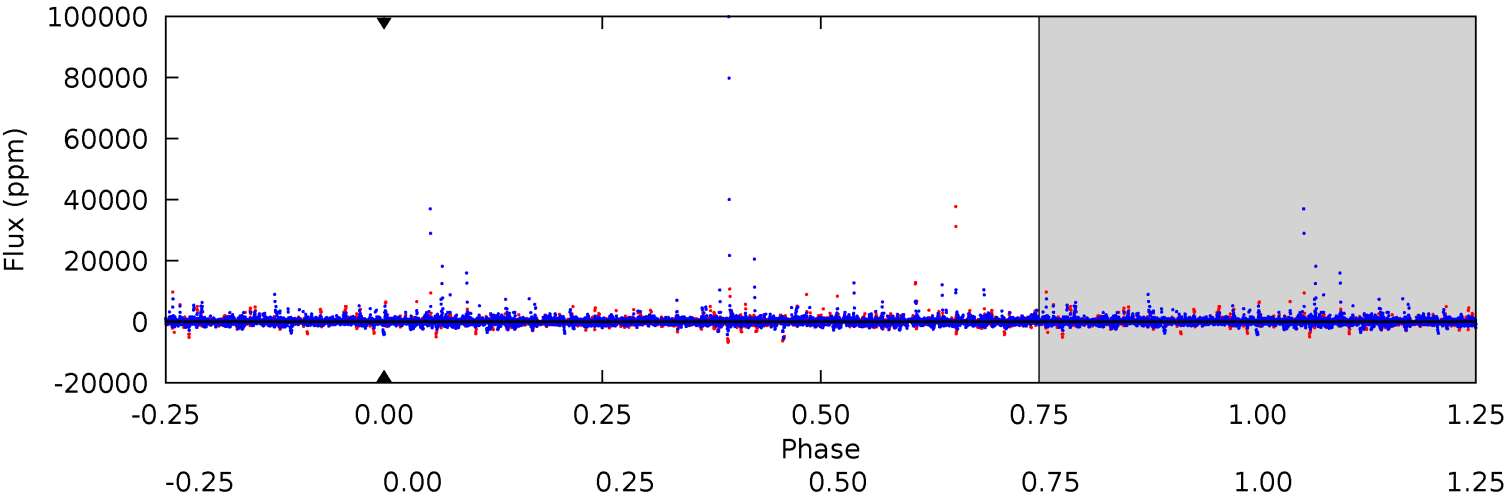
TCE 010162509-06 P= 63.403742 Days $T_0=138.410144$ (BKJD)



DV Model-Shift Uniqueness Test

010162509-06, P = 63.403742 Days, E = 74.992870 Days

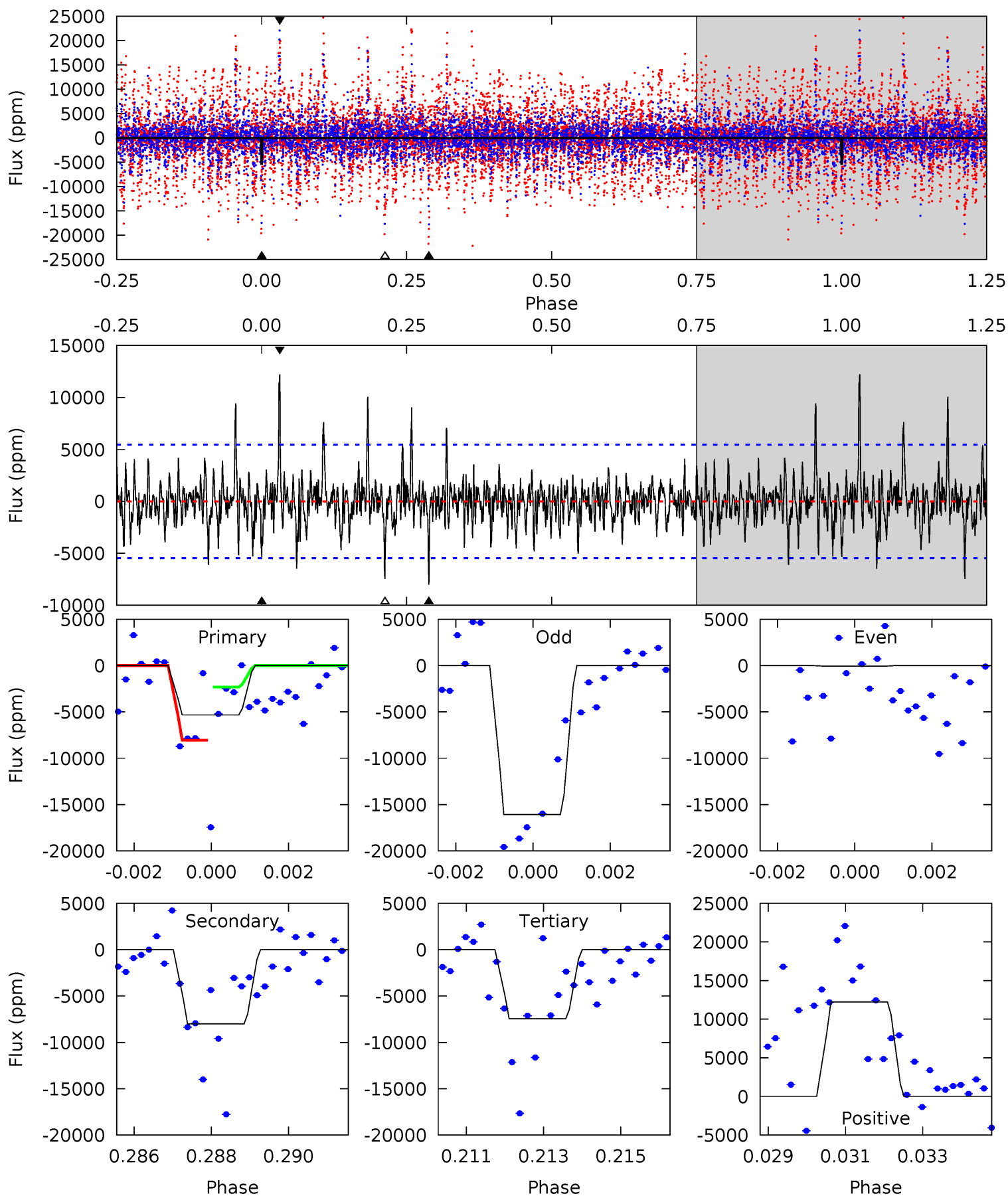
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

