

KIC 004145040

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})
004145040-01	OBS	No	5.339758	133.587910	11.6	17.966	7.9	6.5	1.29	7122	0.51	902.96
004145040-02	OBS	No	32.081195	133.355774	53.5	25.379	16.4	6.3	1.29	7122	1.07	82.67
004145040-03	OBS	No	153.299519	183.100200	77.2	1.386	8.8	3.2	1.29	7122	1.32	10.27
004145040-04	OBS	No	153.933088	182.237307	111.6	6.000	8.8	-1.0	1.29	7122	1.38	10.21

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004145040-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
004145040-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004145040-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004145040-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

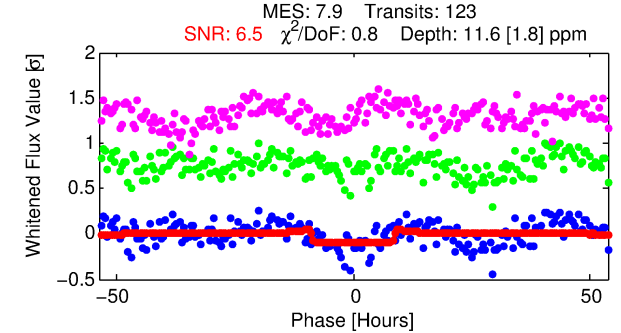
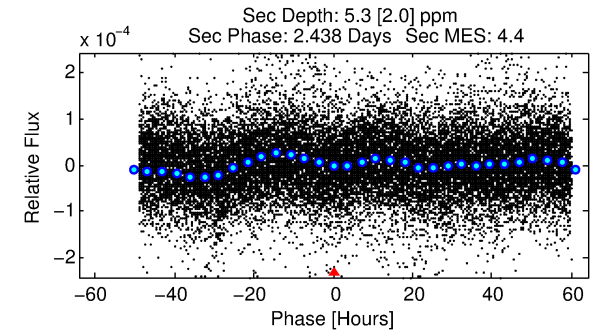
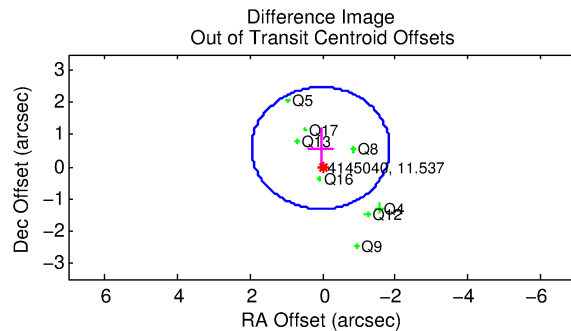
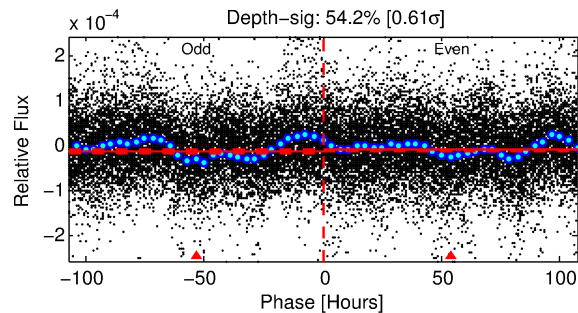
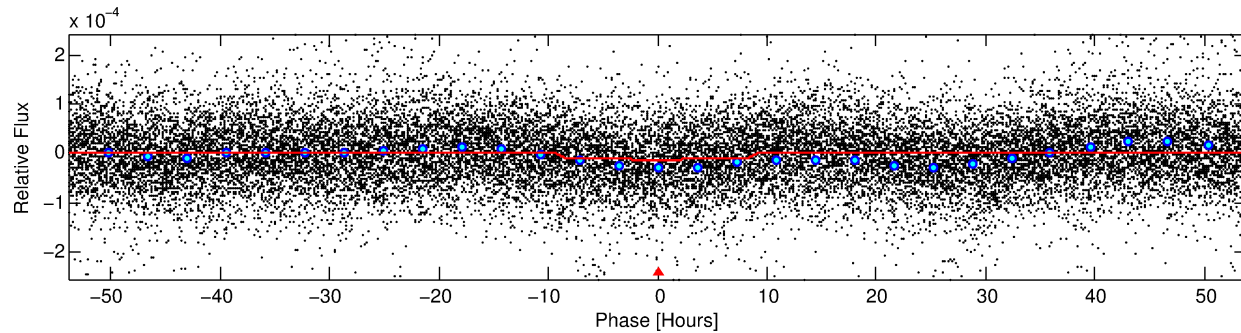
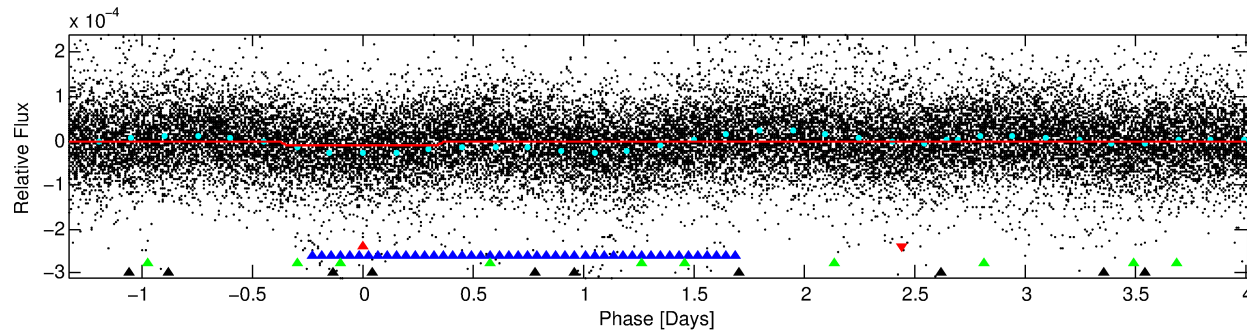
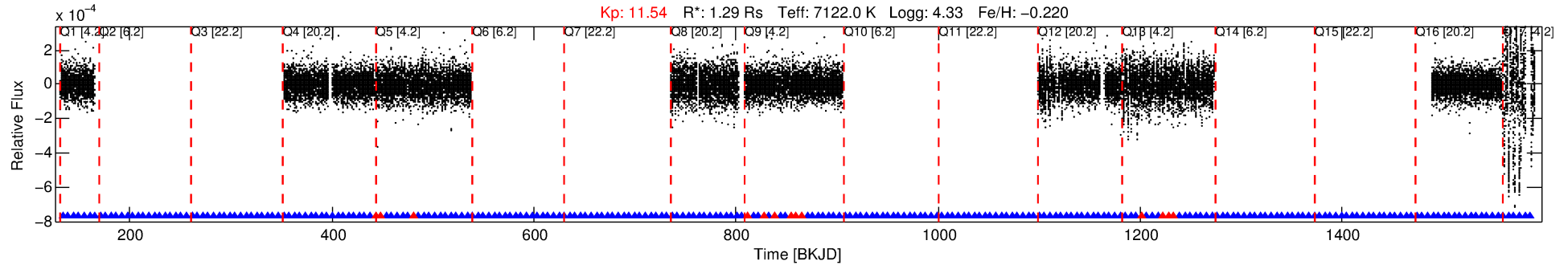
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004145040-01

No Significant Match Found

DV One-Page Summary

KIC: 4145040 Candidate: 1 of 4 Period: 5.340 d



DV Fit Results:

Period = 5.33976 [0.00012] d
Epoch = 133.5879 [0.0163] BKJD
Rp/R* = 0.0036 [0.0006]
a/R* = 1.36 [0.54]
b = 0.90 [0.17]
Seff = 902.96 [295.58]
Teq = 1398 [114] K
Rp = 0.51 [0.15] Re
a = 0.0652 [0.0127] AU
Ag = 46.93 [26.39] [1.74 σ]
Teff = 5656 [736] K [5.72 σ]

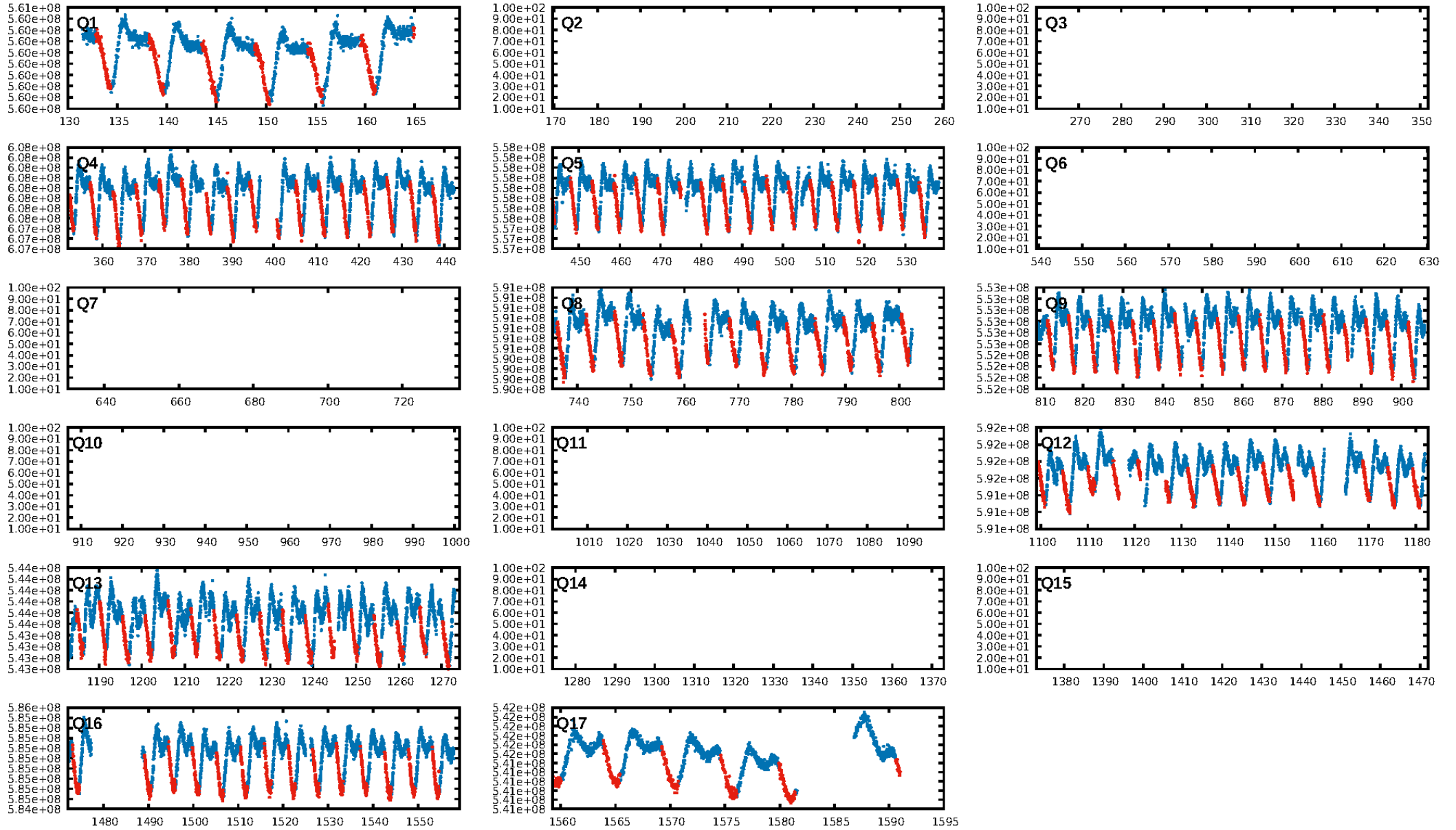
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [20.64 σ]
ModelChiSquare2-sig: 99.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.44e-14
RollingBand-fgt: 0.88 [98/111]
GhostDiagnostic-chr: 0.5058
Centroid-sig: 3.2%
Centroid-so: 2.678 arcsec [1.44 σ]
OotOffset-rm: 0.580 arcsec [0.92 σ]
KicOffset-rm: 0.760 arcsec [1.19 σ]
OotOffset-st: 0/0/4/4 [8]
KicOffset-st: 0/0/4/4 [8]
DiffImageQuality-fgm: 0.88 [7/8]
DiffImageOverlap-fno: 1.00 [9/9]

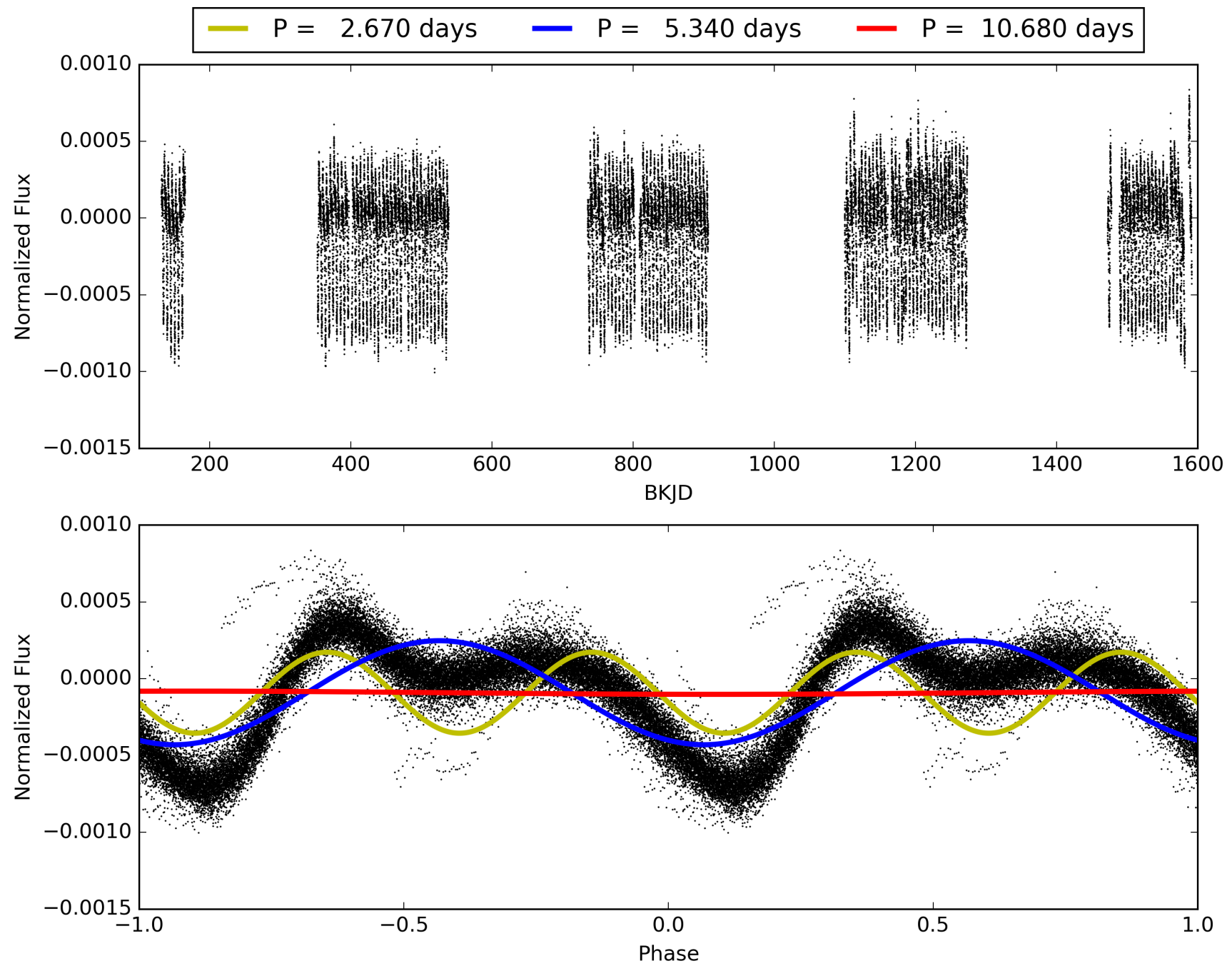
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:08:35 Z

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

TCE 004145040-01, PDC Light Curves

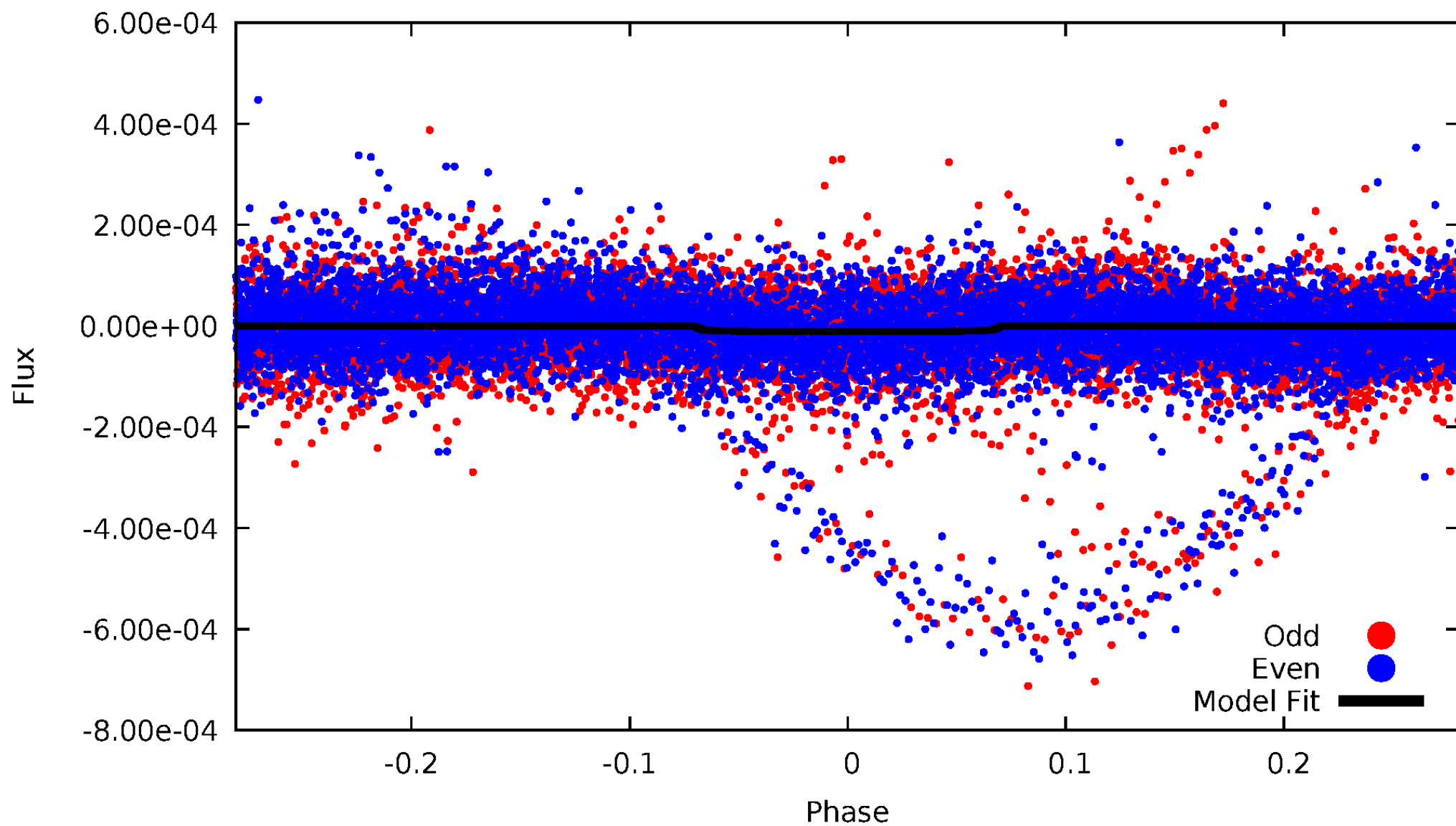


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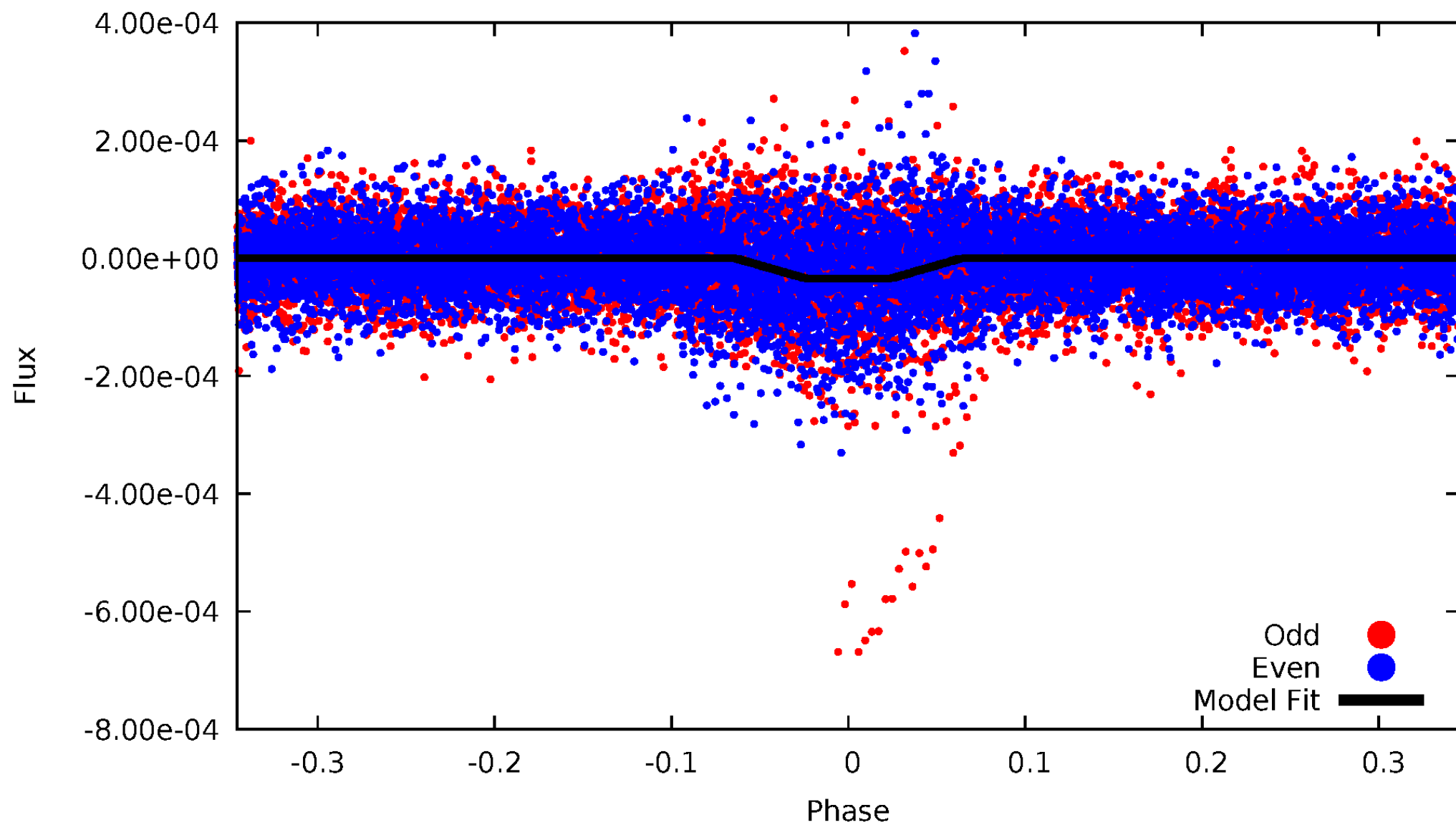
DV Odd/Even

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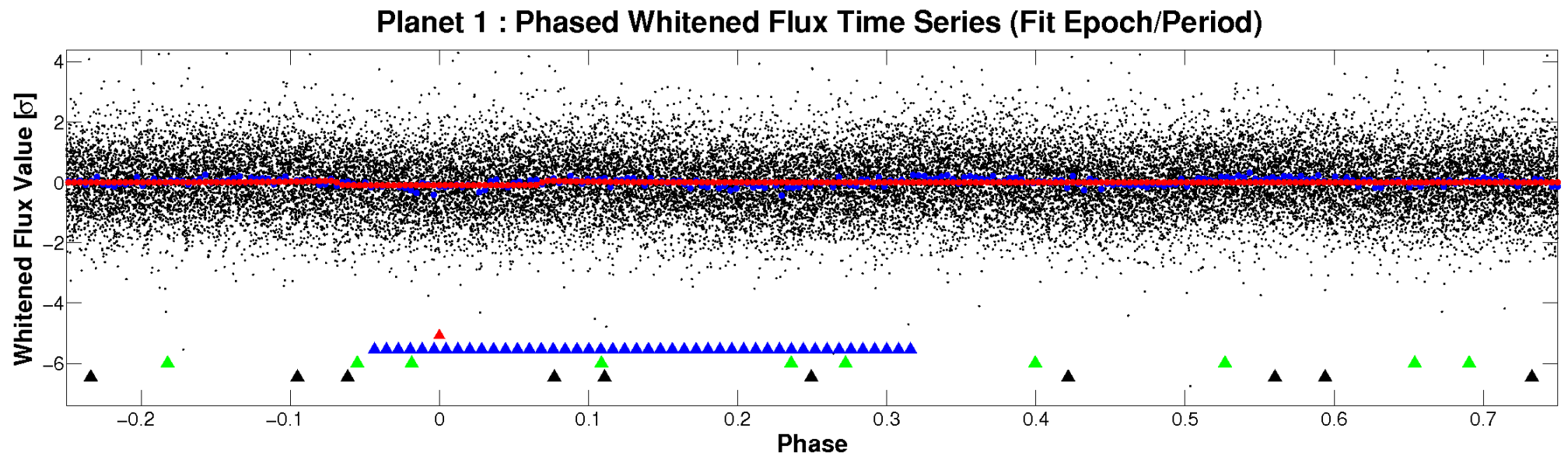
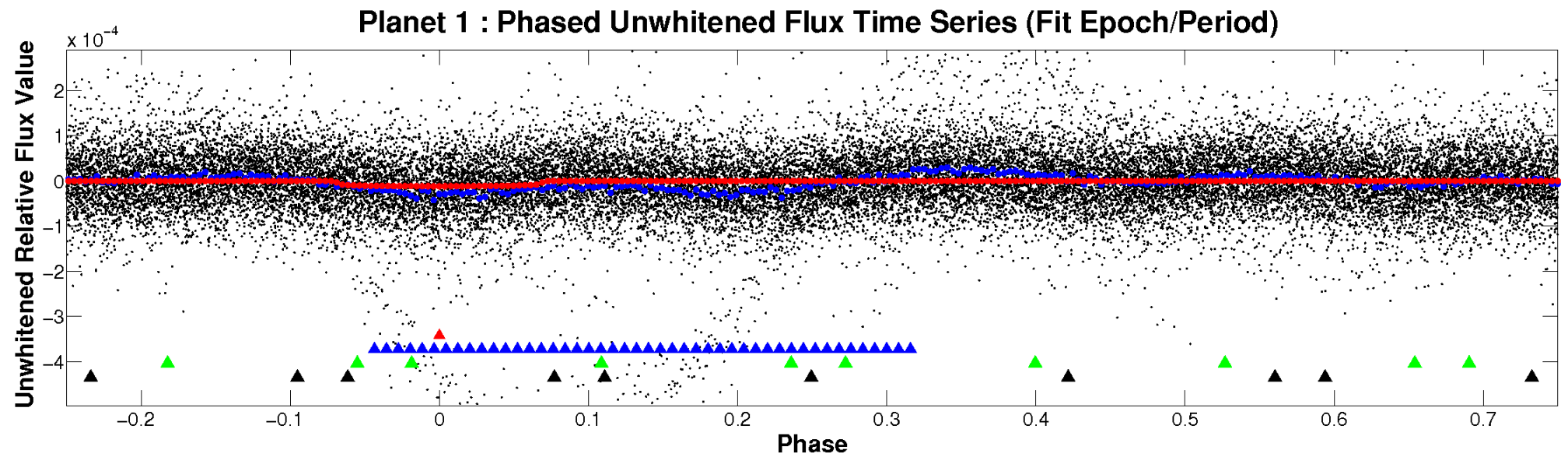


ALT Odd/Even

TCE 004145040-01

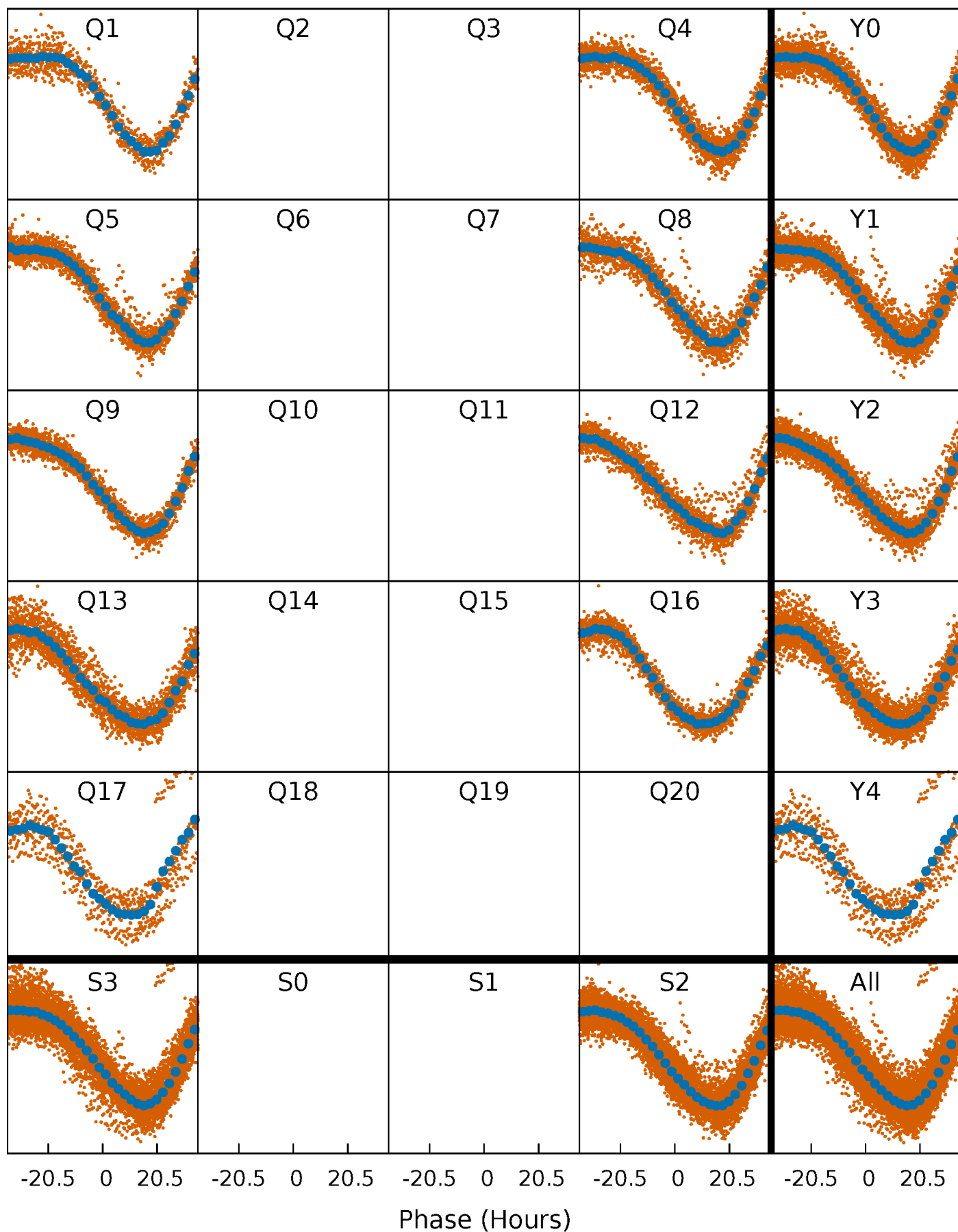


Non-Whitened Vs. Whitened Light Curve



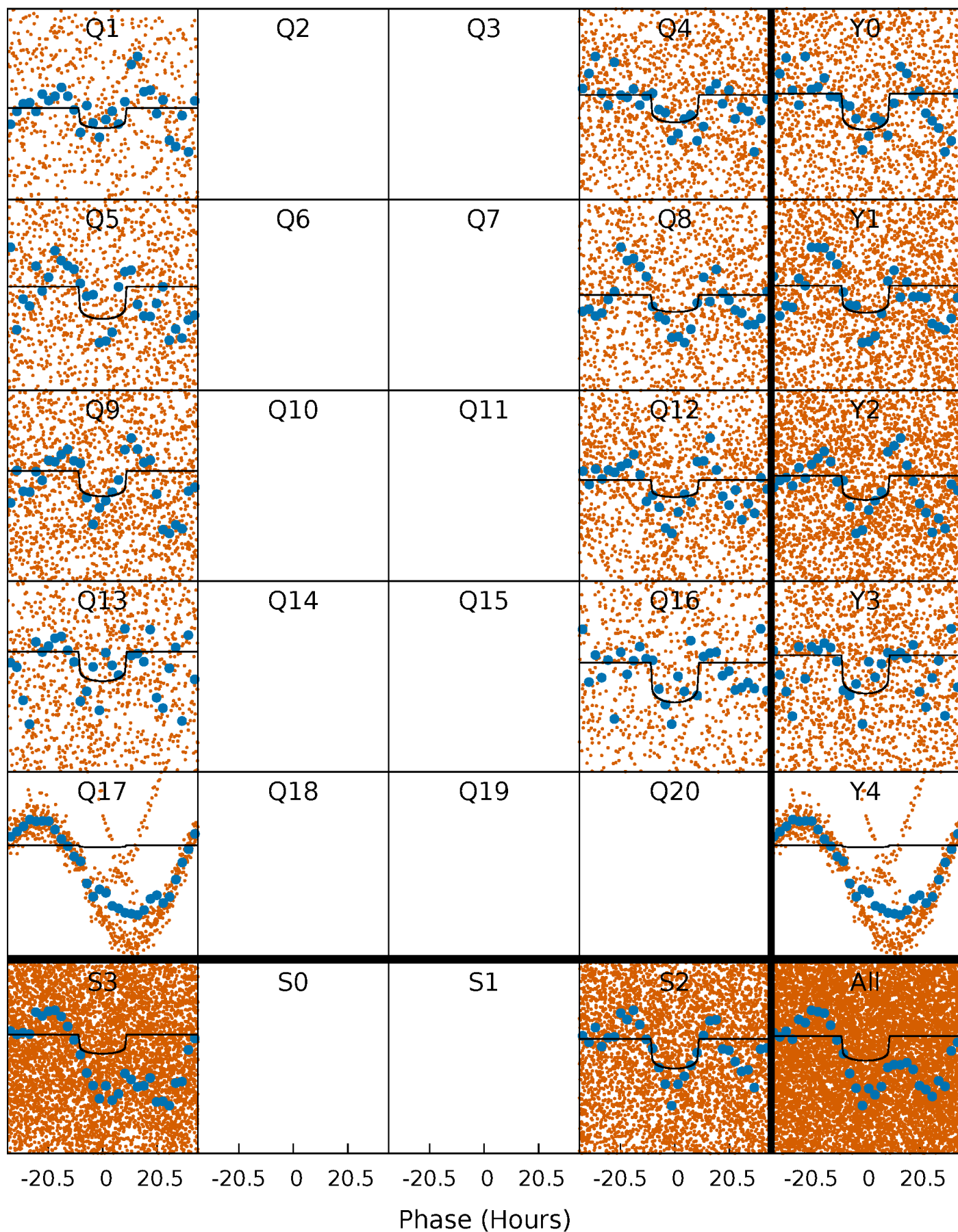
PDC Quarter-Phased Transit Curves

TCE 004145040-01 P= 5.339758 Days $T_0=133.587910$ (BKJD)



