

KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
010470294-05	OBS	No	36.620359	149.395812	784.4	1.620	15.3	11.6	3.67	7186	10.35	464.21
010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

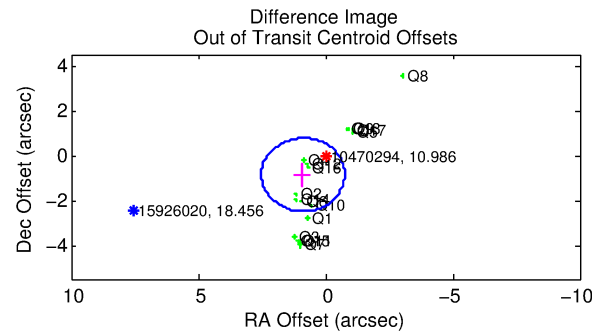
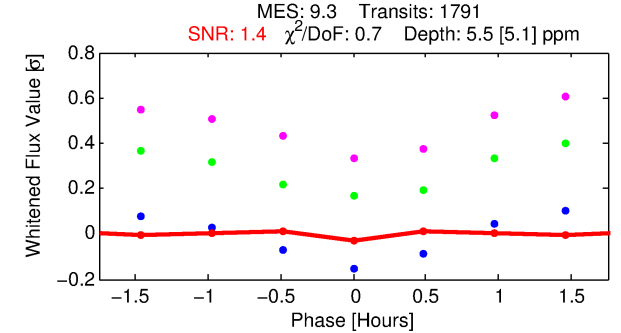
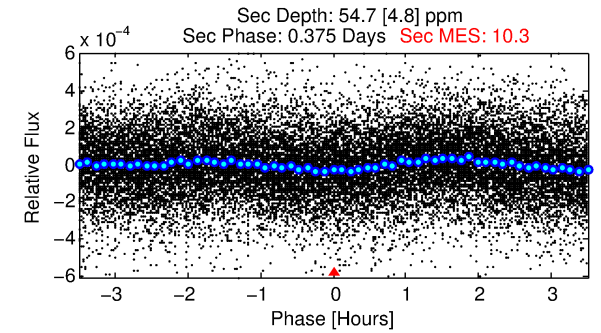
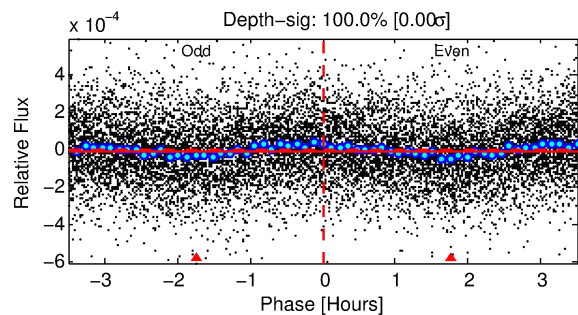
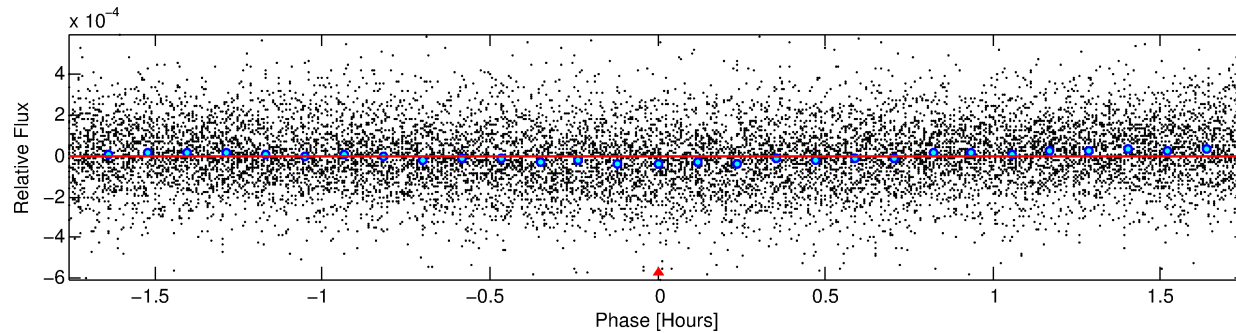
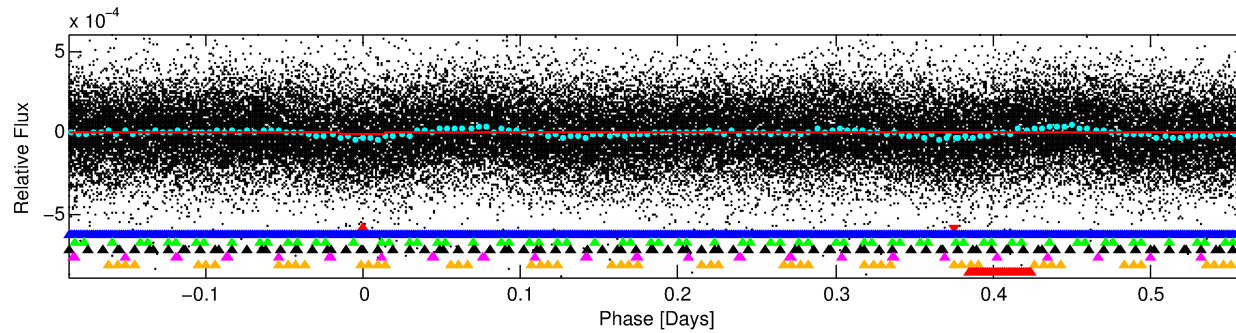
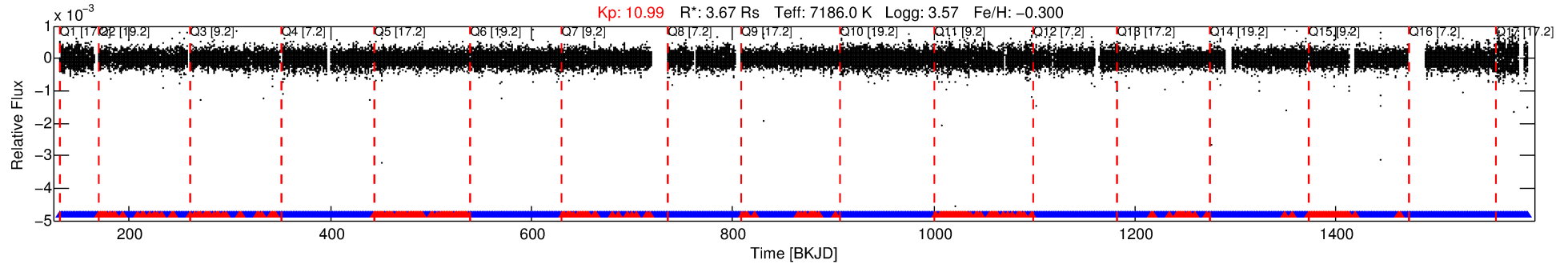
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-01

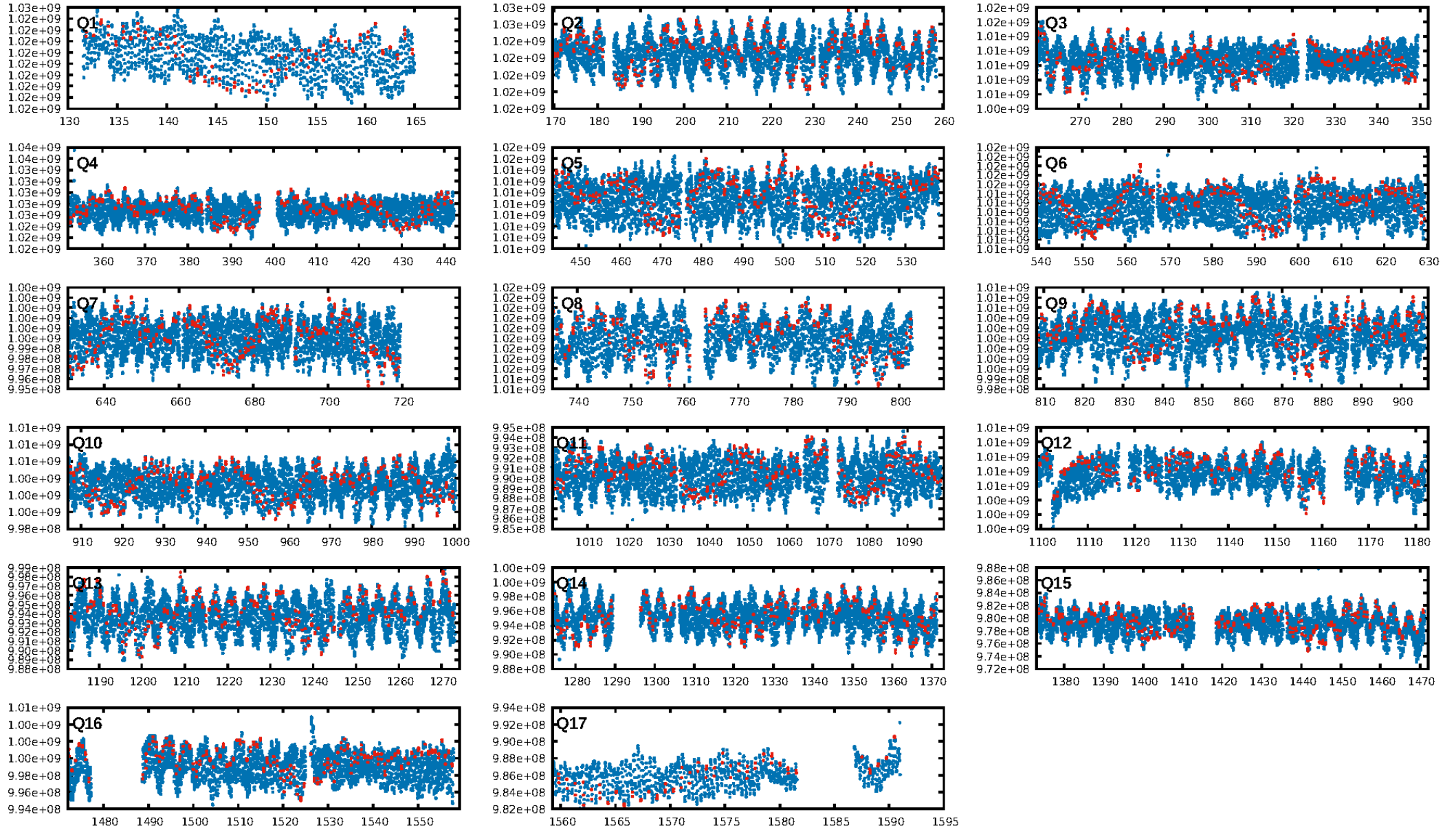
No Significant Match Found

DV One-Page Summary

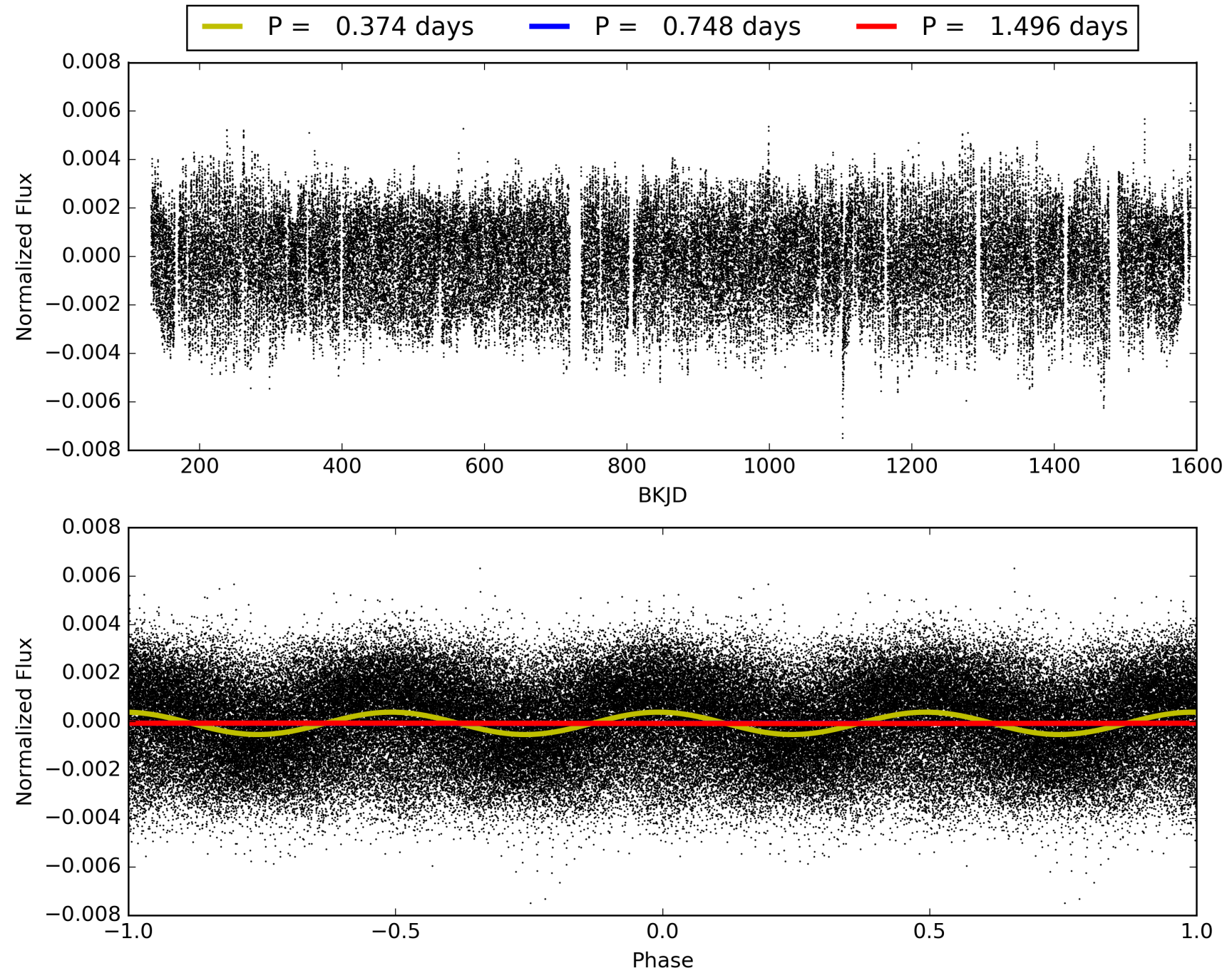
KIC: 10470294 Candidate: 1 of 7 Period: 0.748 d