010162509-06, P = 63.403742 Days, E = 75.006402 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.21	7.82	7.28	11.9	5.33	3.10	1.79	-2.07	-6.73	0.54	-4.12	7.11	0.67	0.60	2.86



Stellar Parameters For KIC 010162509

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4776^{+142}_{-142}	$4.640^{+0.058}_{-0.031}$	$-0.660^{+0.300}_{-0.300}$	$0.616^{+0.052}_{-0.052}$	$0.604^{+0.063}_{-0.034}$	$3.643^{+0.895}_{-0.496}$
	+3%/-3%	+1%/-1%	+45%/-45%	+8%/-8%	+10%/-6%	+25%/-14%
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 010162509-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	0 ± 1000000	$5.24^{+5.78}_{-3.62}$	448^{+15}_{-15}	-3111^{+16273}_{-10368}	$-758.127^{+255904.110}_{-267677.934}$
Alt.	-8007 ± 1024	$9.01^{+6.07}_{-5.41}$	449^{+16}_{-16}	4099^{+2003}_{-667}	3850^{+22046}_{-2486}

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

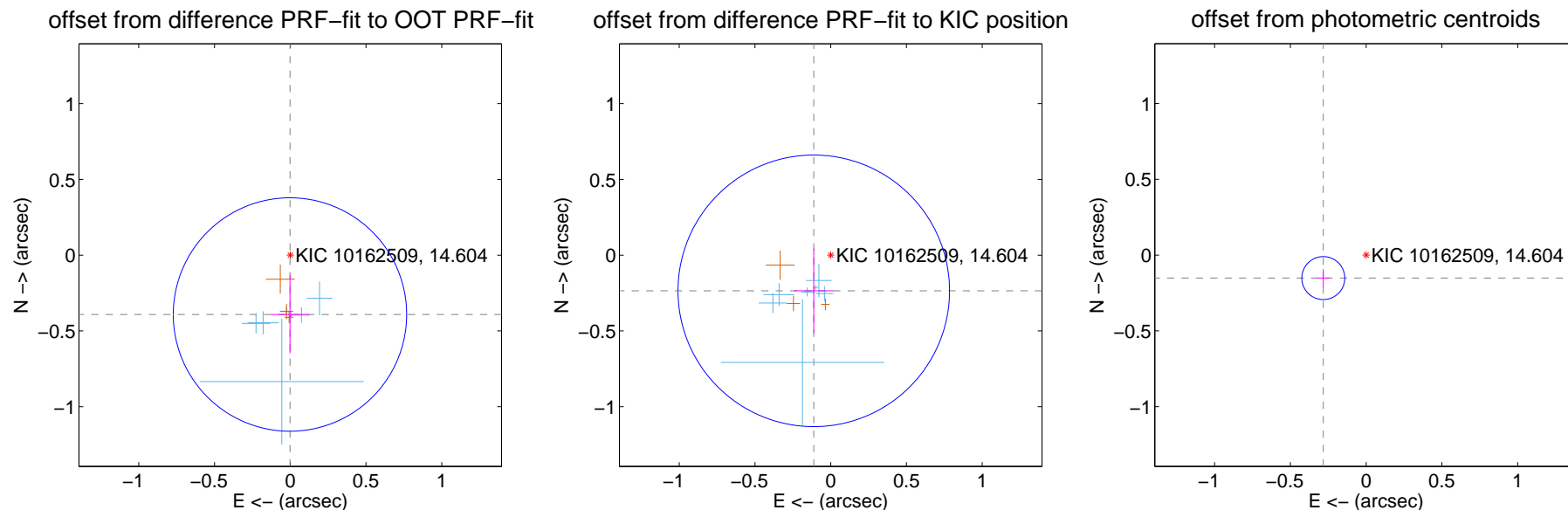
DV Centroid Data

Supplemental centroid analysis for 010162509-06. Kepler magnitude: 14.60. Transit SNR -1.00