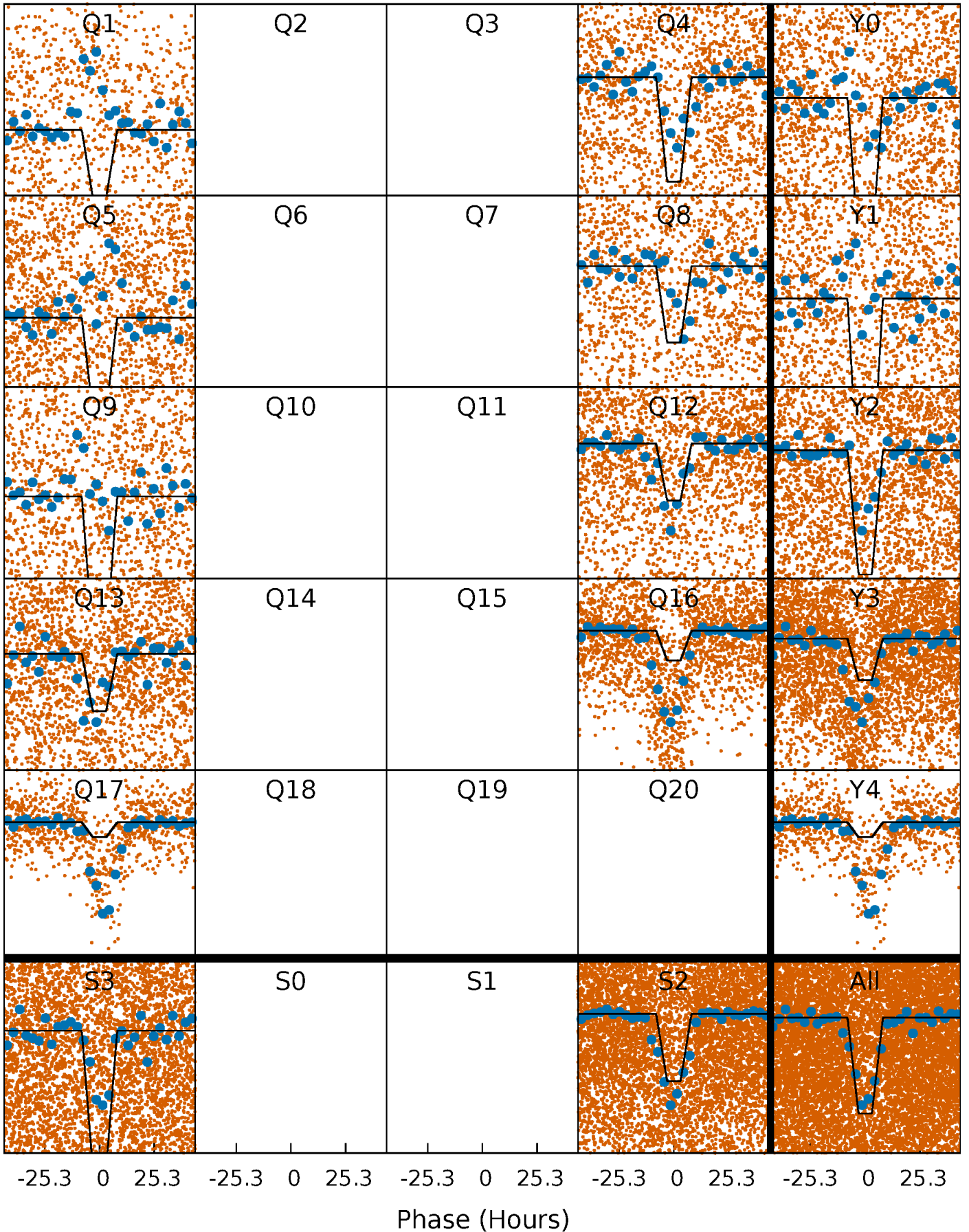
DV Quarter-Phased Transit Curves

TCE 004145040-01 P= 5.339758 Days $T_0=133.587910$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

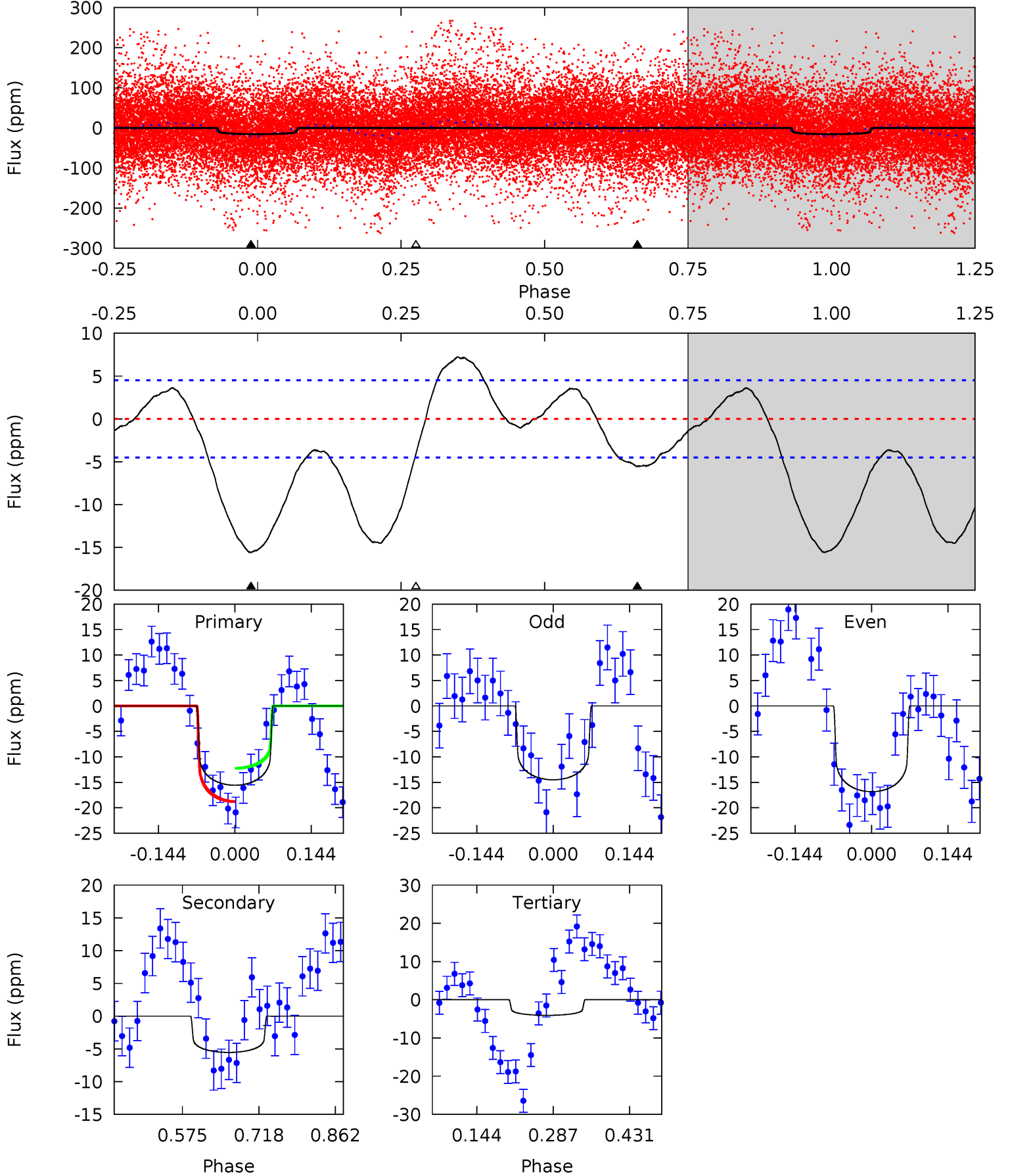
TCE 004145040-01 P= 5.339364 Days $T_0=133.667100$ (BKJD)



DV Model-Shift Uniqueness Test

004145040-01, P = 5.339758 Days, E = 128.248152 Days

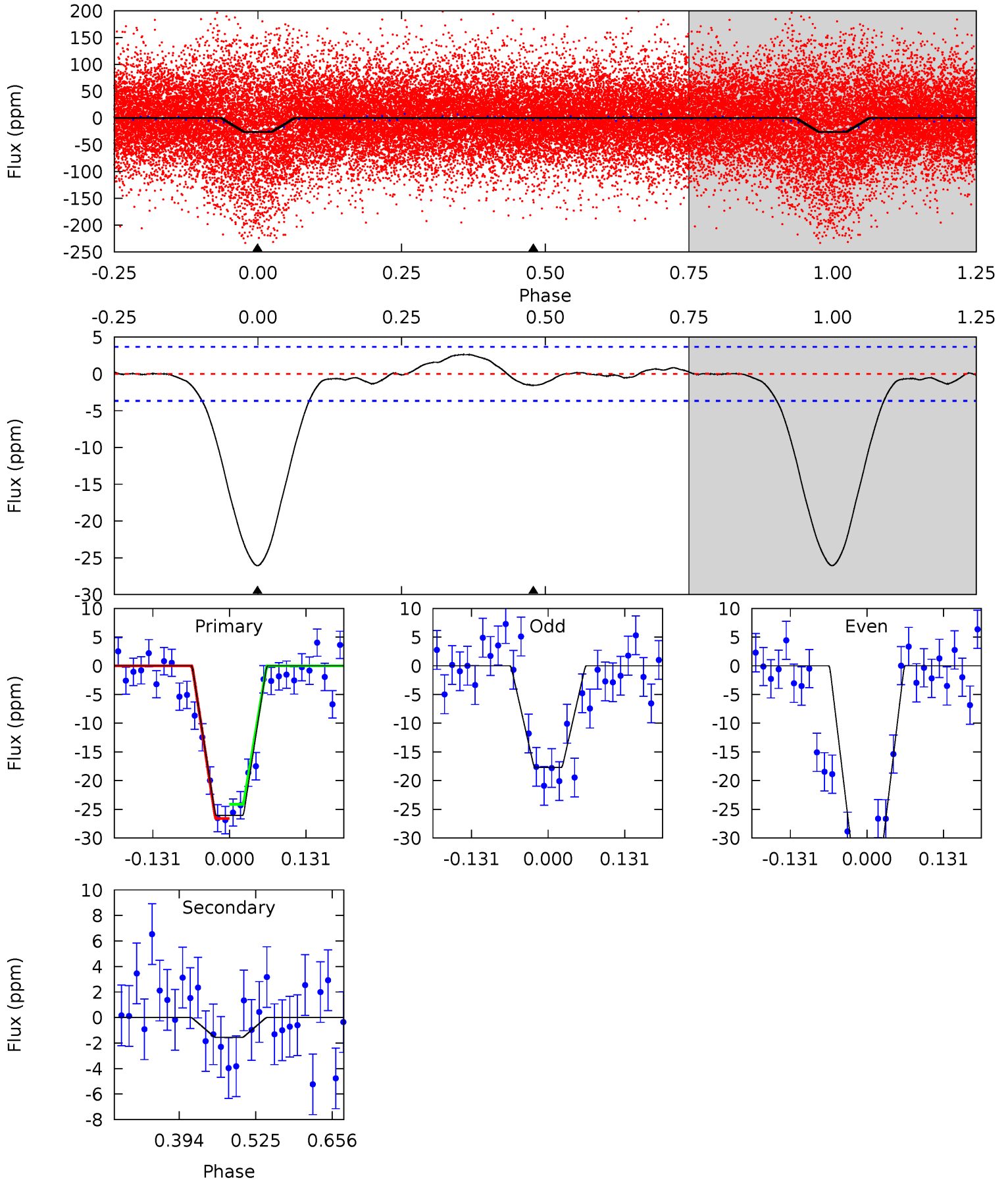
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.5	5.52	4.06	0	4.49	1.46	6.88	11.4	15.5	1.46	5.52	1.18	1.71	0.32	3.25



Alt Model-Shift Uniqueness Test

004145040-01, P = 5.339364 Days, E = 128.327736 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
32.0	1.92	0	0	4.51	1.51	1.03	32.0	32.0	1.92	1.92	9.81	1.93	0.09	1.50



Stellar Parameters For KIC 004145040

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7122^{+227}_{-313}	$4.329^{+0.063}_{-0.147}$	$-0.220^{+0.250}_{-0.350}$	$1.290^{+0.308}_{-0.142}$	$1.312^{+0.158}_{-0.176}$	$0.861^{+0.242}_{-0.378}$
	+3%/-4%	+1%/-3%	+114%/-159%	+24%/-11%	+12%/-13%	+28%/-44%
Source	KIC0	FLK73	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 004145040-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-6 ± 1	$0.52^{+0.10}_{-0.09}$	1971^{+117}_{-108}	5688^{+593}_{-512}	47^{+24}_{-15}
Alt.	-2 ± 1	$0.85^{+0.14}_{-0.12}$	1974^{+125}_{-102}	3621^{+335}_{-427}	$4.912^{+3.367}_{-2.618}$

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

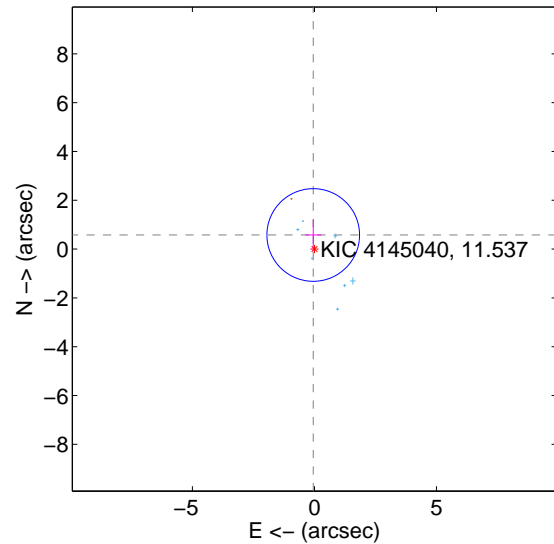
Supplemental centroid analysis for 004145040-01. **Kepler magnitude: 11.54.** Transit SNR 6.47

There are 7 quarters with good PRF difference image offsets

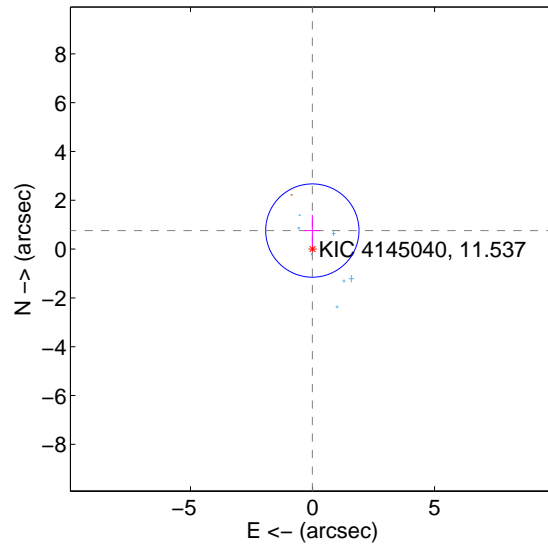
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.580 ± 0.633	0.92	0.050 ± 0.332	0.578 ± 0.635
PRF-fit source offset from KIC position	0.760 ± 0.637	1.19	0.008 ± 0.330	0.760 ± 0.637
photometric centroid source offset	2.68 ± 1.86	1.44	-0.25 ± 1.94	-2.67 ± 1.86

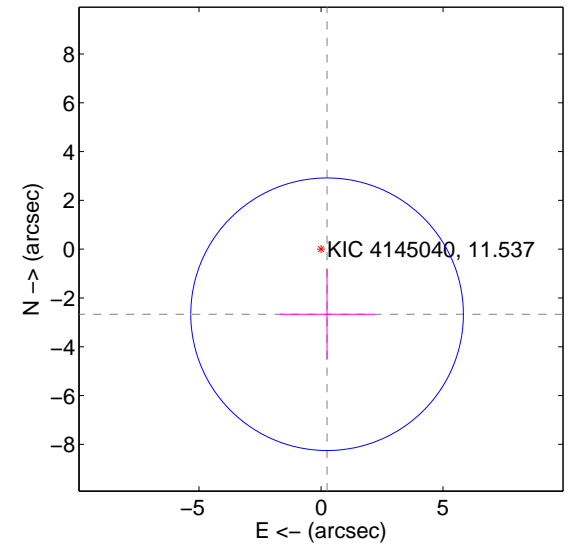
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

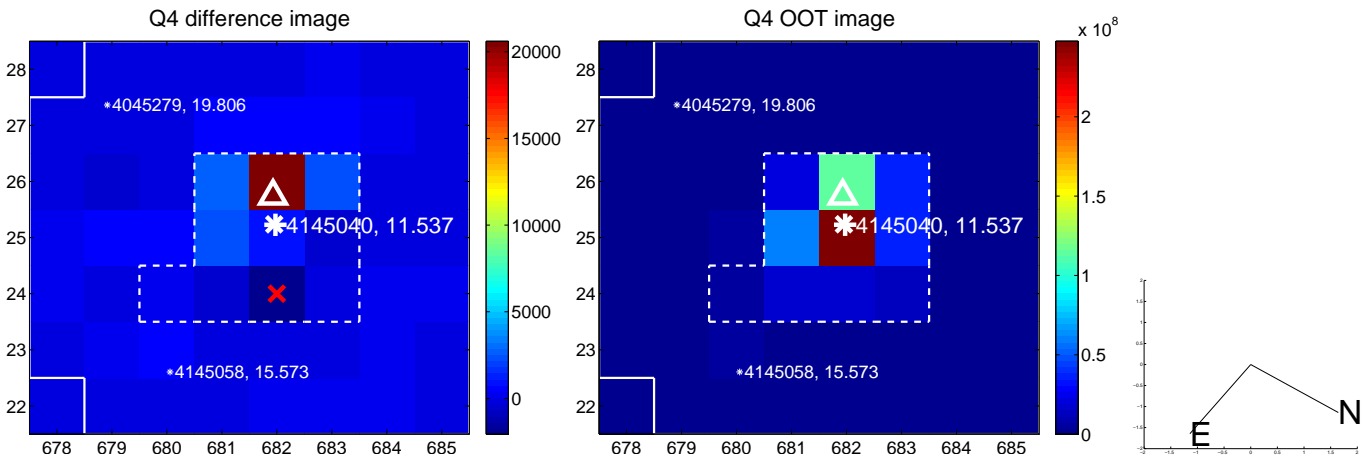
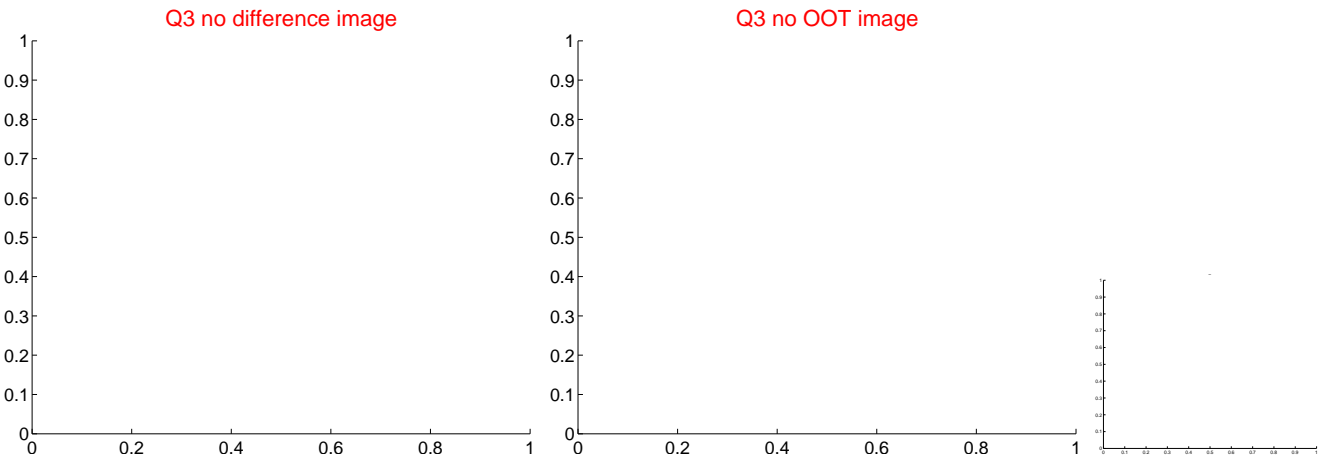
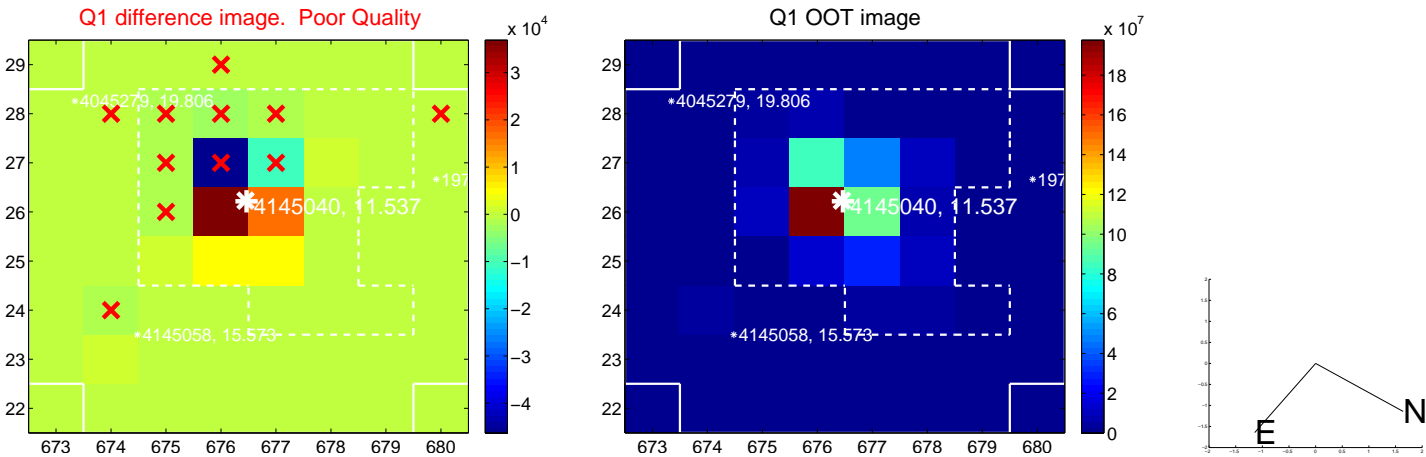


offset from photometric centroids

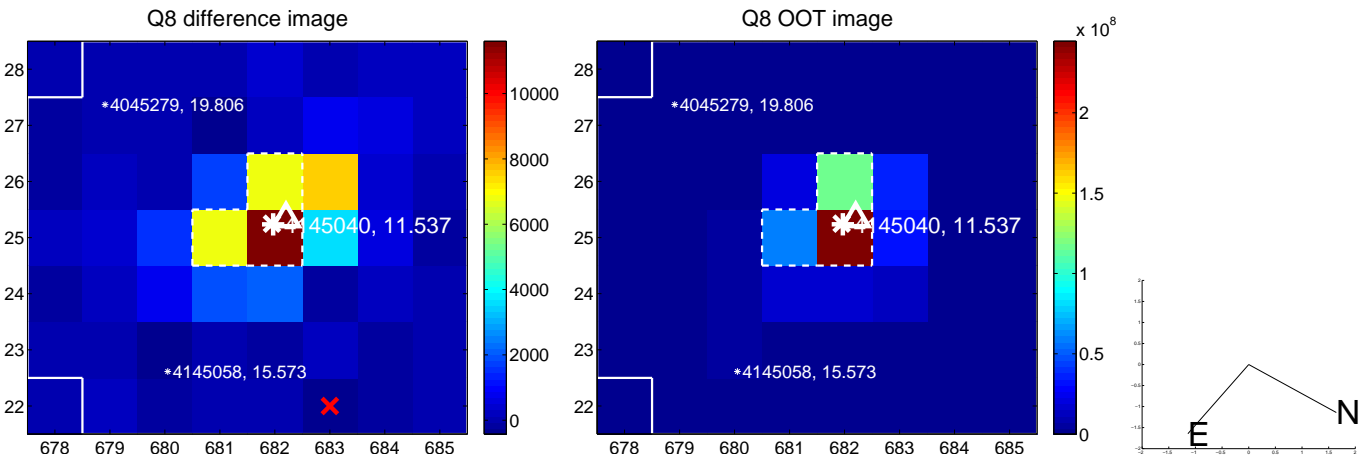
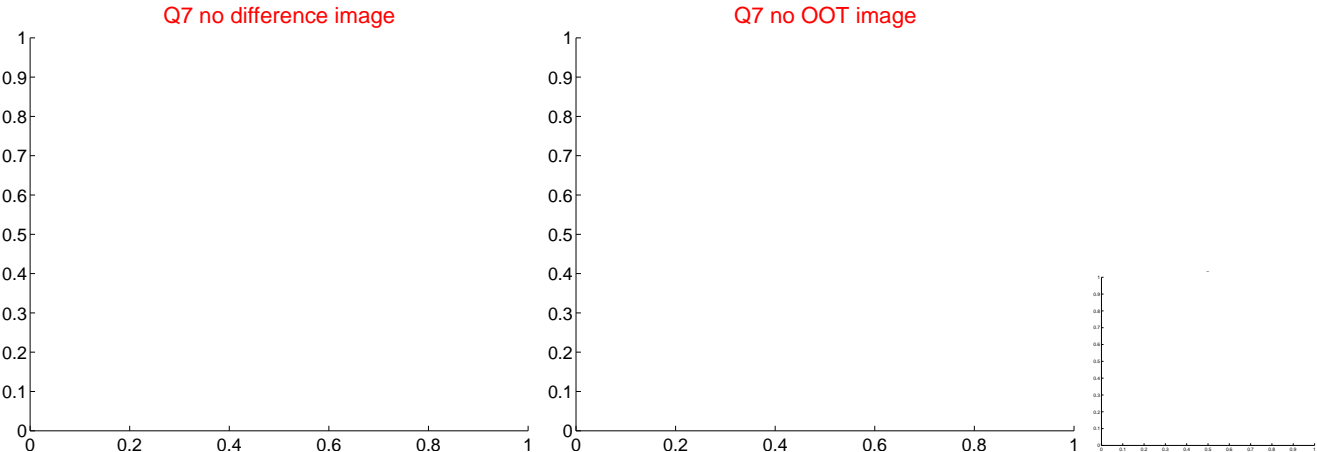
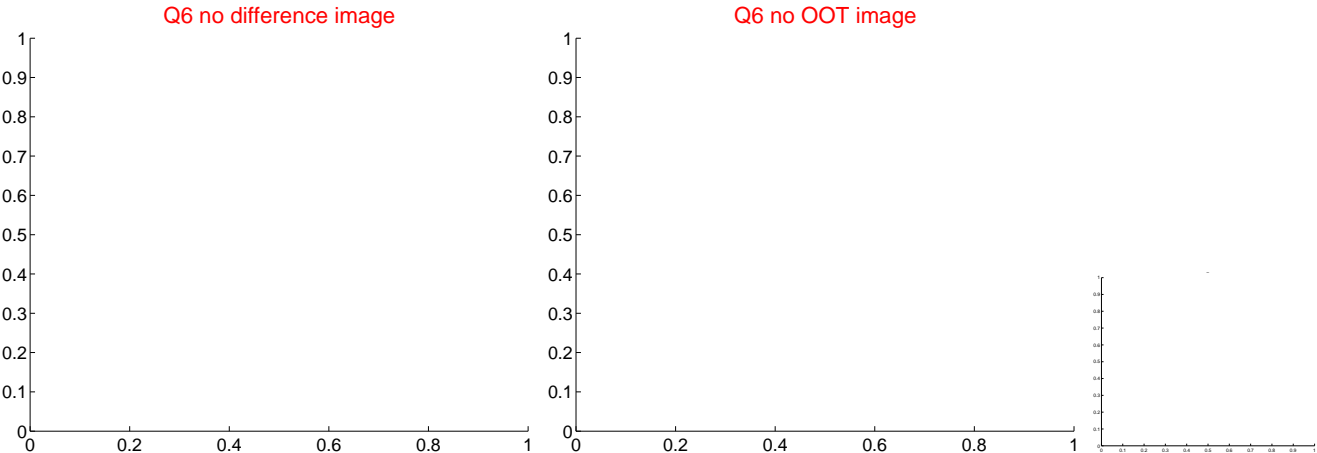
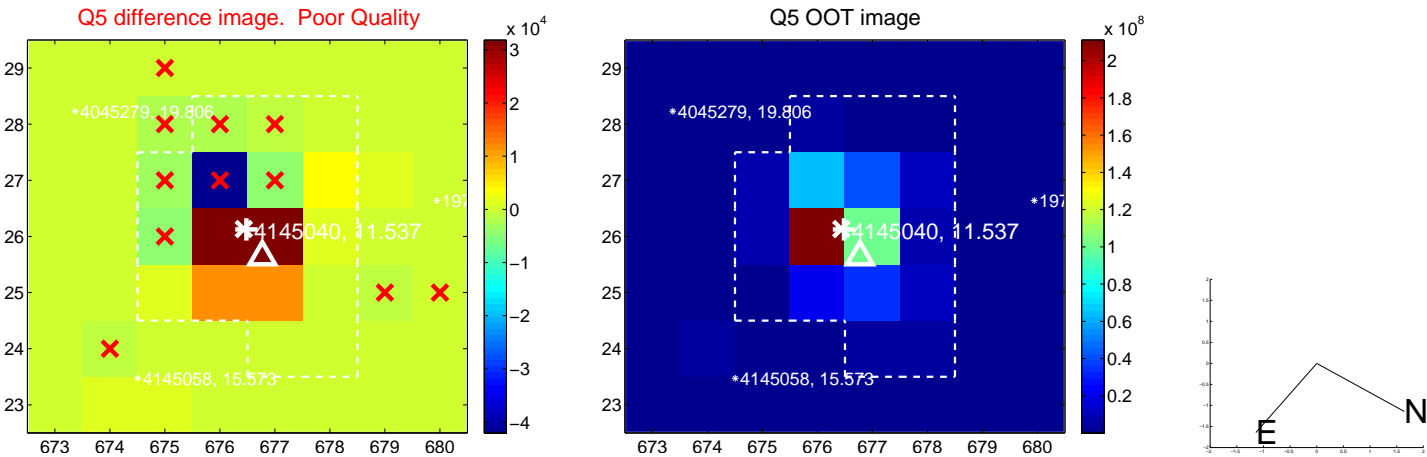


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

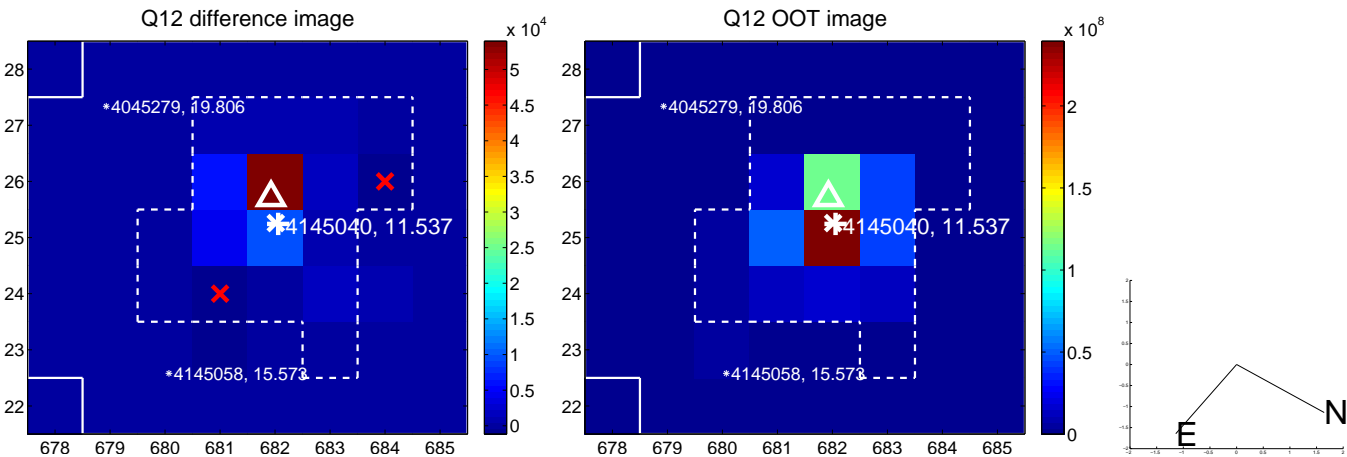
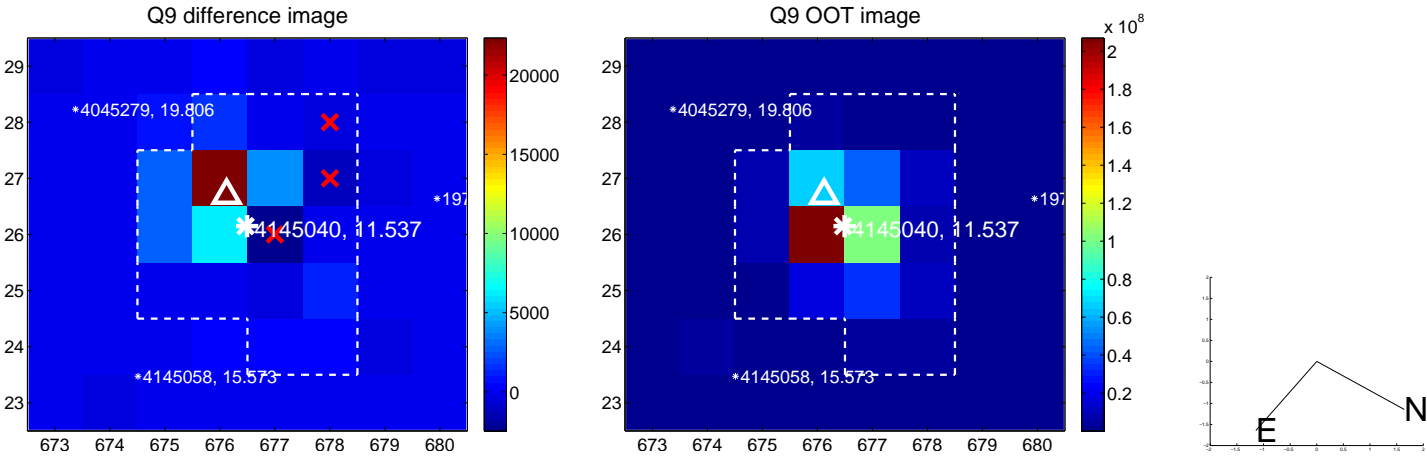
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