TCE 010470294-01, PDC Light Curves

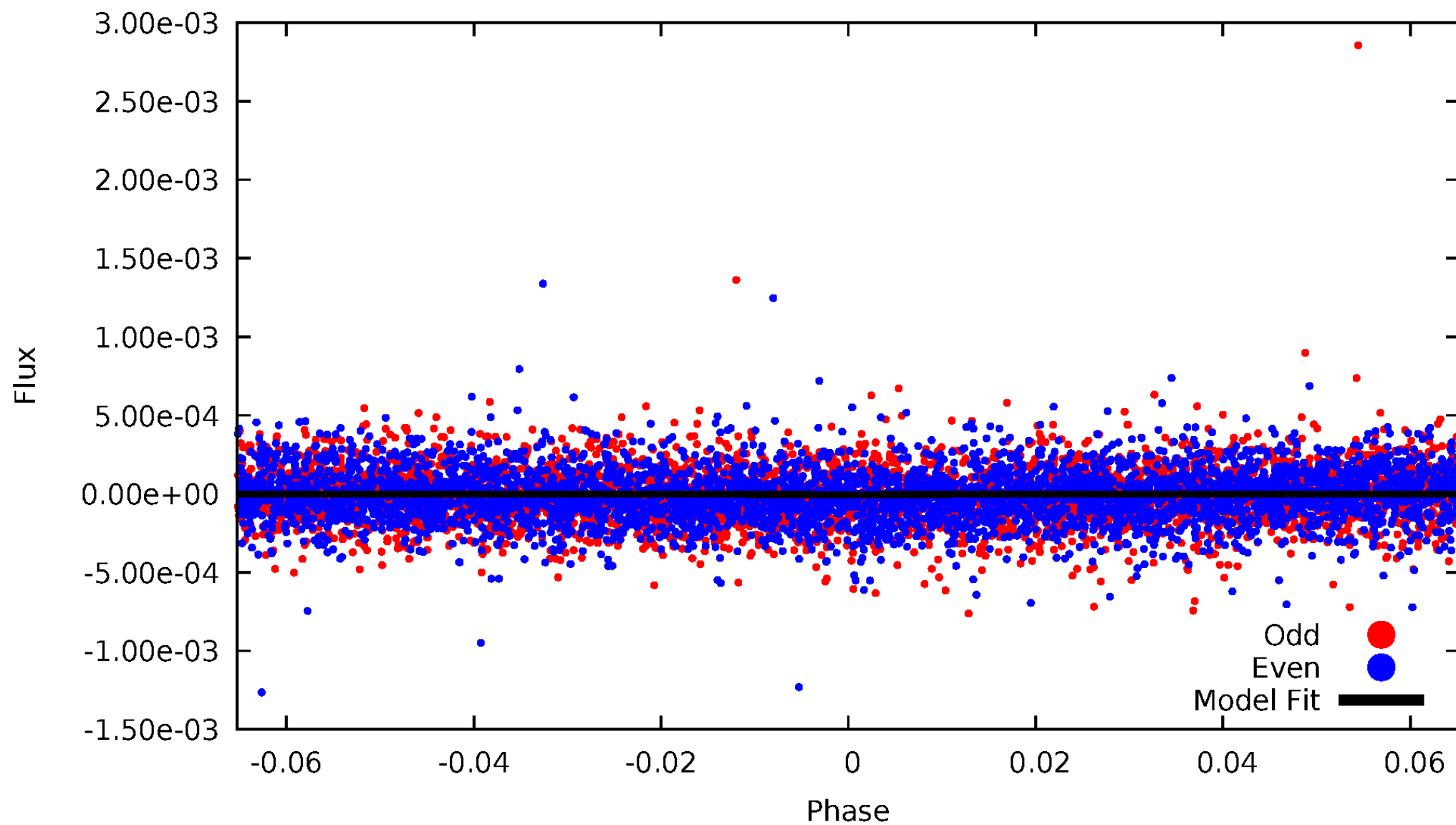


TCE 010470294-01



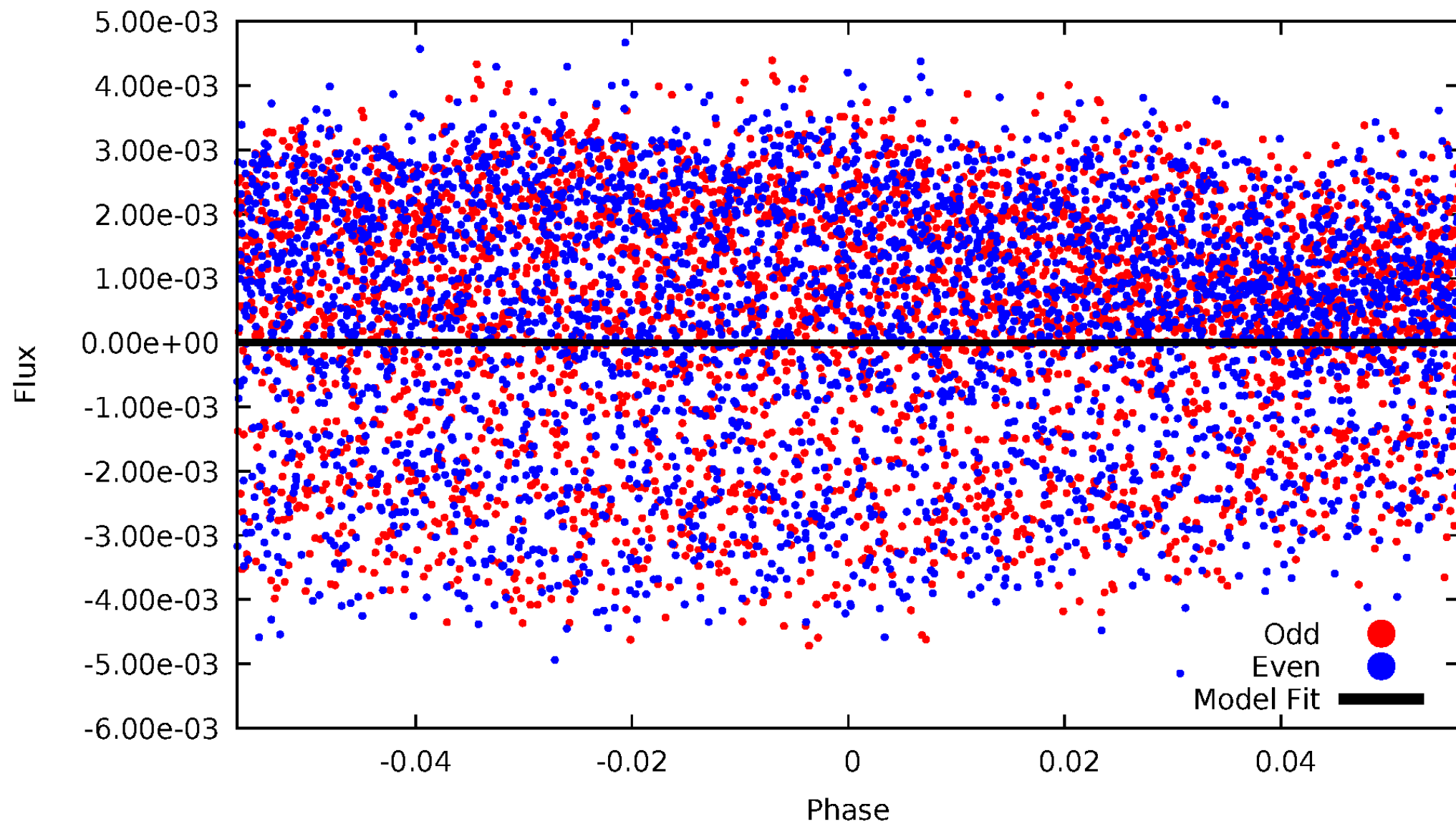
DV Odd/Even

TCE 010470294-01



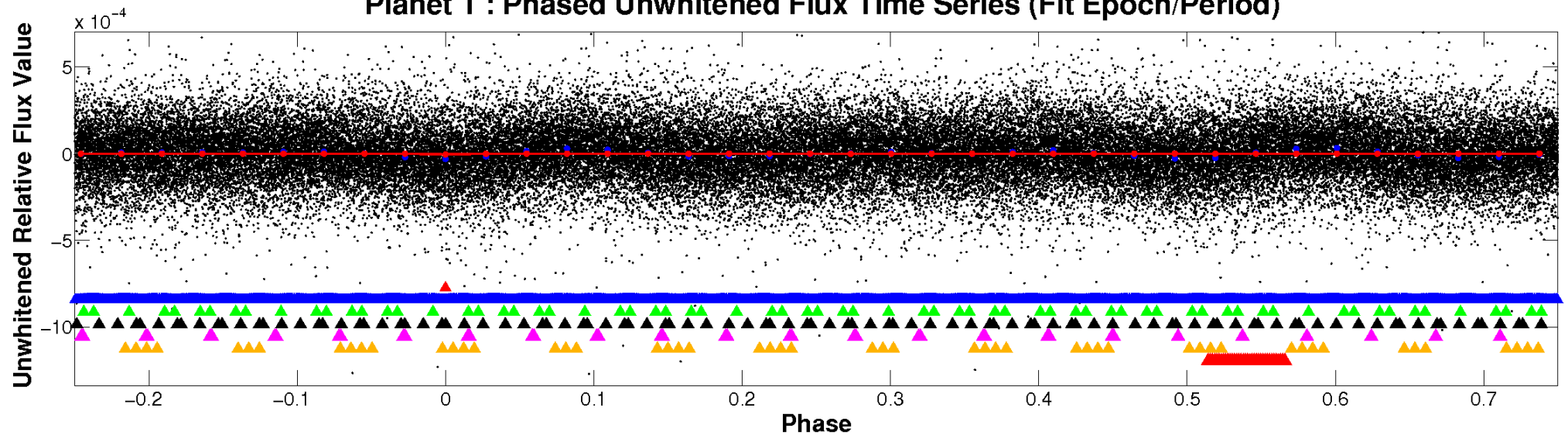
ALT Odd/Even

TCE 010470294-01

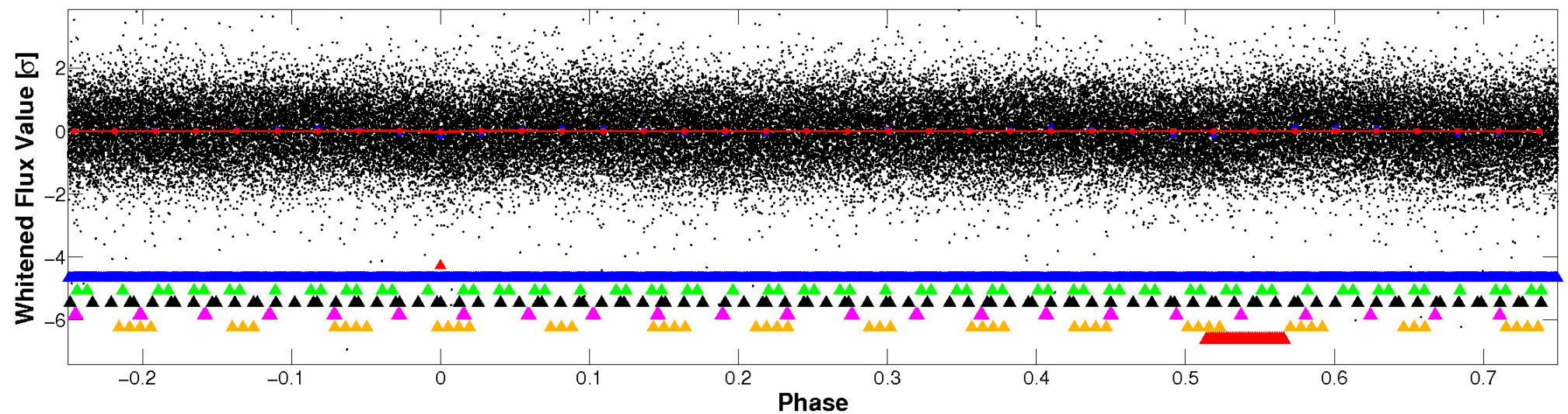


Non-Whitened Vs. Whitened Light Curve

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

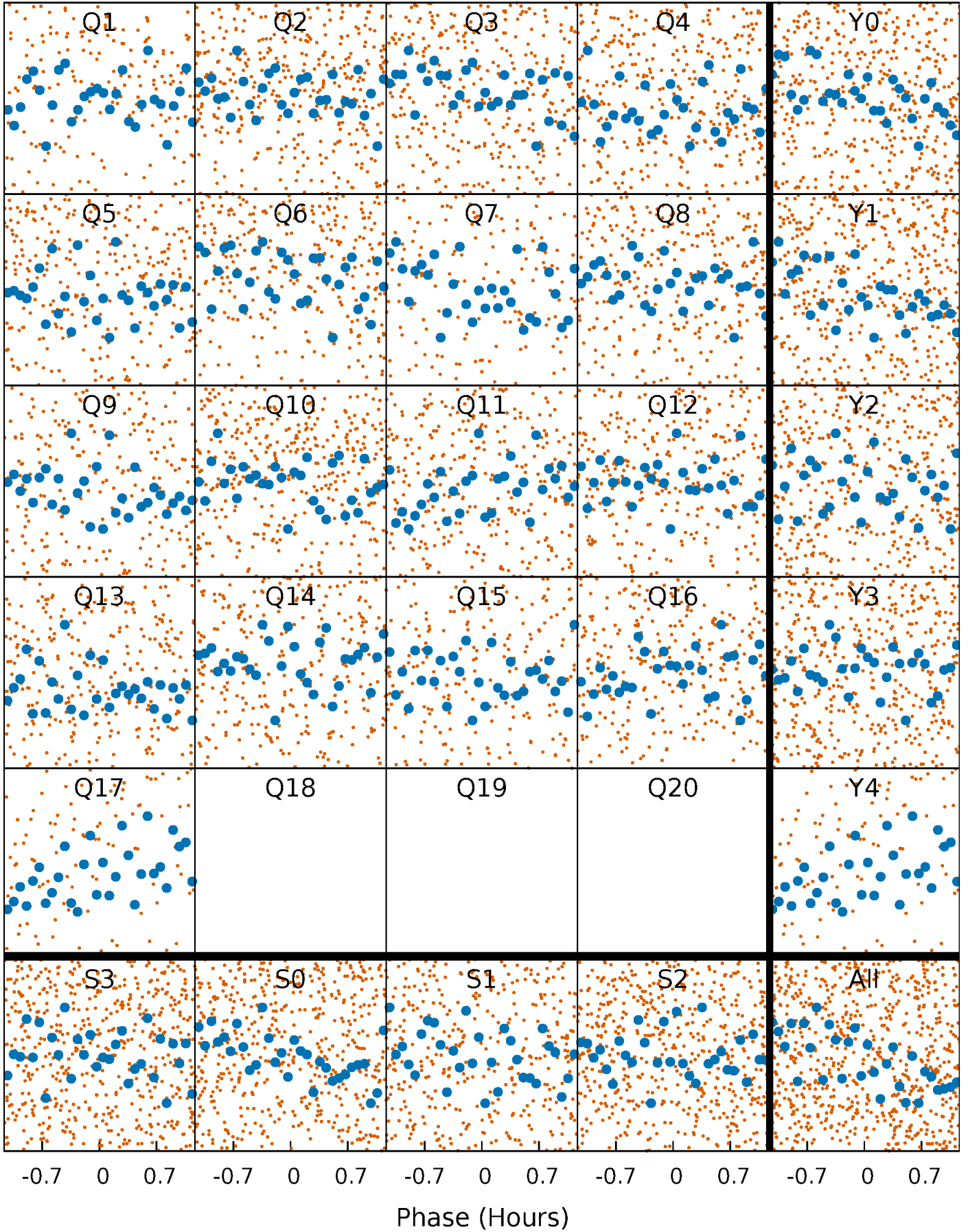


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



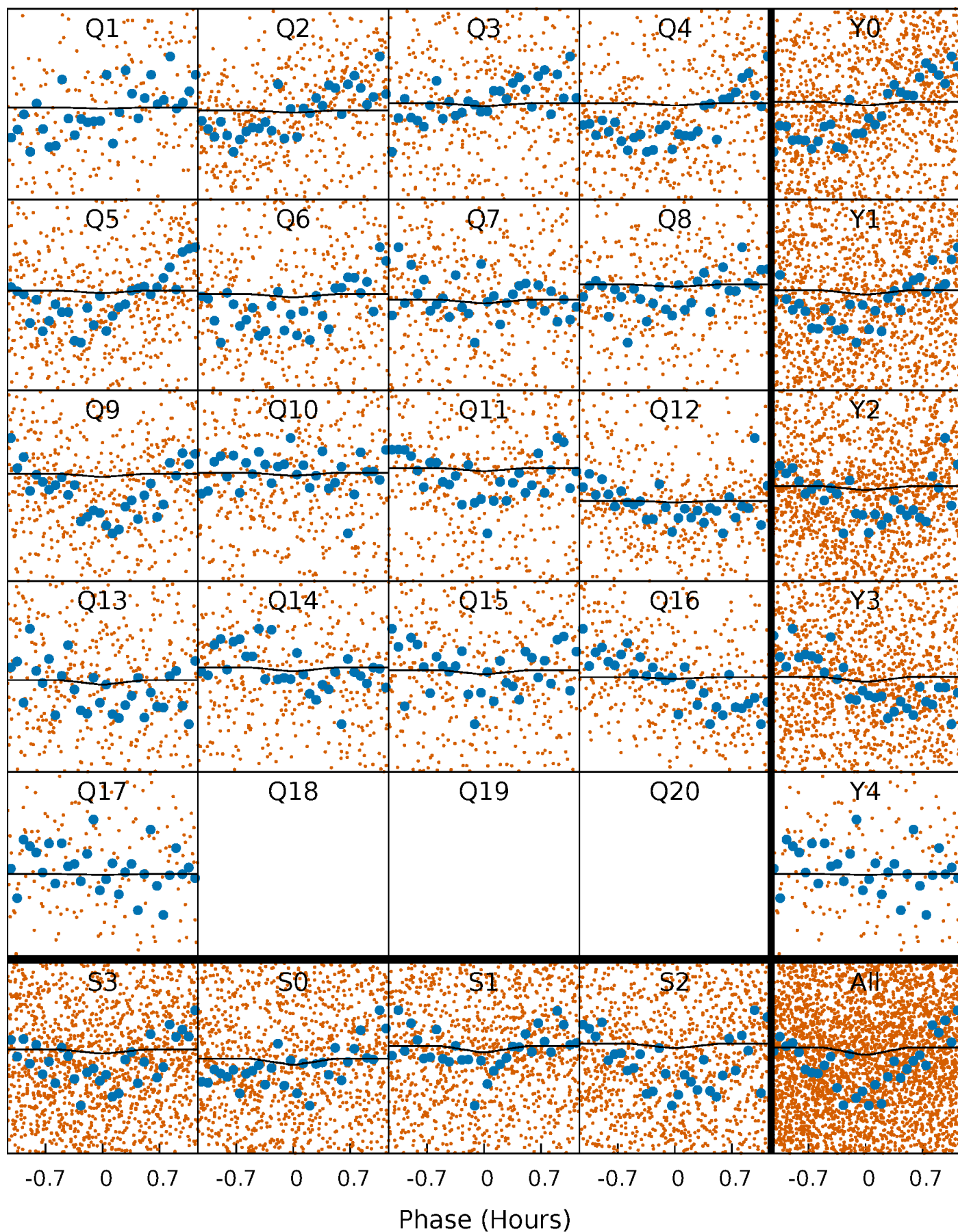
PDC Quarter-Phased Transit Curves

TCE 010470294-01 P= 0.748017 Days $T_0=131.855273$ (BKJD)



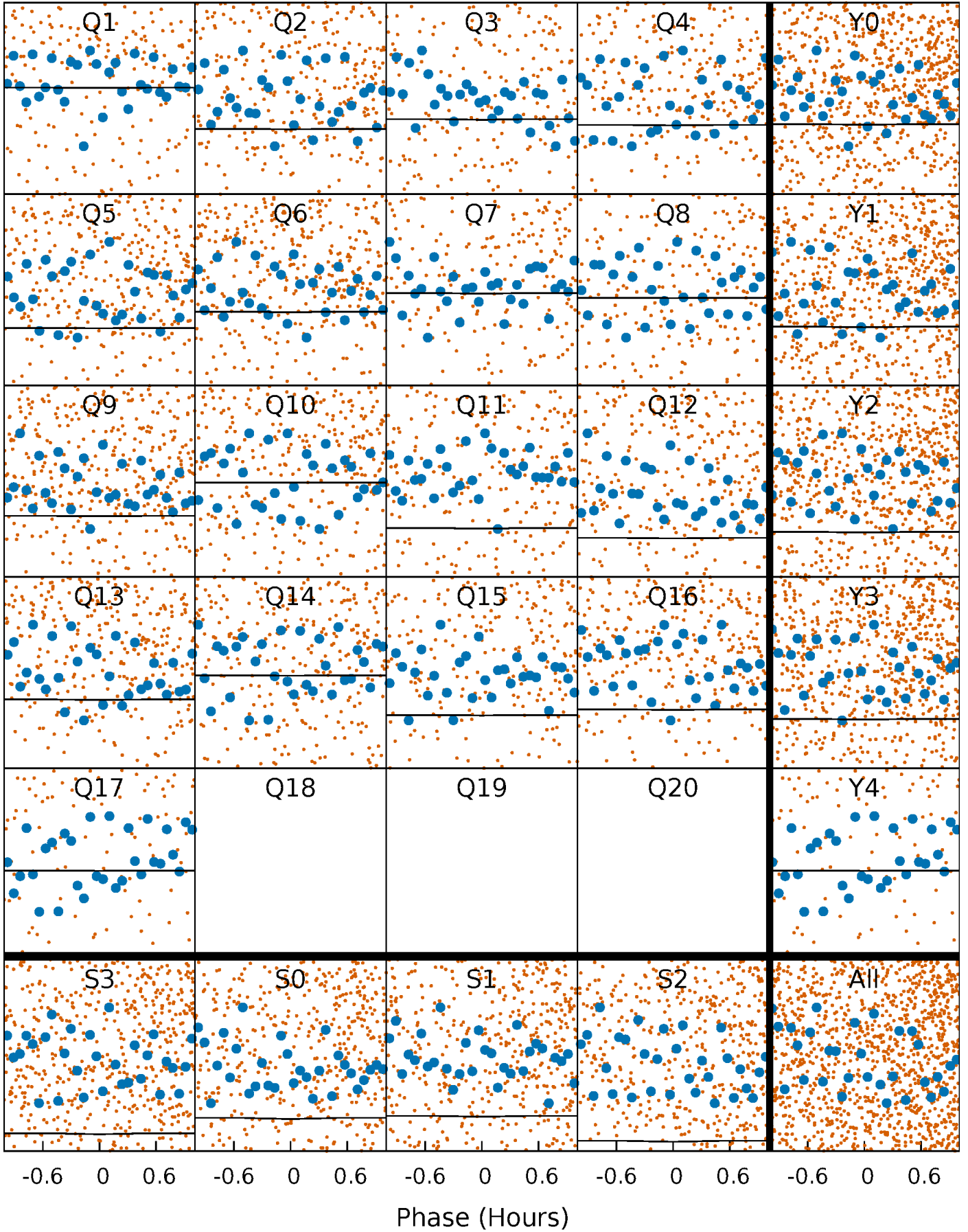
DV Quarter-Phased Transit Curves

TCE 010470294-01 P= 0.748017 Days $T_0=131.855273$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