There are 7 quarters with good PRF difference image offsets

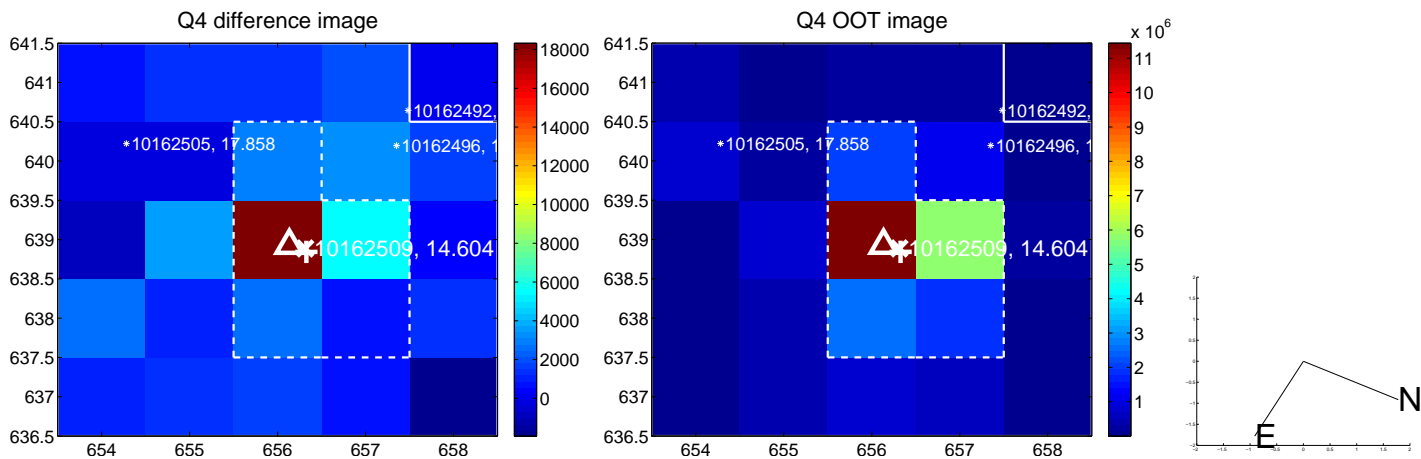
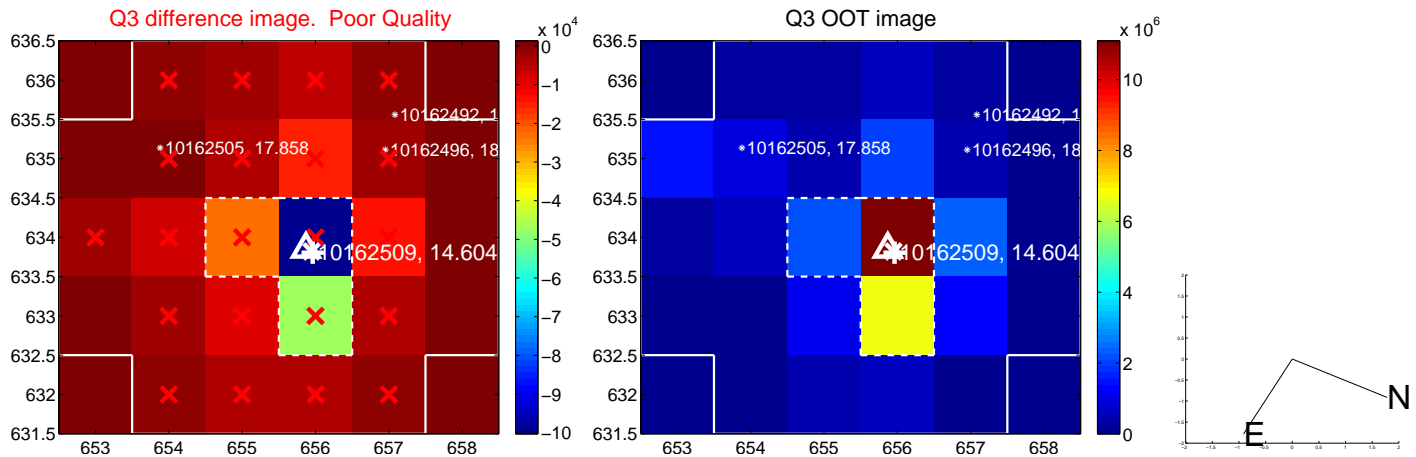
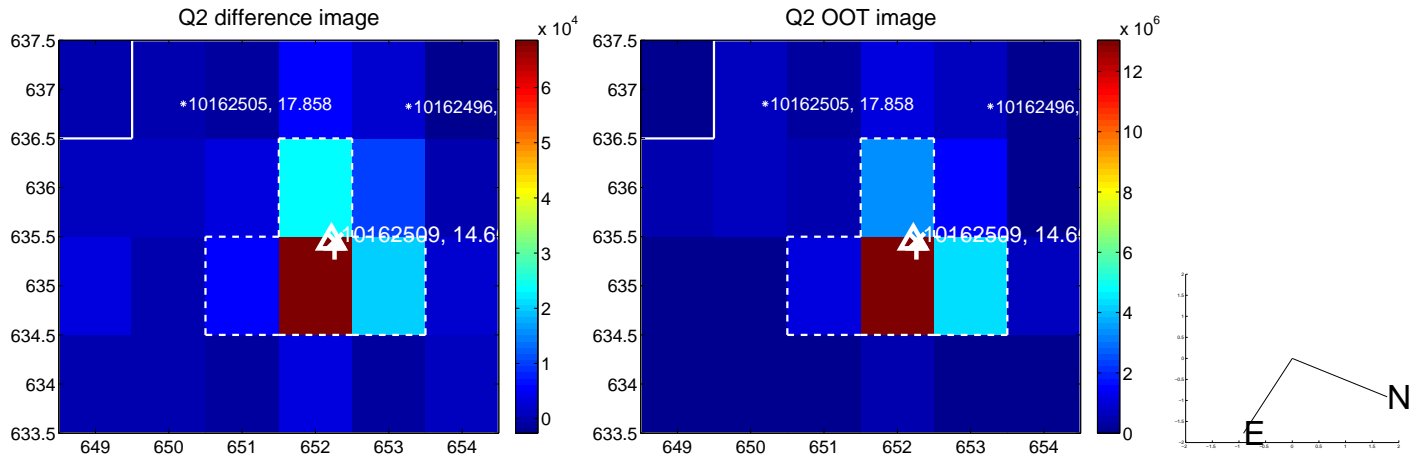
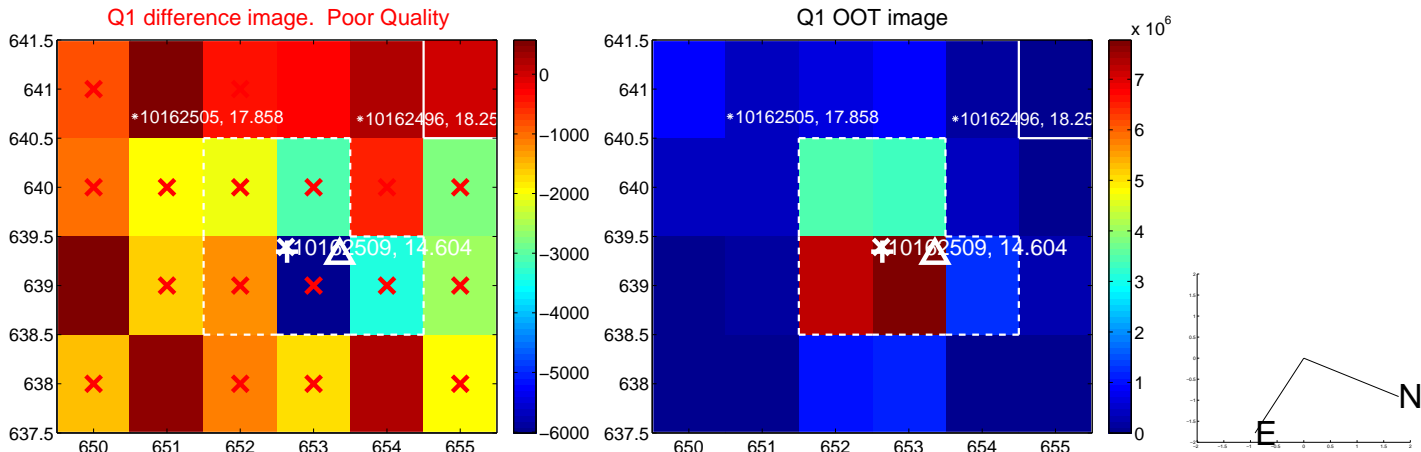
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.392 ± 0.257	1.53	0.002 ± 0.125	-0.392 ± 0.256
PRF-fit source offset from KIC position	0.261 ± 0.299	0.87	0.112 ± 0.131	-0.235 ± 0.279
photometric centroid source offset	0.32 ± 0.05	6.79	0.28 ± 0.04	-0.15 ± 0.06