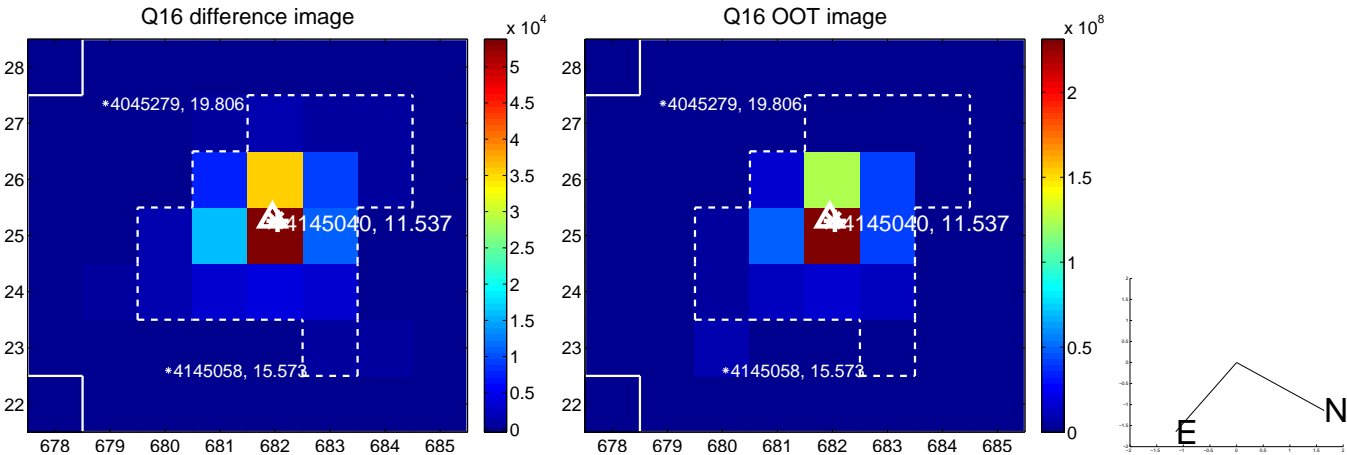
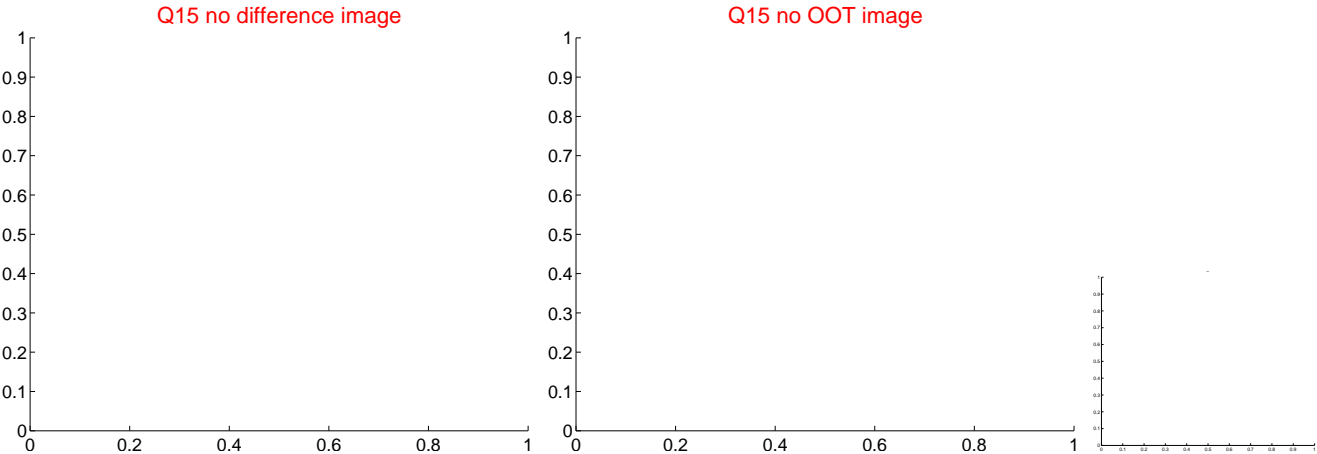
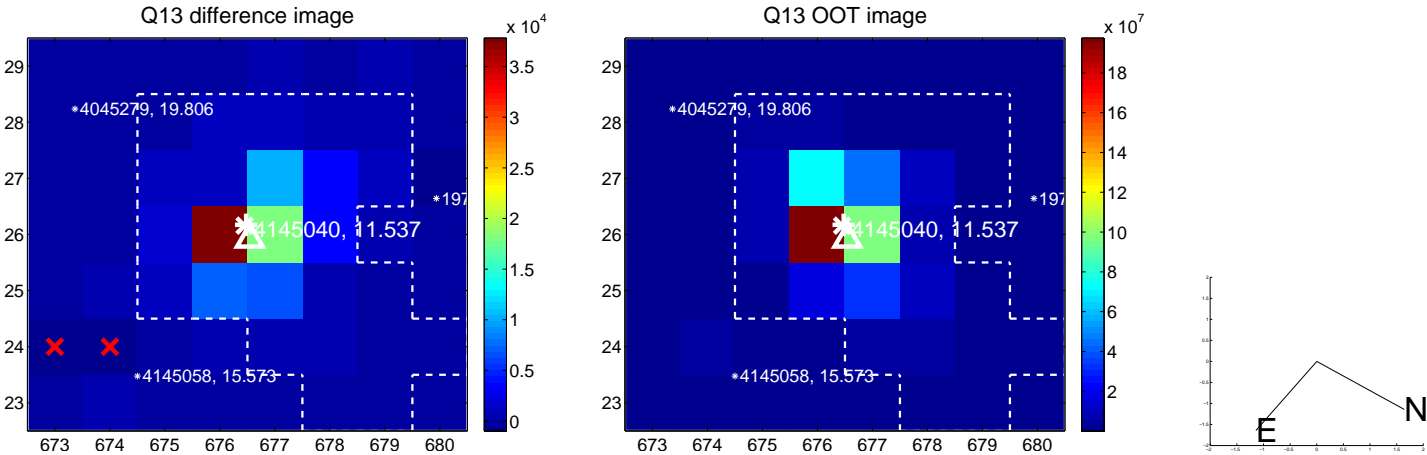
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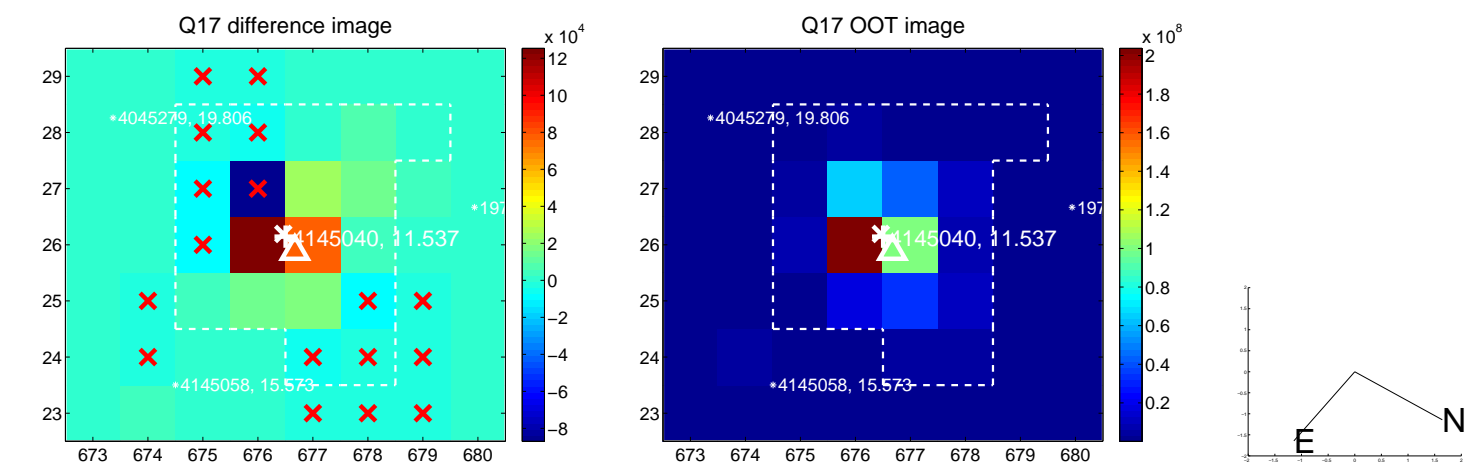
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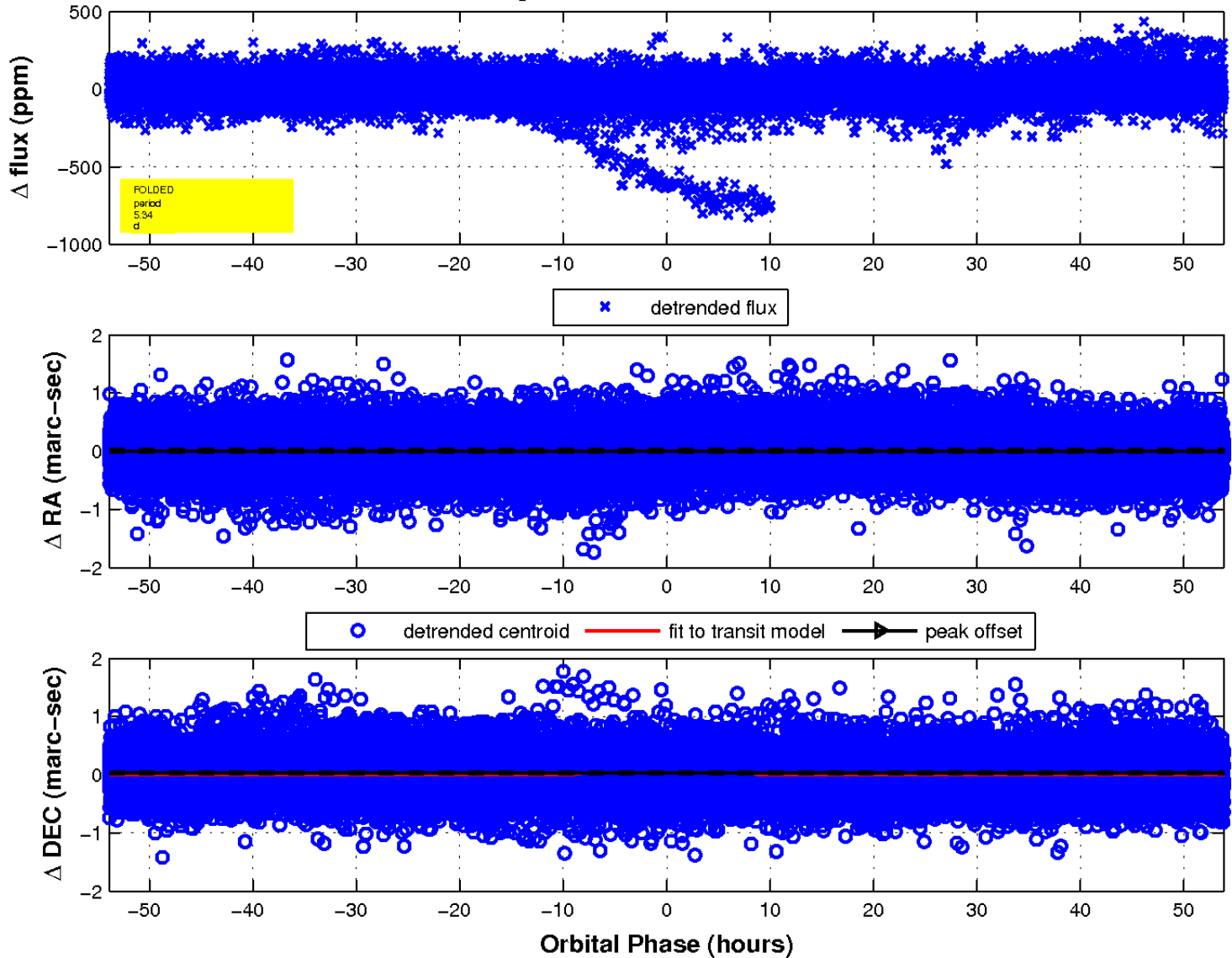
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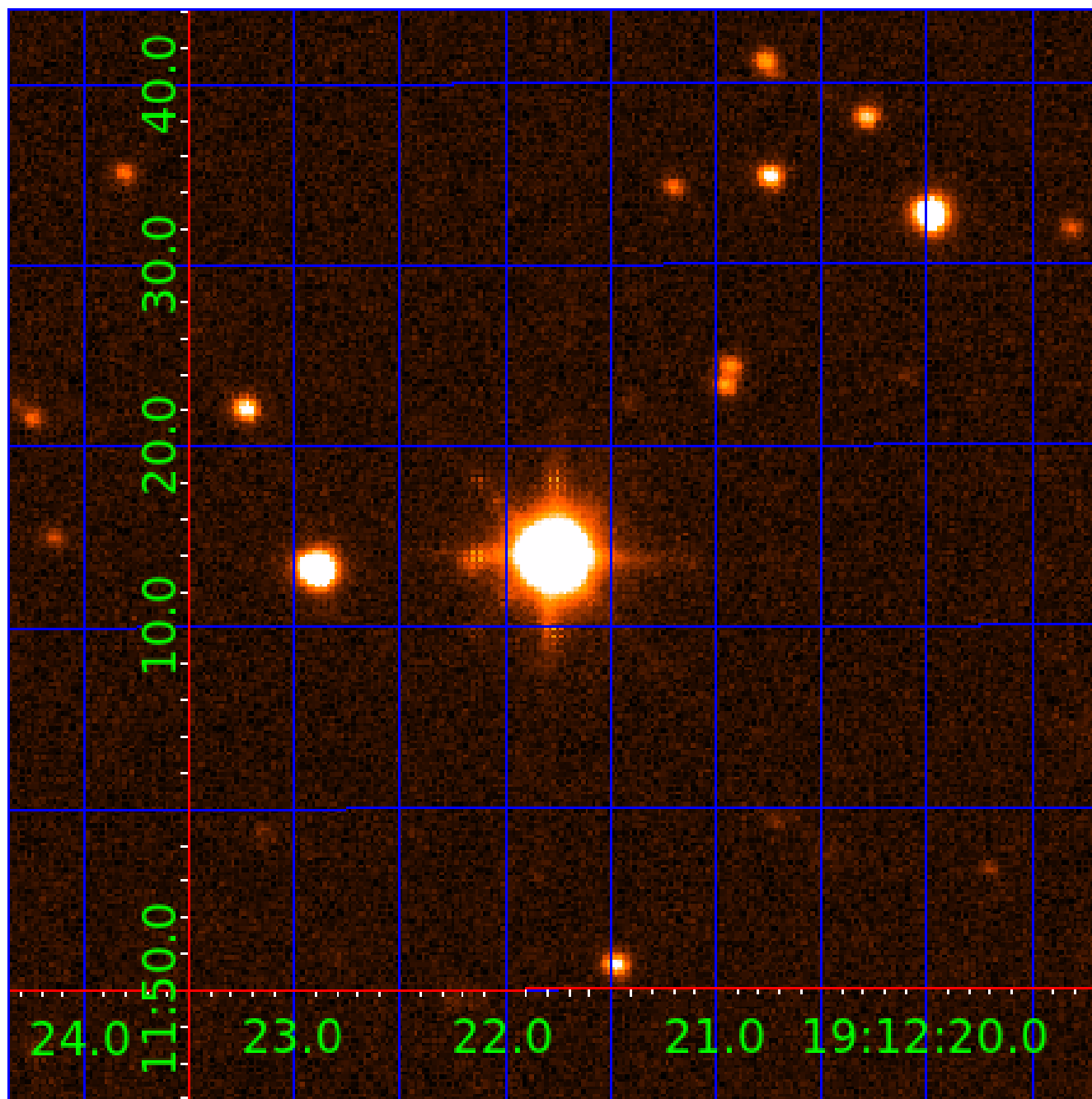


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 004145040

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})
004145040-01	OBS	No	5.339758	133.587910	11.6	17.966	7.9	6.5	1.29	7122	0.51	902.96
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004145040-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004145040-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004145040-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

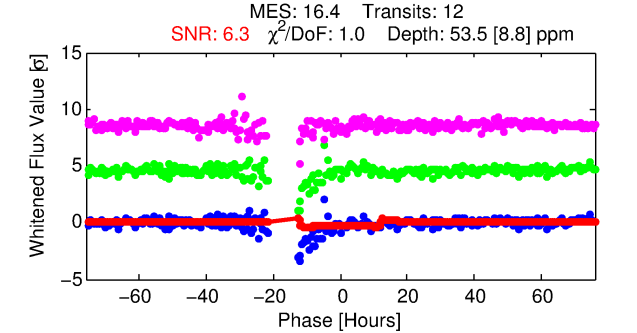
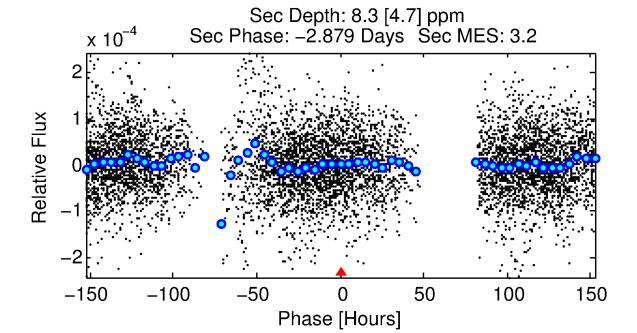
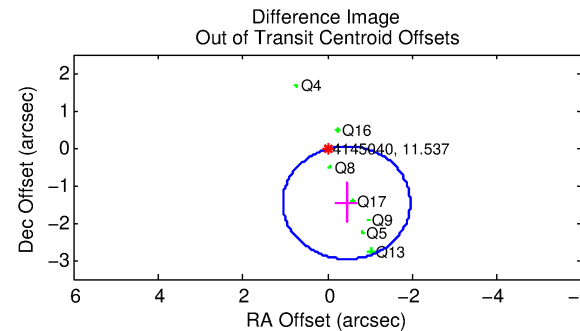
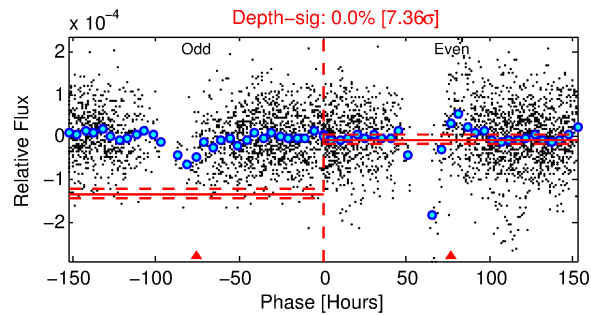
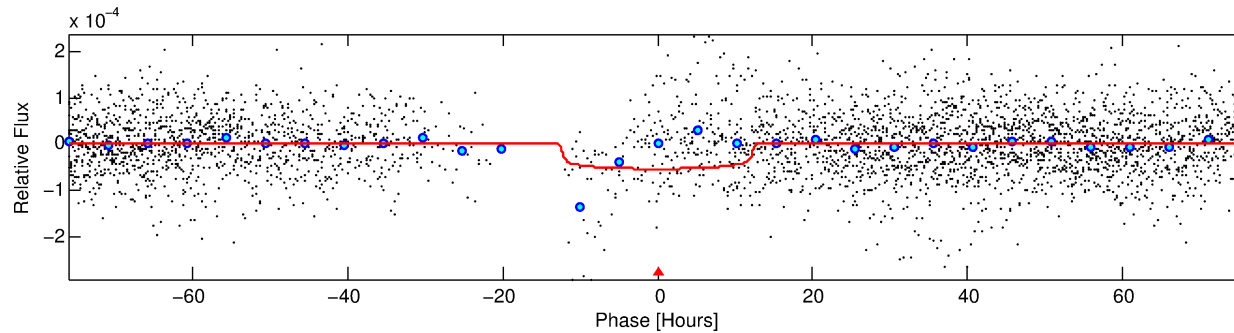
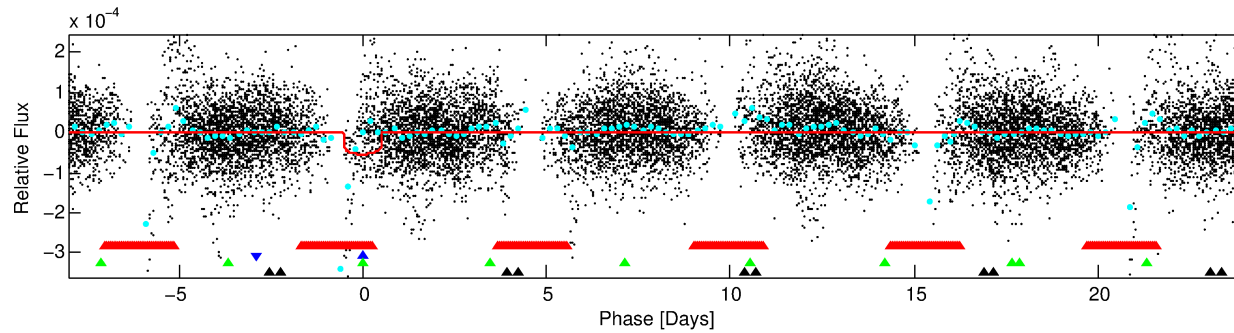
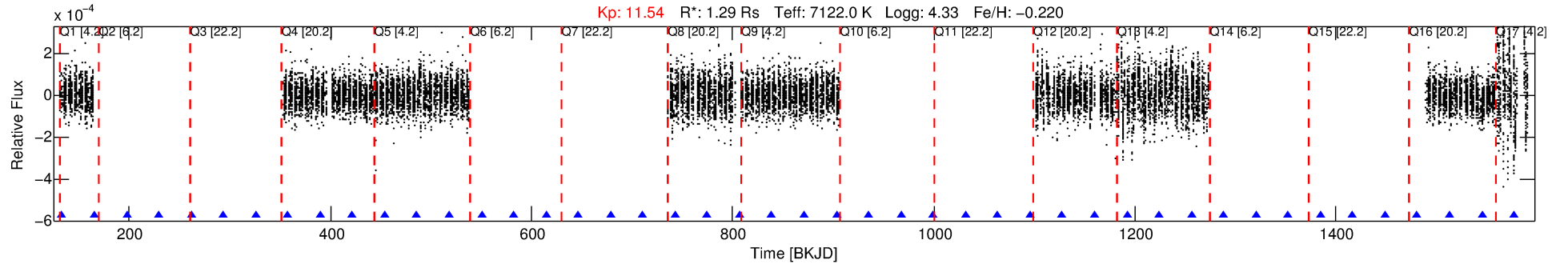
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004145040-02

No Significant Match Found

DV One-Page Summary

KIC: 4145040 Candidate: 2 of 4 Period: 32.081 d



DV Fit Results:

Period = 32.08120 [0.00155] d
Epoch = 133.3558 [0.0644] BKJD
Rp/R* = 0.0076 [0.0010]
a/R* = 4.93 [2.74]
b = 0.87 [0.15]
Seff = 82.67 [27.06]
Teq = 769 [63] K
Rp = 1.08 [0.29] Re
a = 0.2154 [0.0420] AU
Ag = 183.18 [125.78] [1.45 σ]
Teffp = 4373 [714] K [5.03 σ]

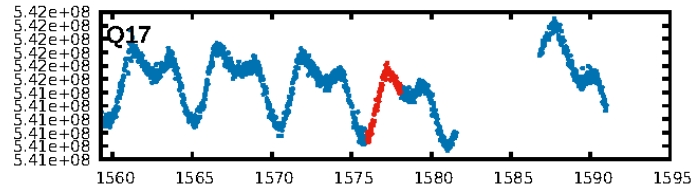
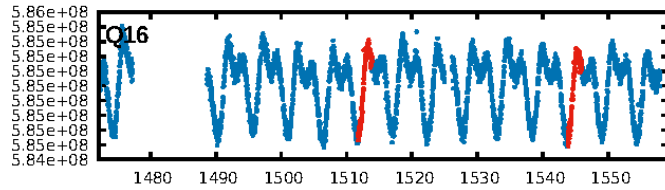
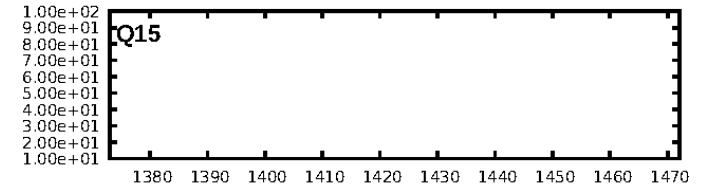
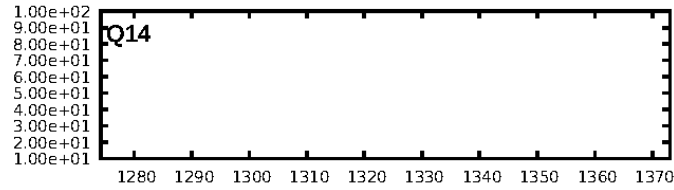
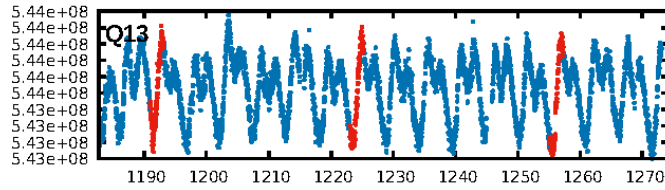
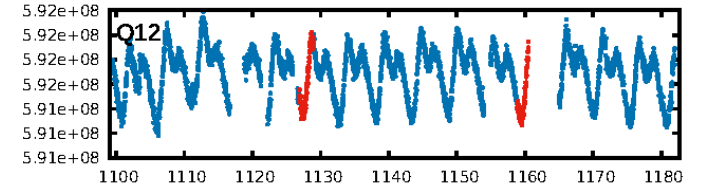
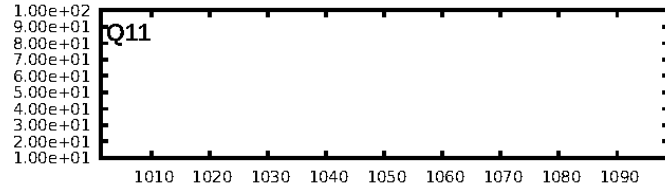
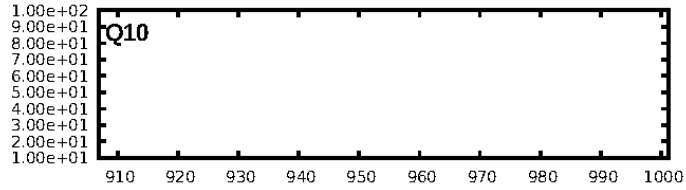
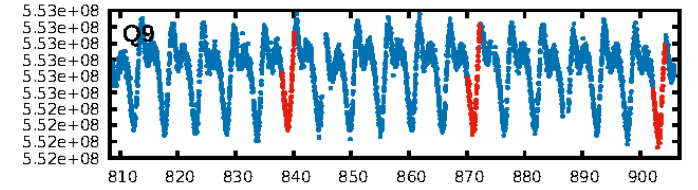
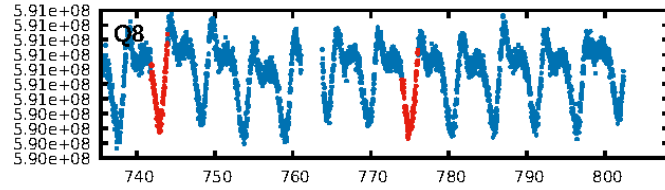
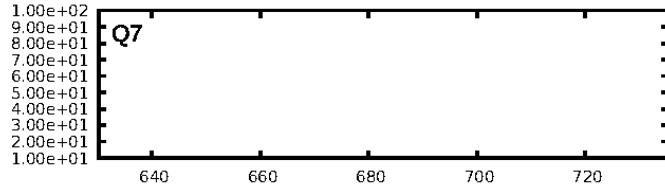
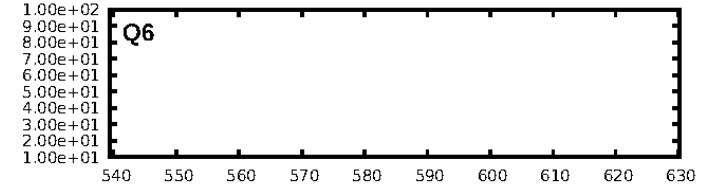
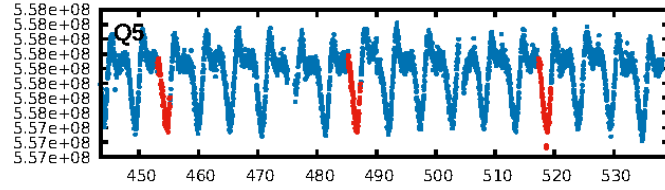
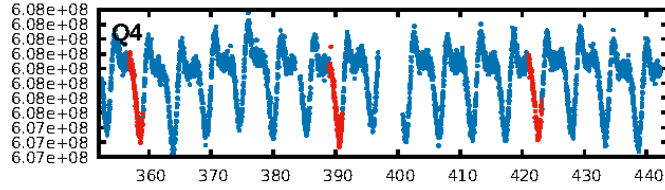
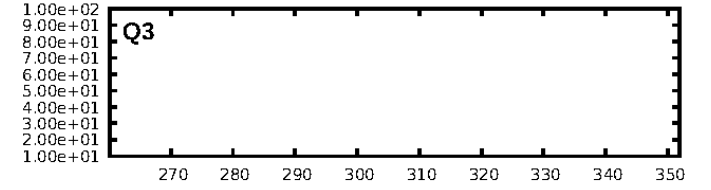
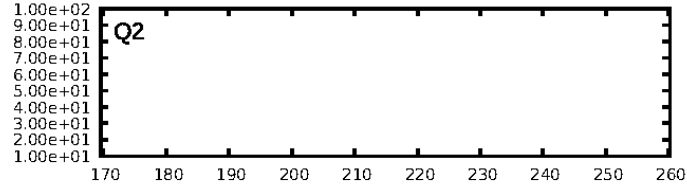
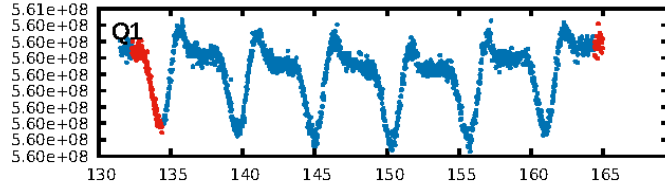
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.64 σ]
LongPeriod-sig: 100.0% [114.46 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 7.18e-44
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: 1.05
Centroid-sig: 3.7%
Centroid-so: 1.714 arcsec [1.70 σ]
OotOffset-rm: 1.530 arcsec [3.05 σ]
KicOffset-rm: 1.425 arcsec [2.52 σ]
OotOffset-st: 0/0/3/4 [7]
KicOffset-st: 0/0/3/4 [7]
DiffImageQuality-fgm: 0.57 [4/7]
DiffImageOverlap-fno: 0.00 [0/8]

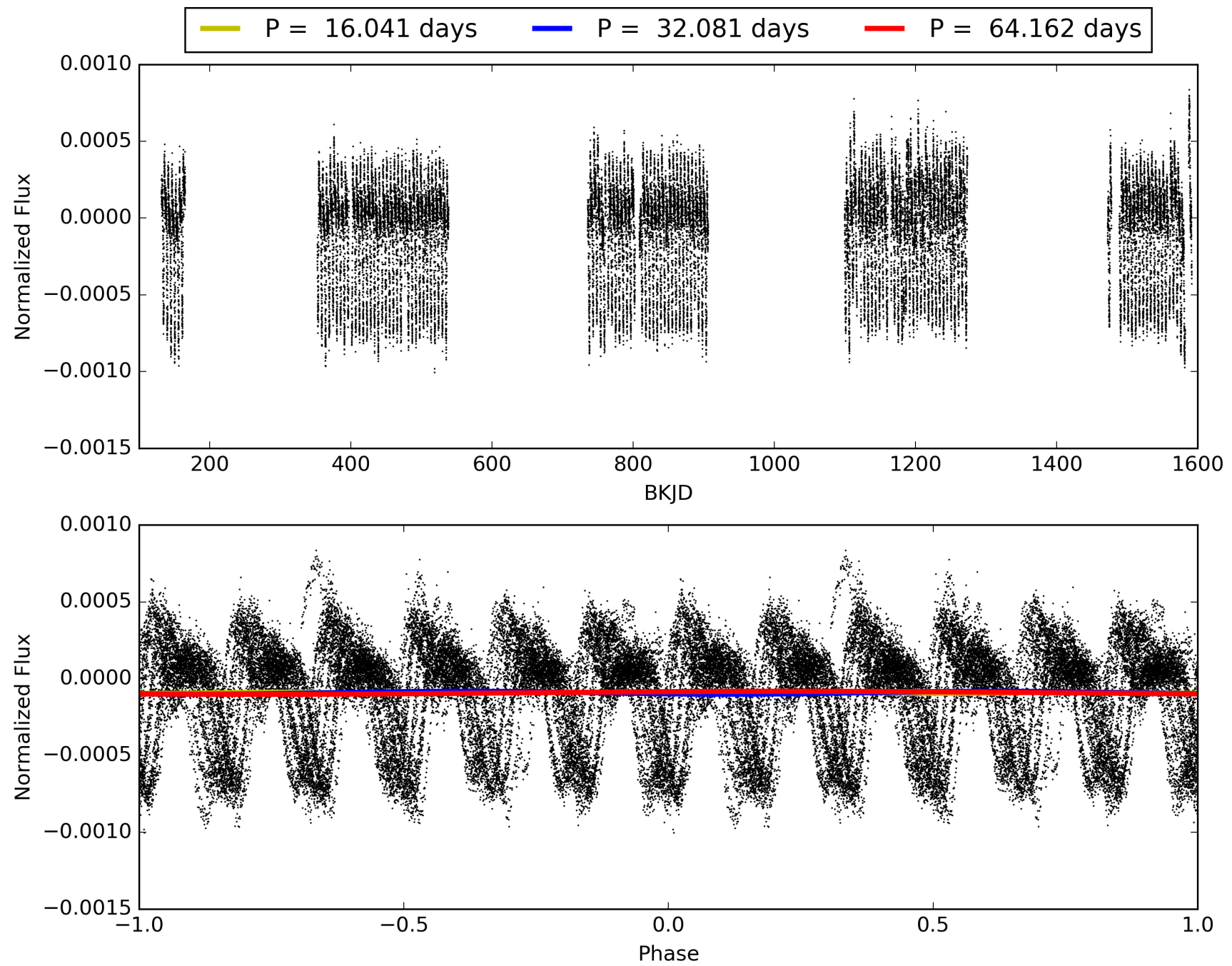
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:08:42 Z