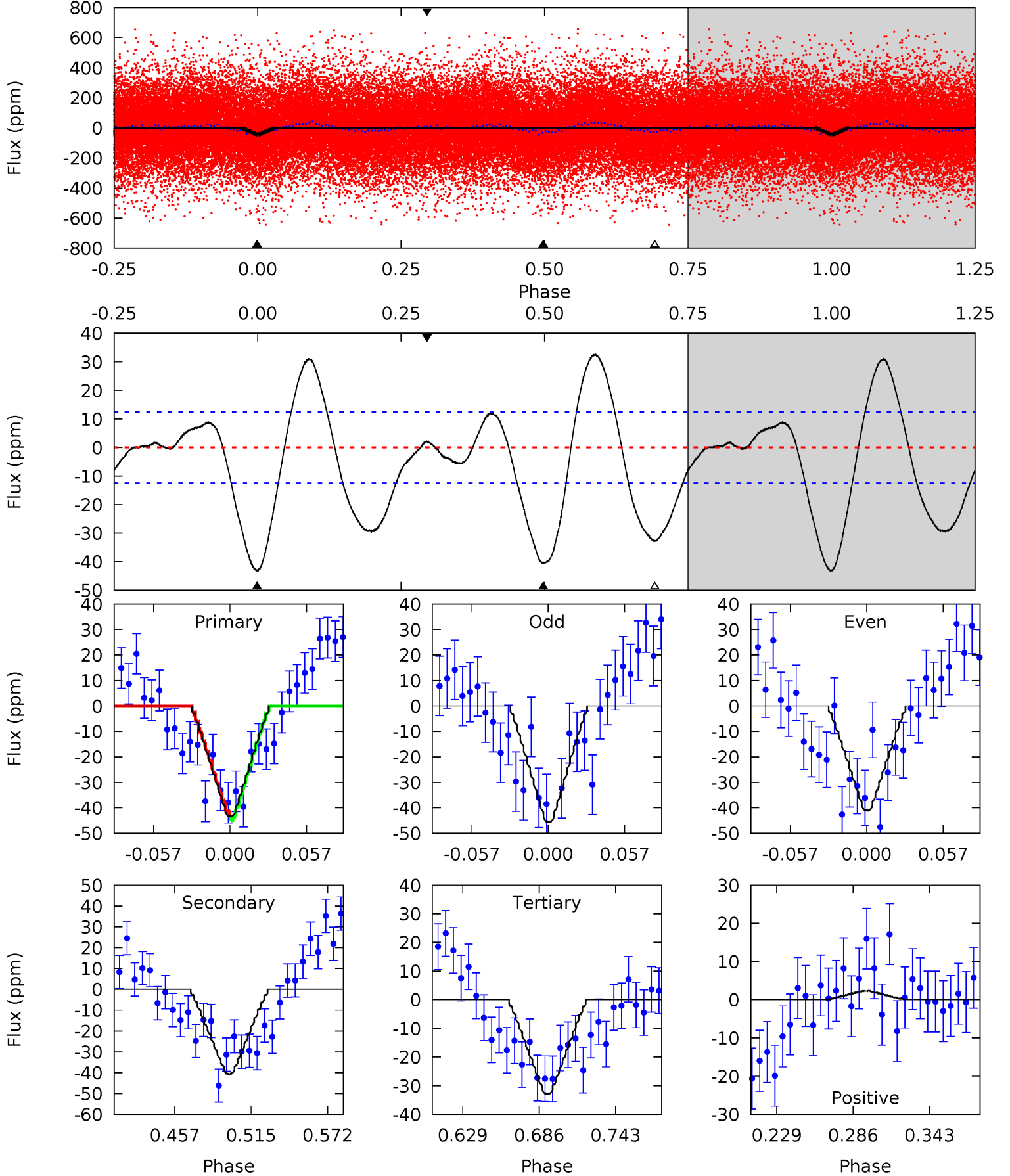
TCE 010470294-01 P= 0.748034 Days $T_0=131.859413$ (BKJD)



DV Model-Shift Uniqueness Test

010470294-01, P = 0.748017 Days, E = 131.107256 Days

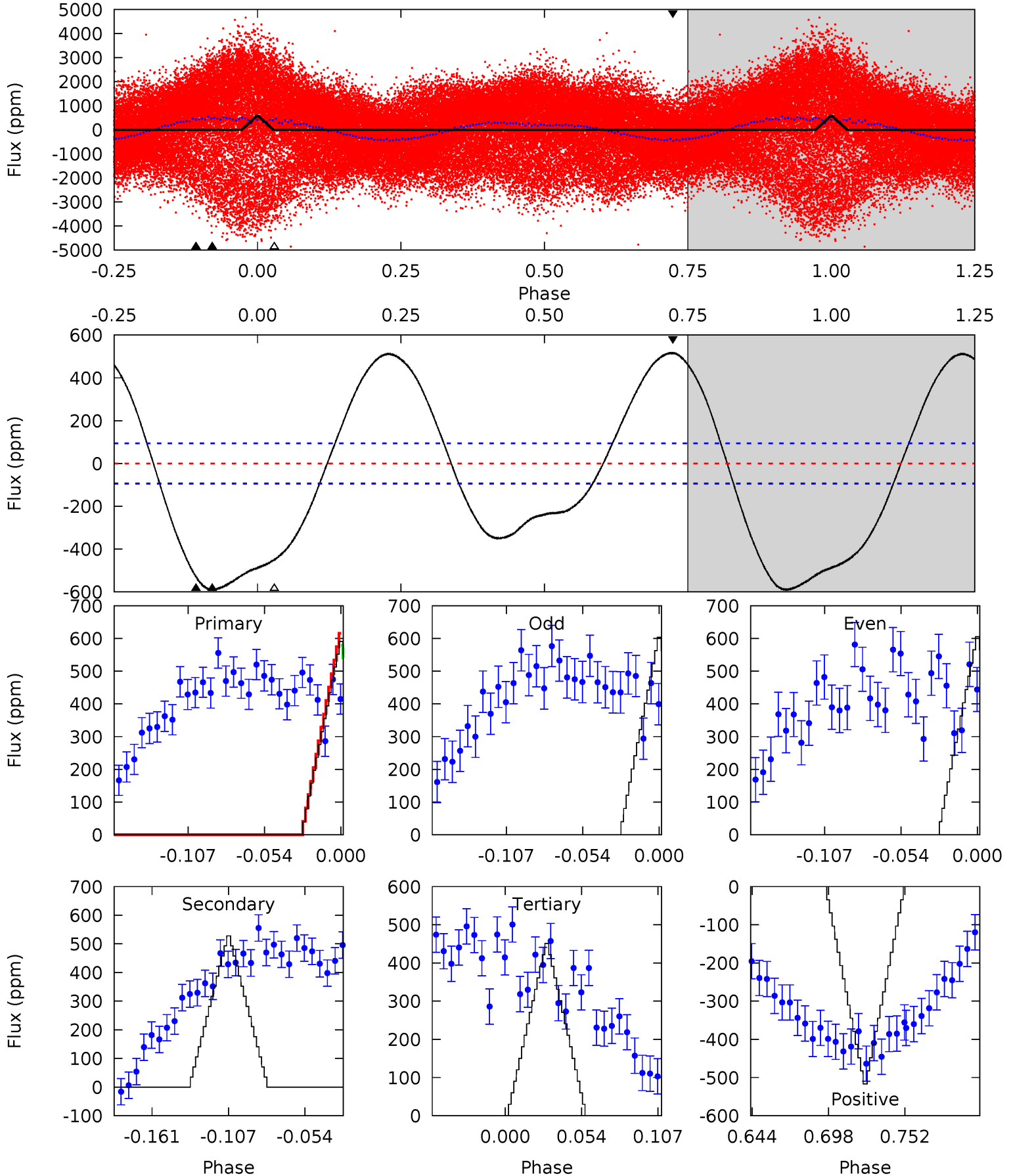
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.2	15.2	12.3	0.86	4.68	1.90	6.24	3.92	15.3	2.91	14.3	0.84	0.98	0.43	0.46



Alt Model-Shift Uniqueness Test

010470294-01, P = 0.748034 Days, E = 131.111379 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.5	26.3	22.5	25.8	4.69	1.93	16.3	6.96	3.70	3.82	0.56	0.06	0.56	0.47	0.97



Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-41 ± 3	$1.07^{+1.02}_{-0.72}$	5905^{+405}_{-763}	11674^{+26366}_{-4424}	$7.173^{+62.396}_{-5.198}$
Alt.	-528 ± 20	$1.20^{+1.02}_{-0.77}$	5886^{+409}_{-795}	$46736^{+208488}_{-25574}$	76^{+524}_{-53}