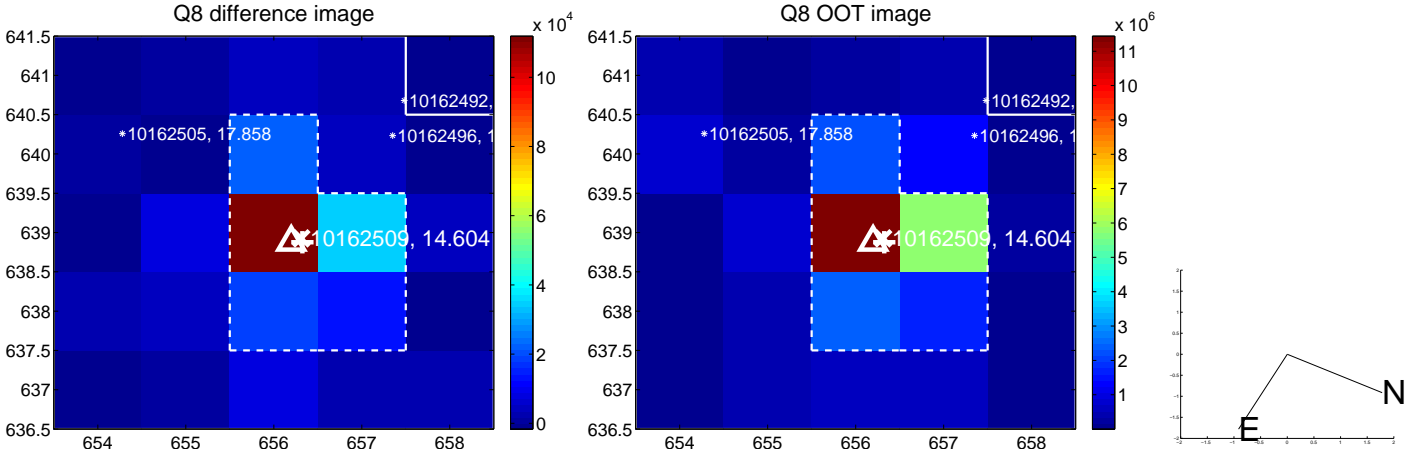
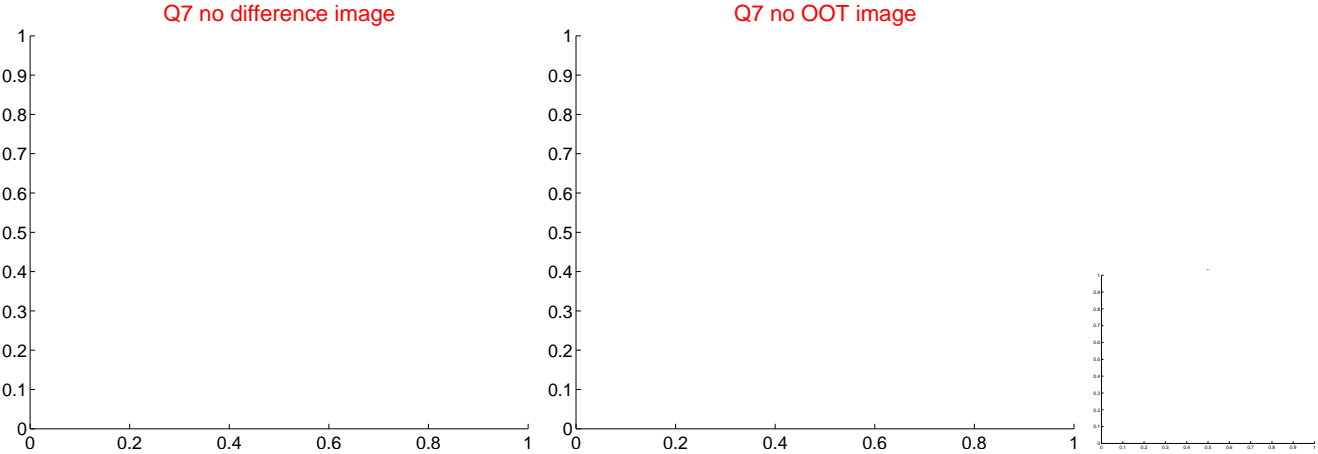
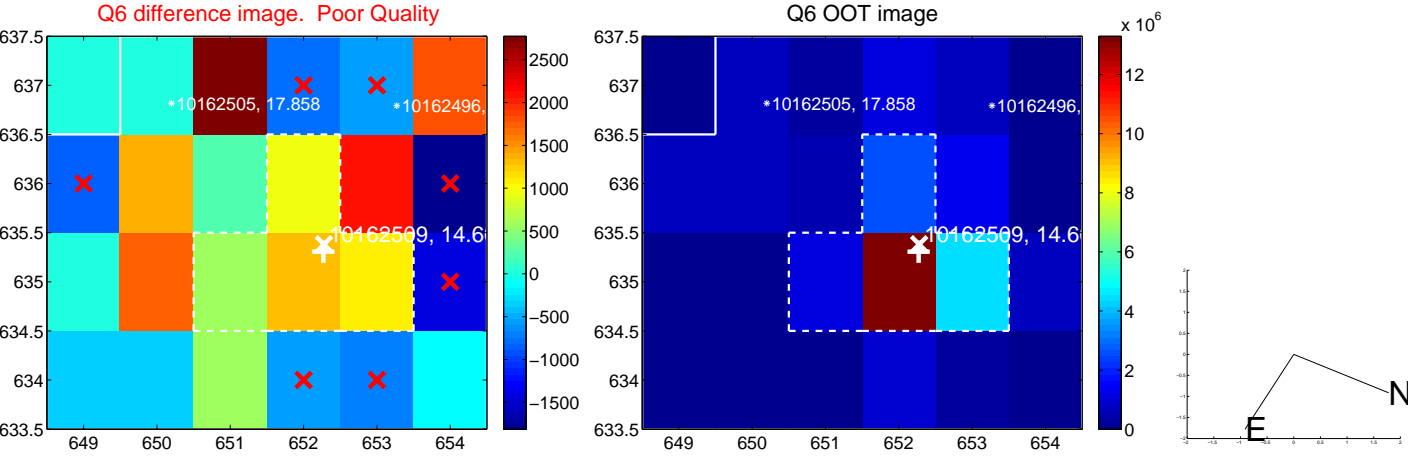
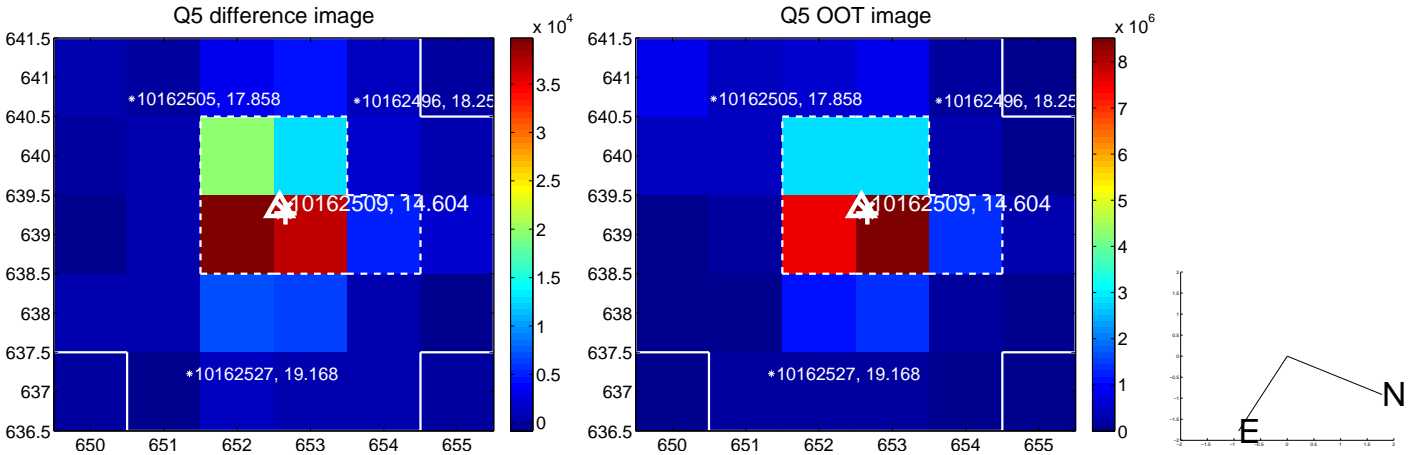