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

TCE 004145040-02, PDC Light Curves

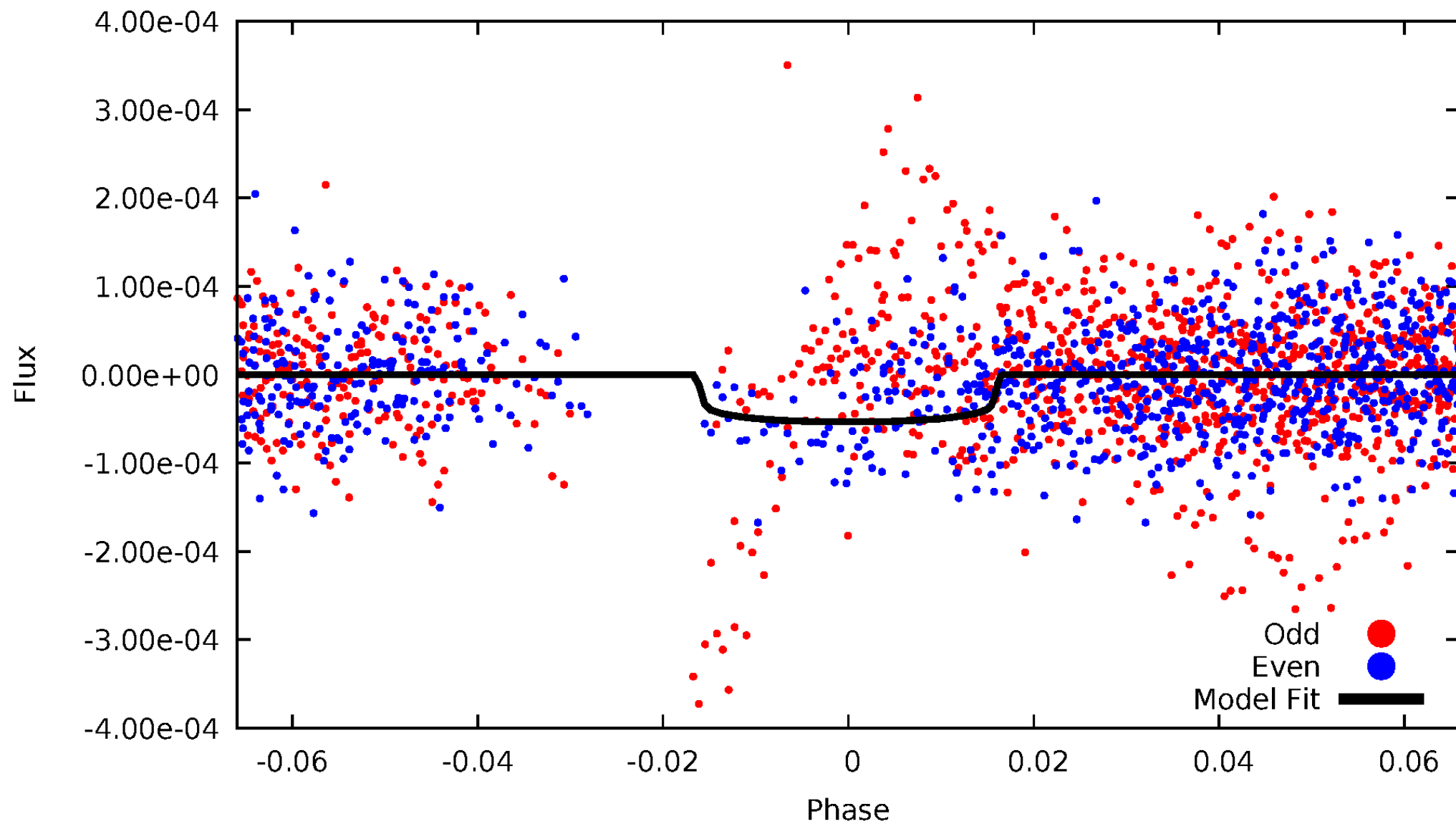


TCE 004145040-02



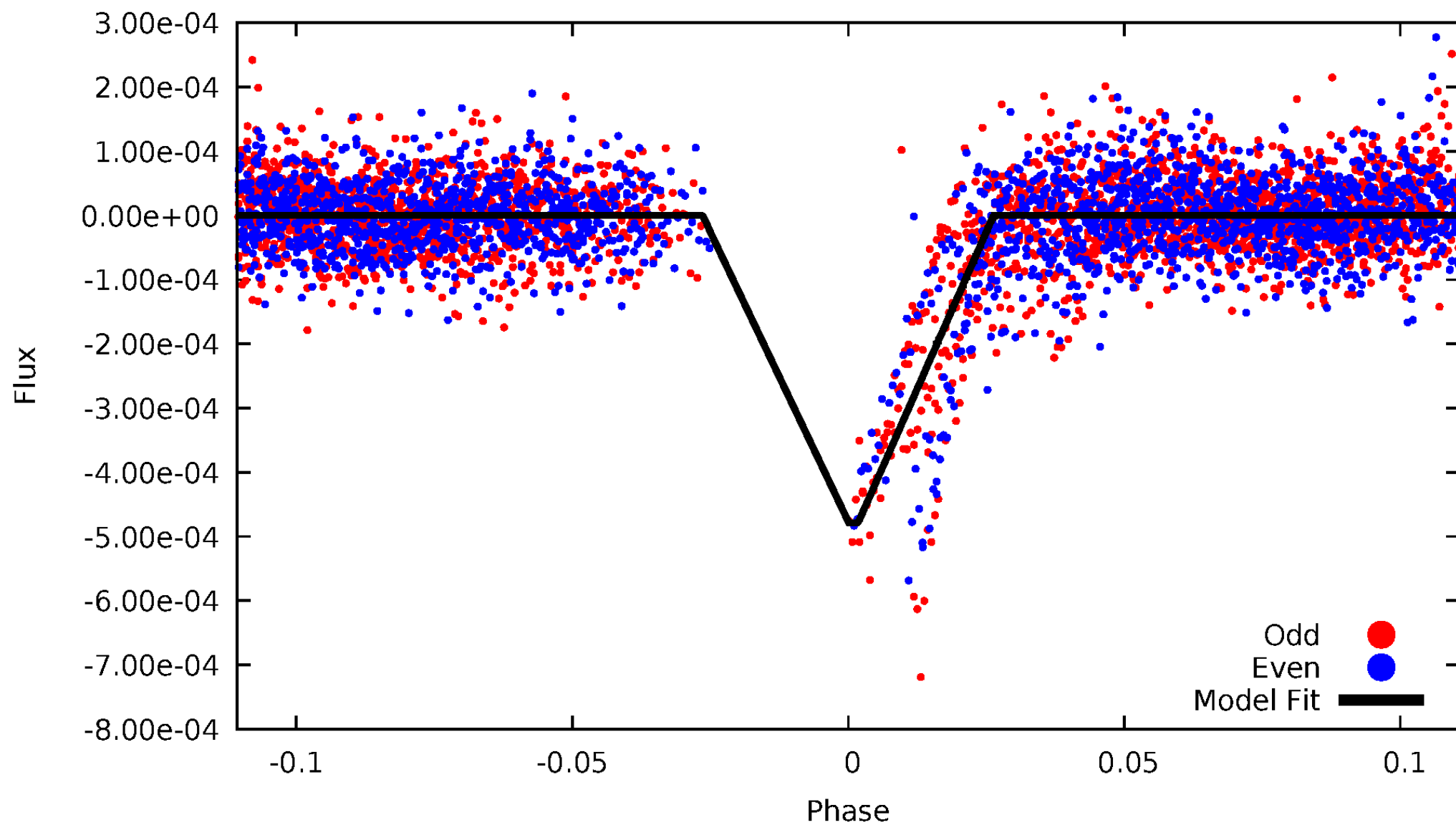
DV Odd/Even

TCE 004145040-02



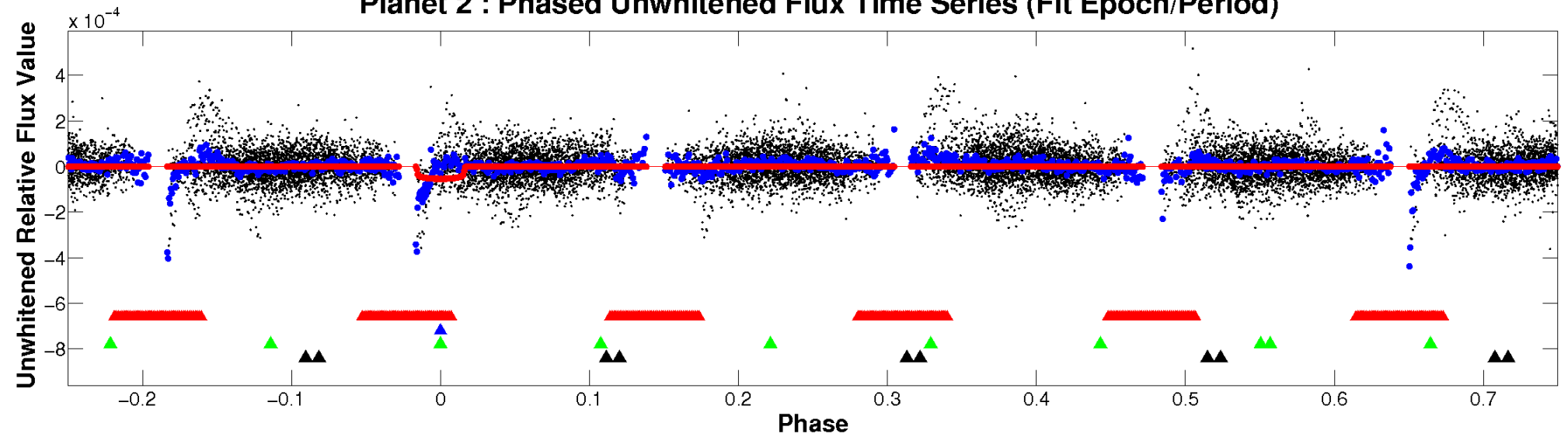
ALT Odd/Even

TCE 004145040-02

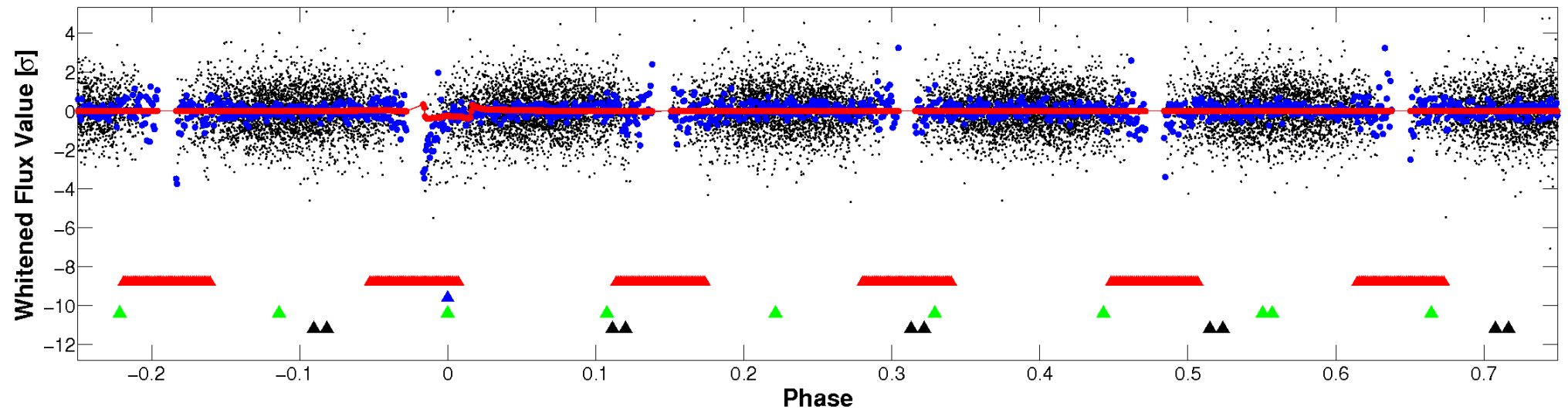


Non-Whitened Vs. Whitened Light Curve

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

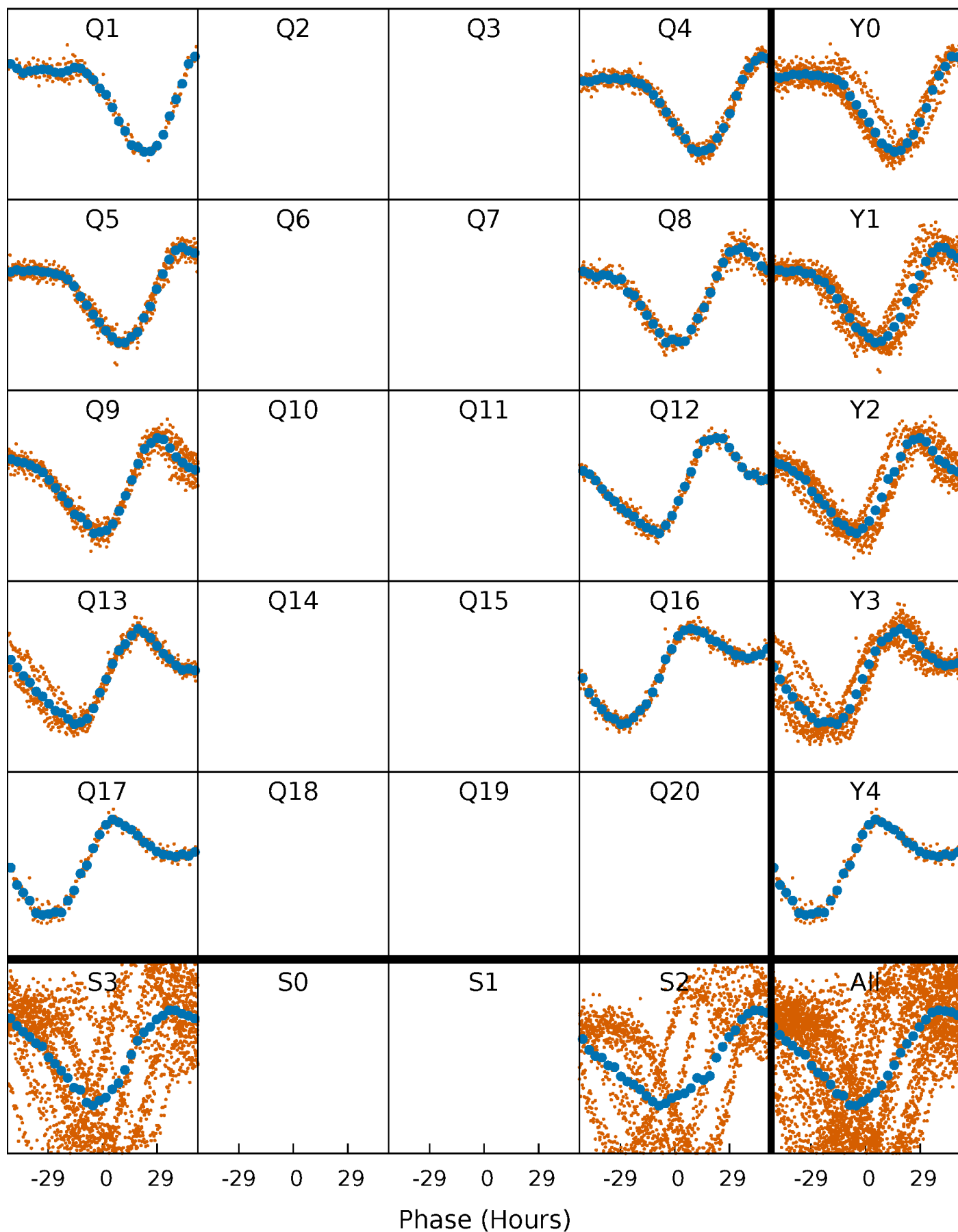


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



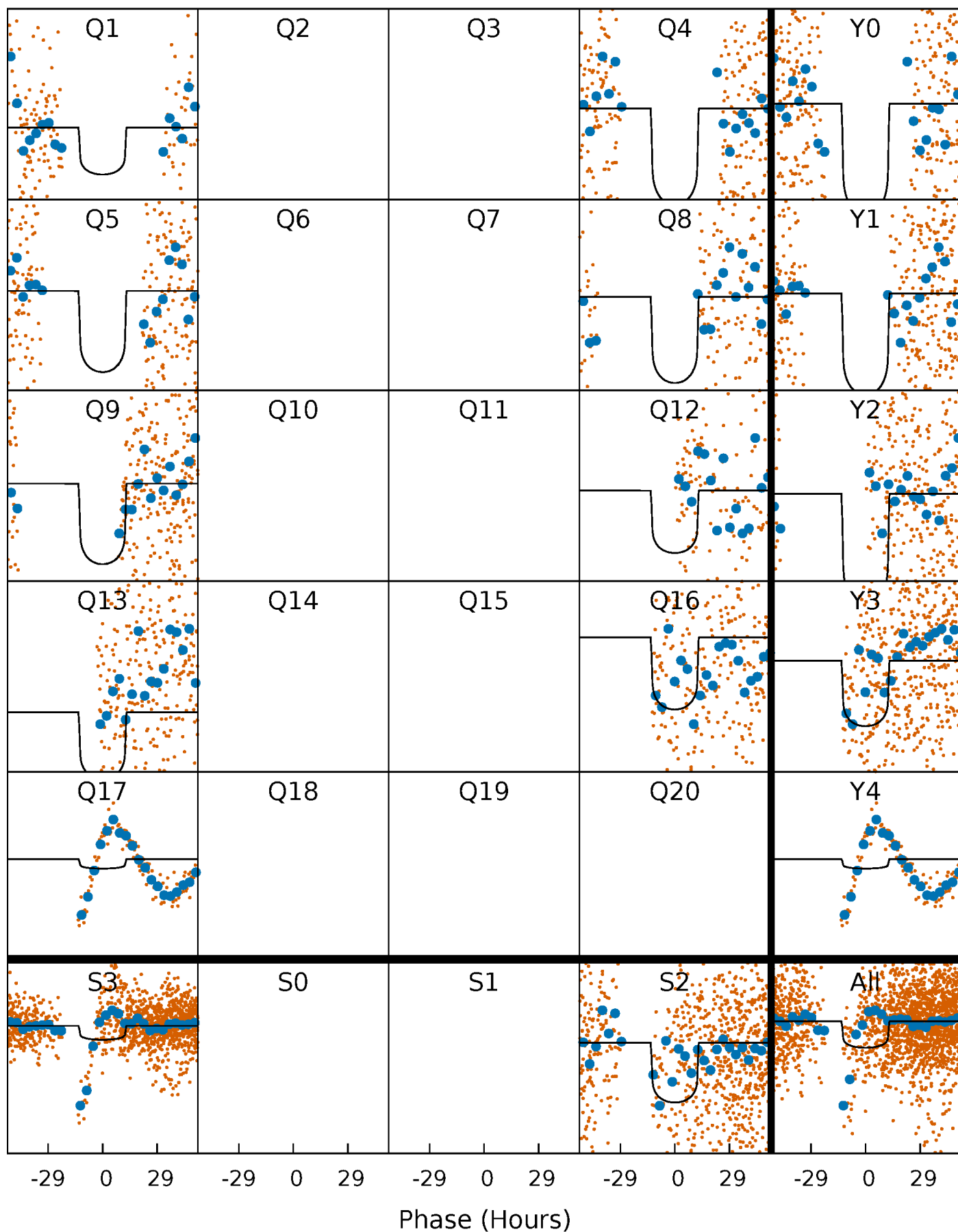
PDC Quarter-Phased Transit Curves

TCE 004145040-02 P= 32.081195 Days $T_0=133.355774$ (BKJD)



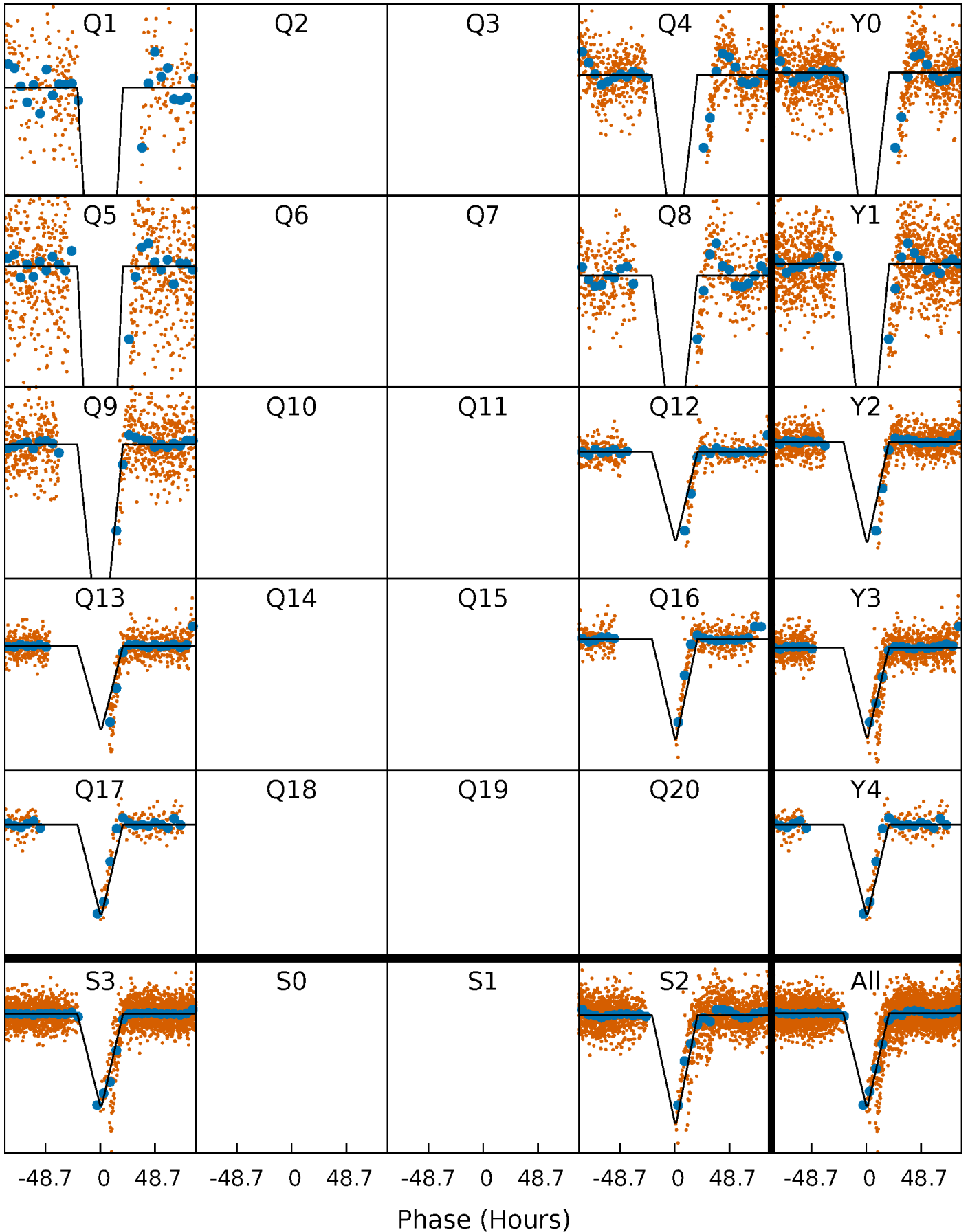
DV Quarter-Phased Transit Curves

TCE 004145040-02 P= 32.081195 Days $T_0=133.355774$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

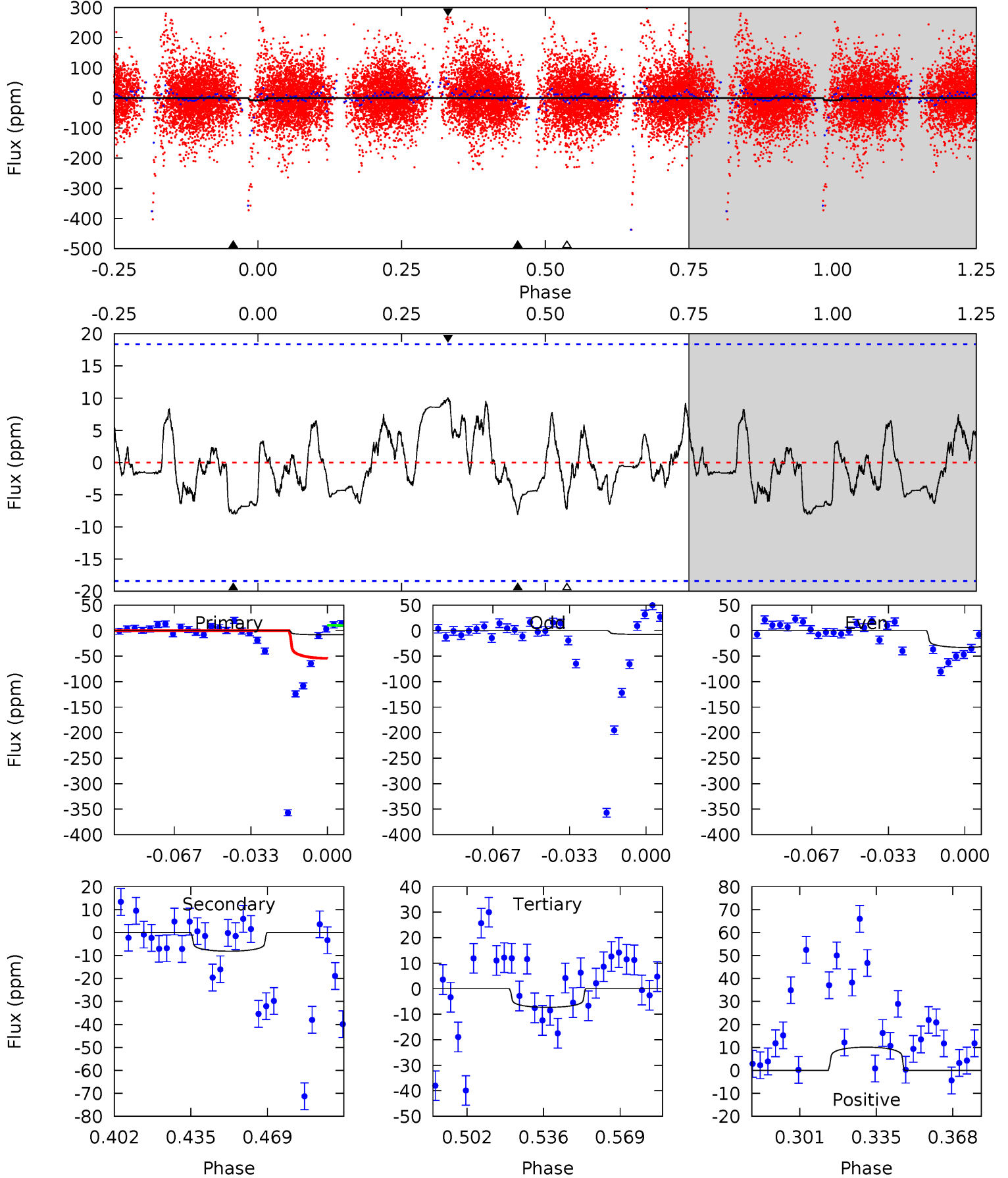
TCE 004145040-02 P= 32.071351 Days $T_0=133.258800$ (BKJD)



DV Model-Shift Uniqueness Test

004145040-02, P = 32.081195 Days, E = 101.274579 Days

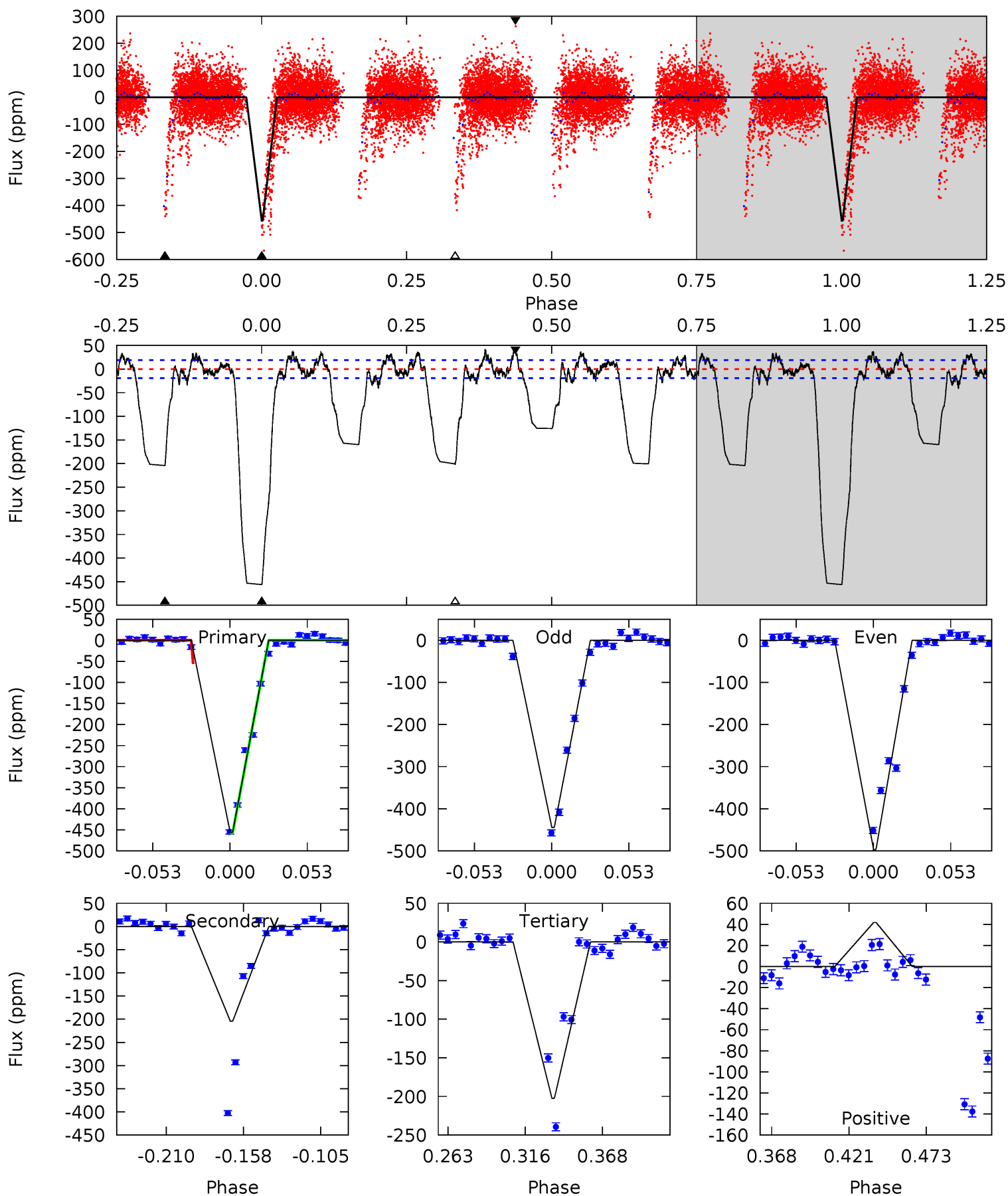
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.10	2.11	1.90	2.63	4.79	2.13	0.99	0.20	-0.53	0.21	-0.52	3.40	1.94	0.55	5.22



Alt Model-Shift Uniqueness Test

004145040-02, P = 32.071351 Days, E = 101.187449 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
112.2	50.2	49.8	10.3	4.70	1.94	7.07	62.4	101.9	0.41	39.9	6.32	1.55	0.08	5.98



Stellar Parameters For KIC 004145040

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7122^{+227}_{-313}	$4.329^{+0.063}_{-0.147}$	$-0.220^{+0.250}_{-0.350}$	$1.290^{+0.308}_{-0.142}$	$1.312^{+0.158}_{-0.176}$	$0.861^{+0.242}_{-0.378}$
	+3%/-4%	+1%/-3%	+114%/-159%	+24%/-11%	+12%/-13%	+28%/-44%
Source	KIC0	FLK73	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 004145040-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-8 ± 4	$1.09^{+0.19}_{-0.16}$	1083^{+66}_{-56}	4431^{+524}_{-513}	161^{+113}_{-82}
Alt.	-204 ± 4	$3.16^{+0.39}_{-0.30}$	1085^{+61}_{-53}	5700^{+217}_{-224}	521^{+95}_{-92}

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

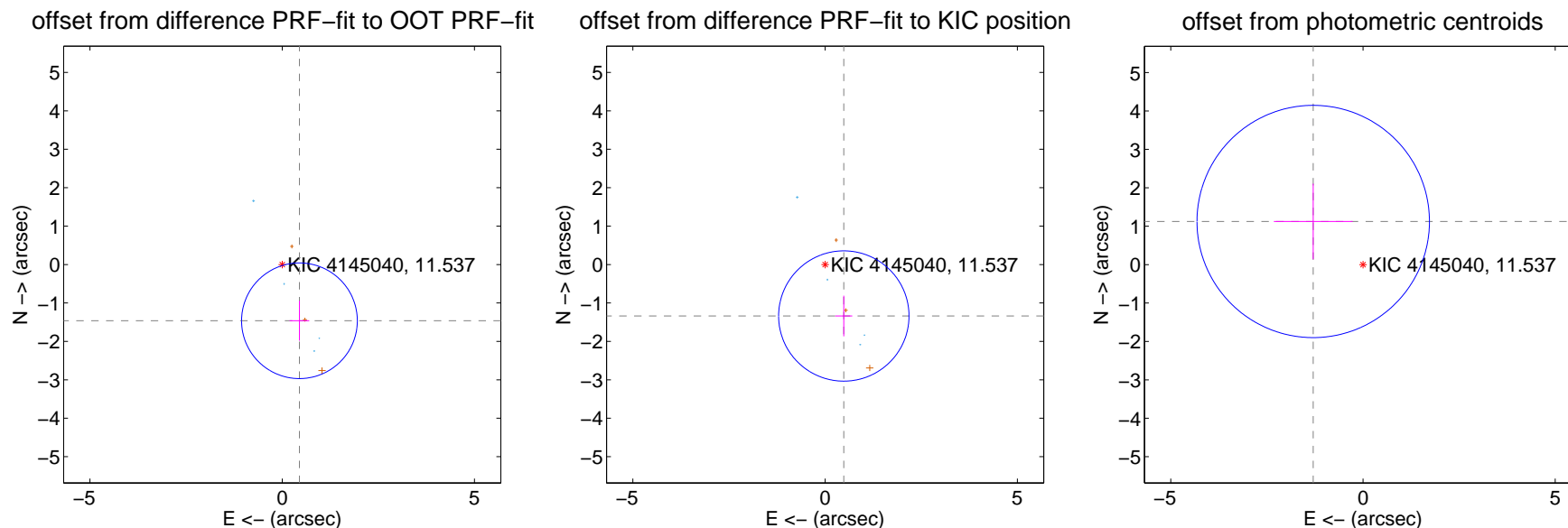
DV Centroid Data

Supplemental centroid analysis for 004145040-02. **Kepler magnitude: 11.54.** Transit SNR 6.27

There are 4 quarters with good PRF difference image offsets

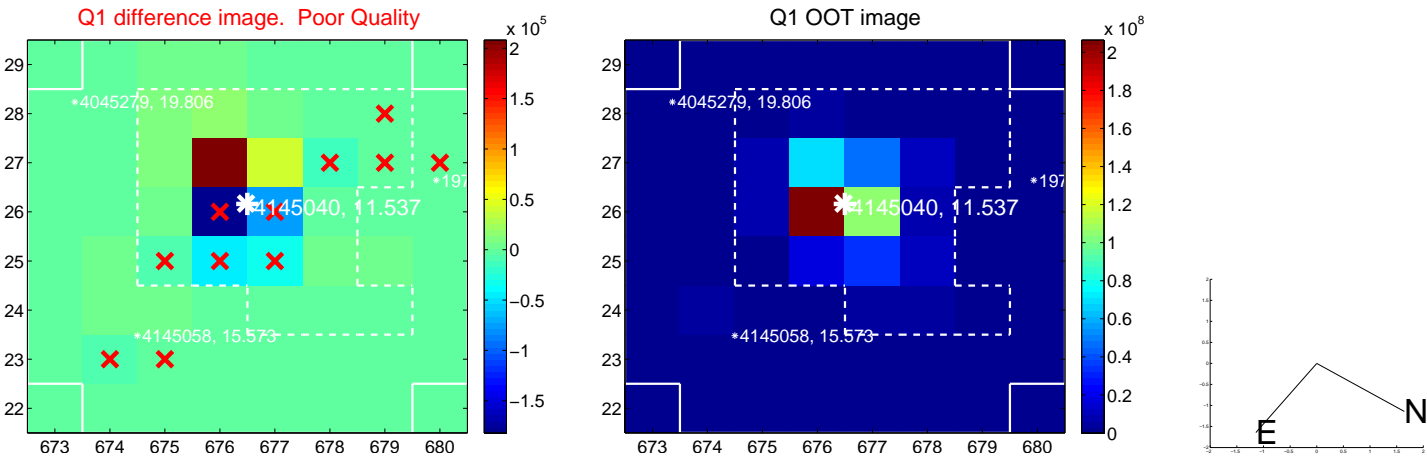
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.530 ± 0.502	3.05	-0.448 ± 0.255	-1.463 ± 0.519
PRF-fit source offset from KIC position	1.425 ± 0.565	2.52	-0.486 ± 0.220	-1.339 ± 0.529
photometric centroid source offset	1.71 ± 1.01	1.70	1.29 ± 1.02	1.12 ± 0.99

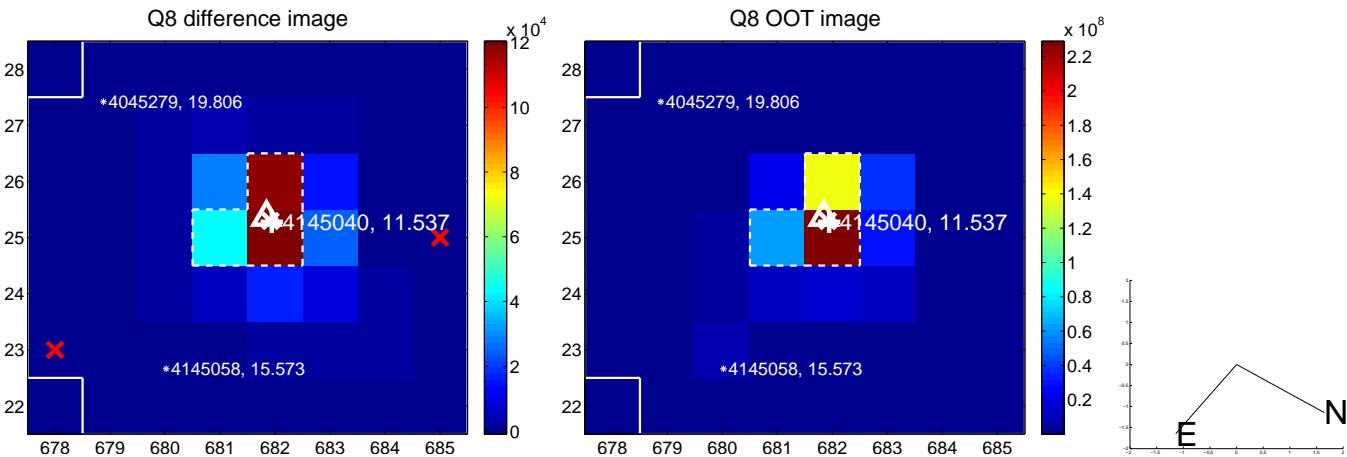
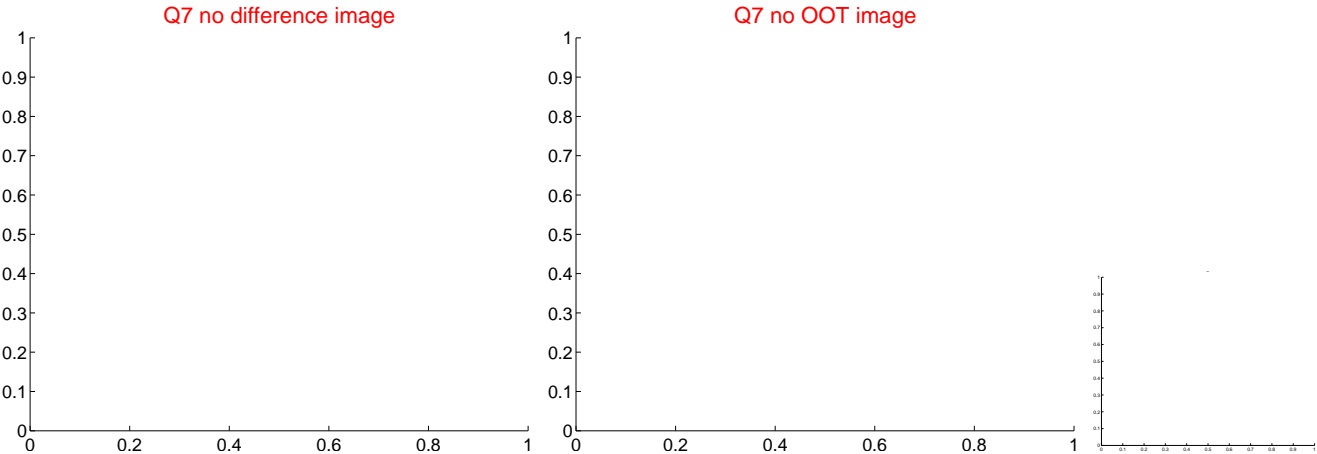
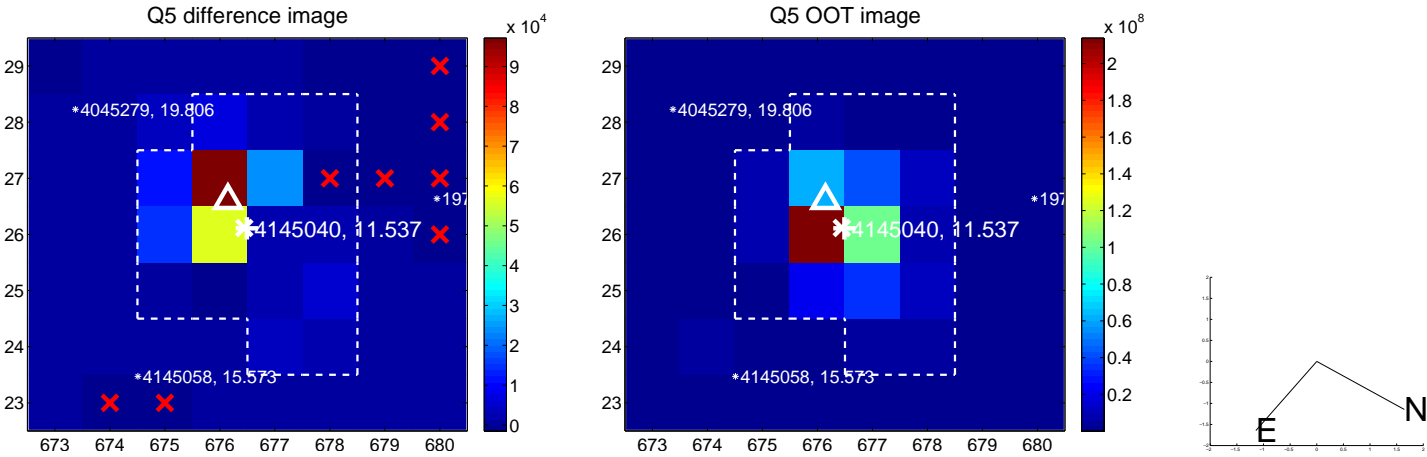