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 $A_{obs} \gg 1.0$

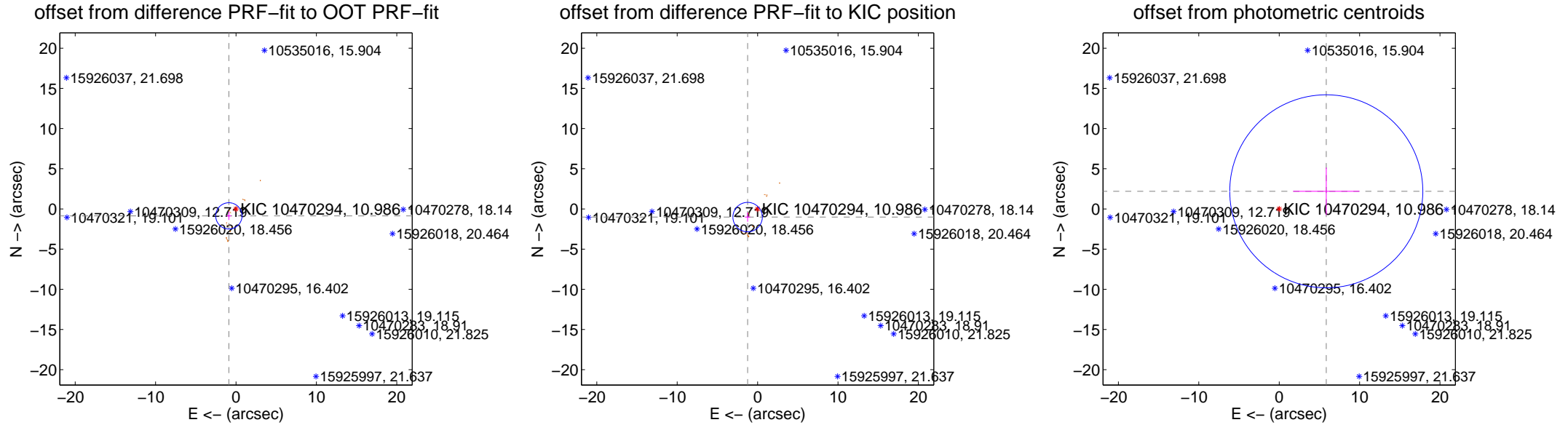
DV Centroid Data

Supplemental centroid analysis for 010470294-01. **Kepler magnitude: 10.99.** Transit SNR 1.41

There are 0 quarters with good PRF difference image offsets

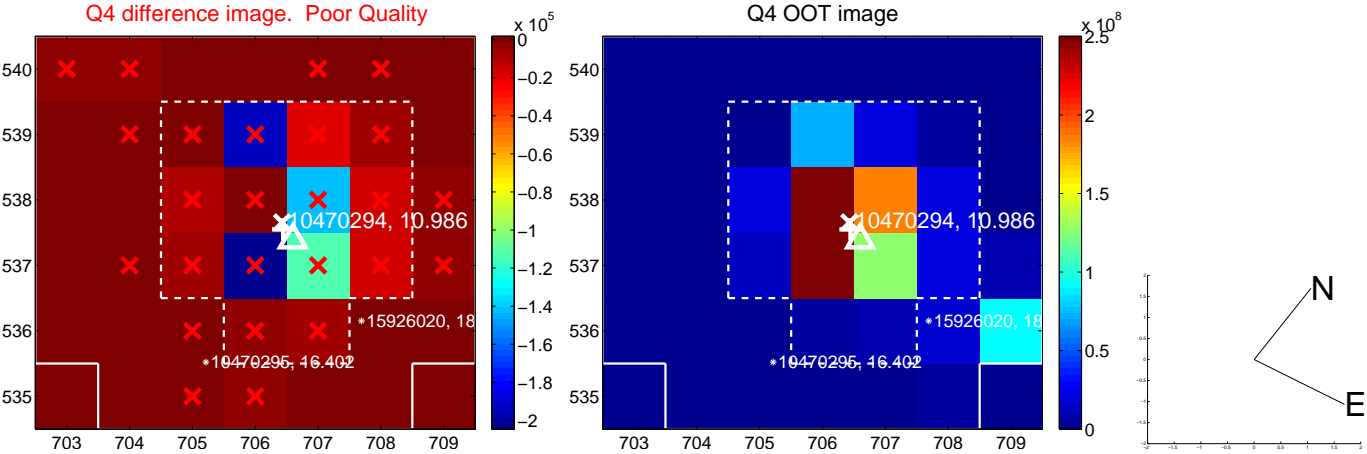
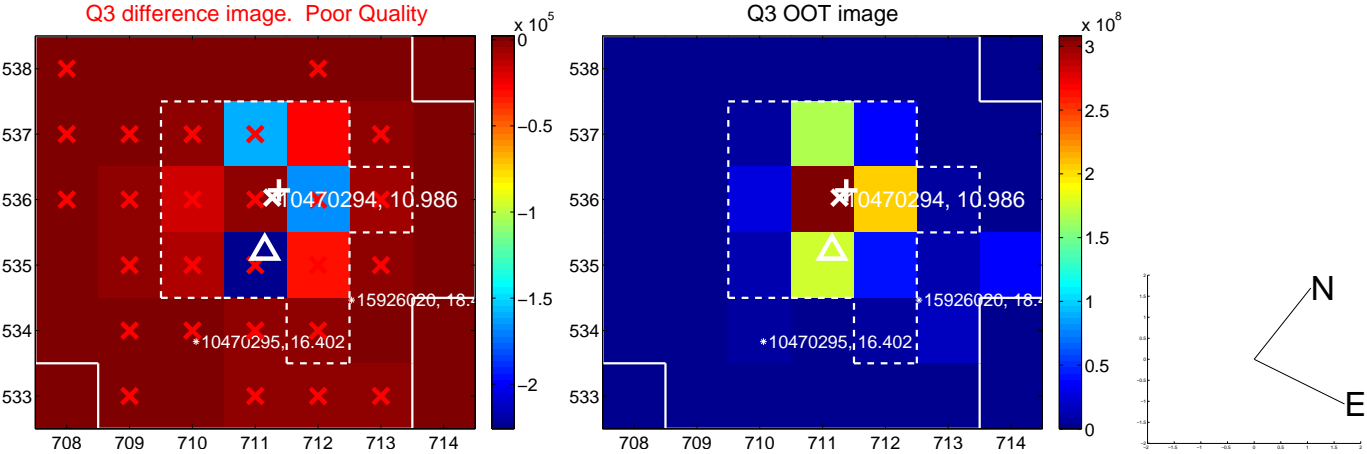
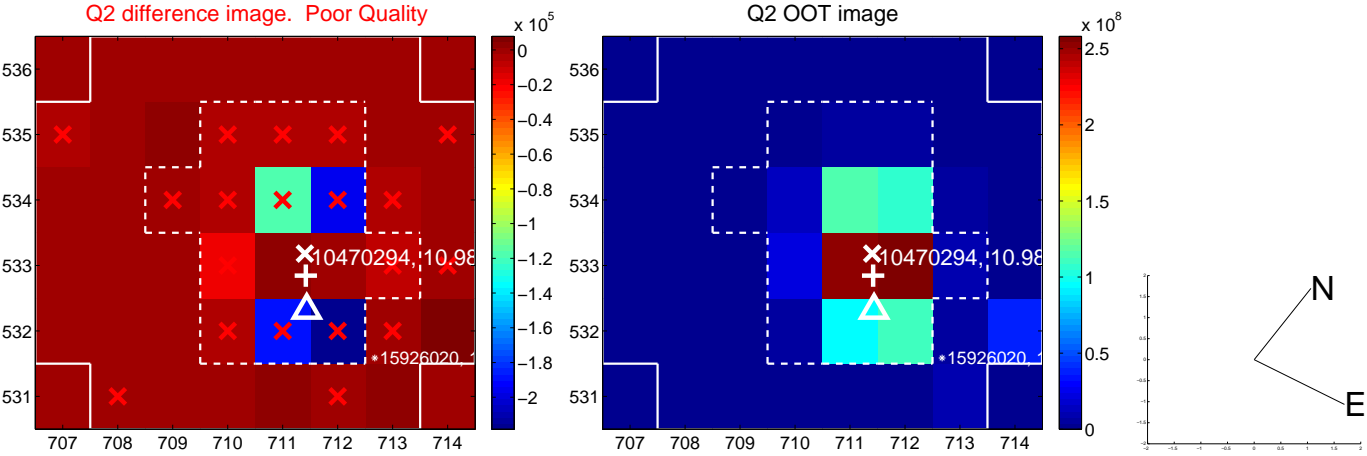
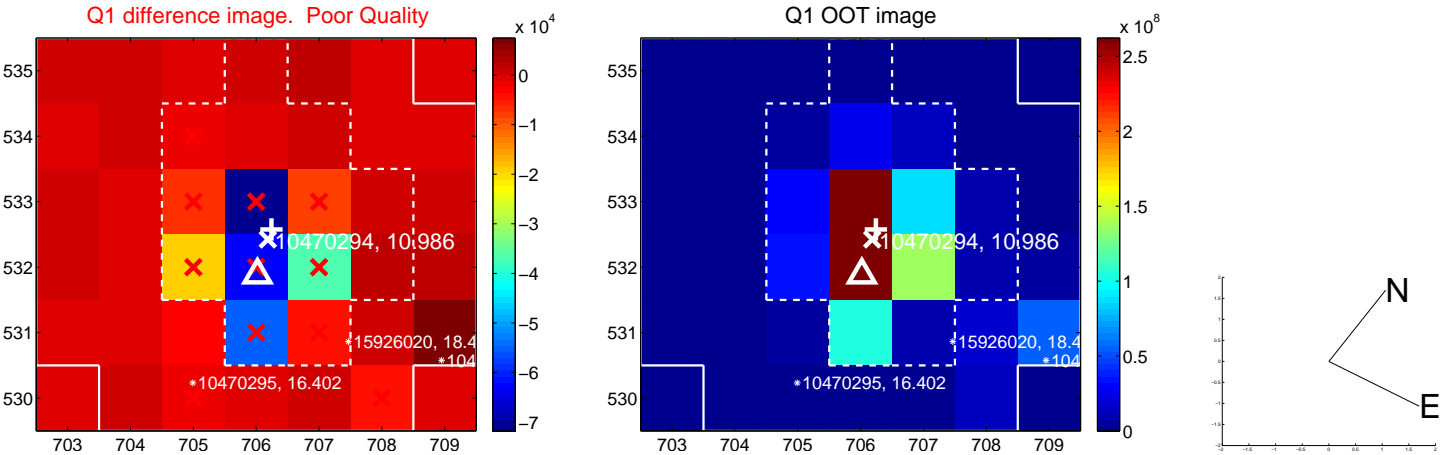
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.238 ± 0.545	2.27	0.887 ± 0.292	-0.864 ± 0.510
PRF-fit source offset from KIC position	1.603 ± 0.610	2.63	1.242 ± 0.335	-1.014 ± 0.576
photometric centroid source offset	6.25 ± 4.00	1.56	-5.86 ± 4.13	2.19 ± 2.96

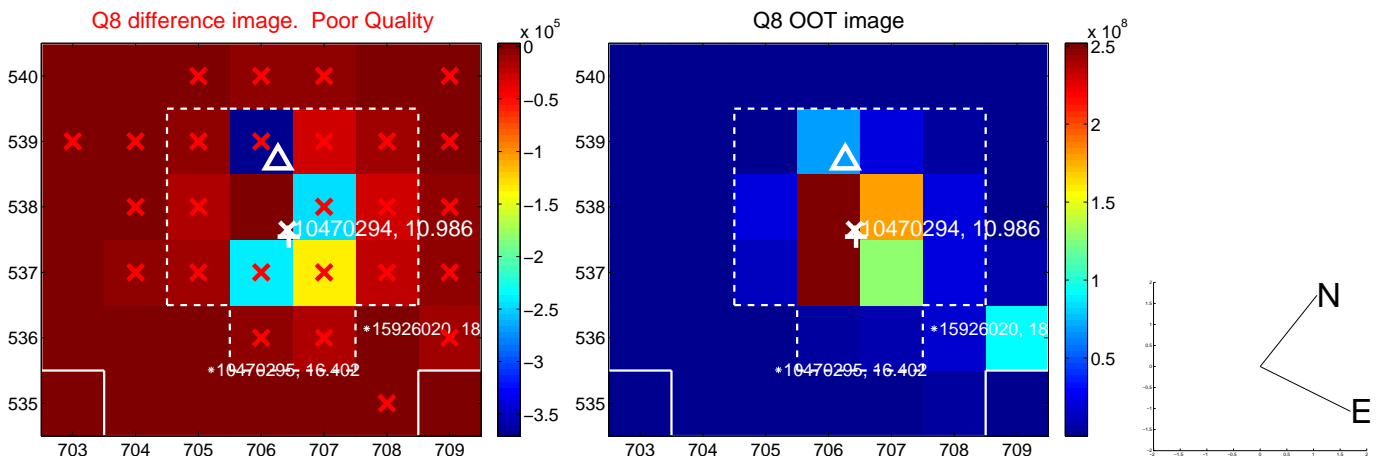
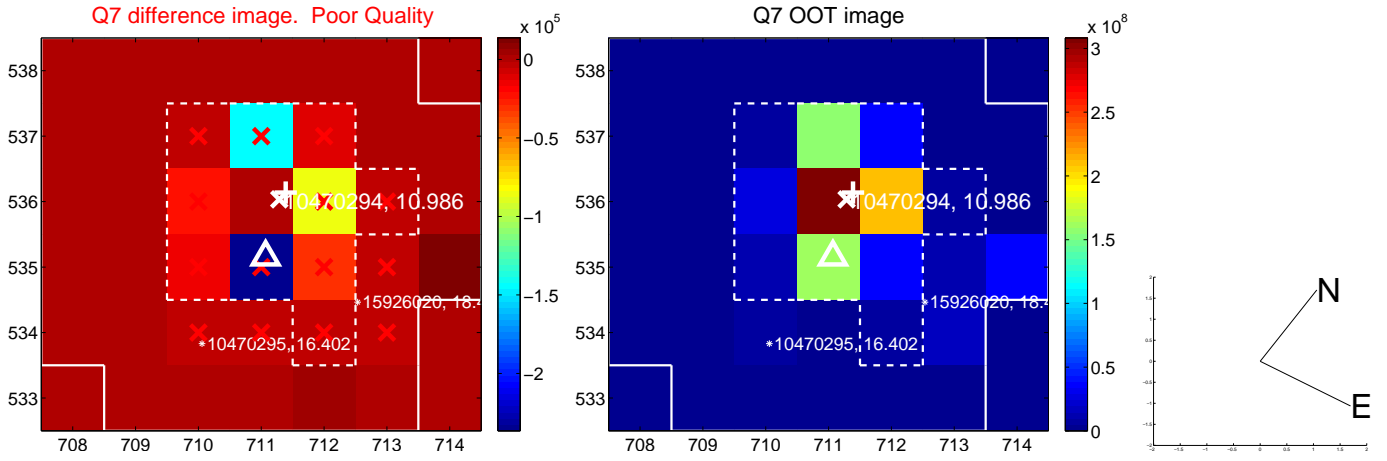
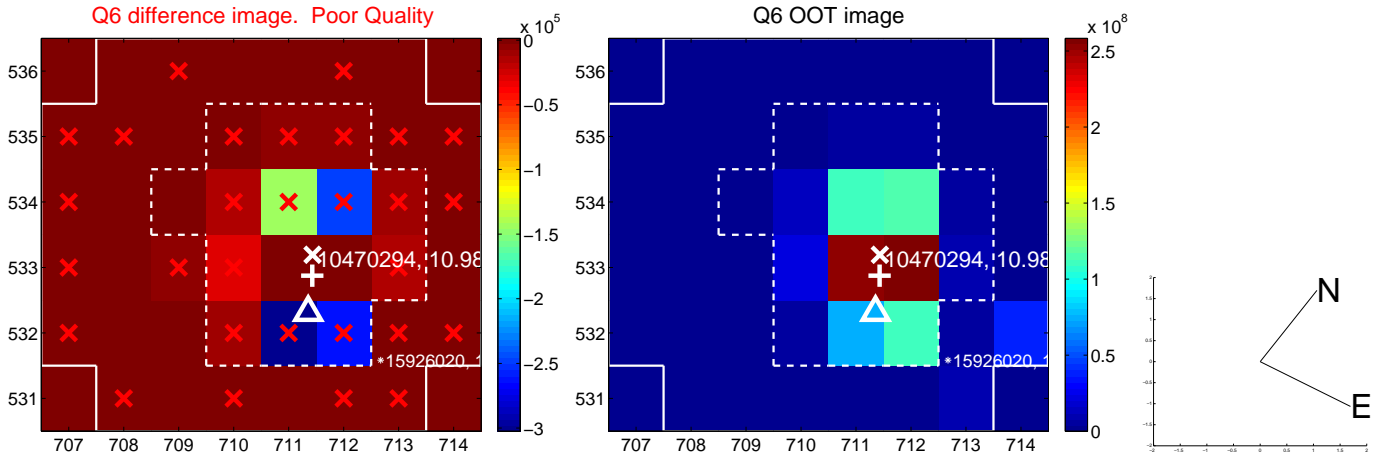
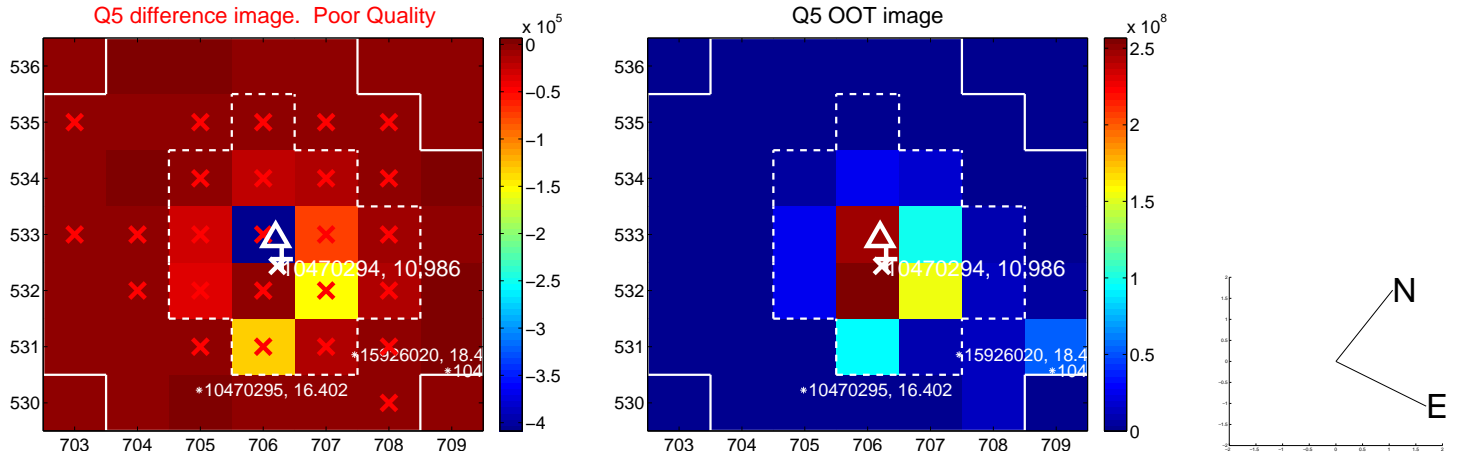