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

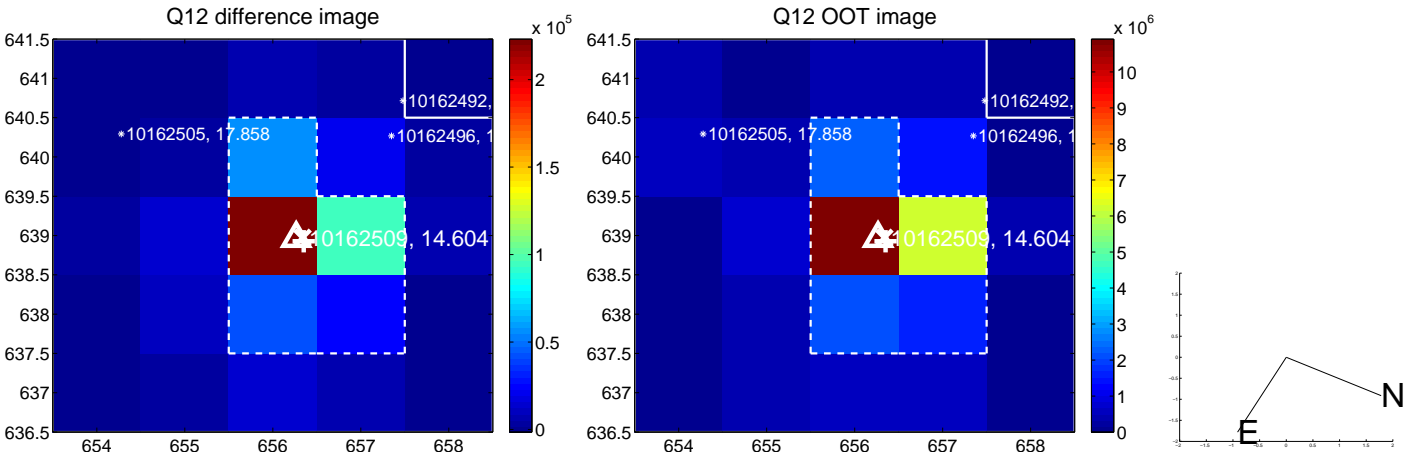
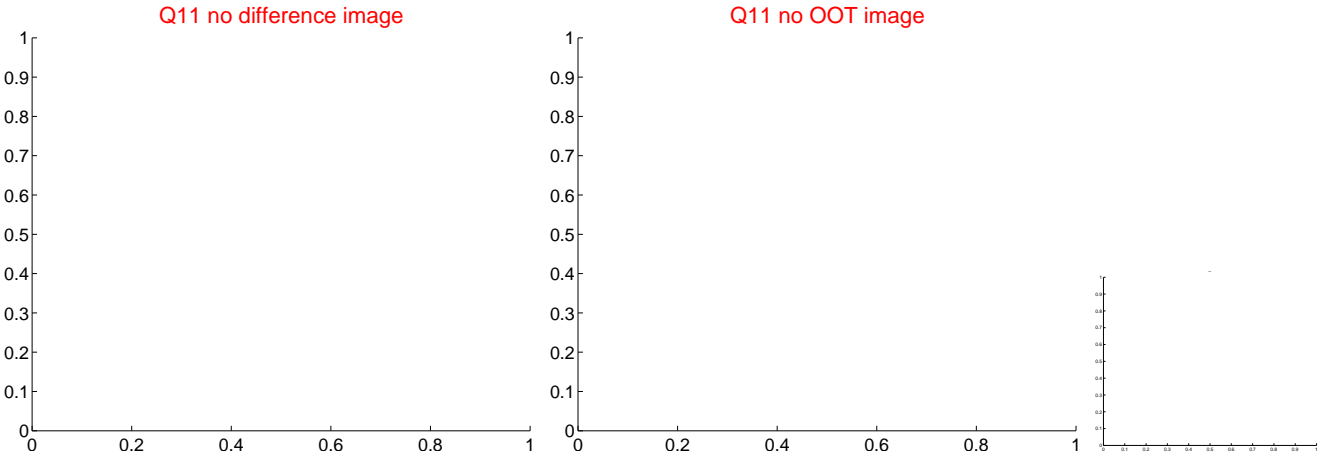
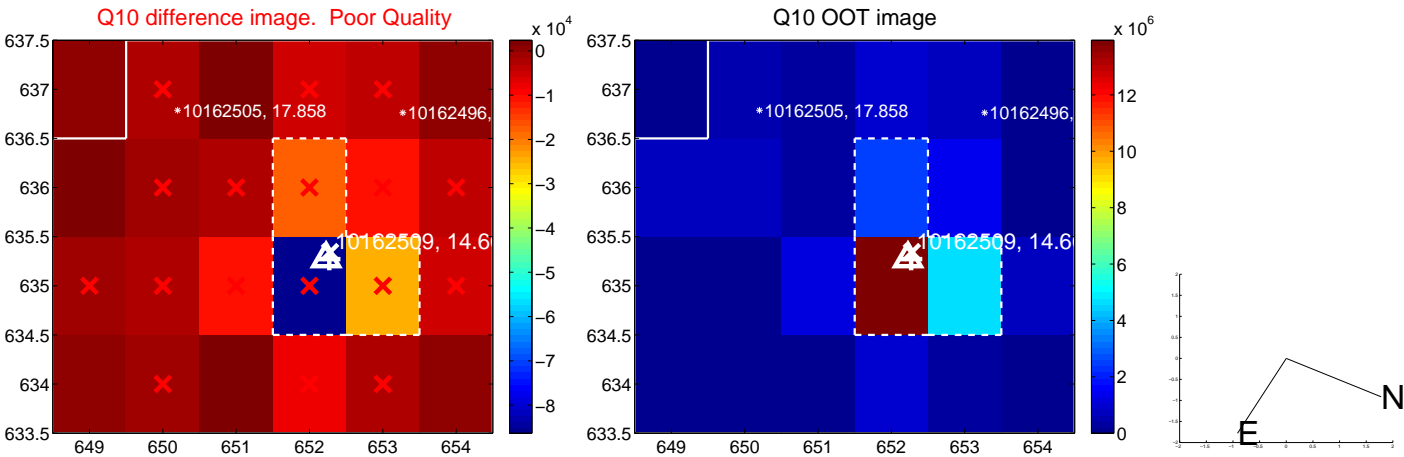
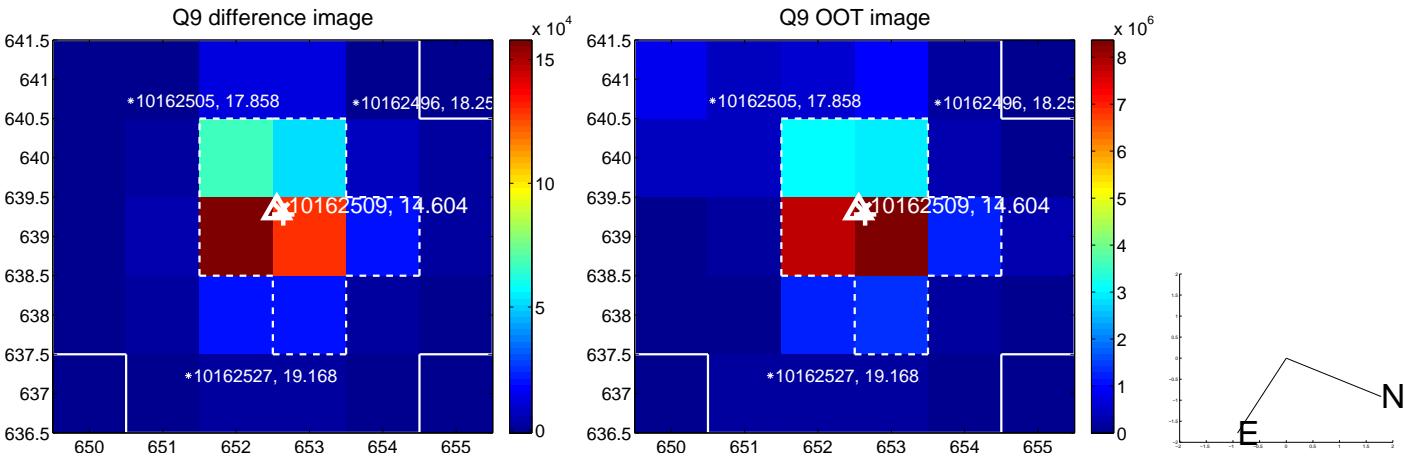
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