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

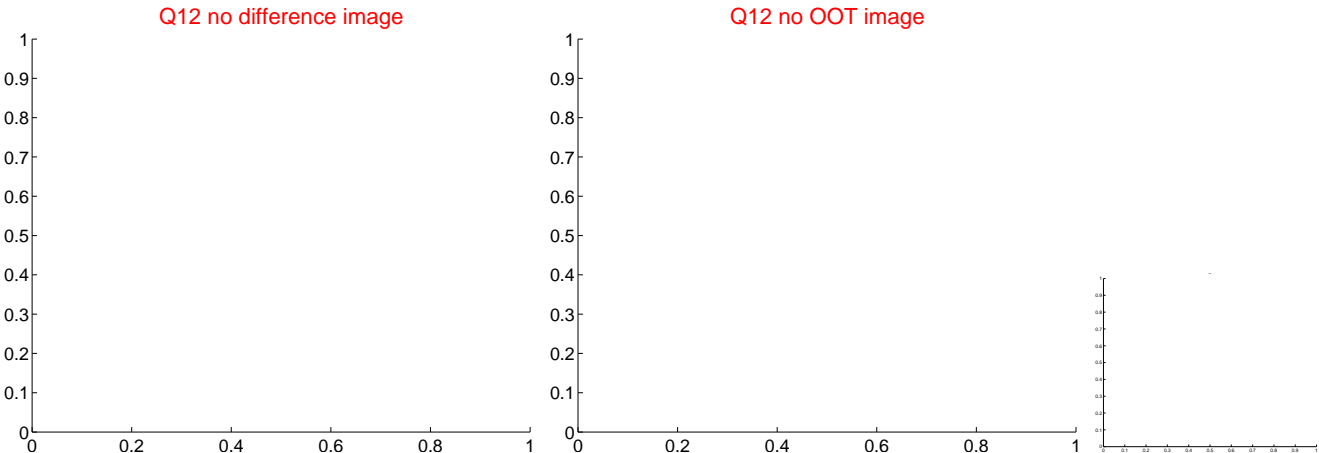
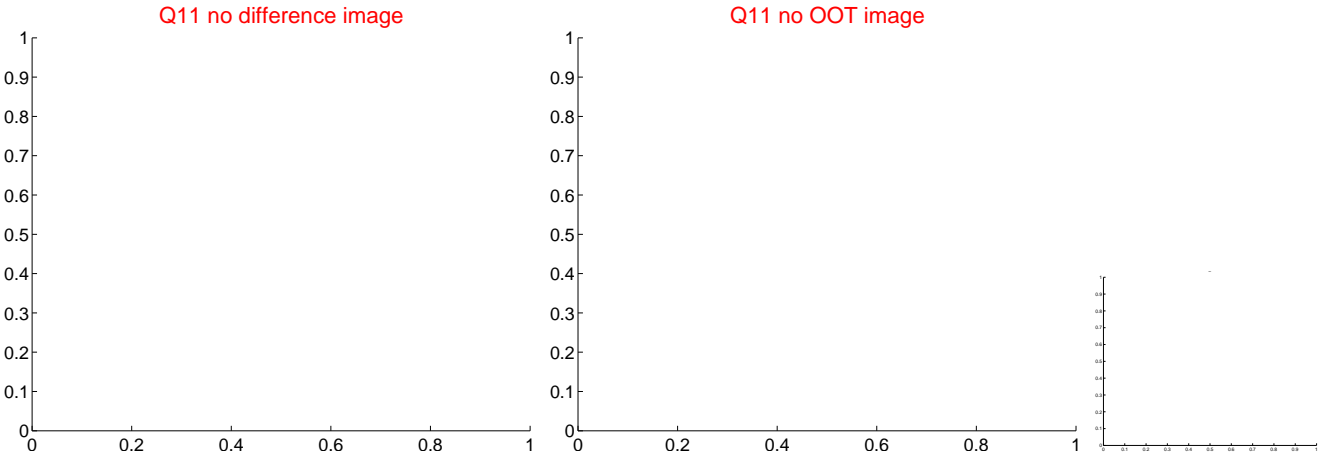
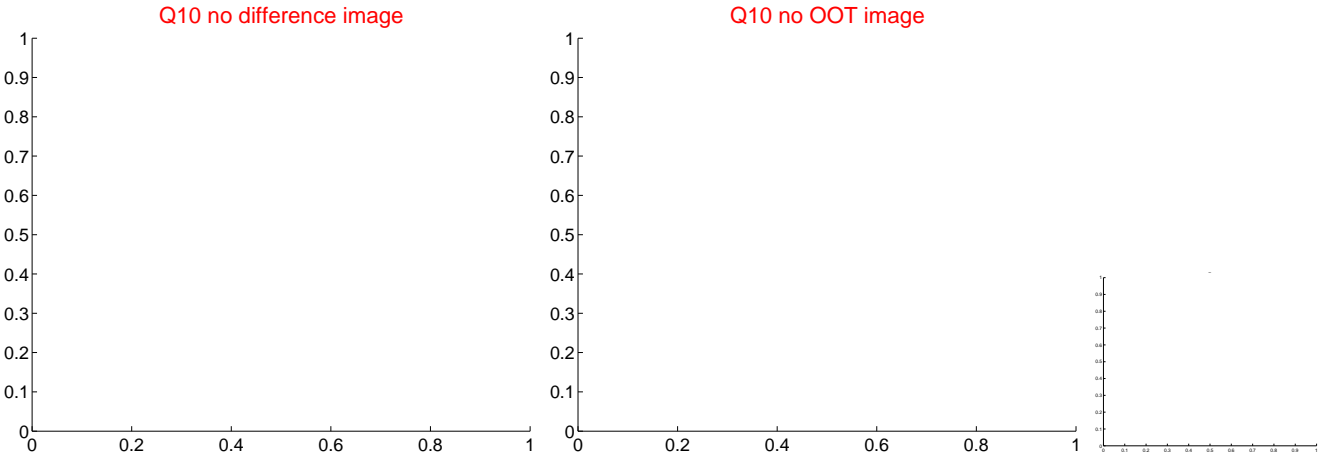
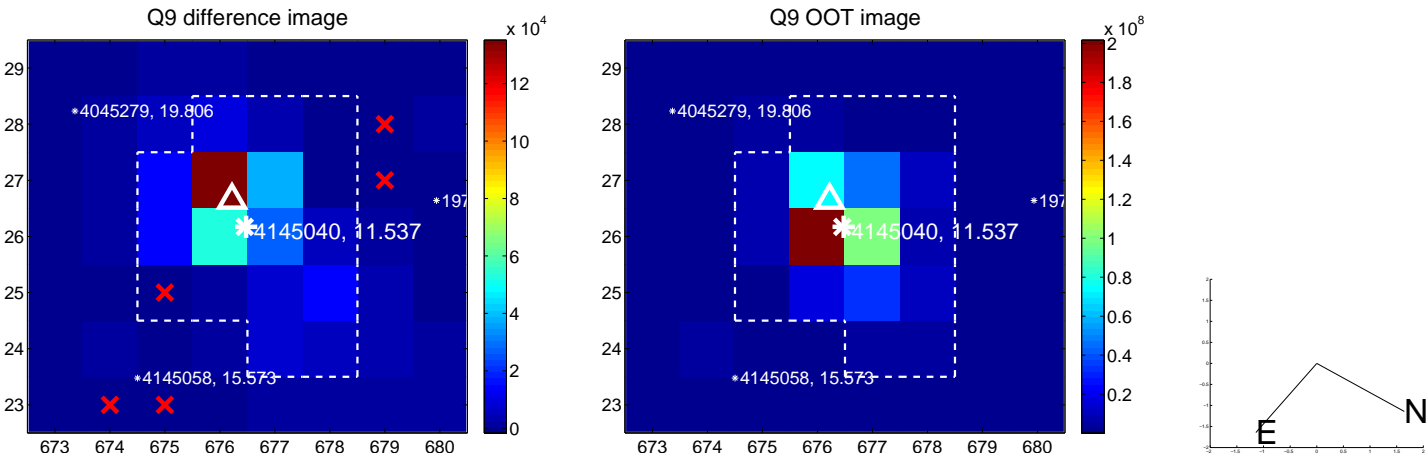
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



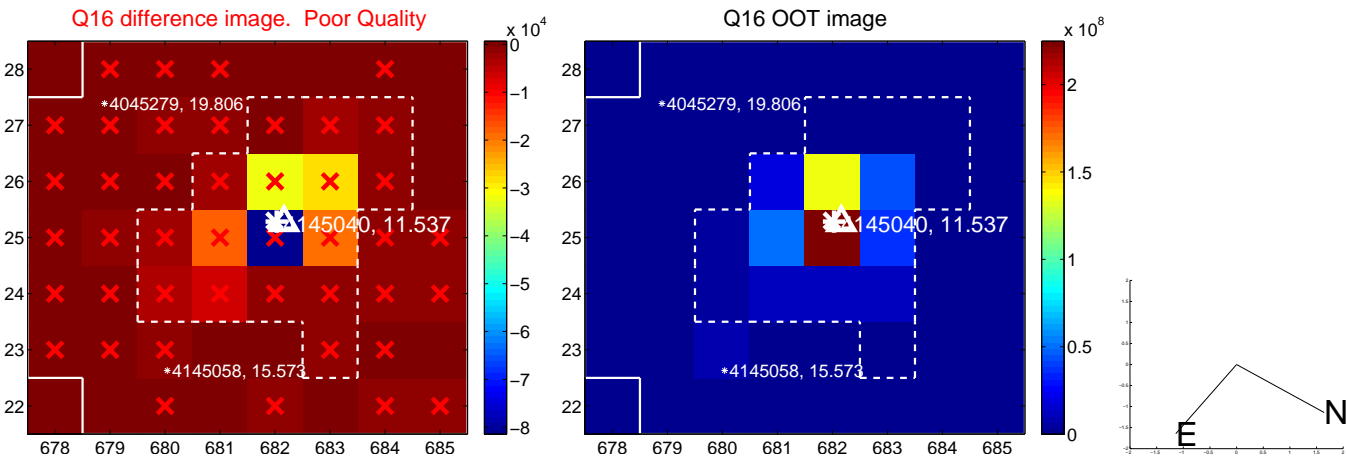
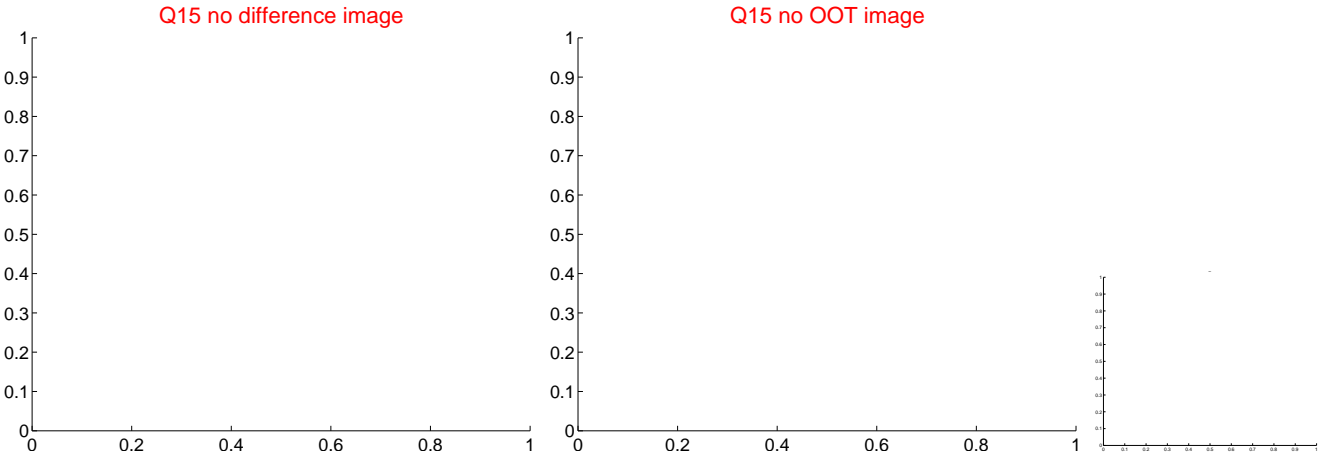
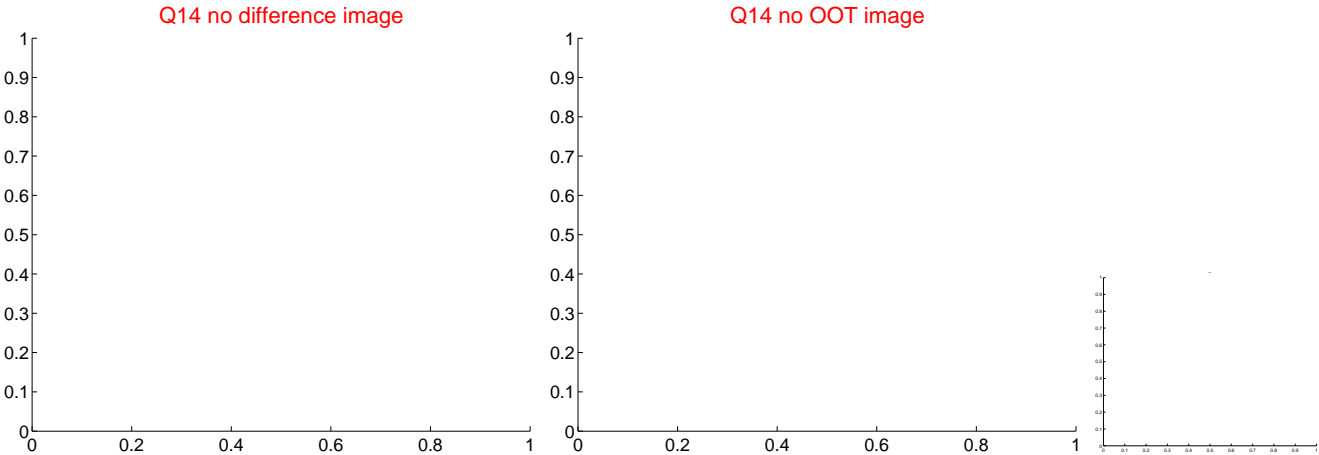
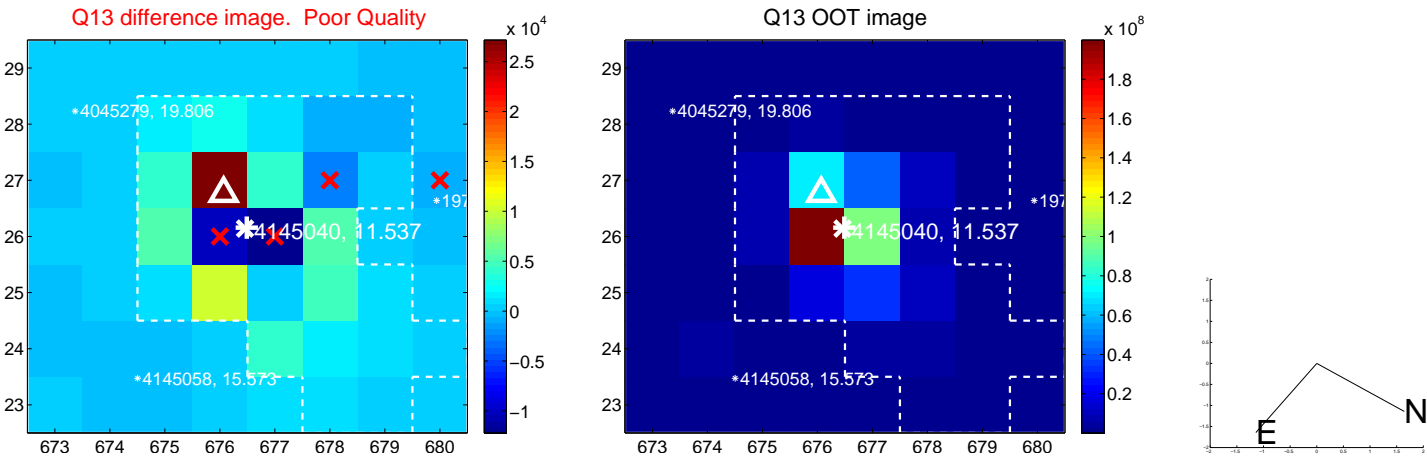
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



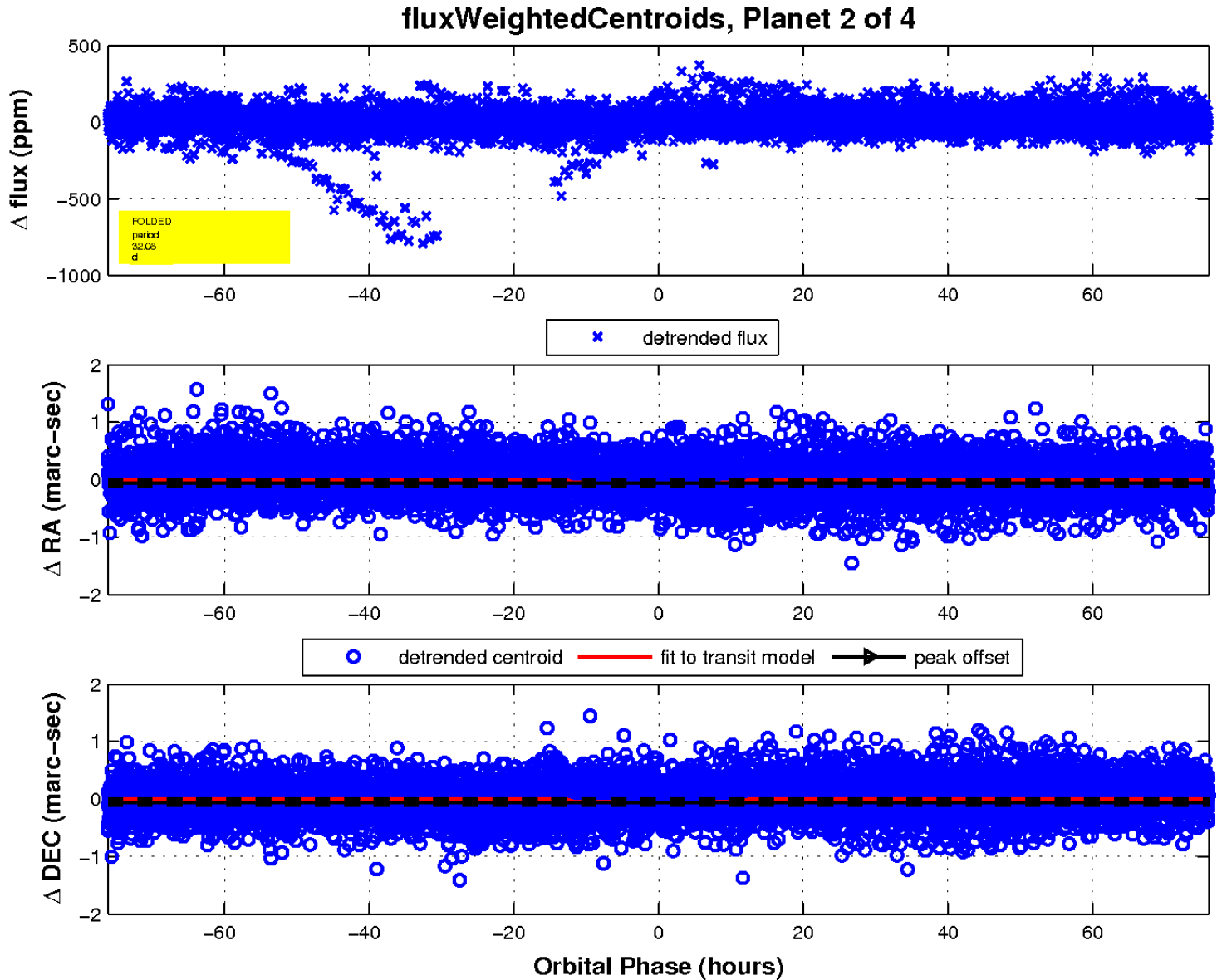
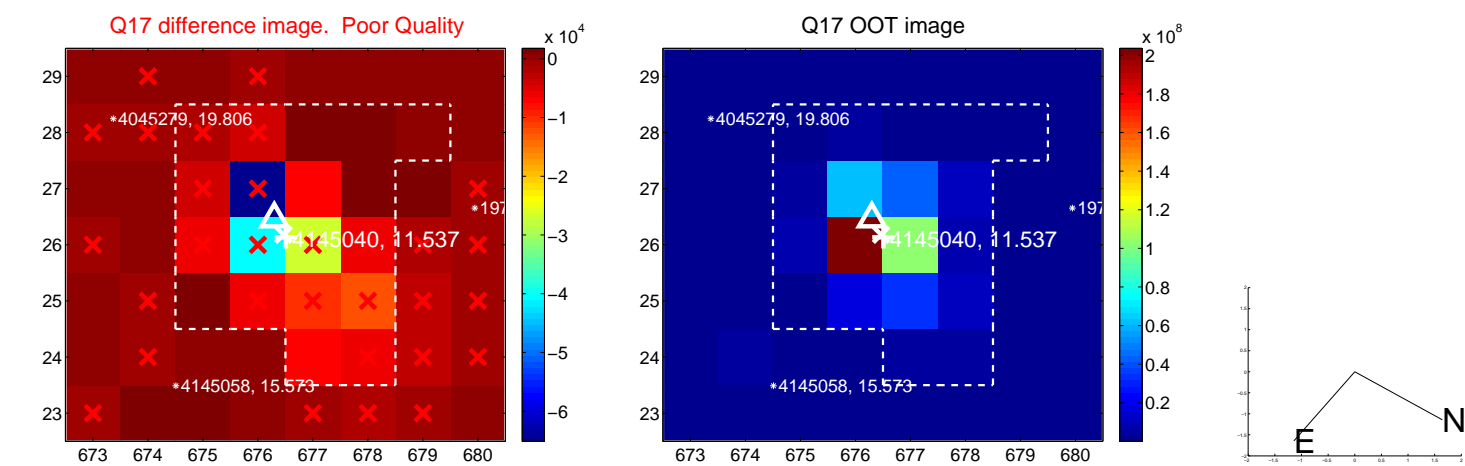
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

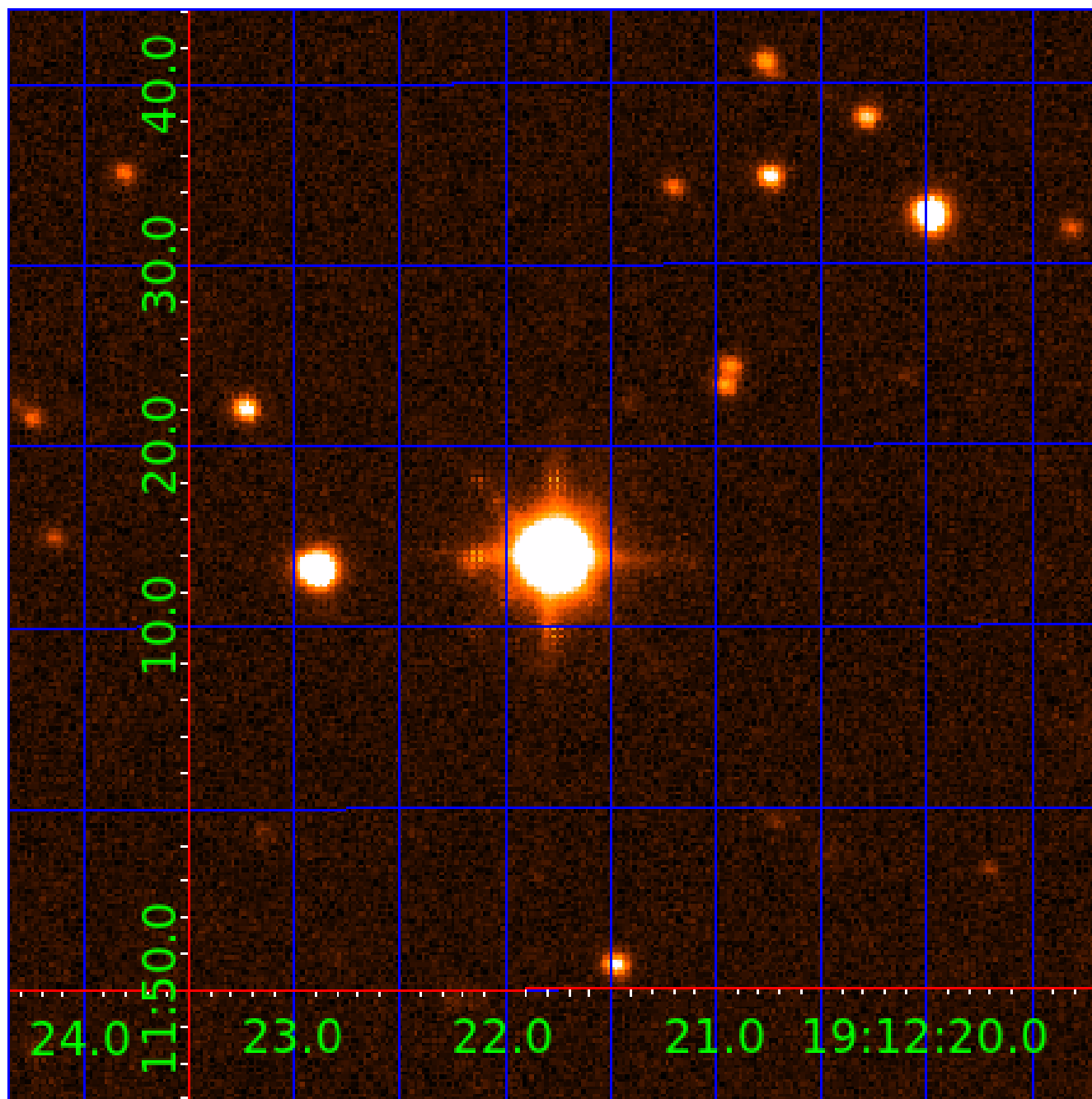


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004145040

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})
004145040-01	OBS	No	5.339758	133.587910	11.6	17.966	7.9	6.5	1.29	7122	0.51	902.96
004145040-02	OBS	No	32.081195	133.355774	53.5	25.379	16.4	6.3	1.29	7122	1.07	82.67
004145040-03	OBS	No	153.299519	183.100200	77.2	1.386	8.8	3.2	1.29	7122	1.32	10.27
004145040-04	OBS	No	153.933088	182.237307	111.6	6.000	8.8	-1.0	1.29	7122	1.38	10.21

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004145040-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
004145040-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004145040-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004145040-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

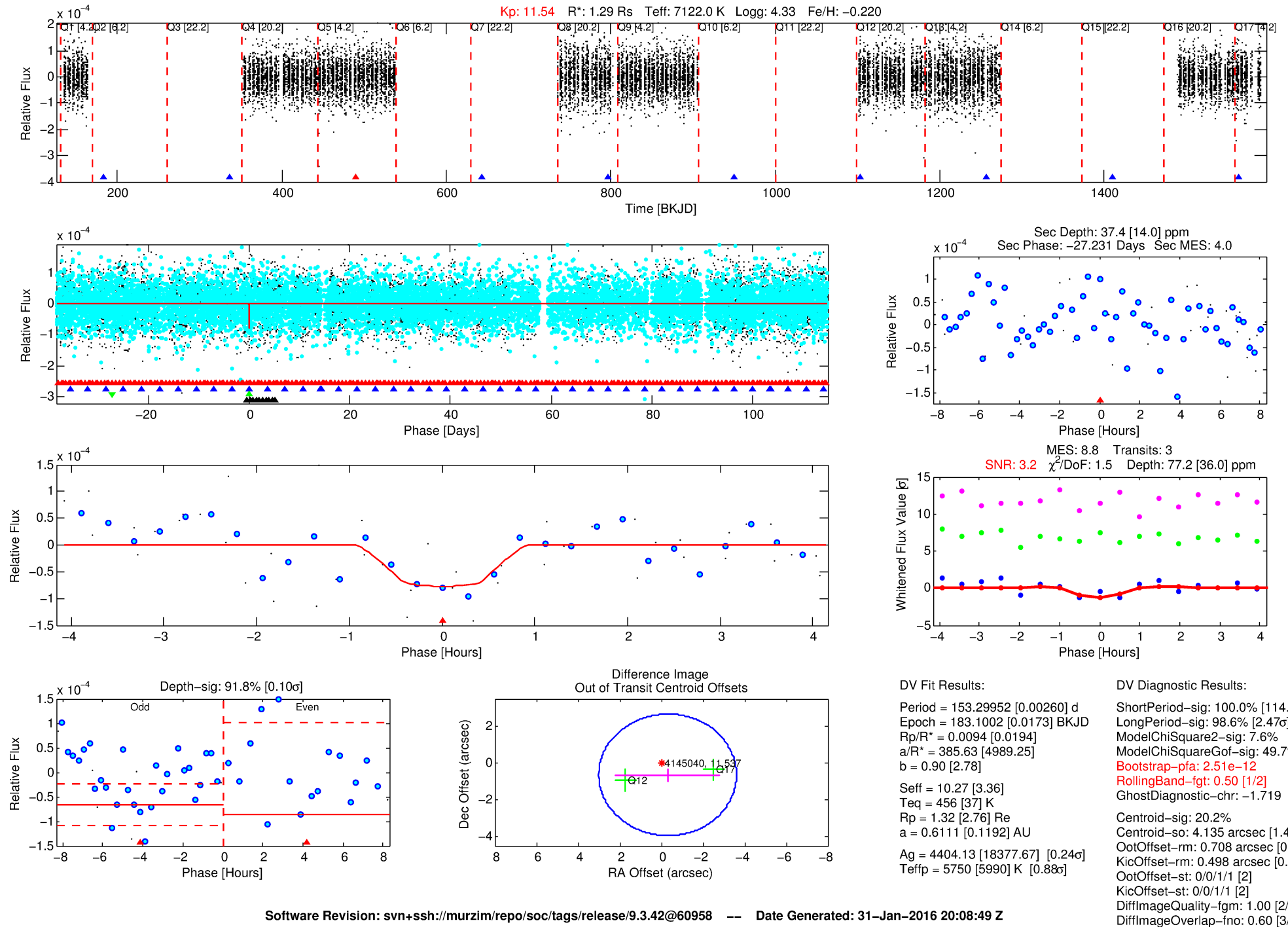
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004145040-03

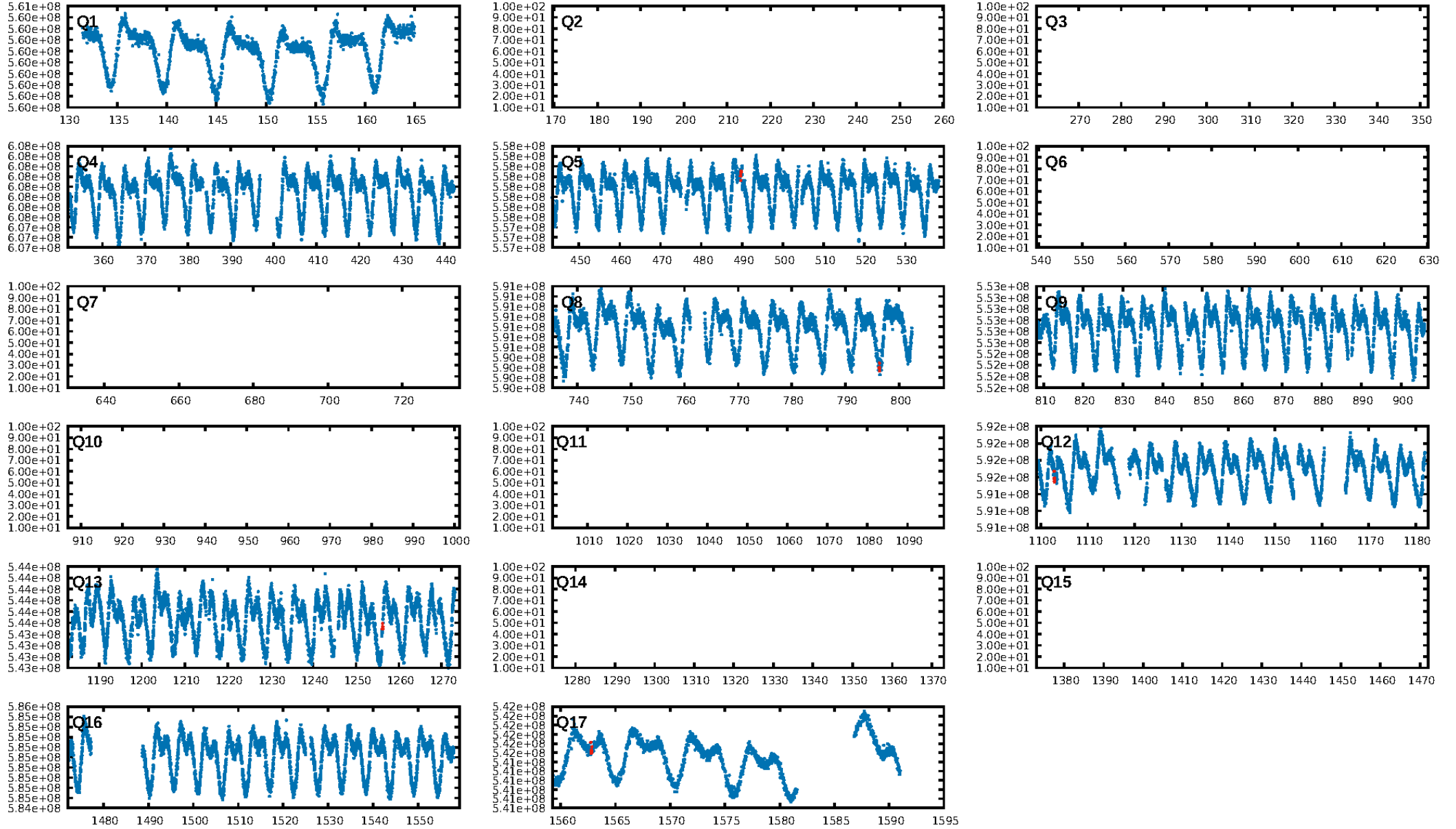
No Significant Match Found

DV One-Page Summary

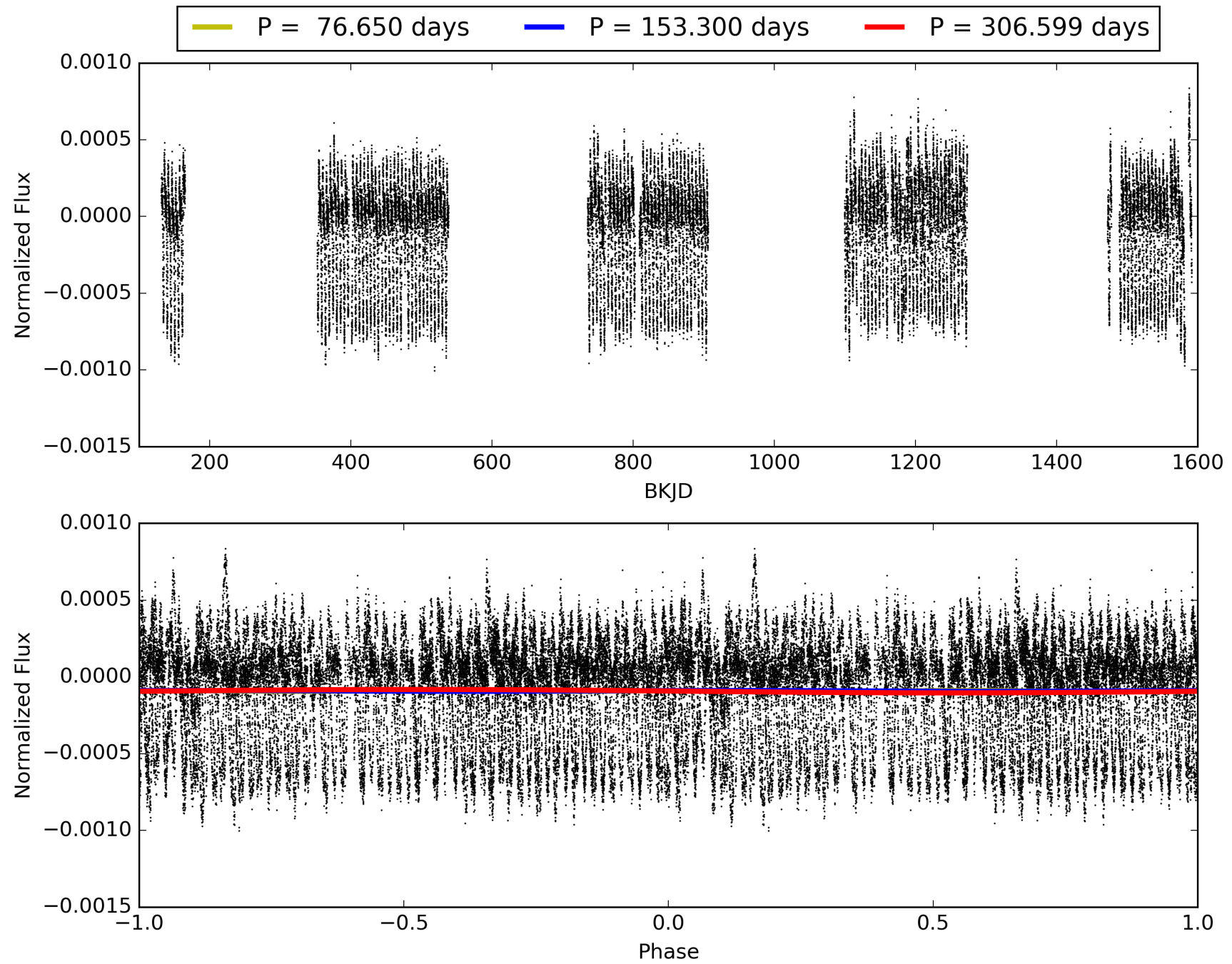
KIC: 4145040 Candidate: 3 of 4 Period: 153.300 d