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

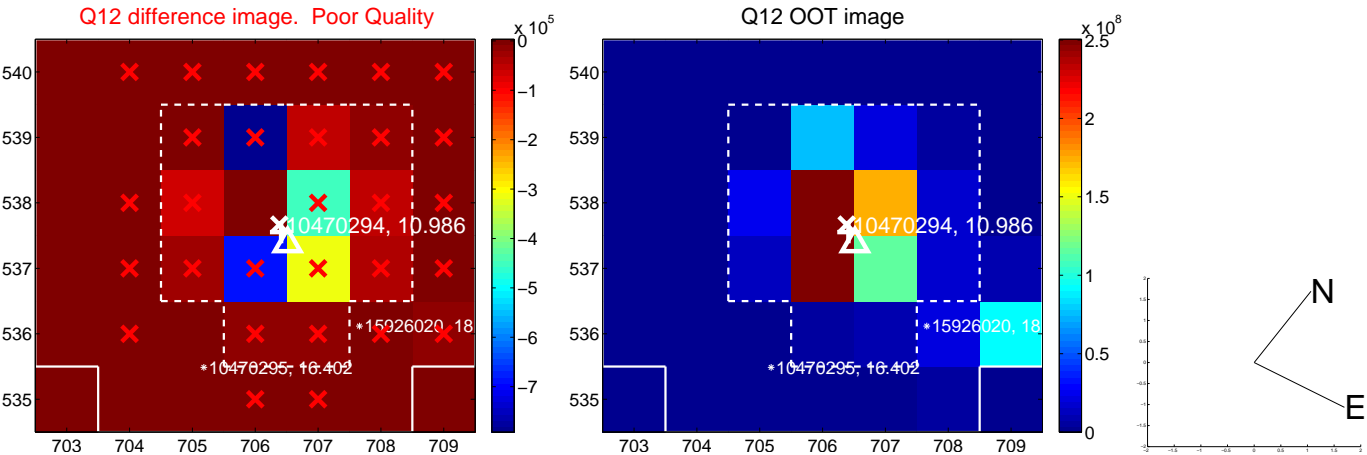
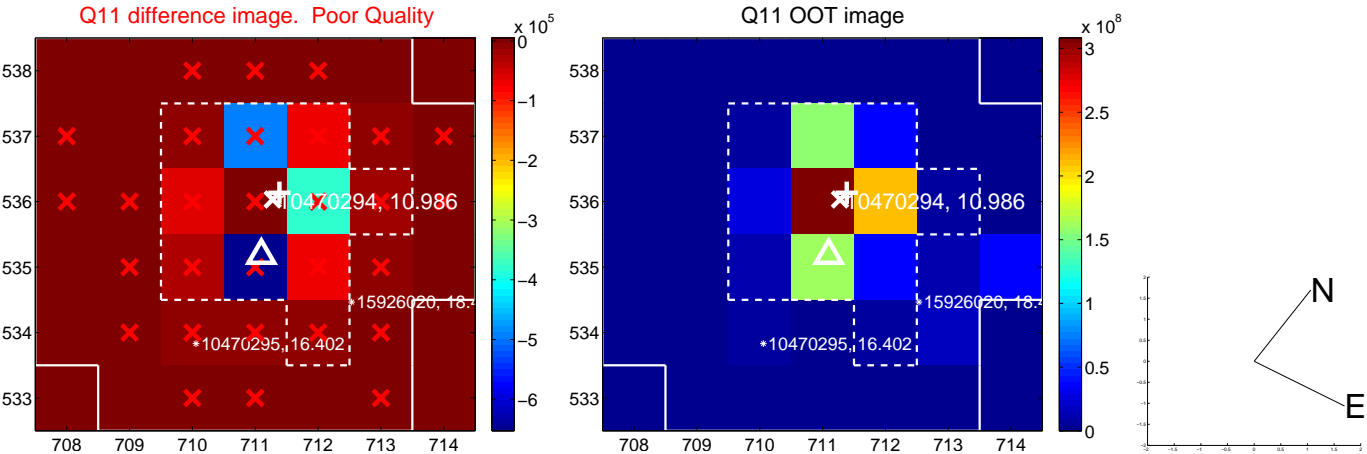
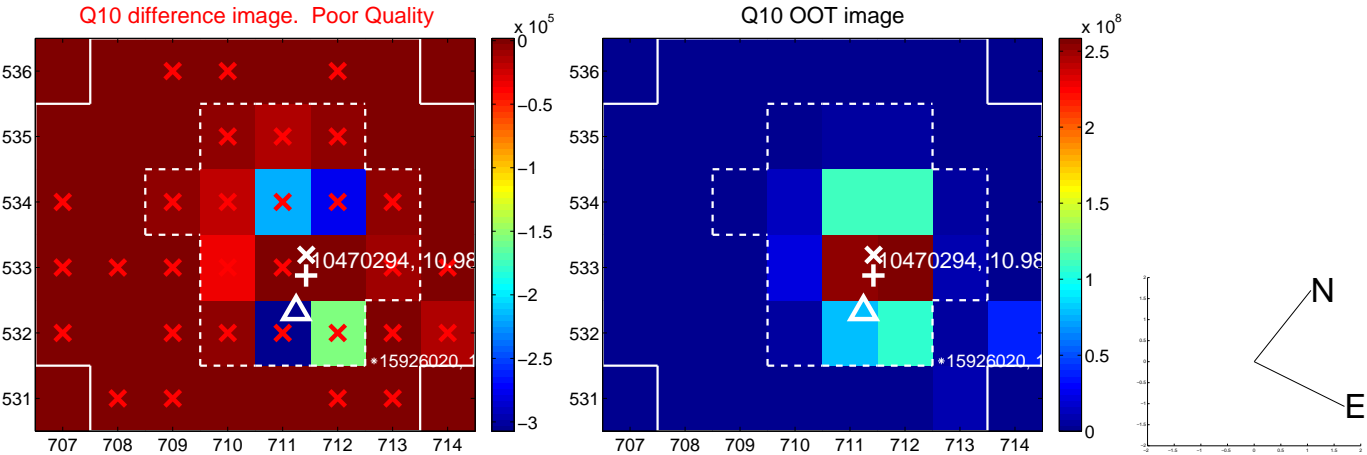
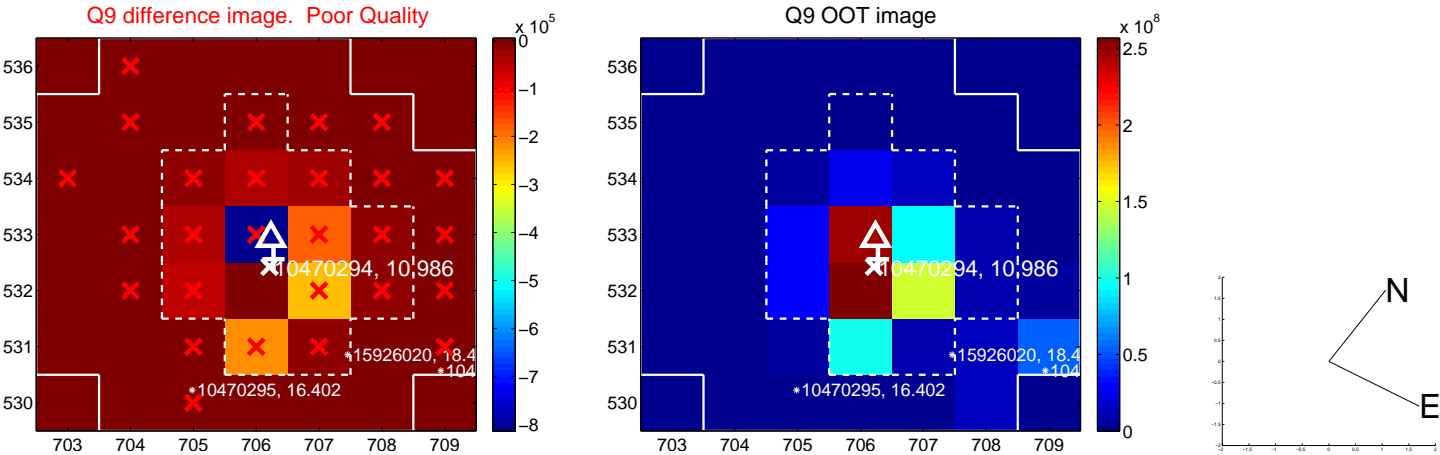
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