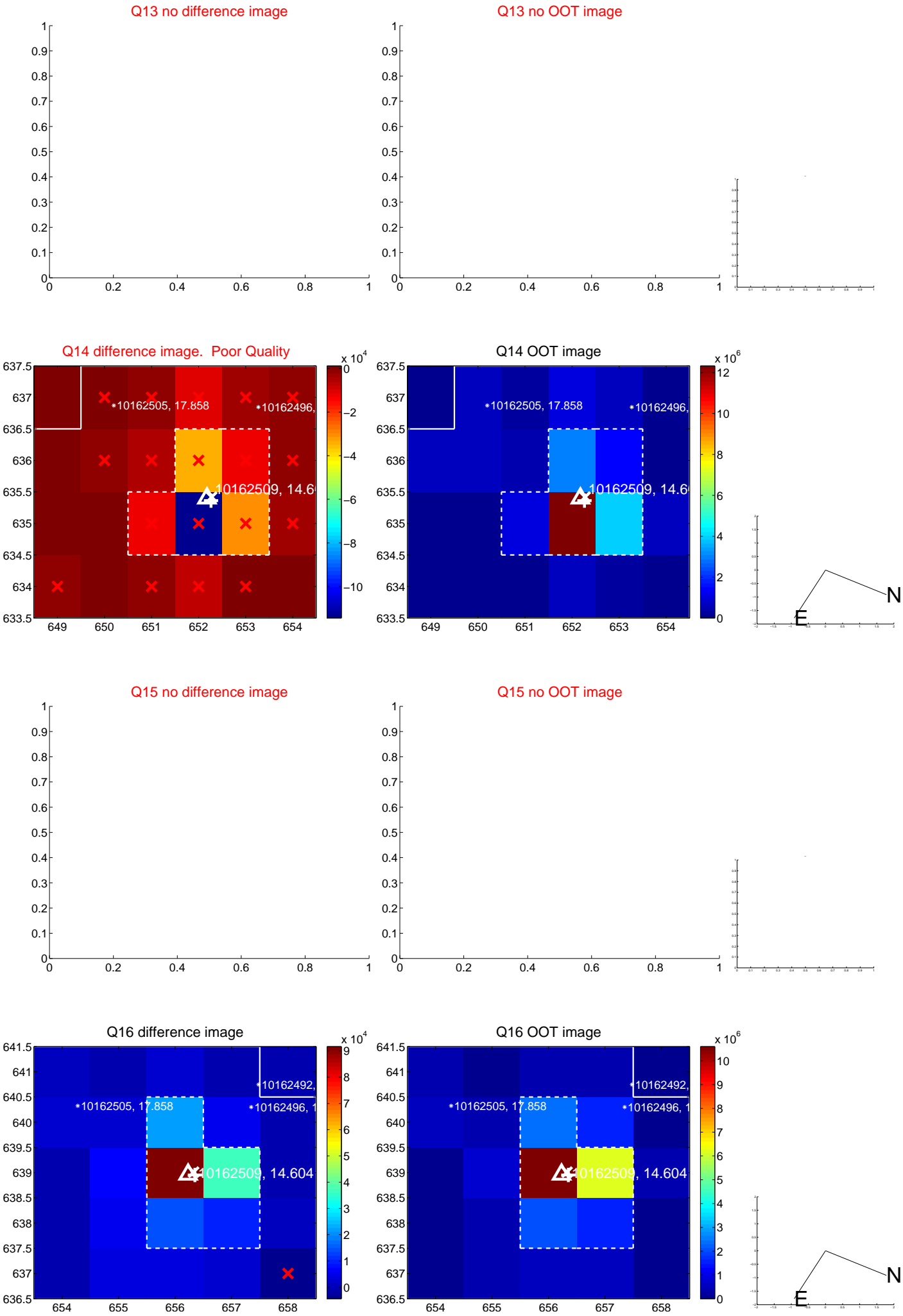
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