TCE 004145040-03, PDC Light Curves

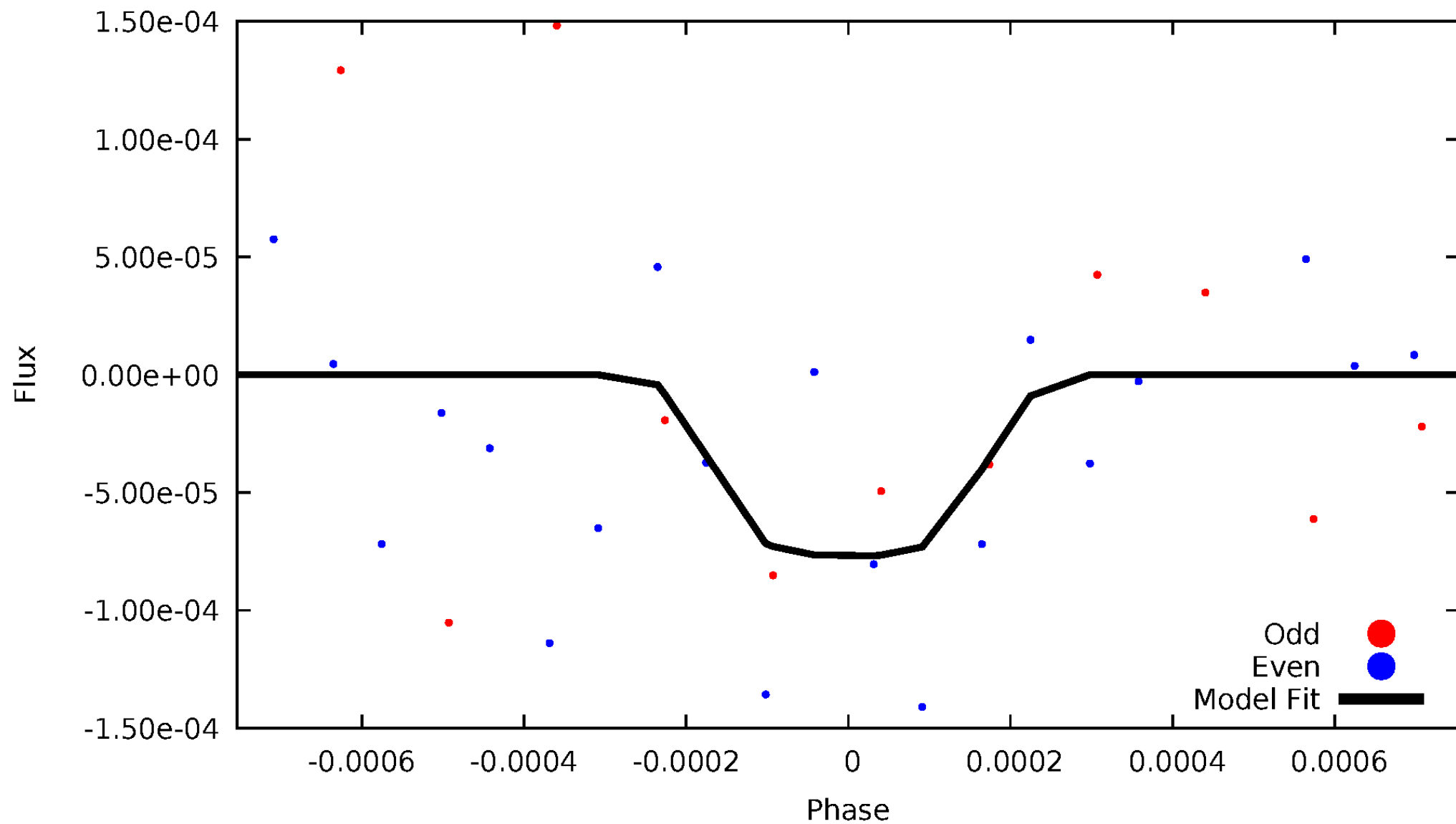


TCE 004145040-03



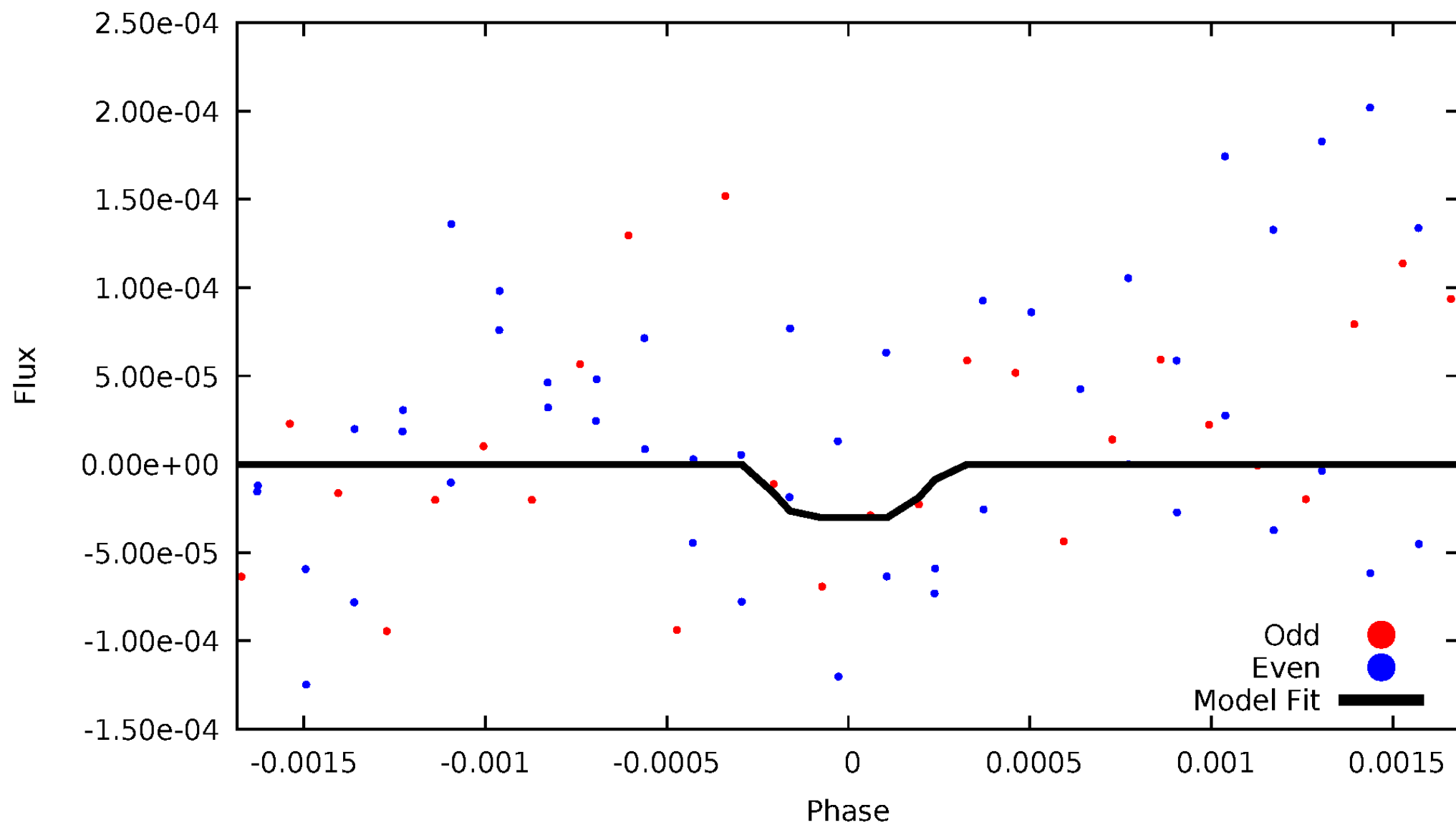
DV Odd/Even

TCE 004145040-03



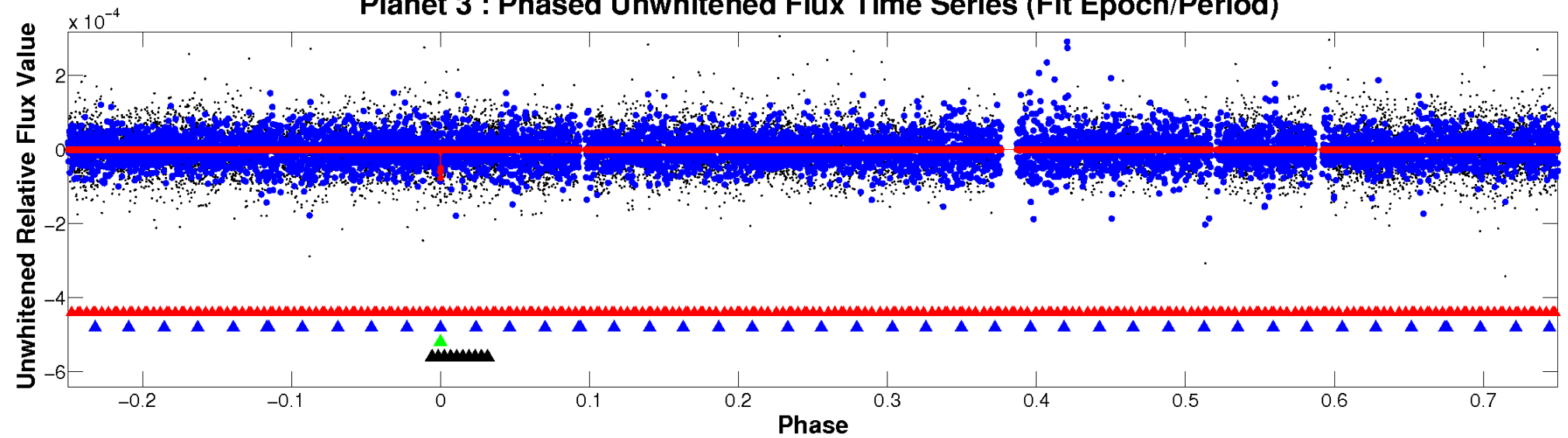
ALT Odd/Even

TCE 004145040-03

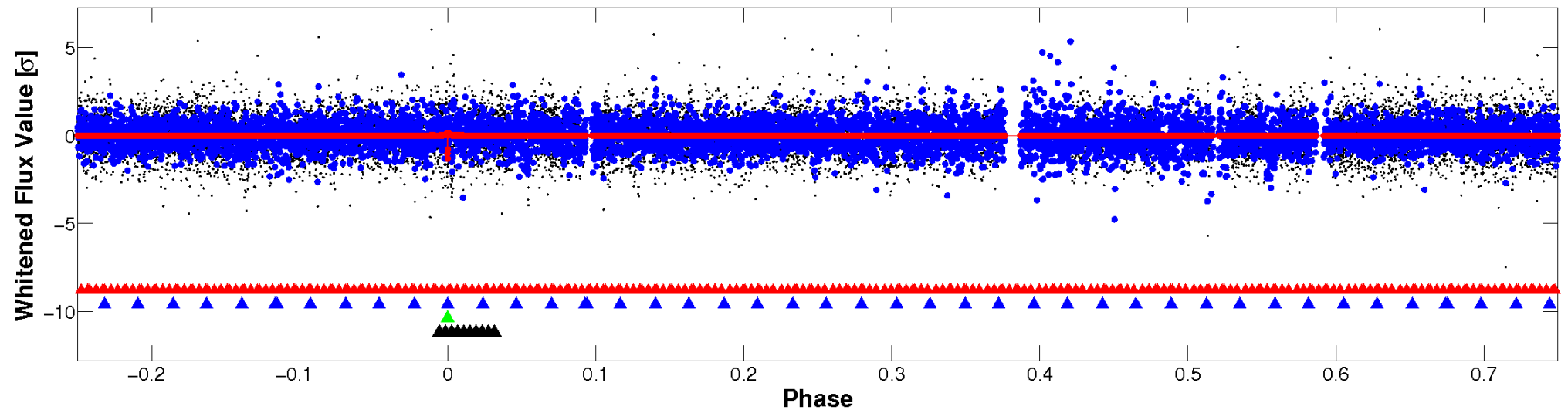


Non-Whitened Vs. Whitened Light Curve

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

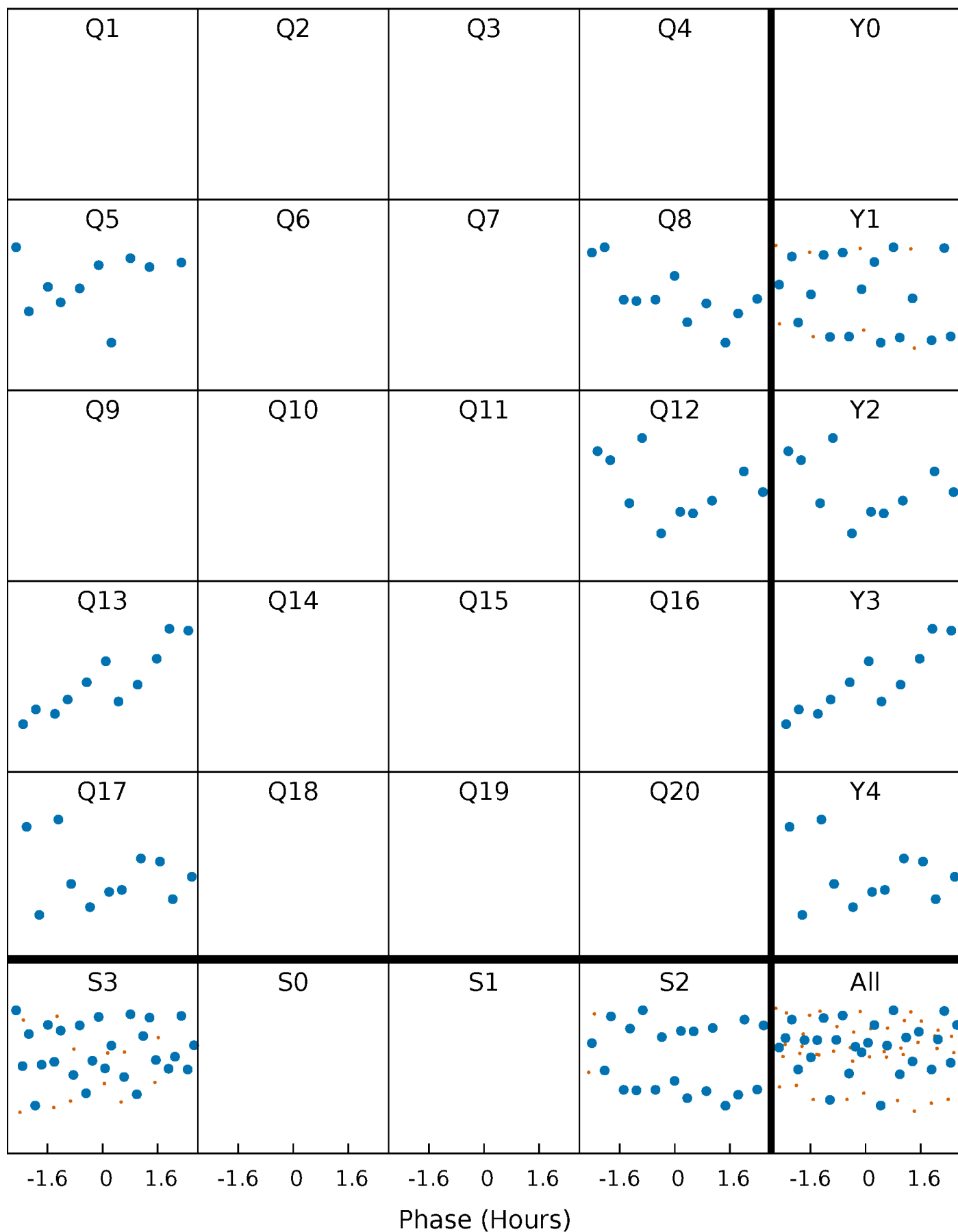


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 004145040-03 P=153.299519 Days $T_0=183.100200$ (BKJD)



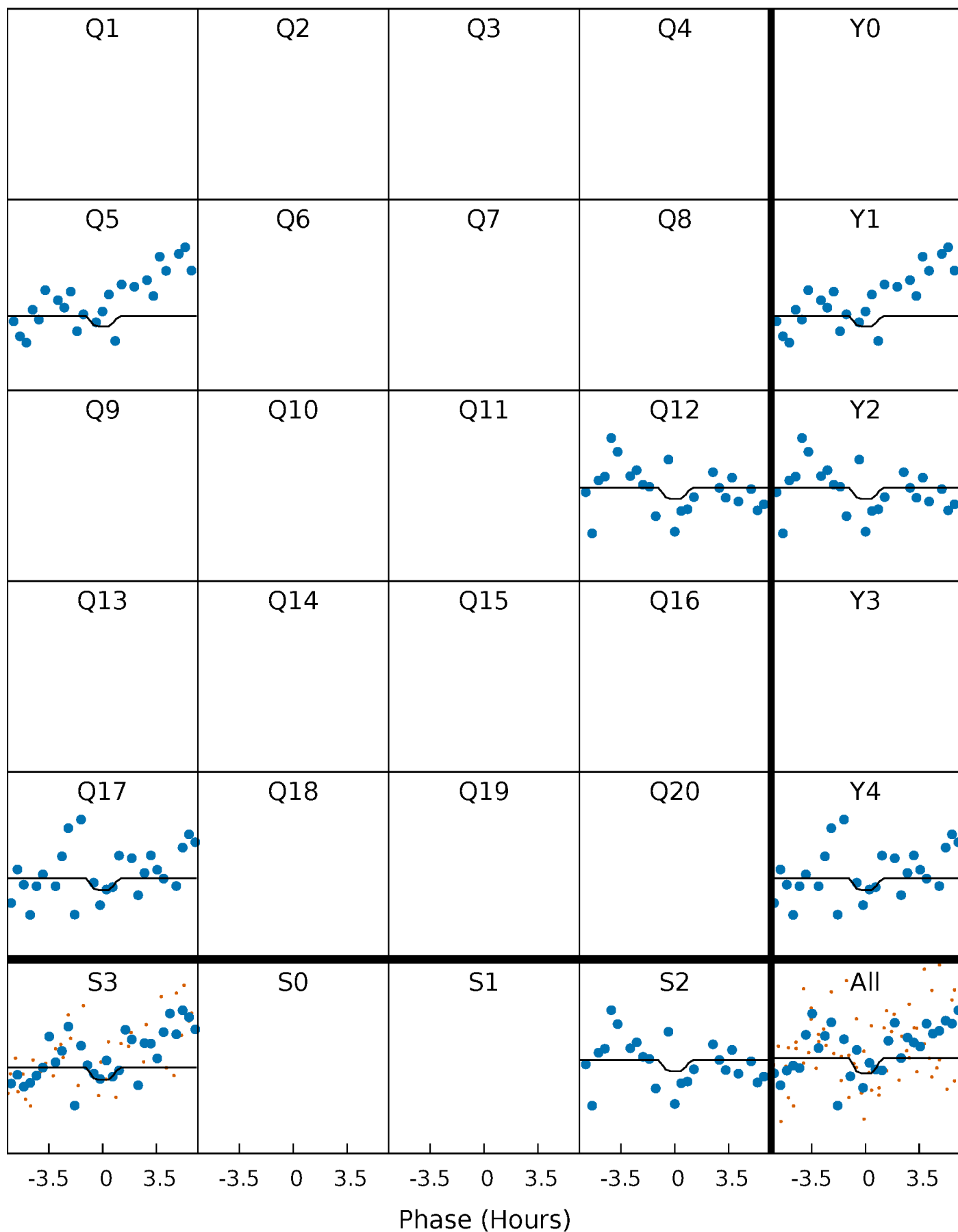
DV Quarter-Phased Transit Curves

TCE 004145040-03 $P=153.299519$ Days $T_0=183.100200$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

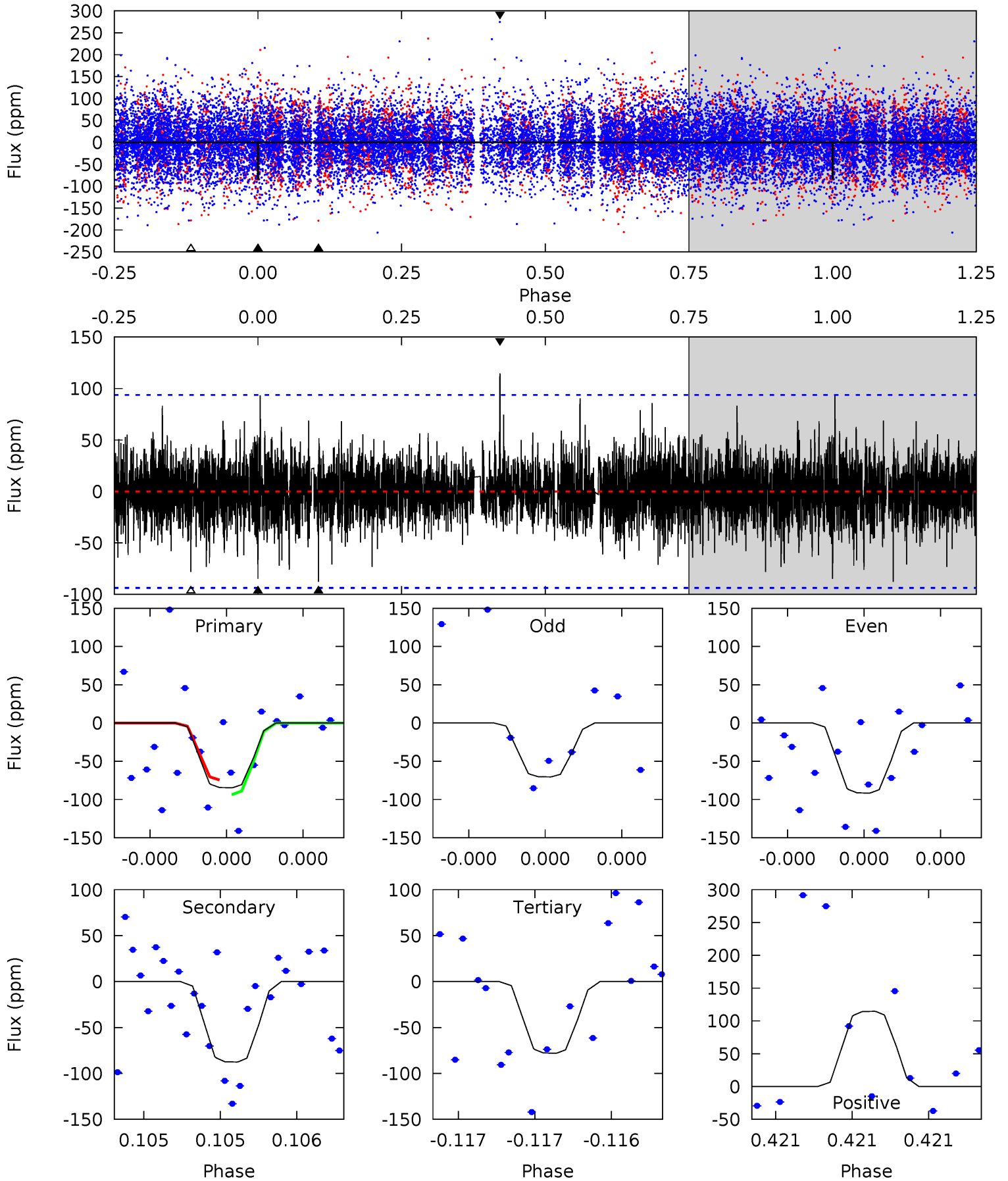
TCE 004145040-03 P=153.302281 Days $T_0=183.072213$ (BKJD)



DV Model-Shift Uniqueness Test

004145040-03, P = 153.299519 Days, E = 29.800681 Days

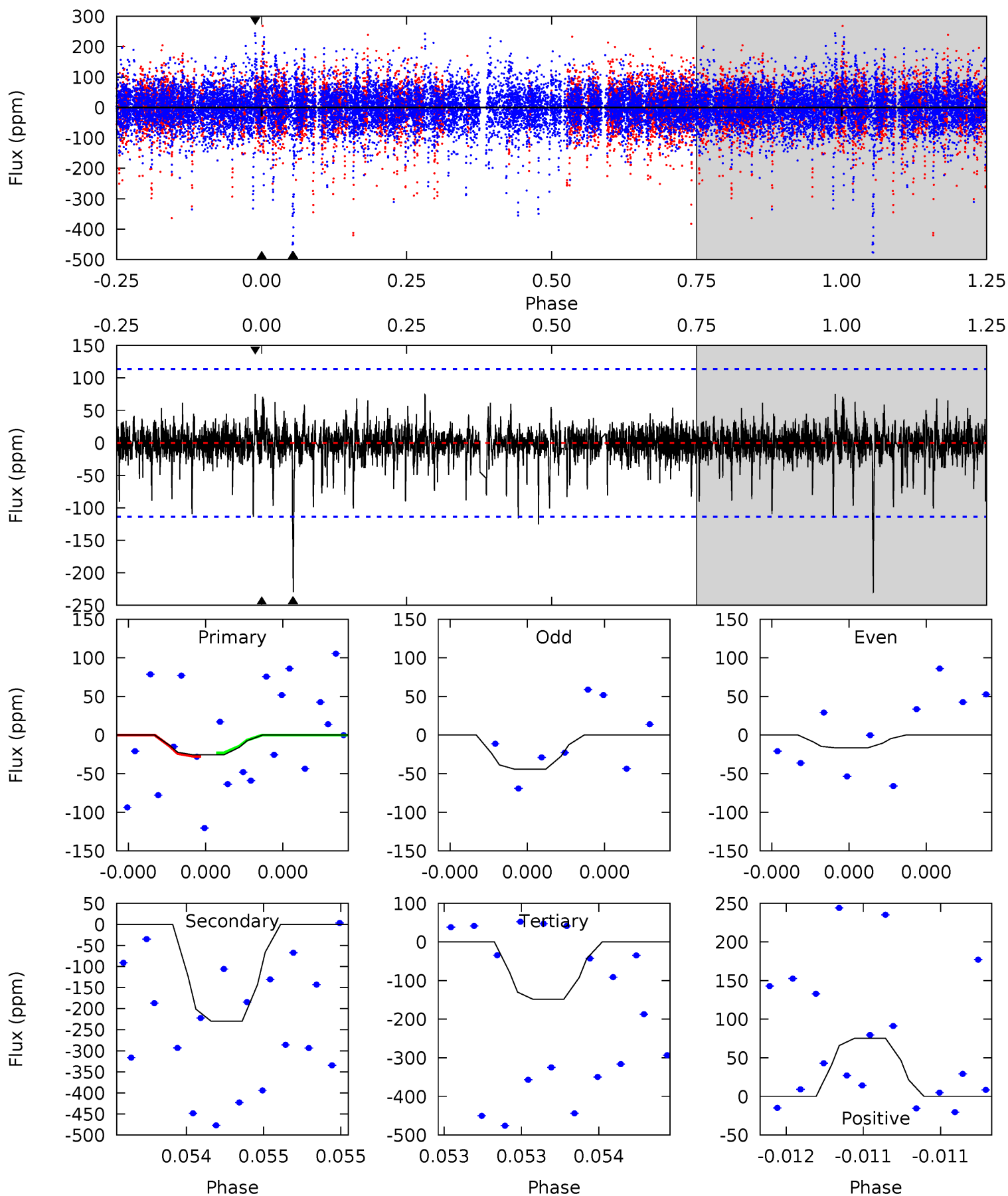
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.05	5.23	4.66	6.84	5.59	3.50	1.25	0.39	-1.79	0.57	-1.61	0.62	1.19	0.57	0.57



Alt Model-Shift Uniqueness Test

004145040-03, P = 153.302281 Days, E = 29.769932 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.25	11.3	7.30	3.70	5.59	3.51	1.04	-6.05	-2.45	4.00	7.60	0.60	0.58	0.25	0.11



Stellar Parameters For KIC 004145040

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7122^{+227}_{-313}	$4.329^{+0.063}_{-0.147}$	$-0.220^{+0.250}_{-0.350}$	$1.290^{+0.308}_{-0.142}$	$1.312^{+0.158}_{-0.176}$	$0.861^{+0.242}_{-0.378}$
	+3%/-4%	+1%/-3%	+114%/-159%	+24%/-11%	+12%/-13%	+28%/-44%
Source	KIC0	FLK73	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 004145040-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-88 ± 17	$2.56^{+2.36}_{-1.75}$	643^{+39}_{-33}	5152^{+4591}_{-1184}	2767^{+24238}_{-2013}
Alt.	-230 ± 20	$2.30^{+2.24}_{-1.61}$	645^{+38}_{-34}	6915^{+10195}_{-1938}	8484^{+91045}_{-6231}

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 $A_{obs} \gg 1.0$

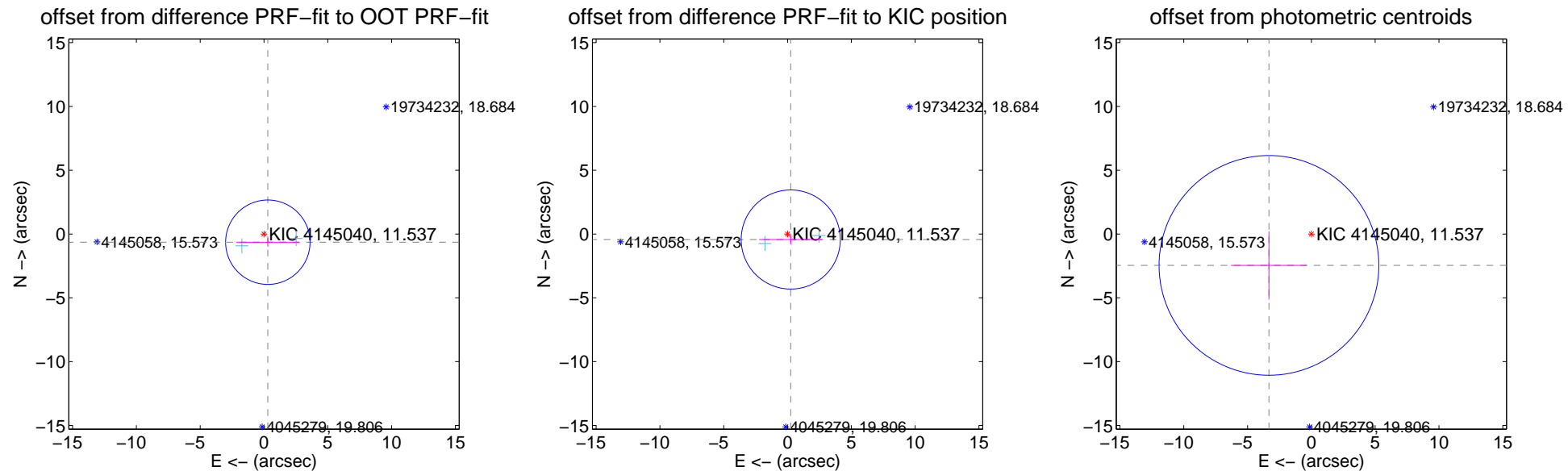
DV Centroid Data

Supplemental centroid analysis for 004145040-03. **Kepler magnitude: 11.54.** Transit SNR 3.18

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	0.708 ± 1.103	0.64	-0.302 ± 2.484	-0.641 ± 0.341
PRF-fit source offset from KIC position	0.498 ± 1.295	0.38	-0.252 ± 2.474	-0.430 ± 0.376
photometric centroid source offset	4.14 ± 2.87	1.44	3.33 ± 2.97	-2.46 ± 2.67

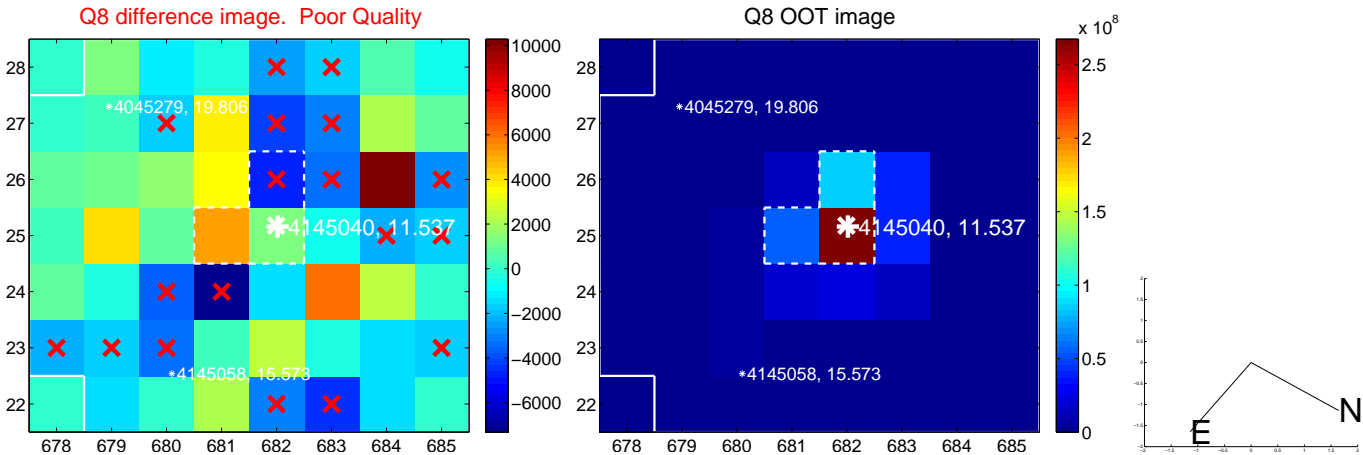
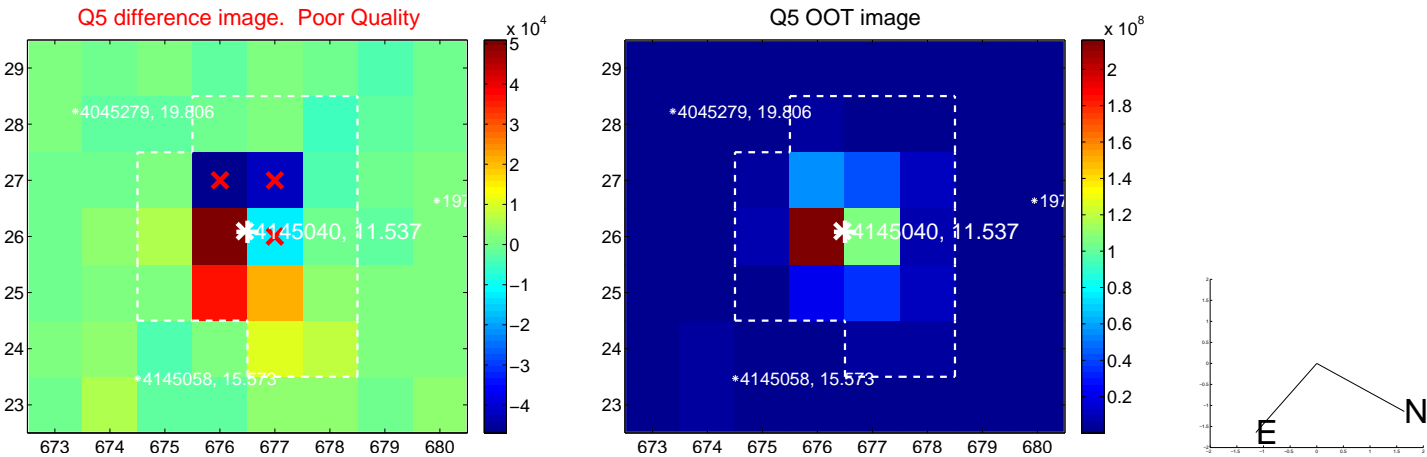


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

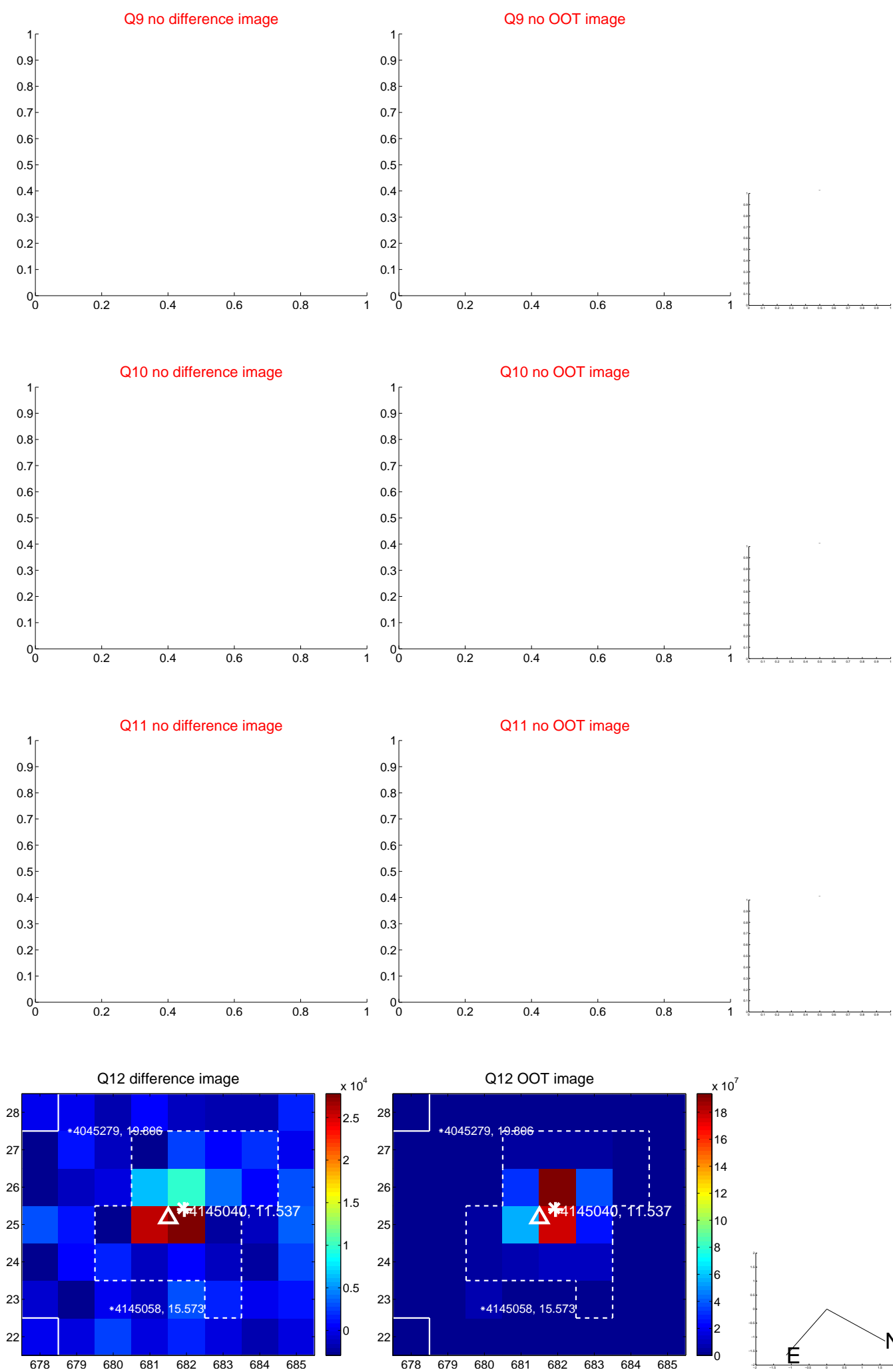
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