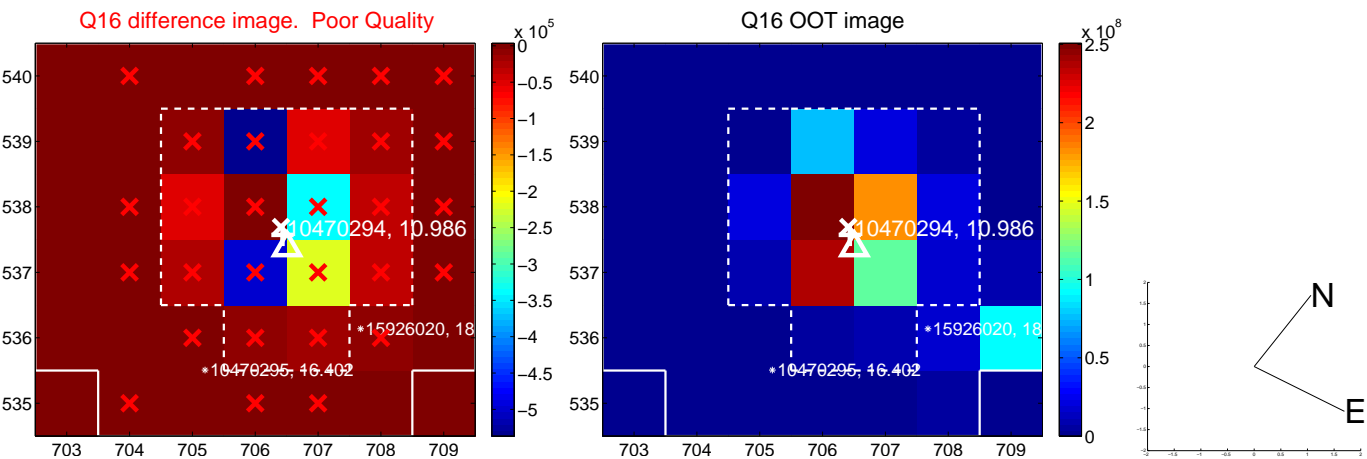
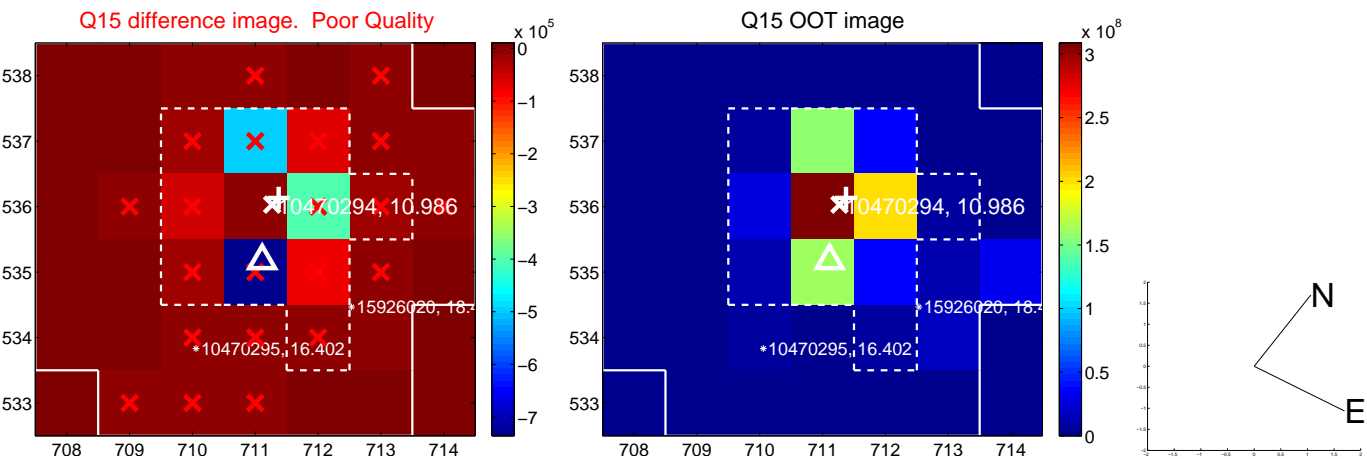
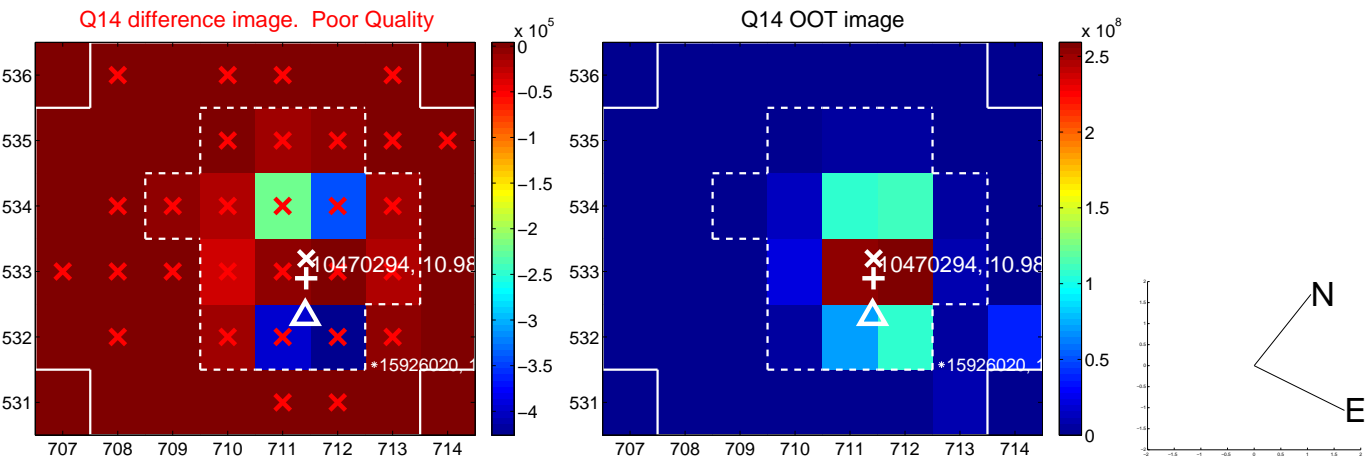
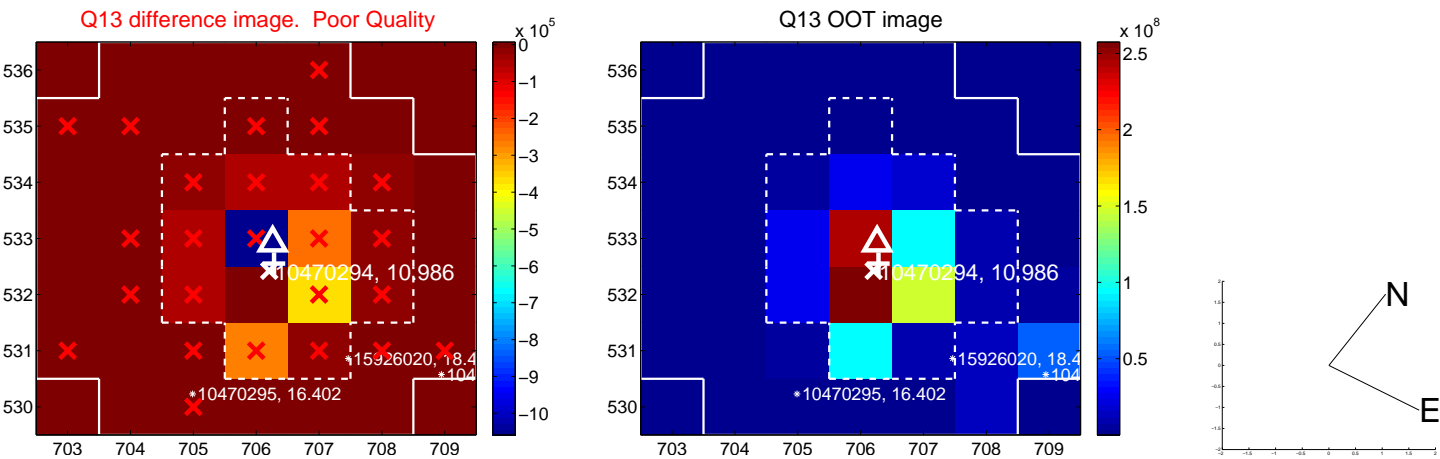
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



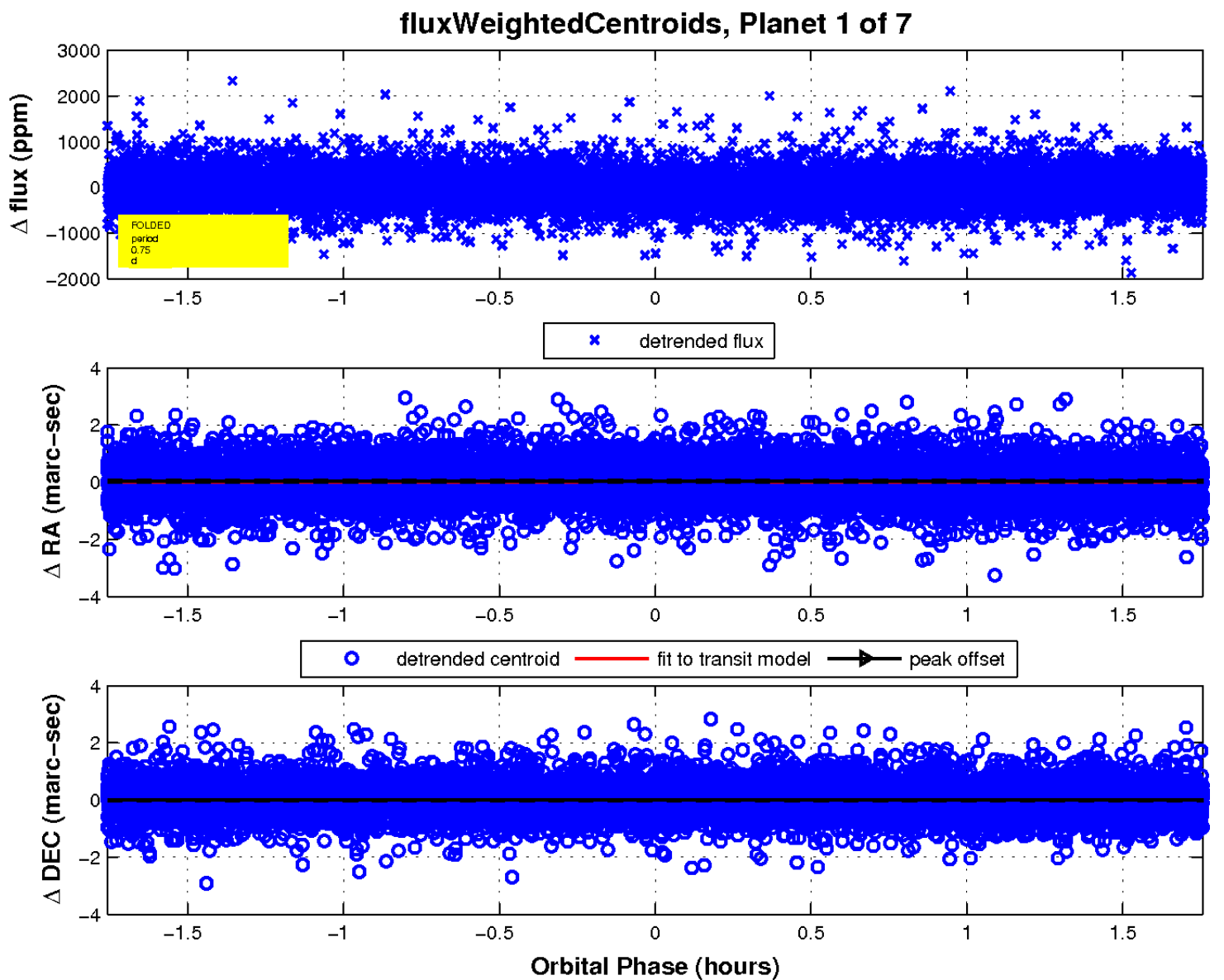
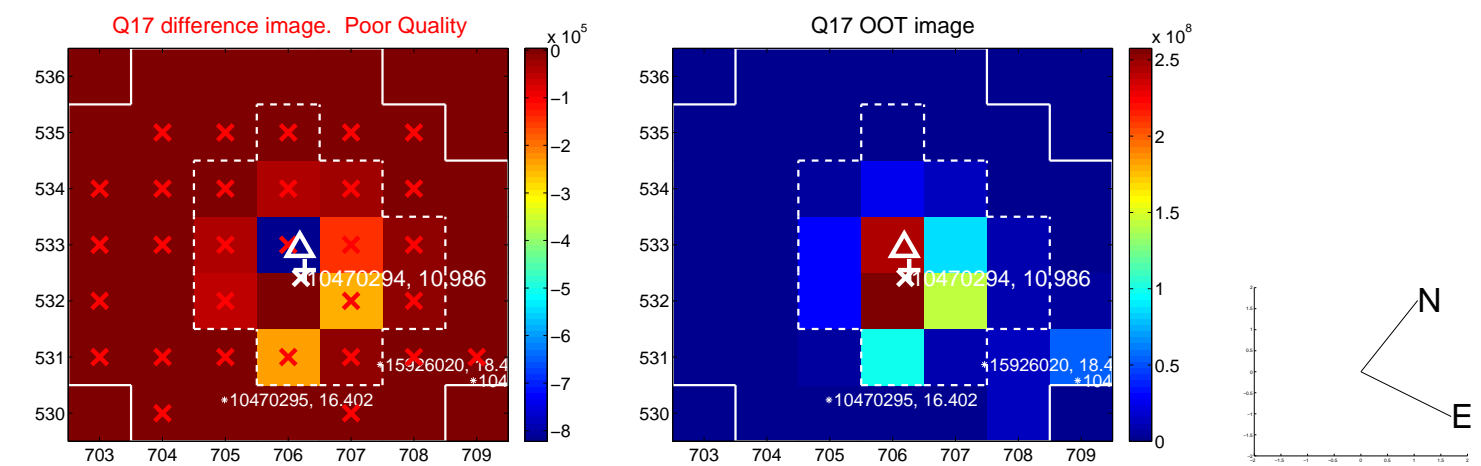
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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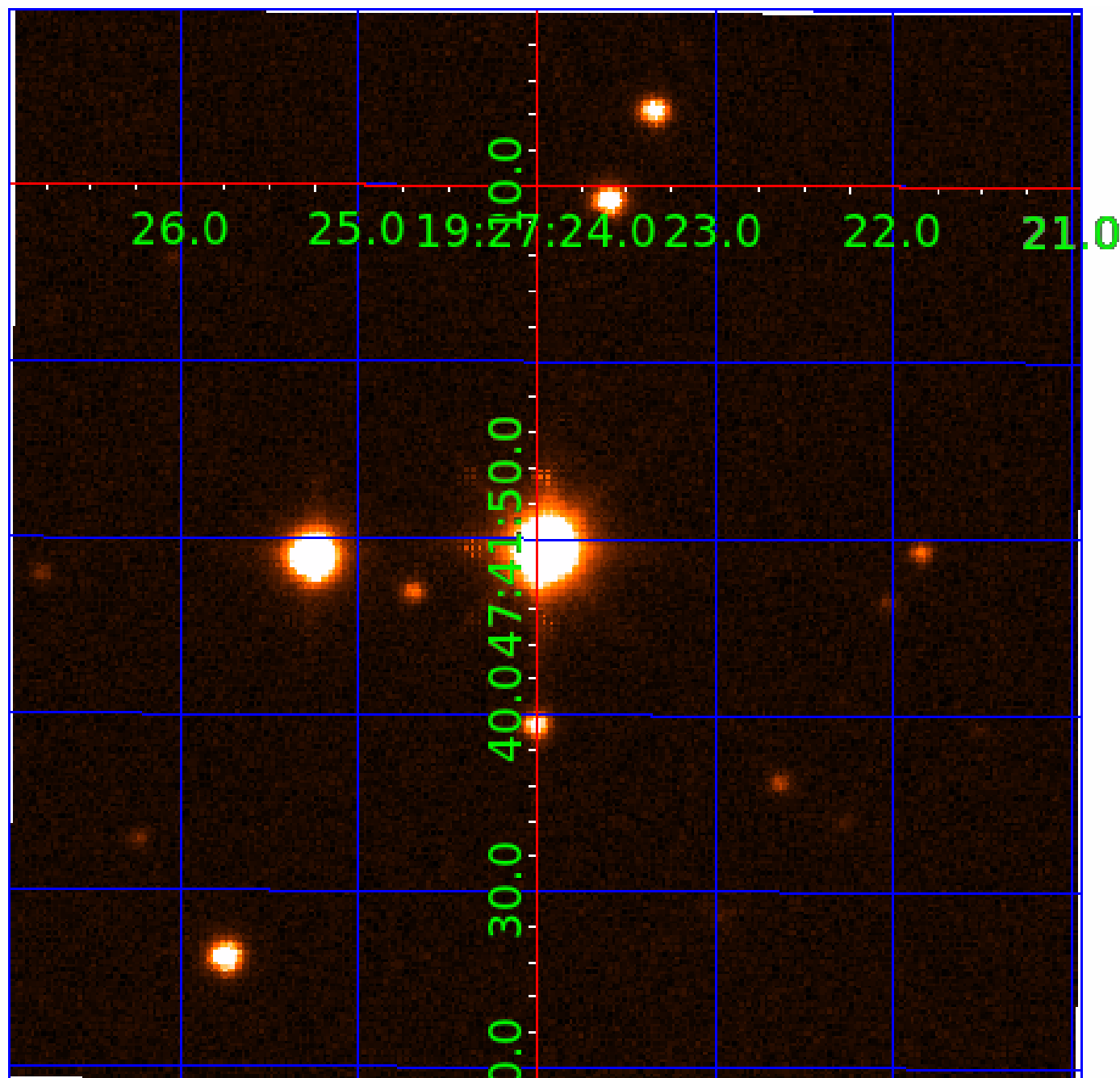


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010470294

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
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Robovetter Results

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010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