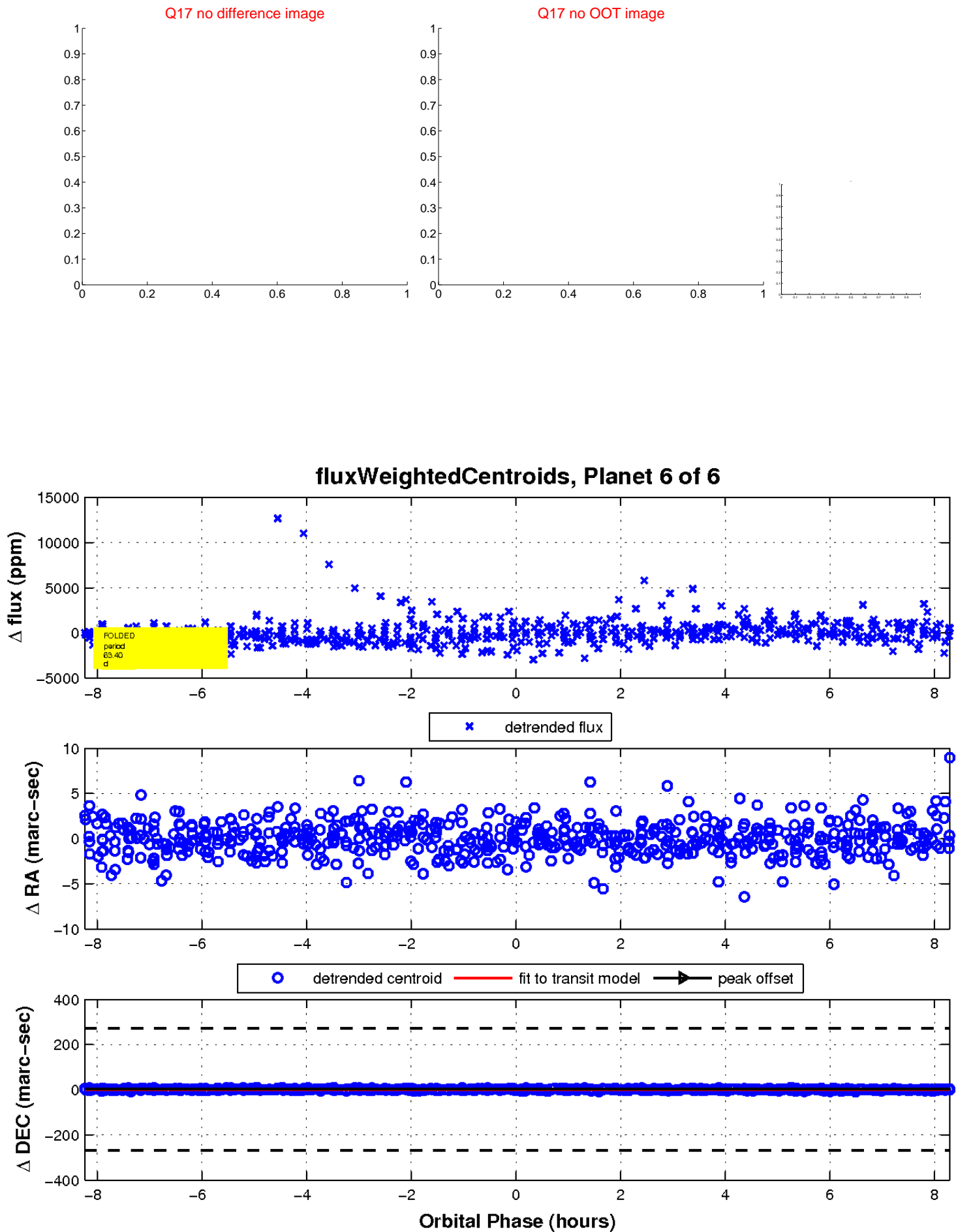
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



UKIRT Image

Declination