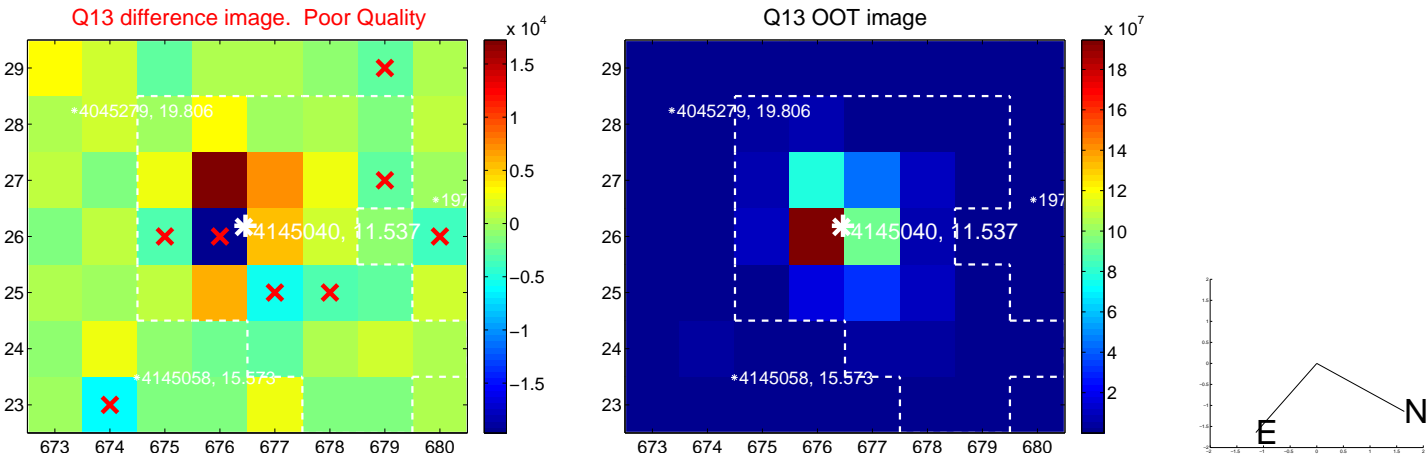
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



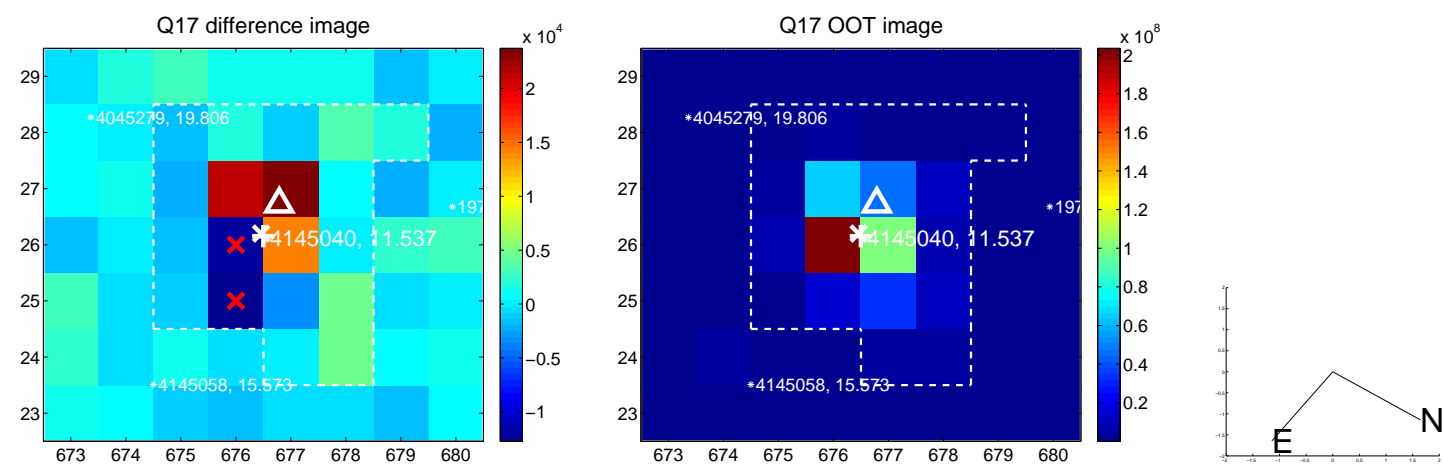
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



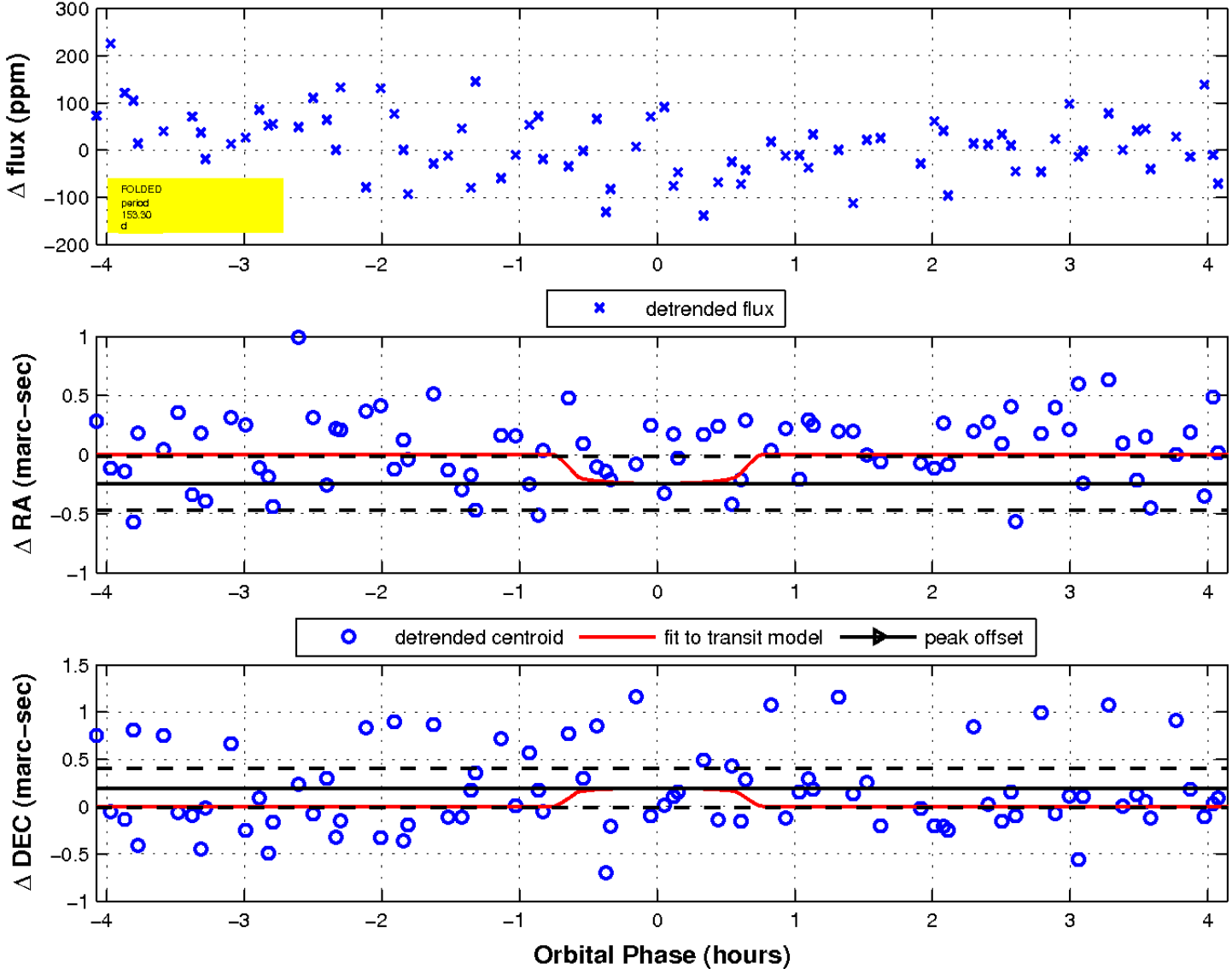
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

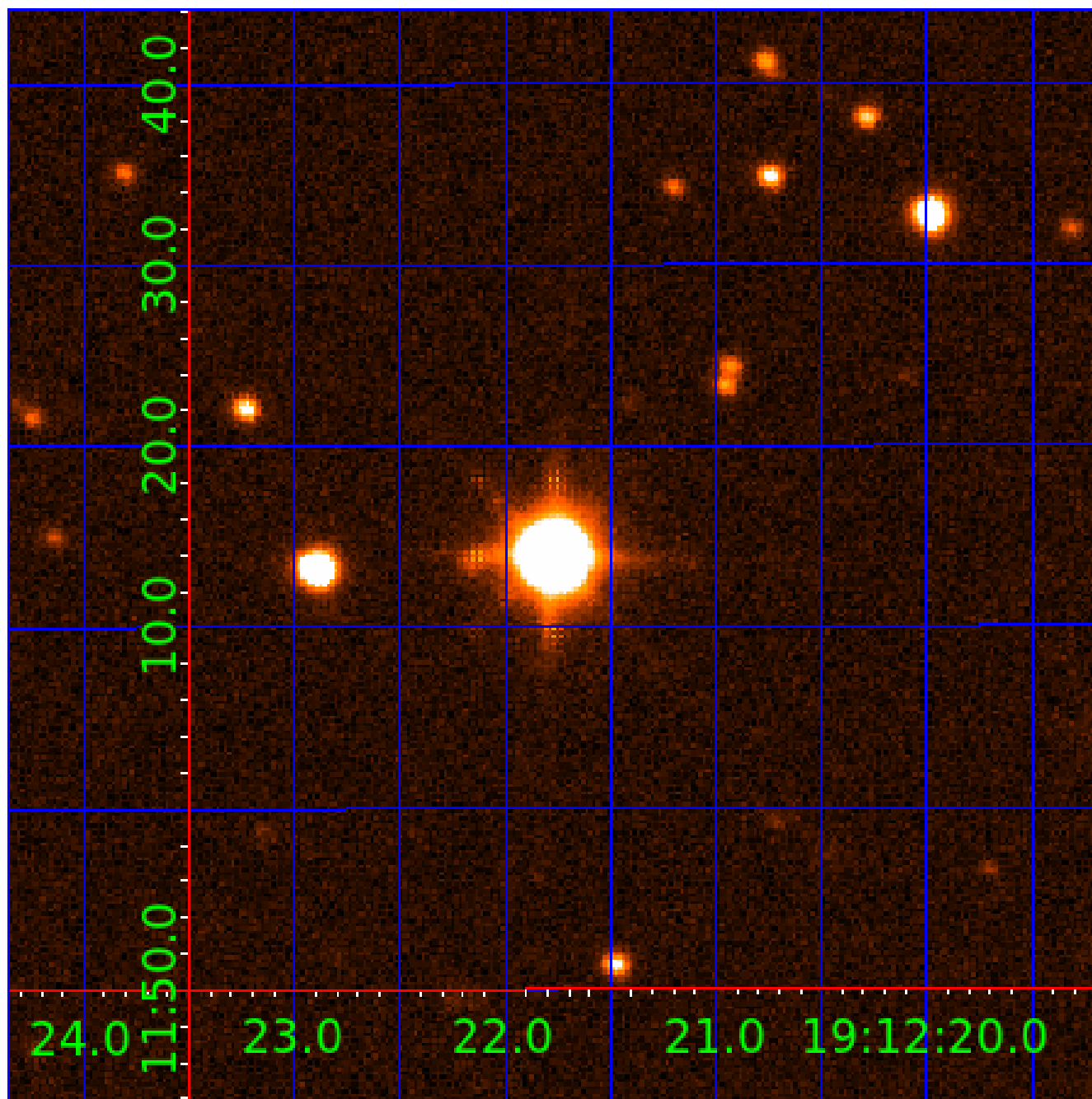


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 004145040

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})
004145040-01	OBS	No	5.339758	133.587910	11.6	17.966	7.9	6.5	1.29	7122	0.51	902.96
004145040-02	OBS	No	32.081195	133.355774	53.5	25.379	16.4	6.3	1.29	7122	1.07	82.67
004145040-03	OBS	No	153.299519	183.100200	77.2	1.386	8.8	3.2	1.29	7122	1.32	10.27
004145040-04	OBS	No	153.933088	182.237307	111.6	6.000	8.8	-1.0	1.29	7122	1.38	10.21

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004145040-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
004145040-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
004145040-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004145040-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS

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

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

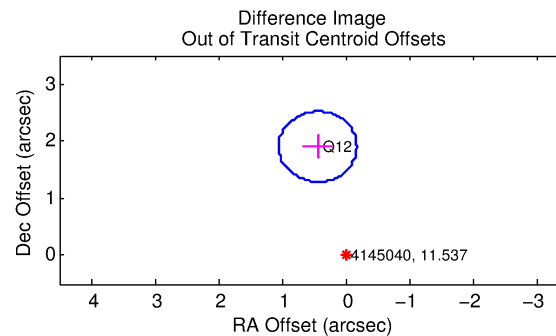
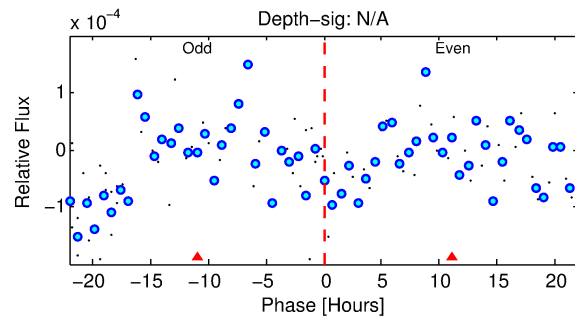
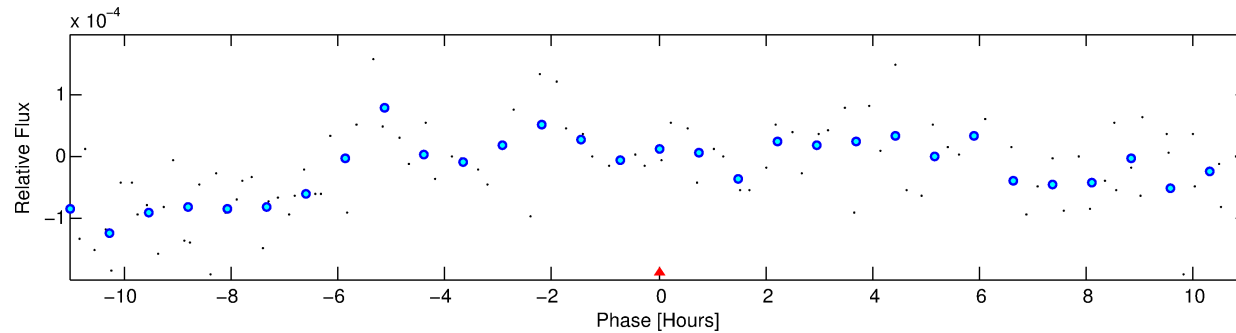
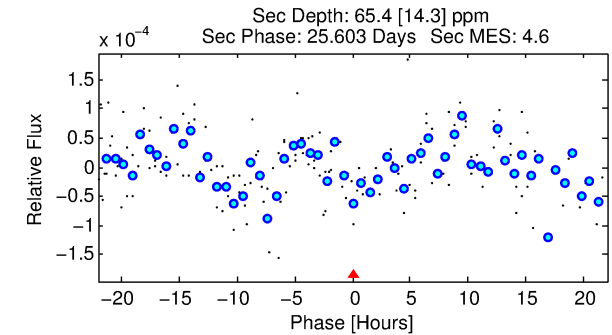
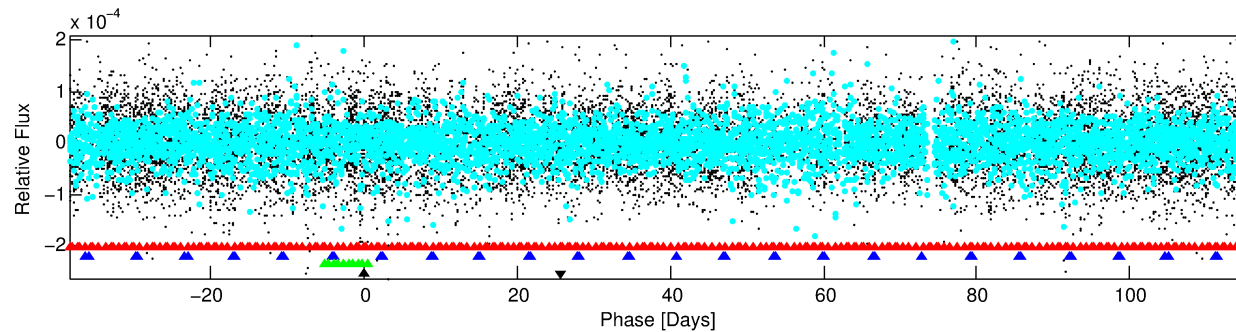
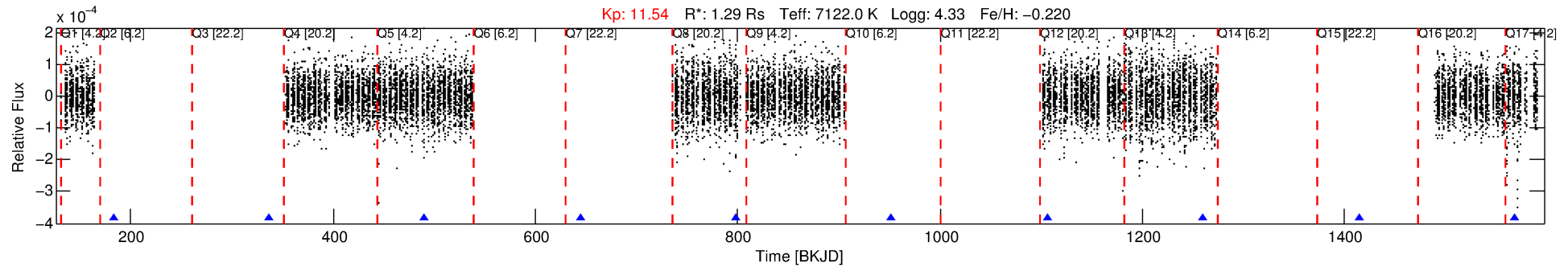
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004145040-04

No Significant Match Found

DV One-Page Summary

KIC: 4145040 Candidate: 4 of 4 Period: 153.933 d



TPS TCE Results:

Period = 153.93309 d
Epoch = 182.2373 BKJD

DV fit results are unavailable

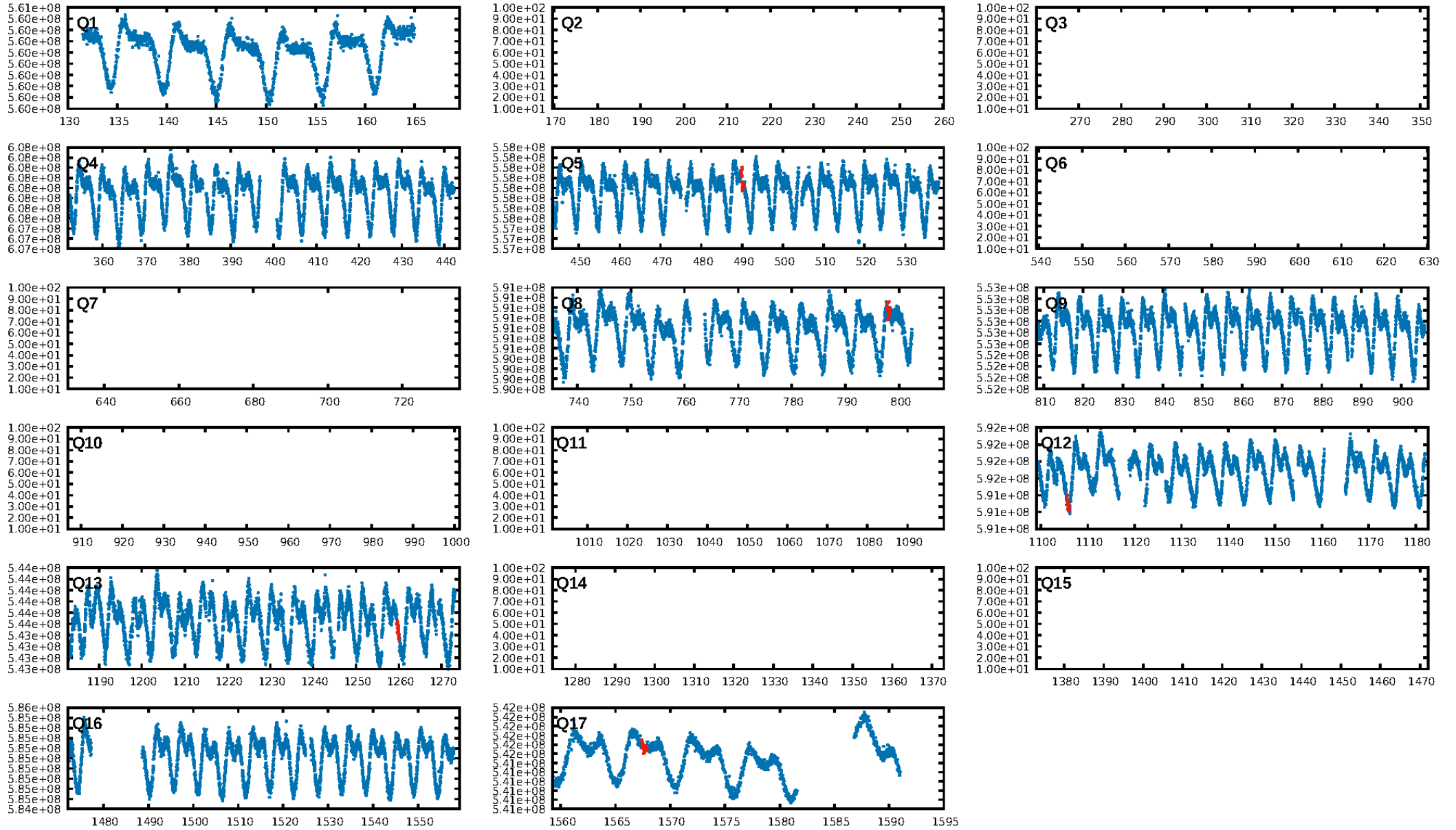
DV Diagnostic Results:

ShortPeriod-sig: 98.6% [2.47σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.79e-12
RollingBand-fgt: 1.00 [1/1]
GhostDiagnostic-chr: 1.571
Centroid-sig: 53.4%
Centroid-so: 18.205 arcsec [0.71σ]
OotOffset-rm: 1.955 arcsec [9.53σ]
KicOffset-rm: 2.140 arcsec [10.44σ]
OotOffset-st: 0/0/1/0 [1]
KicOffset-st: 0/0/1/0 [1]
DiffImageQuality-fgm: 1.00 [1/1]
DiffImageOverlap-fno: 0.80 [4/5]

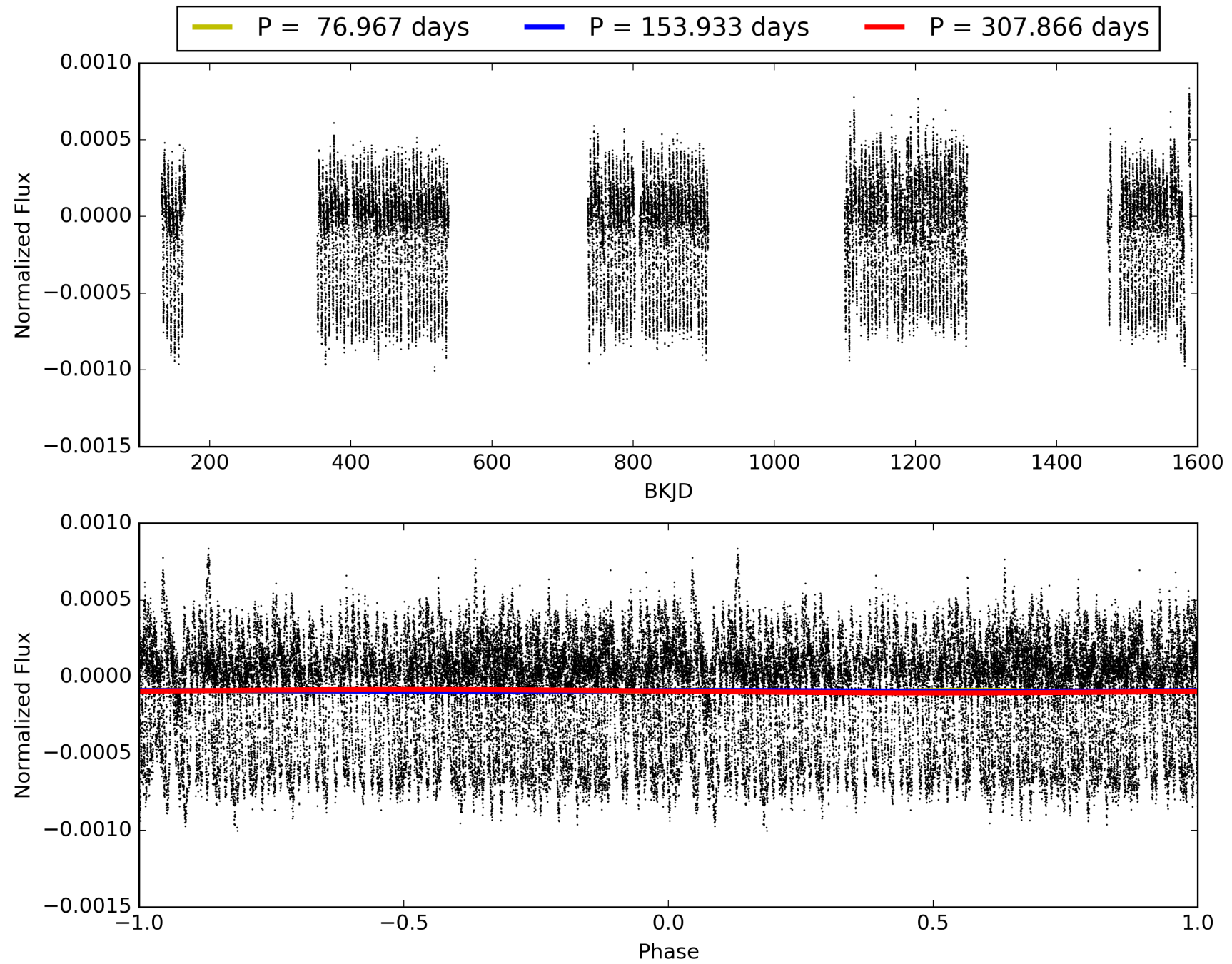
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:08:54 Z

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

TCE 004145040-04, PDC Light Curves

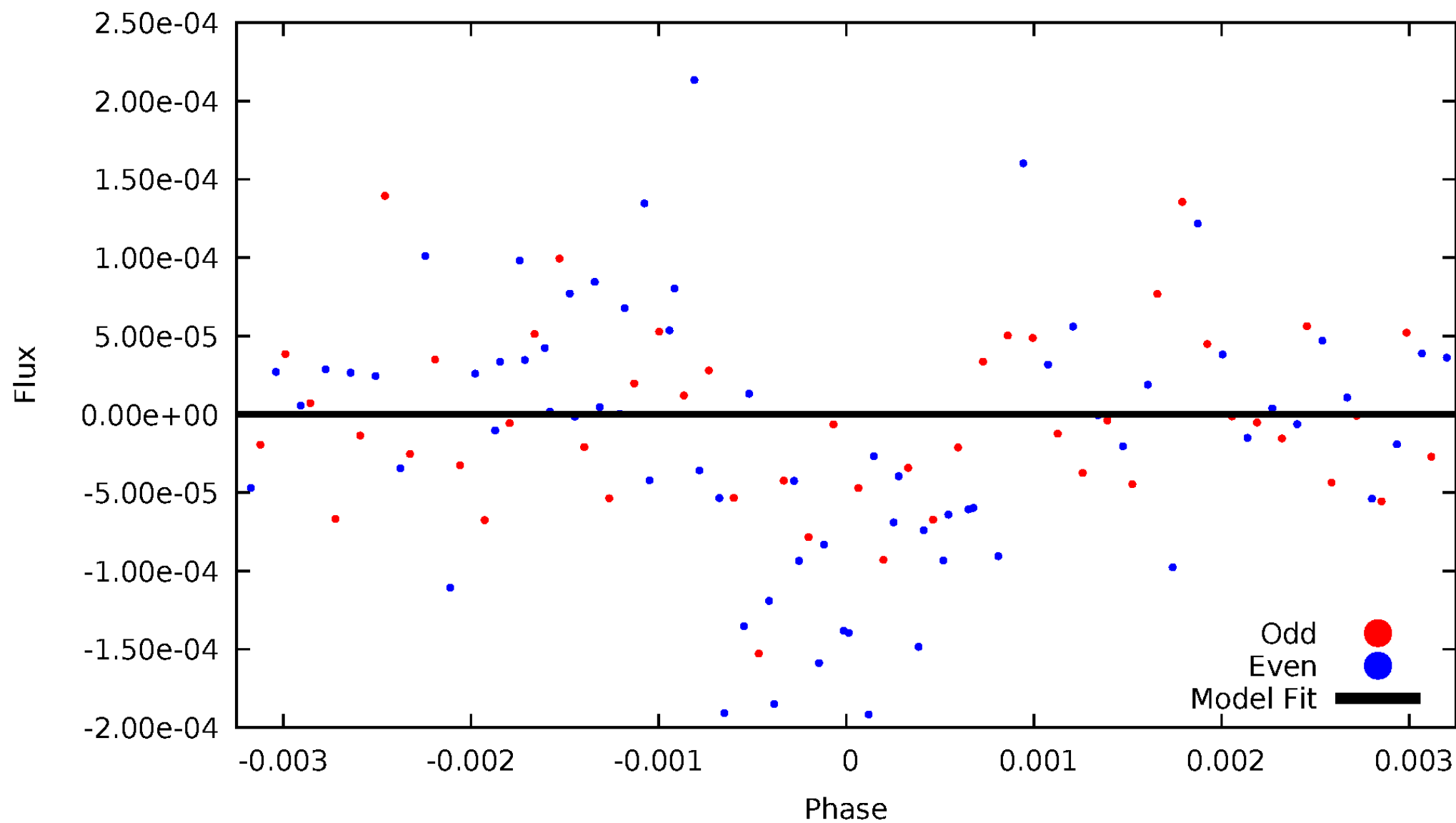


TCE 004145040-04



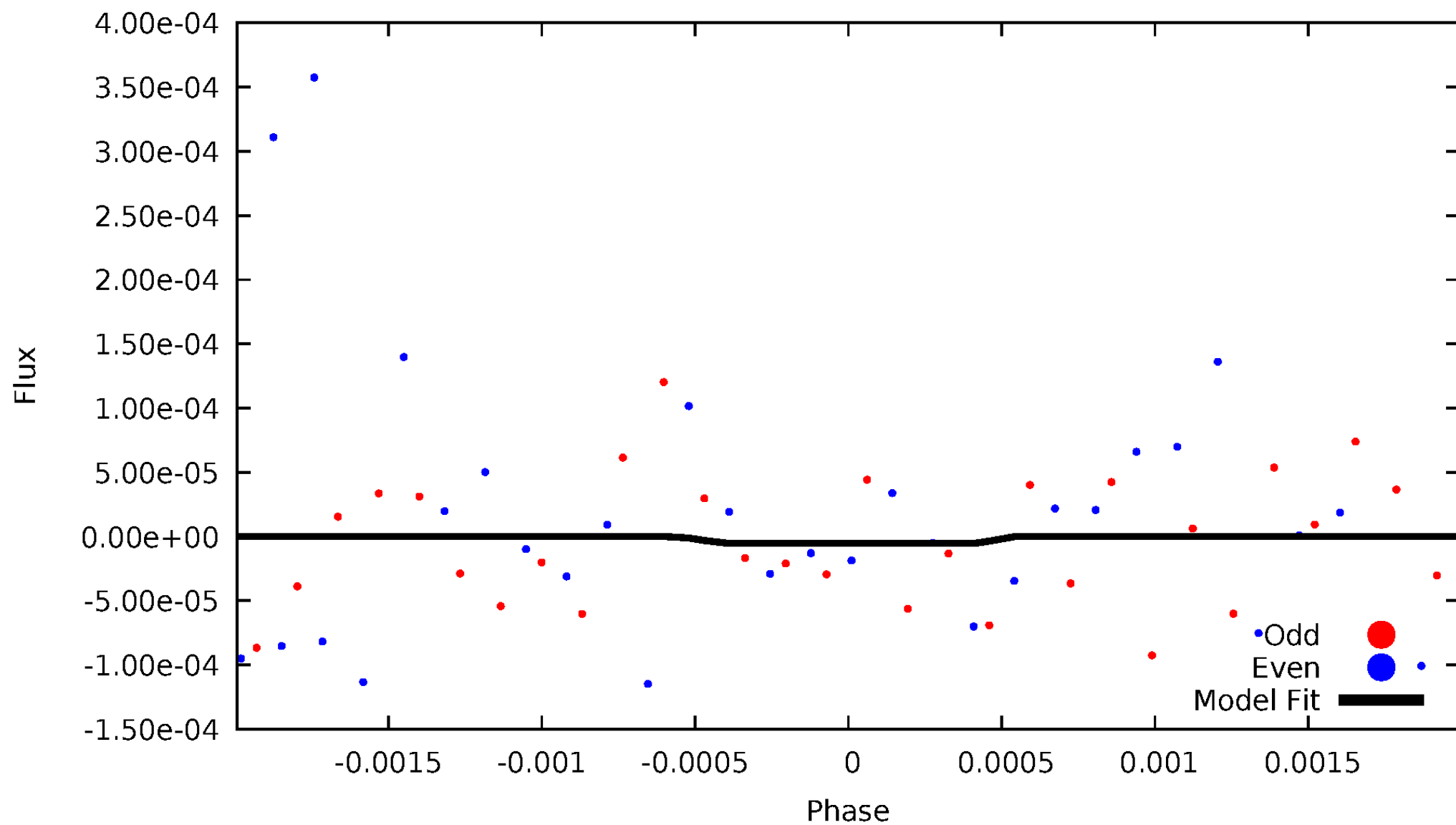
DV Odd/Even

TCE 004145040-04



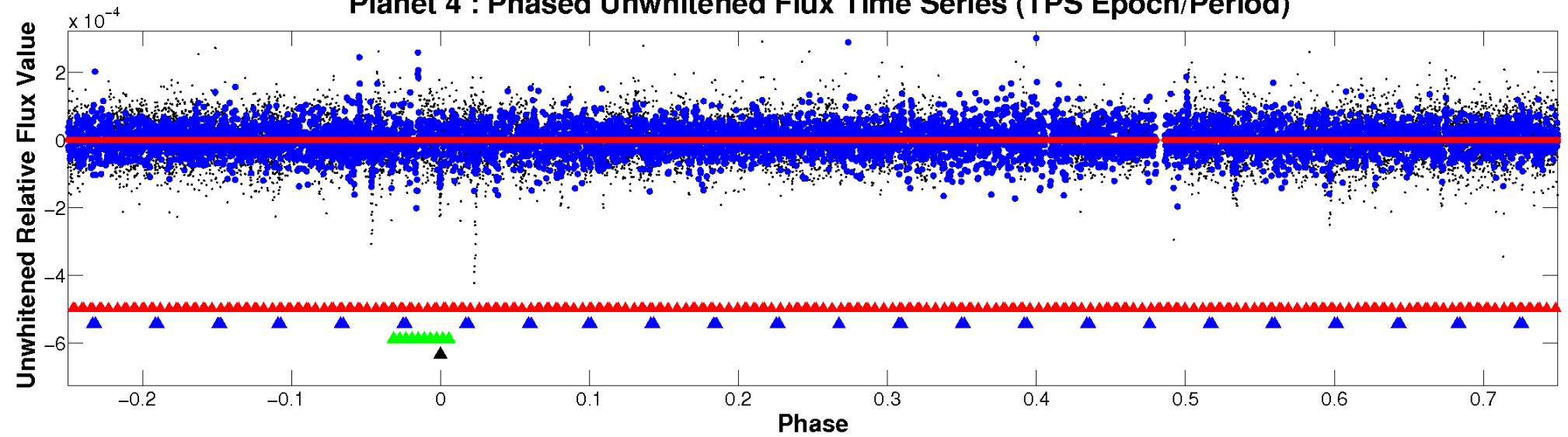
ALT Odd/Even

TCE 004145040-04

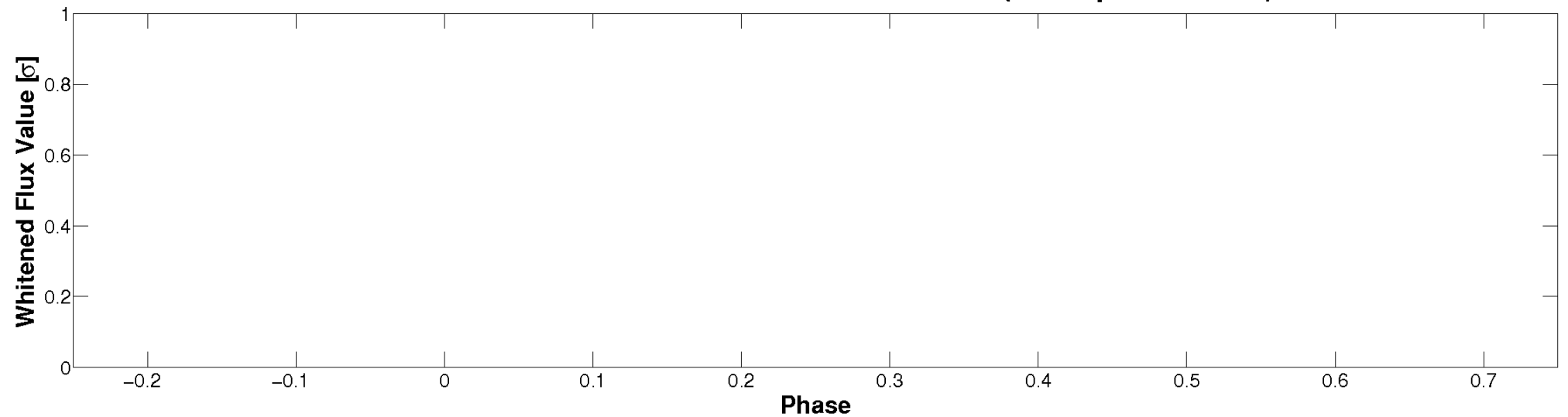


Non-Whitened Vs. Whitened Light Curve

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

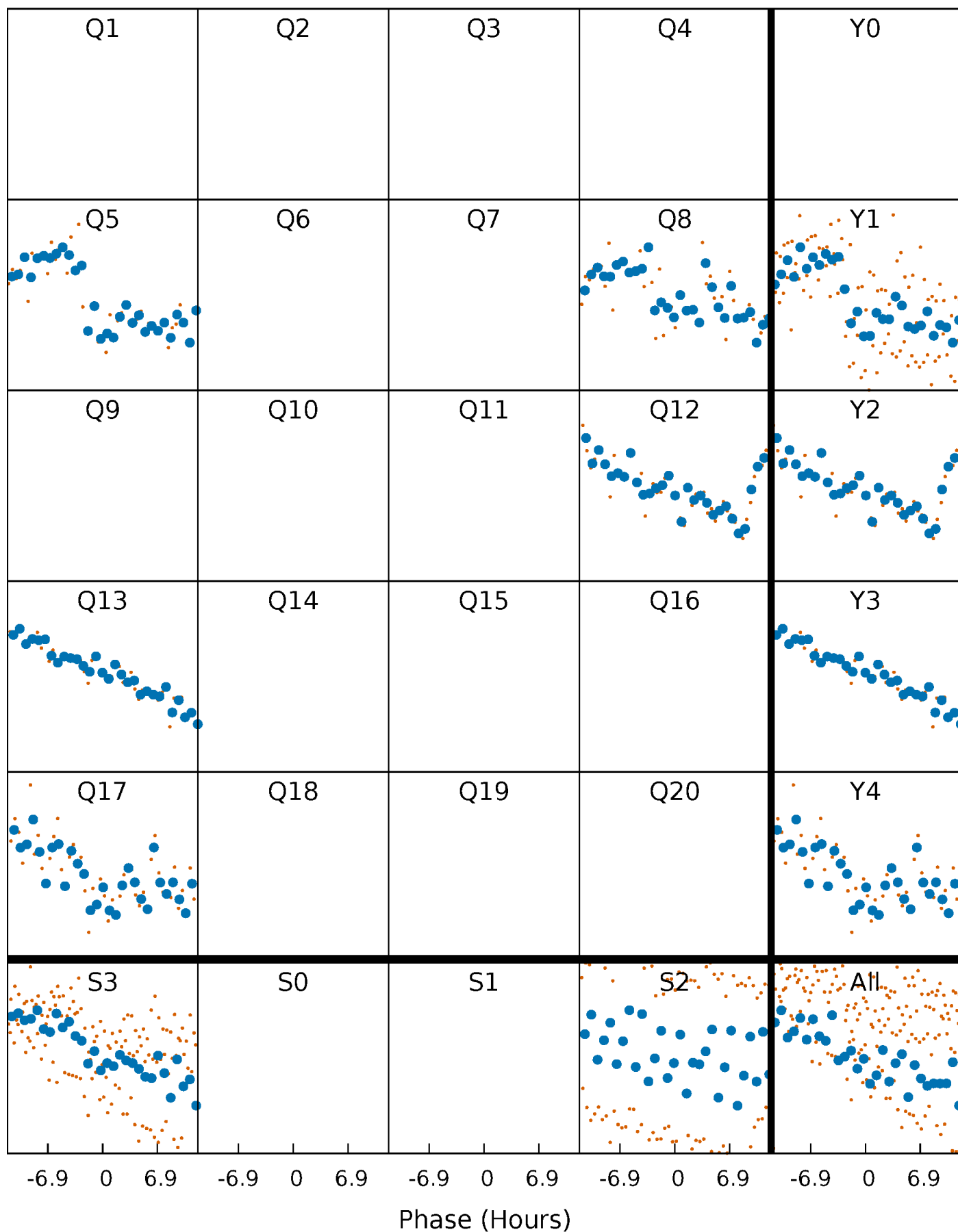


Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 004145040-04 $P=153.933088$ Days $T_0=182.237306$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 004145040-04 P=153.933088 Days $T_0=182.237306$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