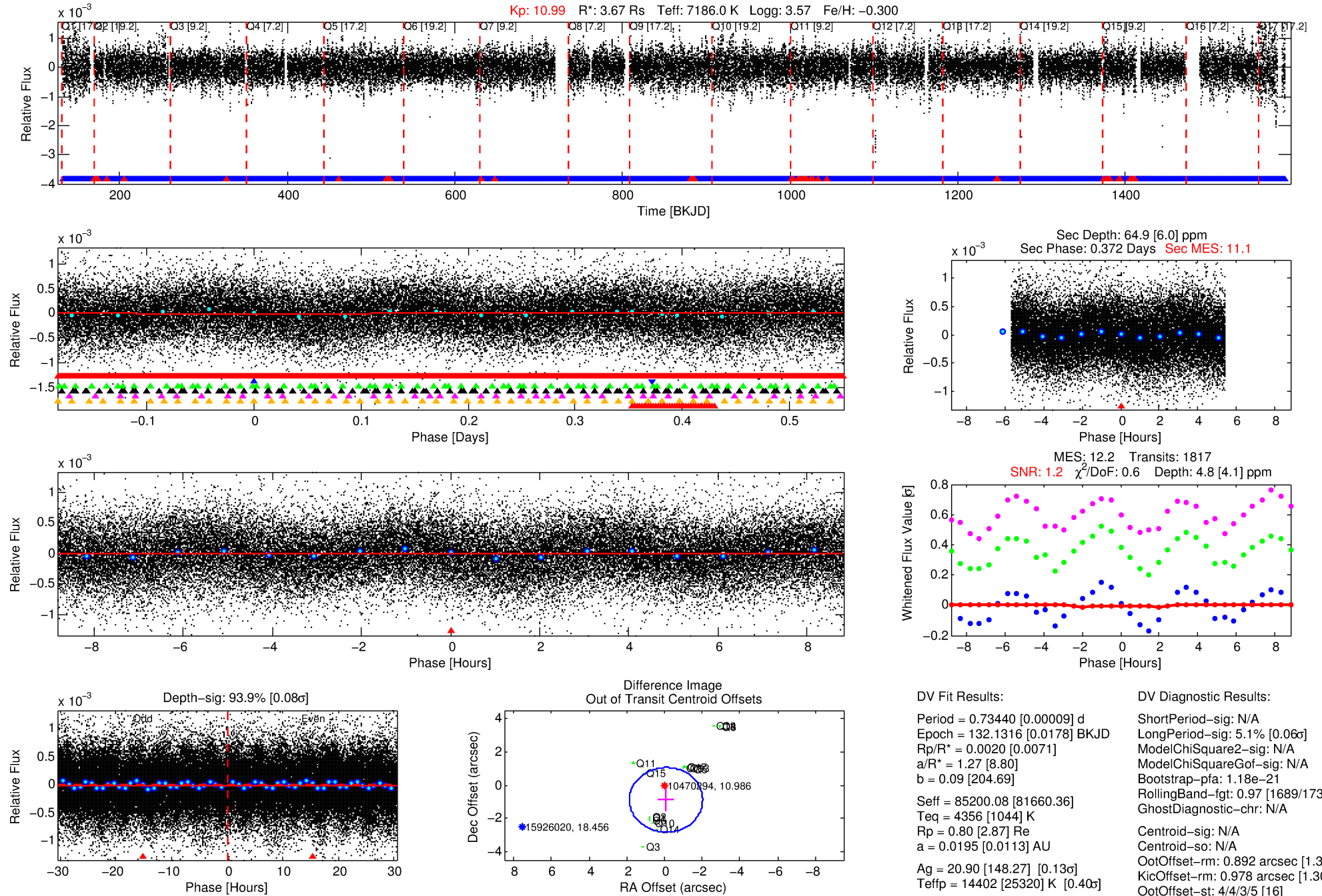
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-02

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 2 of 7 Period: 0.734 d



DV Fit Results:

Period = 0.73440 [0.00009] d
Epoch = 132.1316 [0.0178] BKJD
Rp/R* = 0.0020 [0.0071]
a/R* = 1.27 [8.80]
b = 0.09 [204.69]
Seff = 85200.08 [81660.36]
Teq = 4356 [1044] K
Rp = 0.80 [2.87] Re
a = 0.0195 [0.0113] AU
Ag = 20.90 [148.27] [0.13σ]
Teffp = 14402 [25320] K [0.40σ]

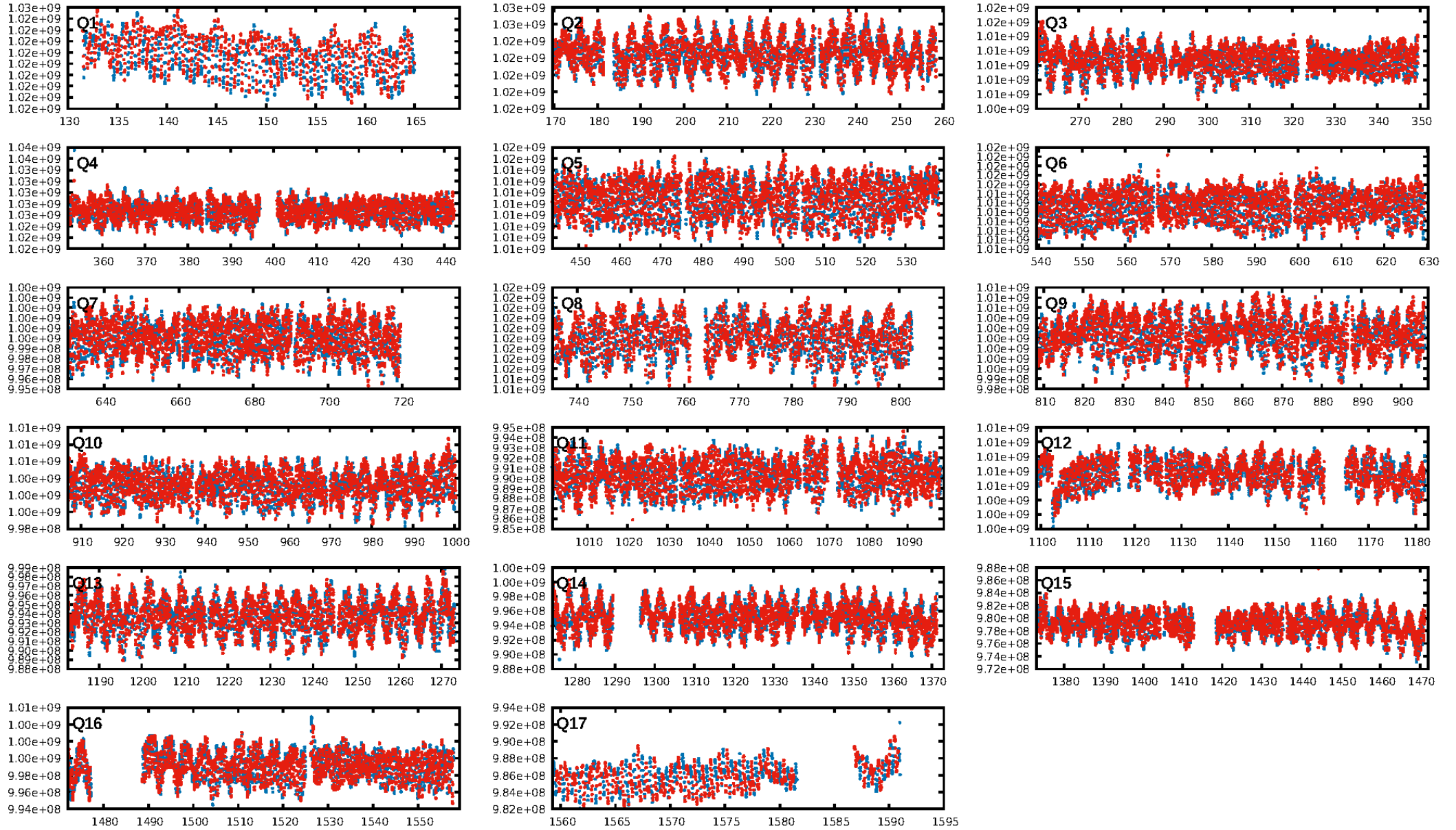
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 5.1% [0.06σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.18e-21
RollingBand-fgt: 0.97 [1689/1736]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.892 arcsec [1.38σ]
KicOffset-rm: 0.978 arcsec [1.30σ]
OotOffset-st: 4/4/3/5 [16]
KicOffset-st: 4/4/3/5 [16]
DiffImageQuality-fgm: 0.69 [11/16]
DiffImageOverlap-fno: 0.00 [0/17]

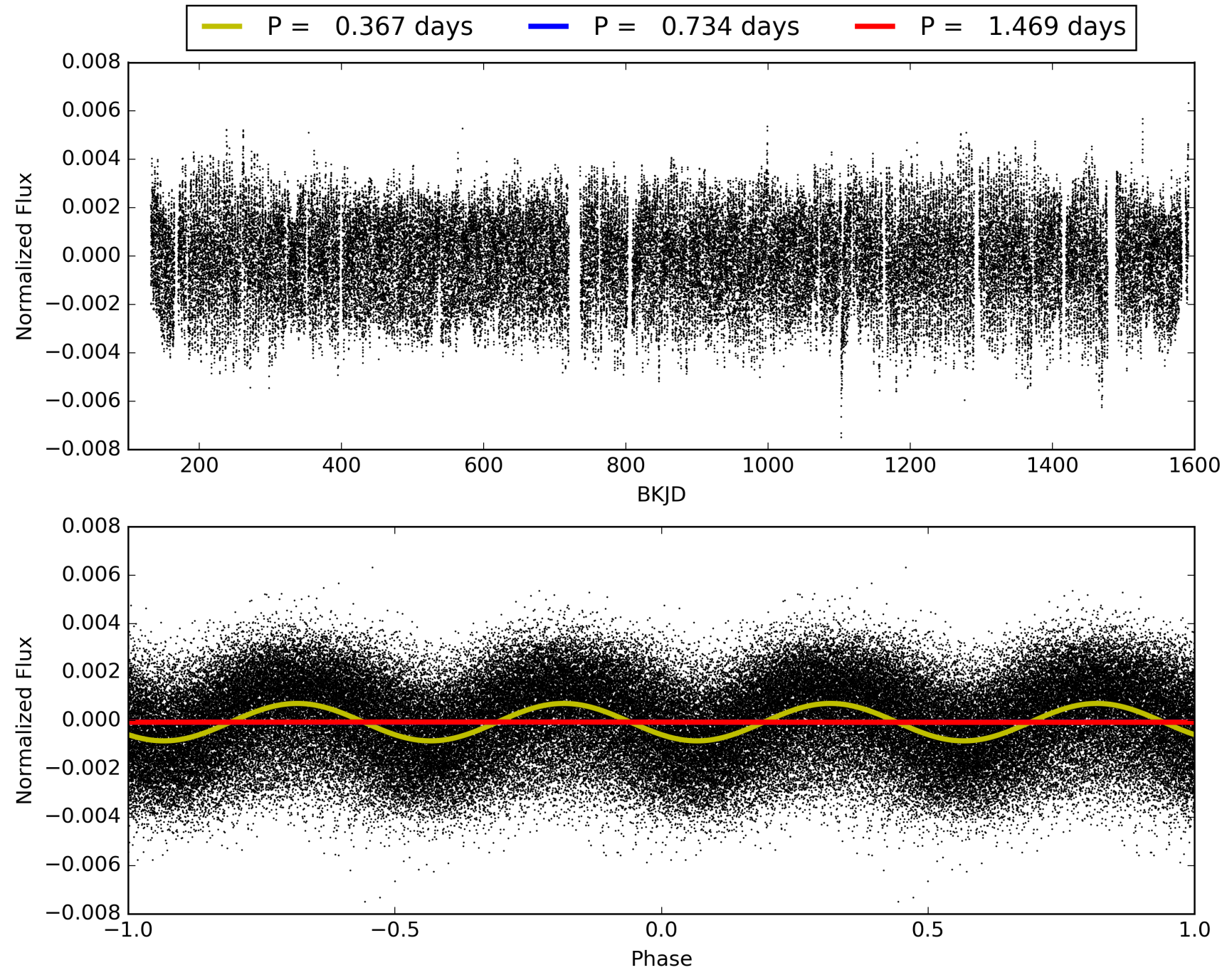
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:21 Z