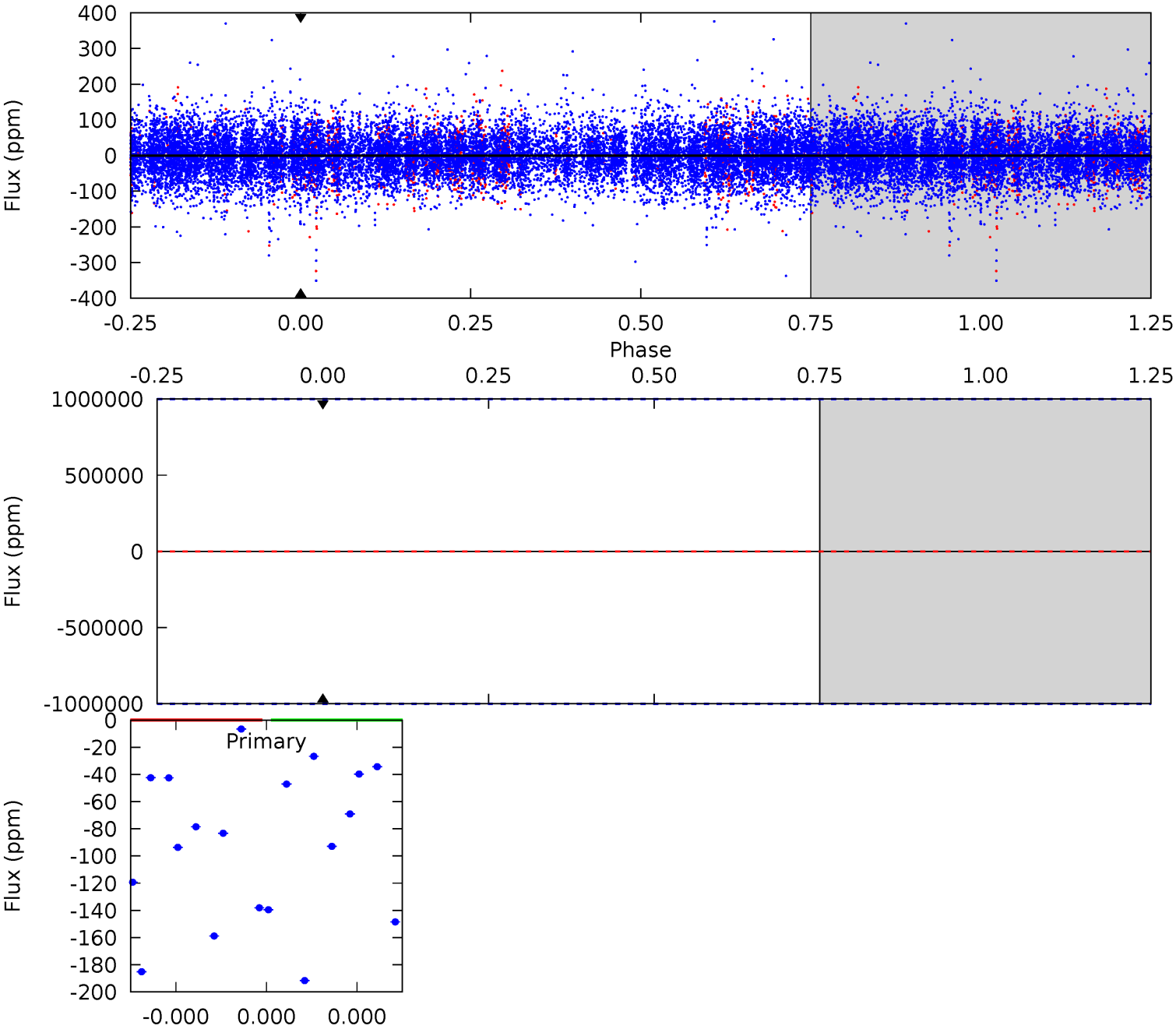
TCE 004145040-04 $P=153.933088$ Days $T_0=182.605647$ (BKJD)



DV Model-Shift Uniqueness Test

004145040-04, P = 153.933088 Days, E = 28.304218 Days

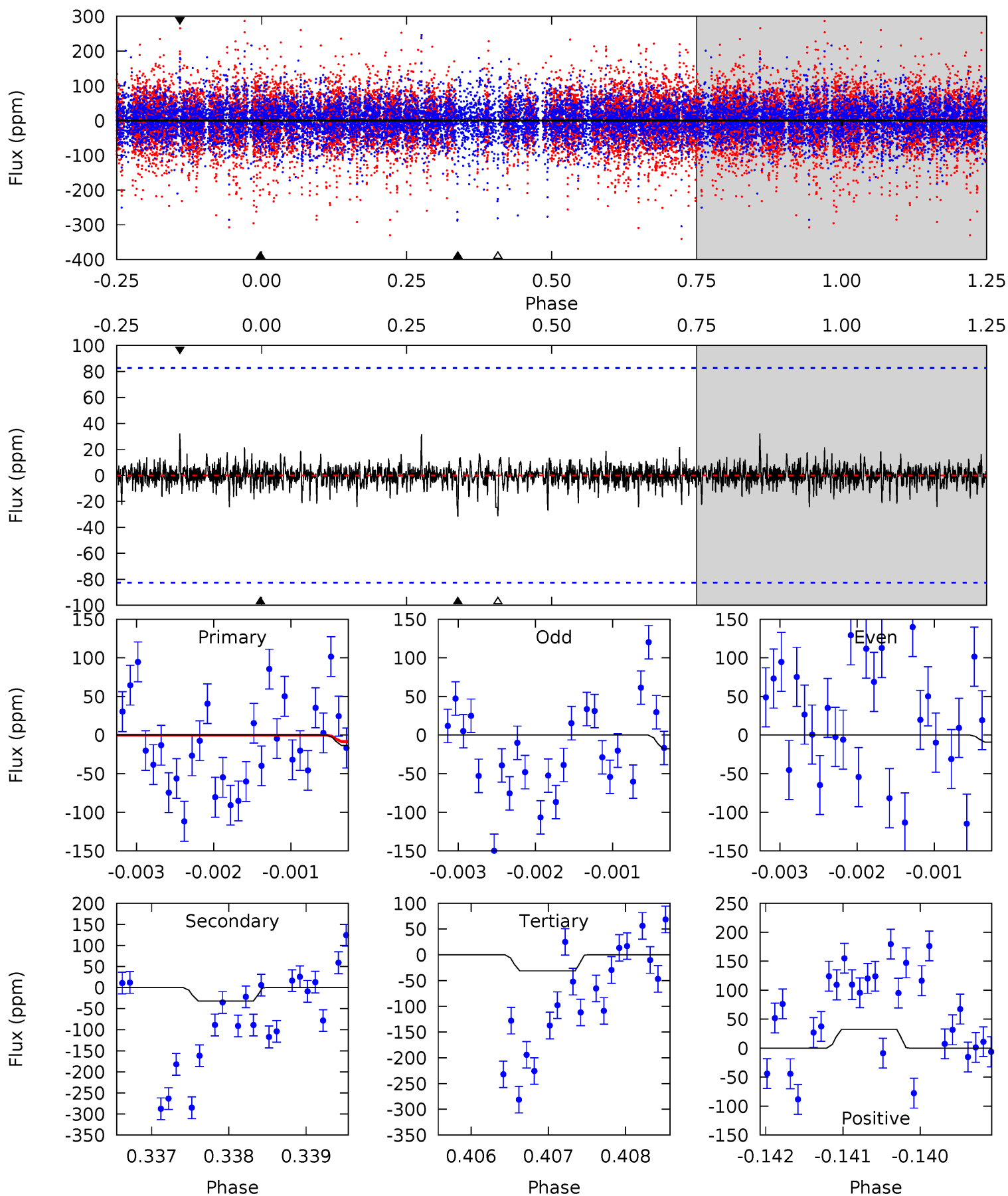
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



Alt Model-Shift Uniqueness Test

004145040-04, $P = 153.933088$ Days, $E = 28.672559$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.88	2.09	2.06	2.12	5.43	3.26	0.37	-1.18	-1.25	0.03	-0.04	0.28	1.00	0.50	0.31



Stellar Parameters For KIC 004145040

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7122^{+227}_{-313}	$4.329^{+0.063}_{-0.147}$	$-0.220^{+0.250}_{-0.350}$	$1.290^{+0.308}_{-0.142}$	$1.312^{+0.158}_{-0.176}$	$0.861^{+0.242}_{-0.378}$
	+3%/-4%	+1%/-3%	+114%/-159%	+24%/-11%	+12%/-13%	+28%/-44%
Source	KIC0	FLK73	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 004145040-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1000000	$9.92^{+11.30}_{-7.13}$	646^{+42}_{-33}	4006^{+38645}_{-41269}	$493^{+405821}_{-357157}$
Alt.	-32 ± 15	$9.84^{+10.20}_{-7.05}$	642^{+37}_{-33}	2750^{+1348}_{-487}	63^{+746}_{-51}

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 $A_{obs} \gg 1.0$

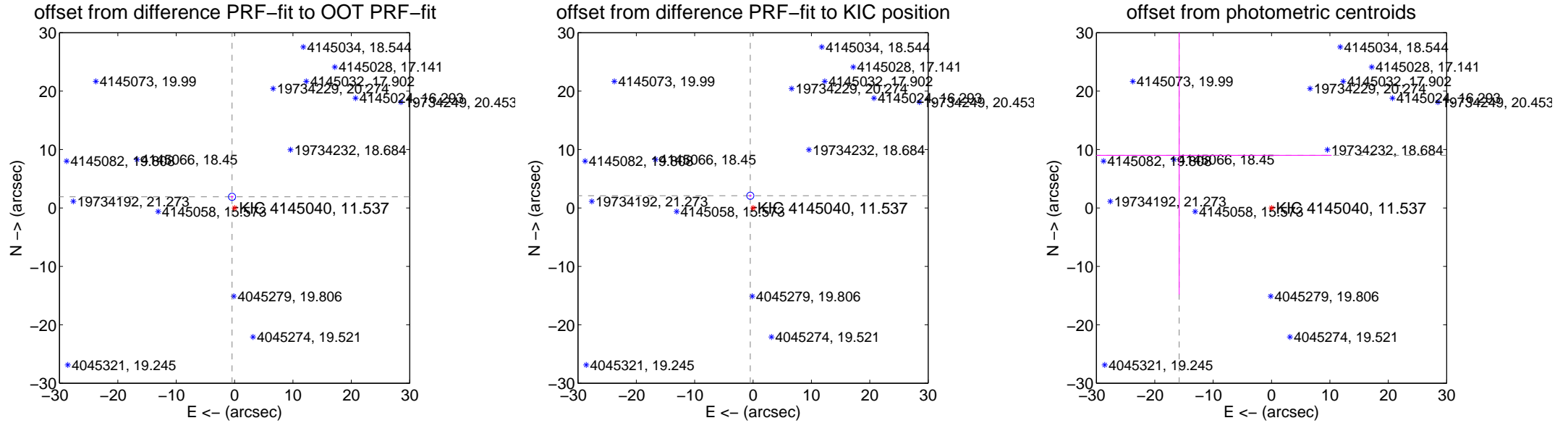
DV Centroid Data

Supplemental centroid analysis for 004145040-04. **Kepler magnitude: 11.54.** Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.955 ± 0.205	9.53	0.437 ± 0.221	1.905 ± 0.204
PRF-fit source offset from KIC position	2.140 ± 0.205	10.44	0.470 ± 0.221	2.087 ± 0.204
photometric centroid source offset	18.20 ± 25.56	0.71	15.82 ± 26.10	9.01 ± 23.81

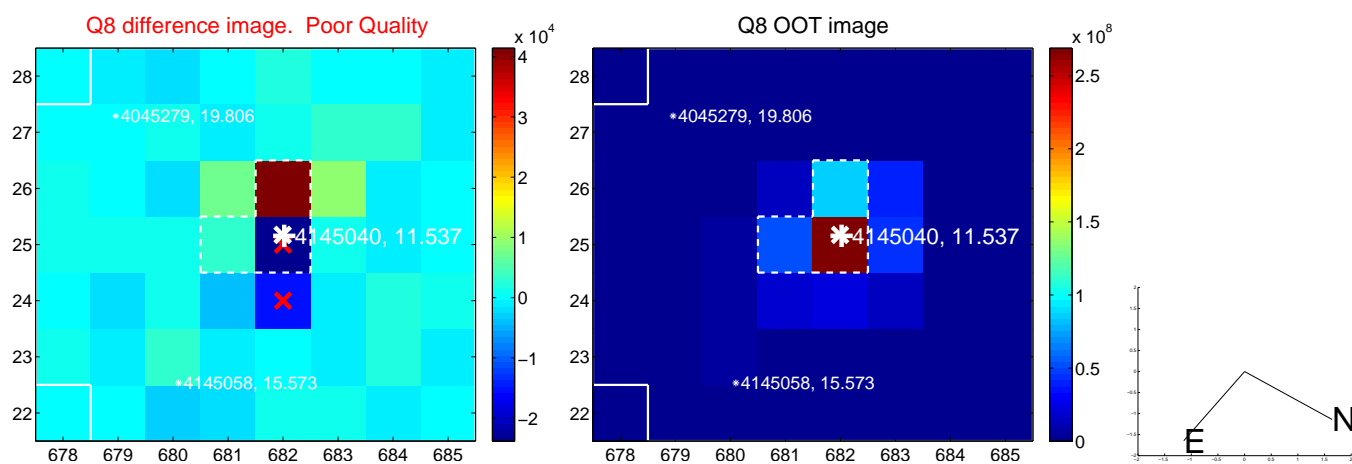
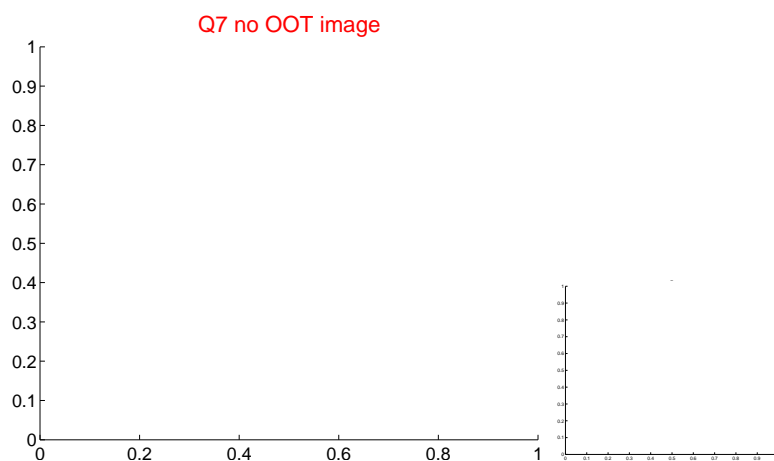
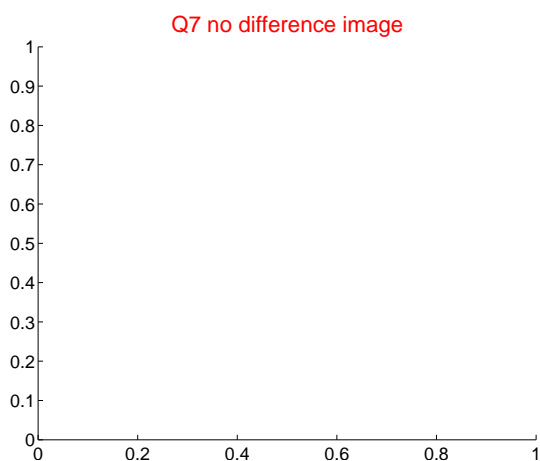
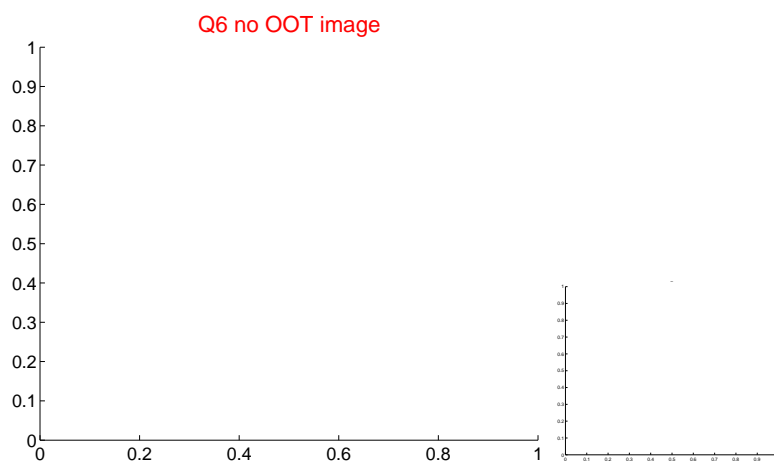
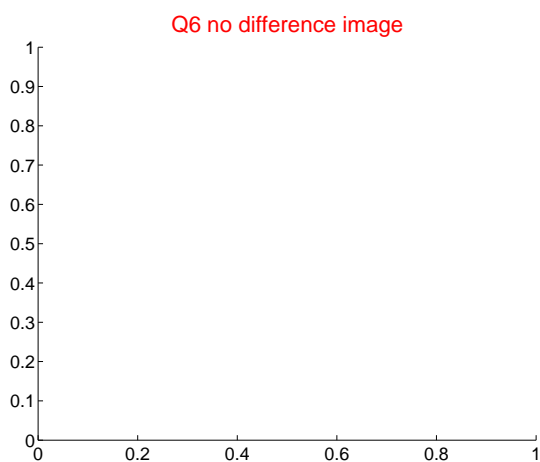
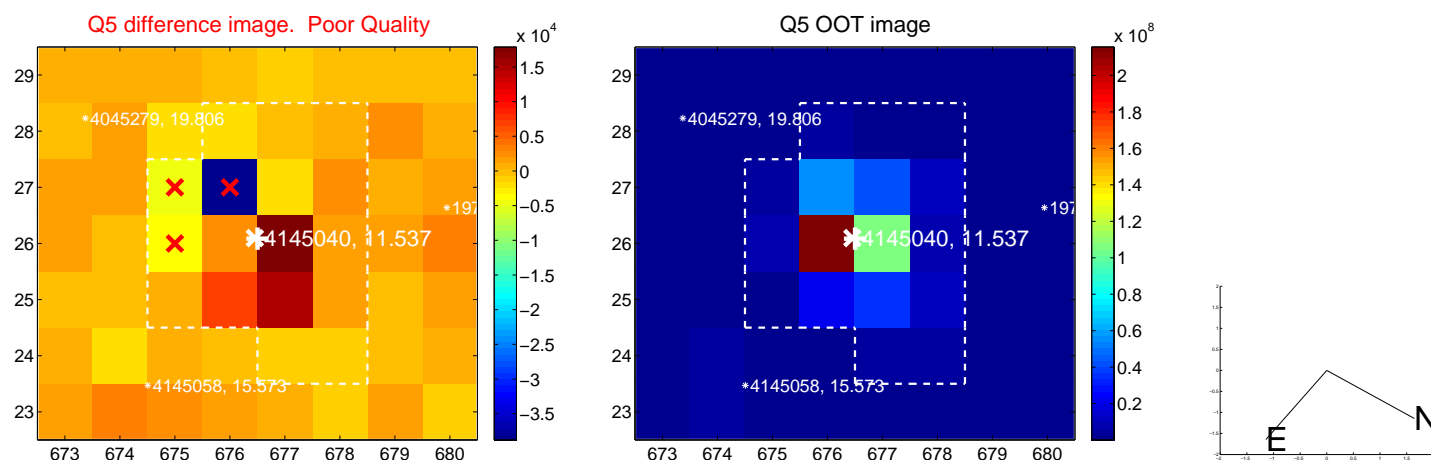


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

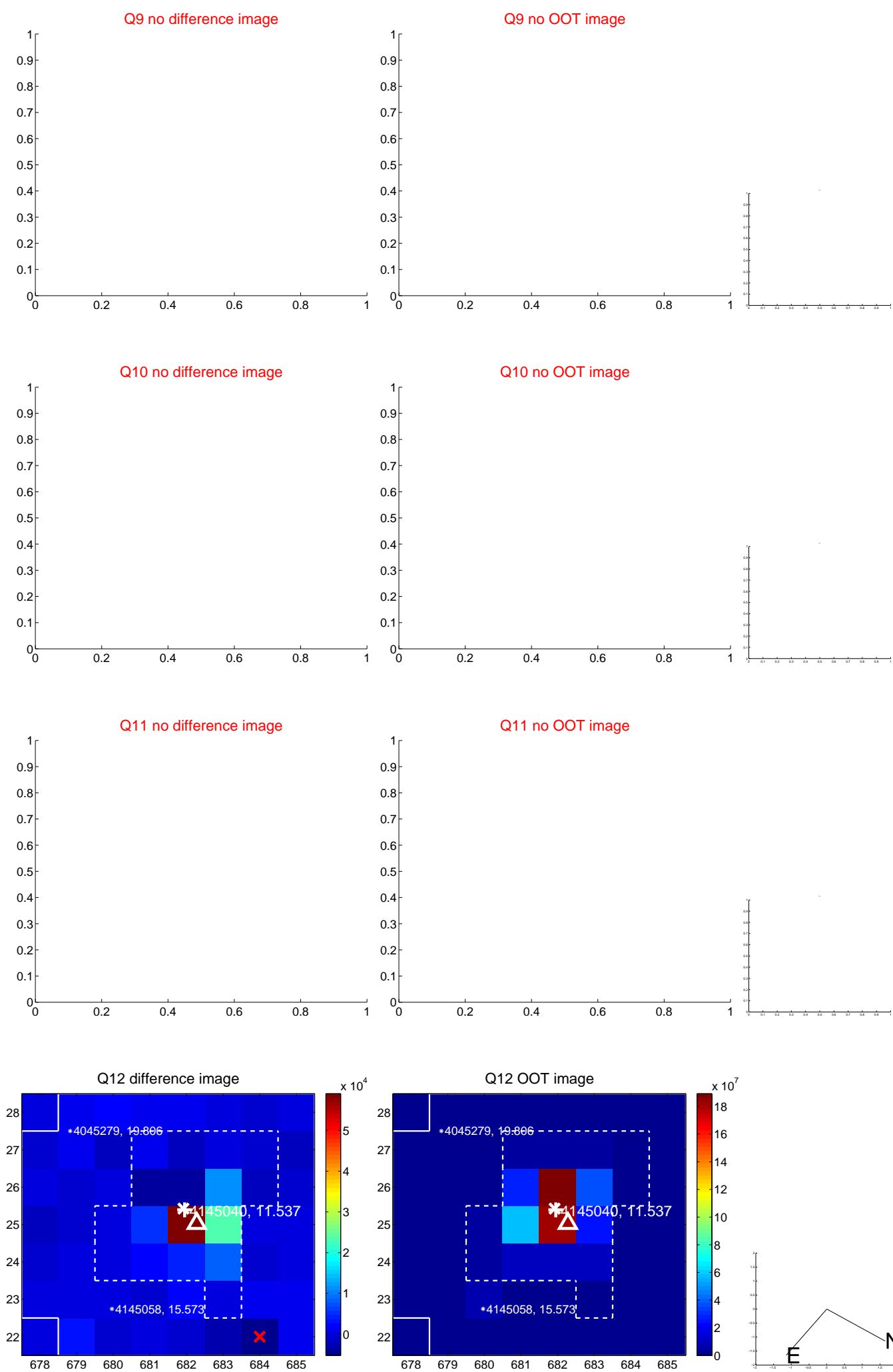
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



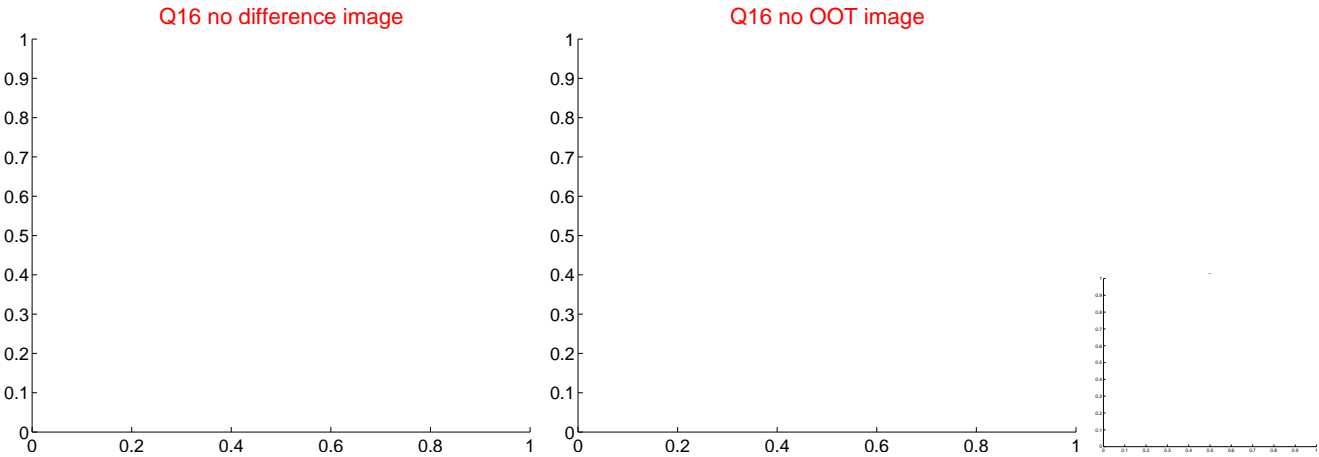
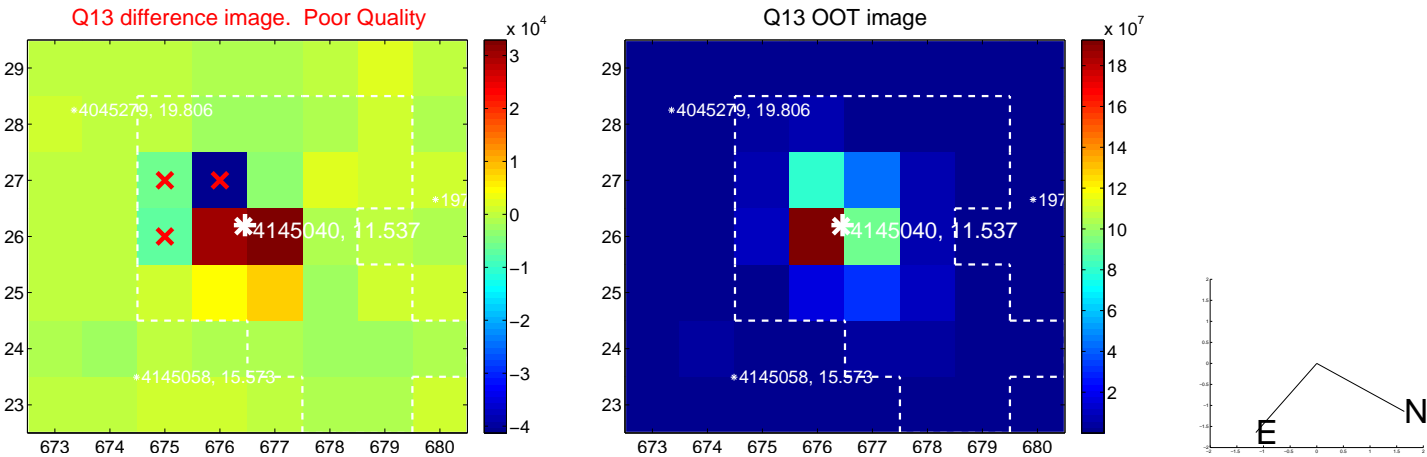
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



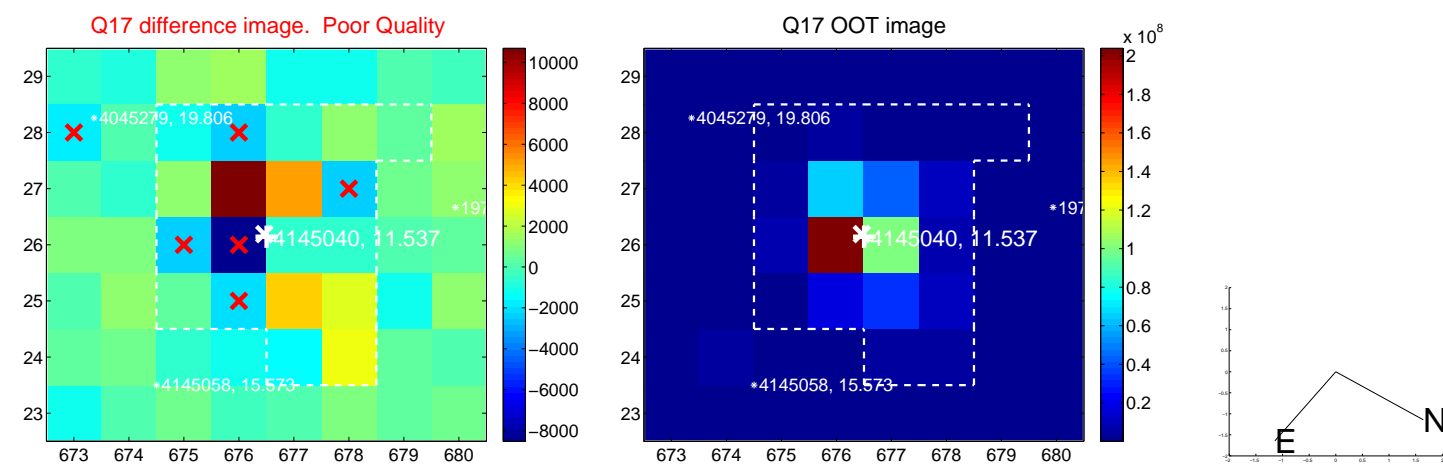
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



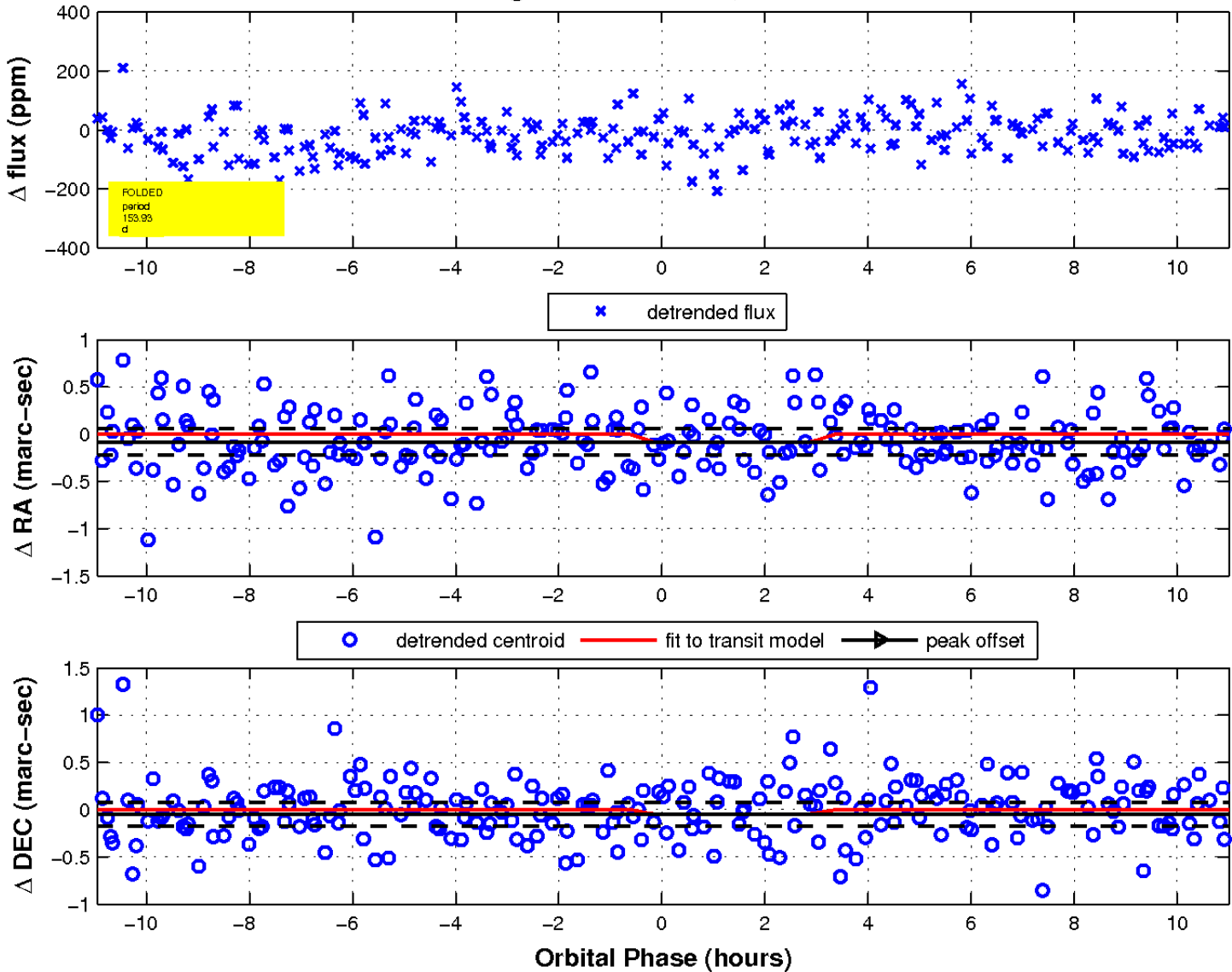
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