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

TCE 010470294-02, PDC Light Curves

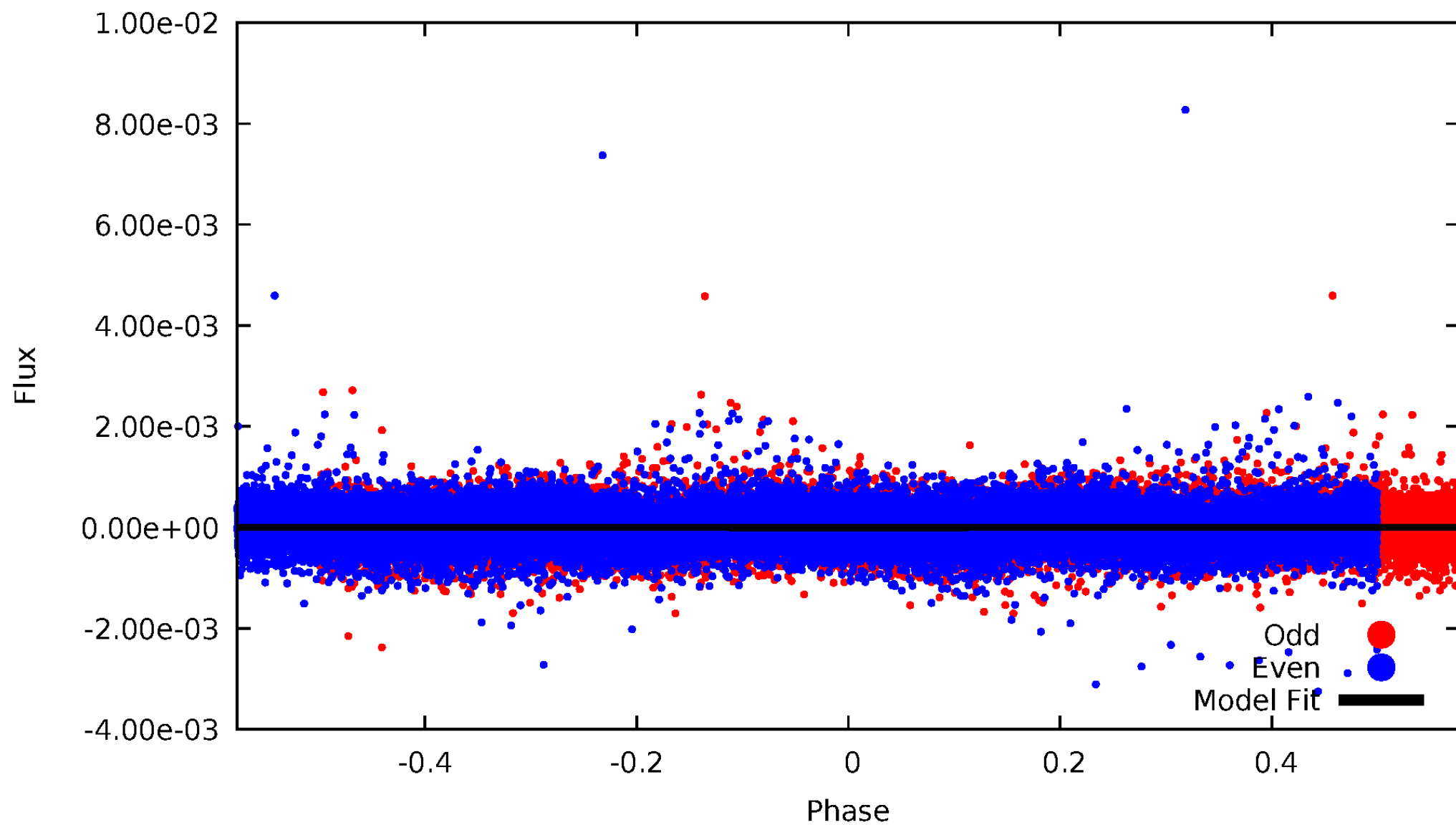


TCE 010470294-02



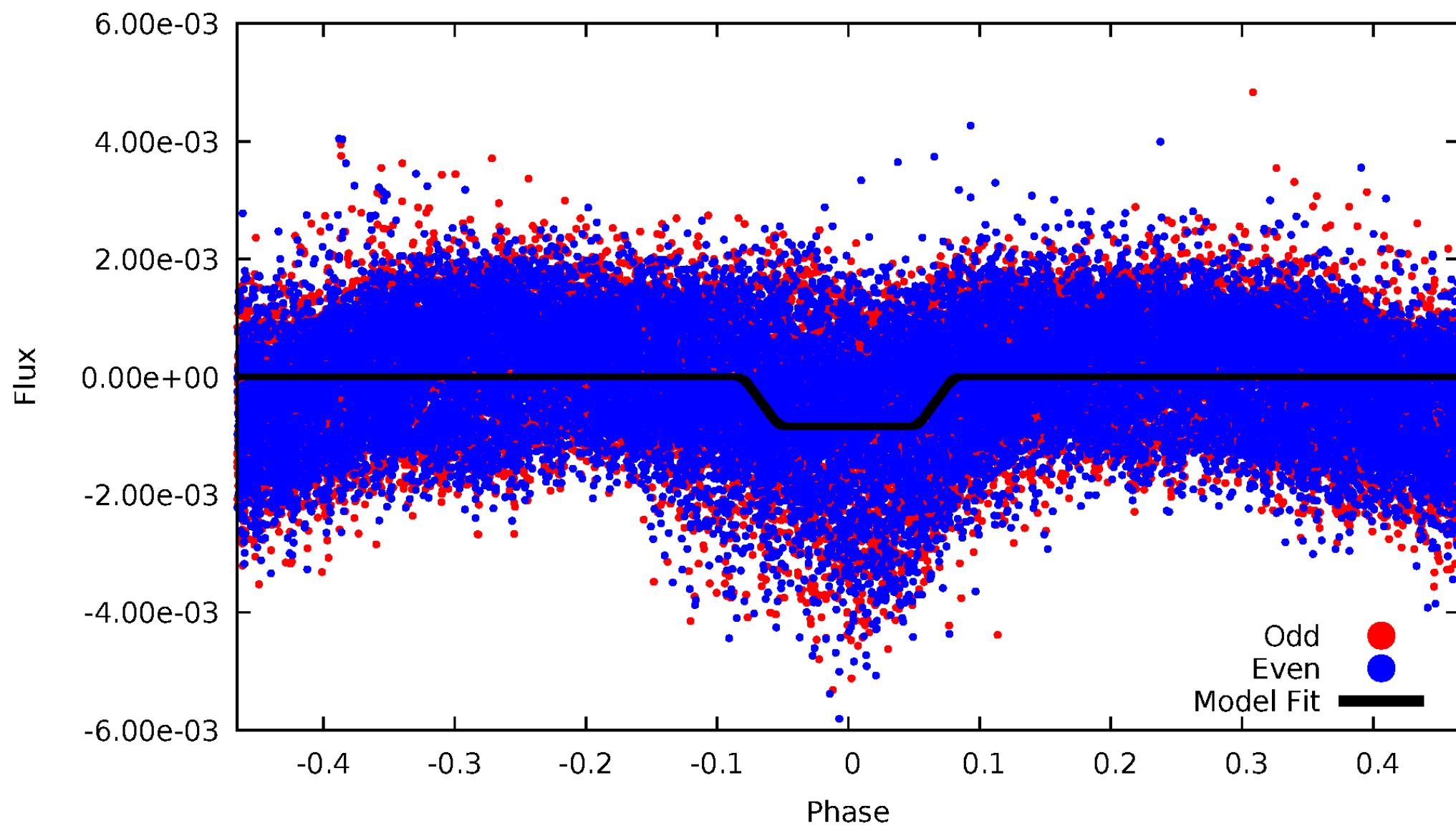
DV Odd/Even

TCE 010470294-02



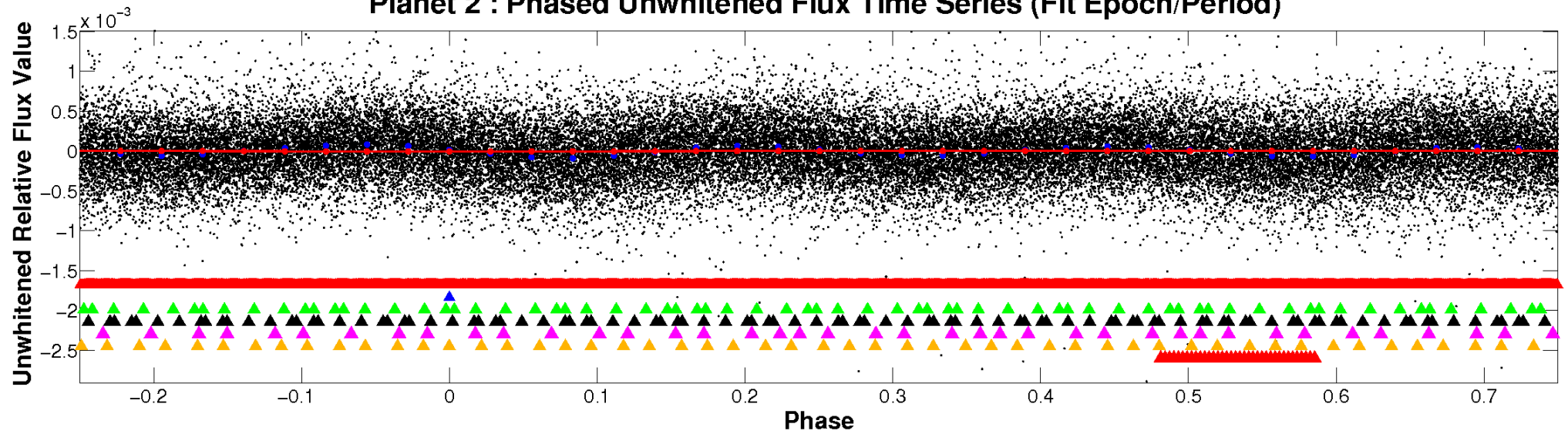
ALT Odd/Even

TCE 010470294-02

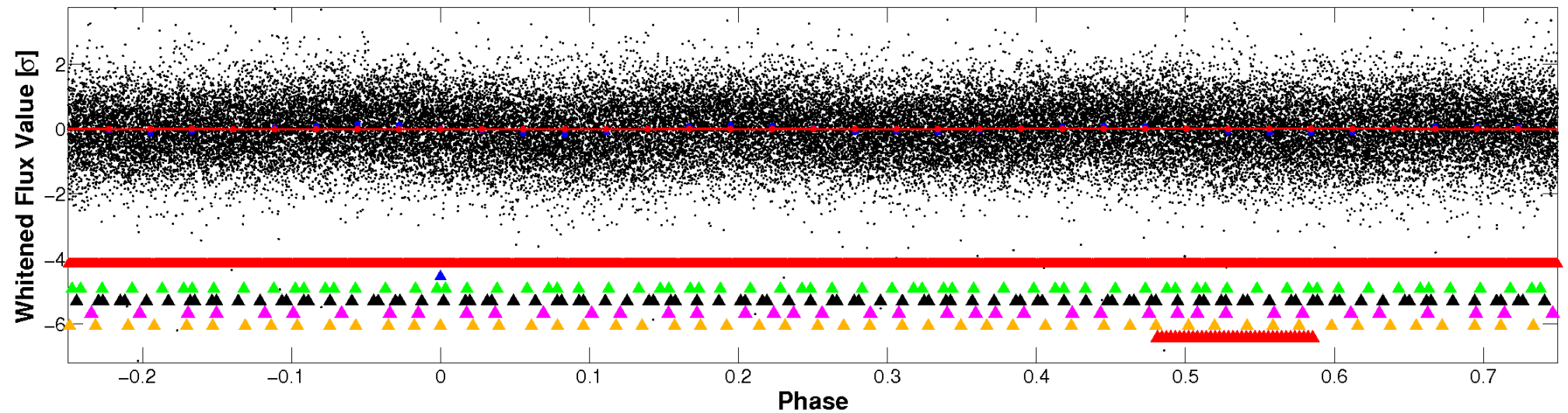


Non-Whitened Vs. Whitened Light Curve

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

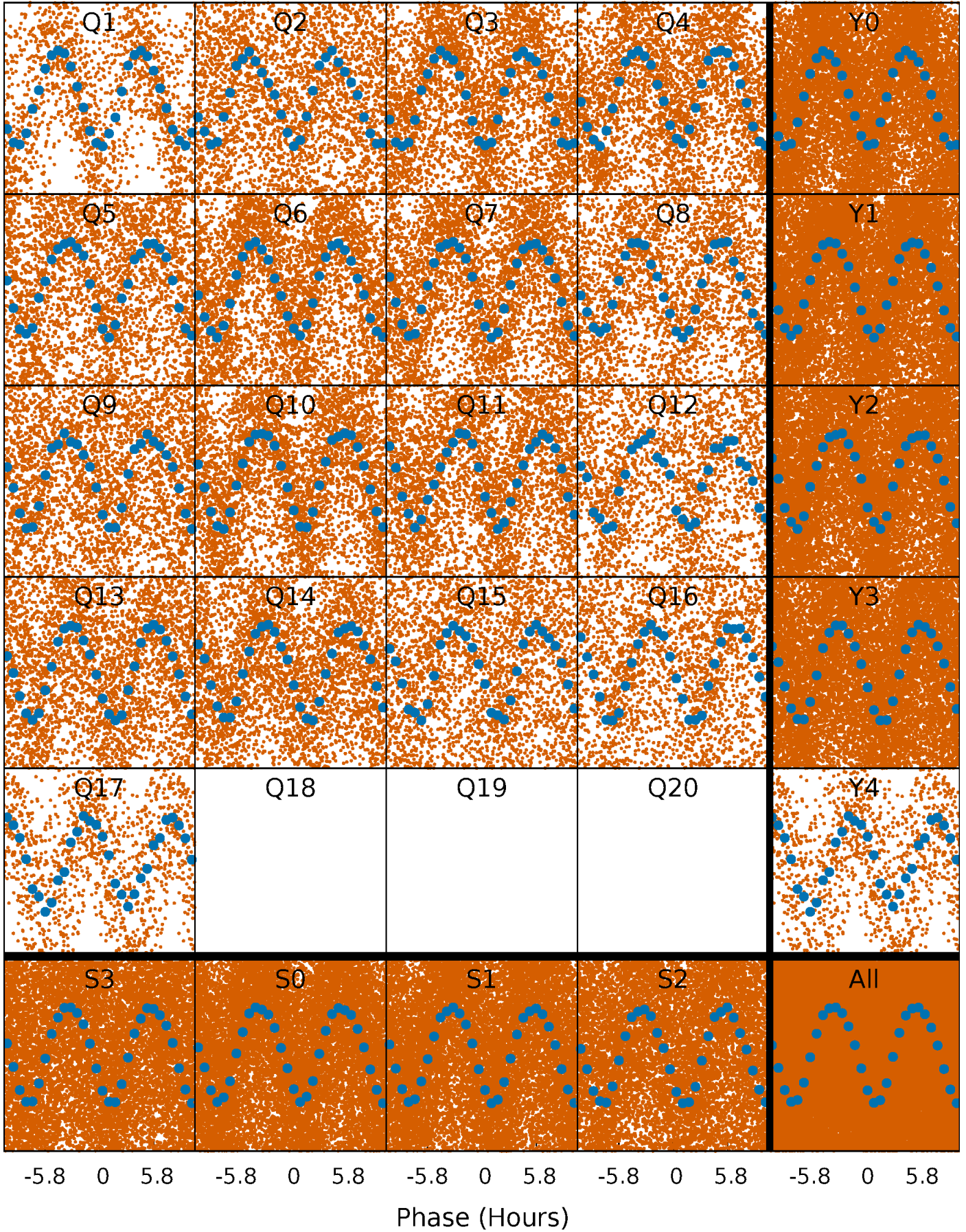


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



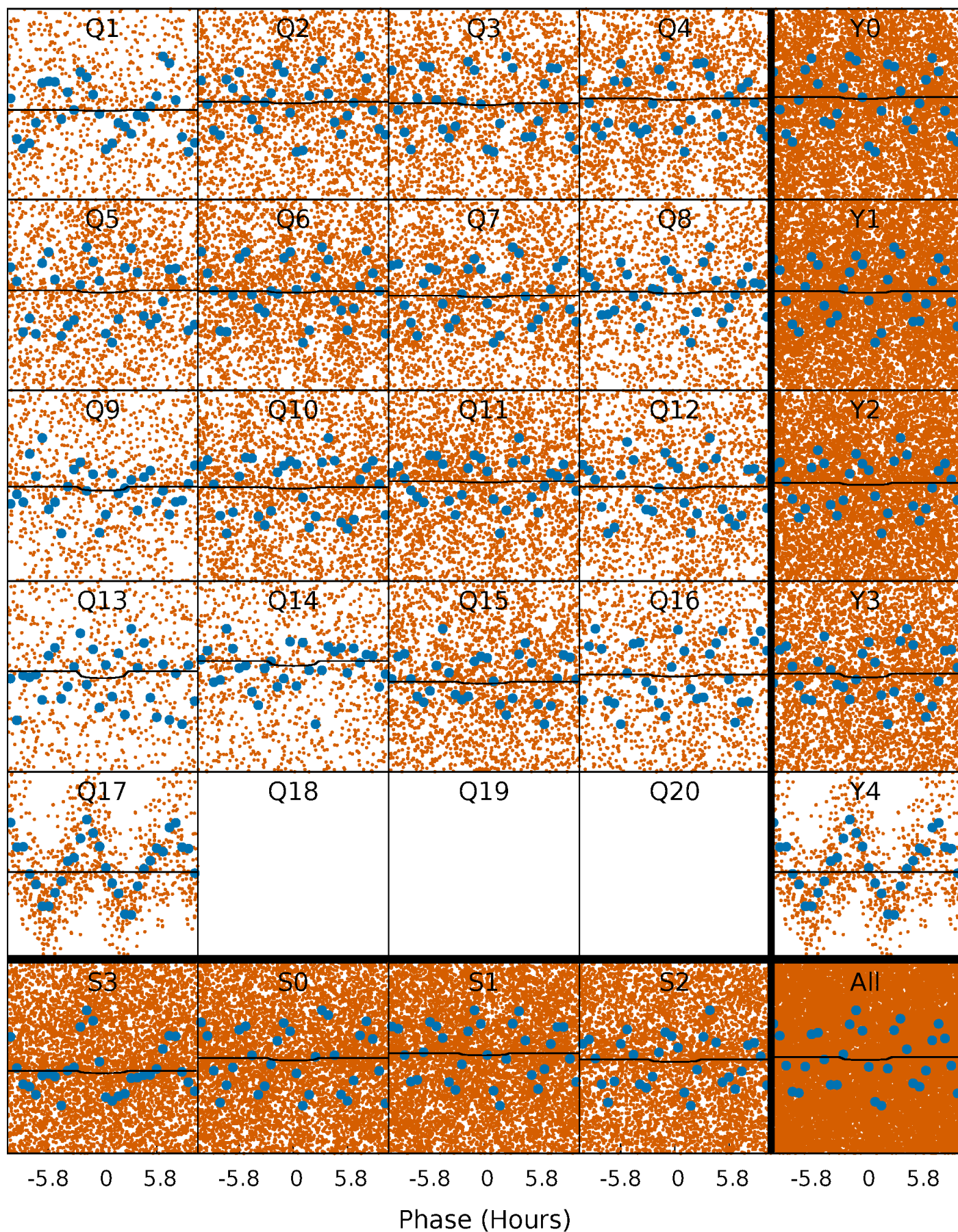
PDC Quarter-Phased Transit Curves

TCE 010470294-02 P= 0.734397 Days $T_0=132.131578$ (BKJD)



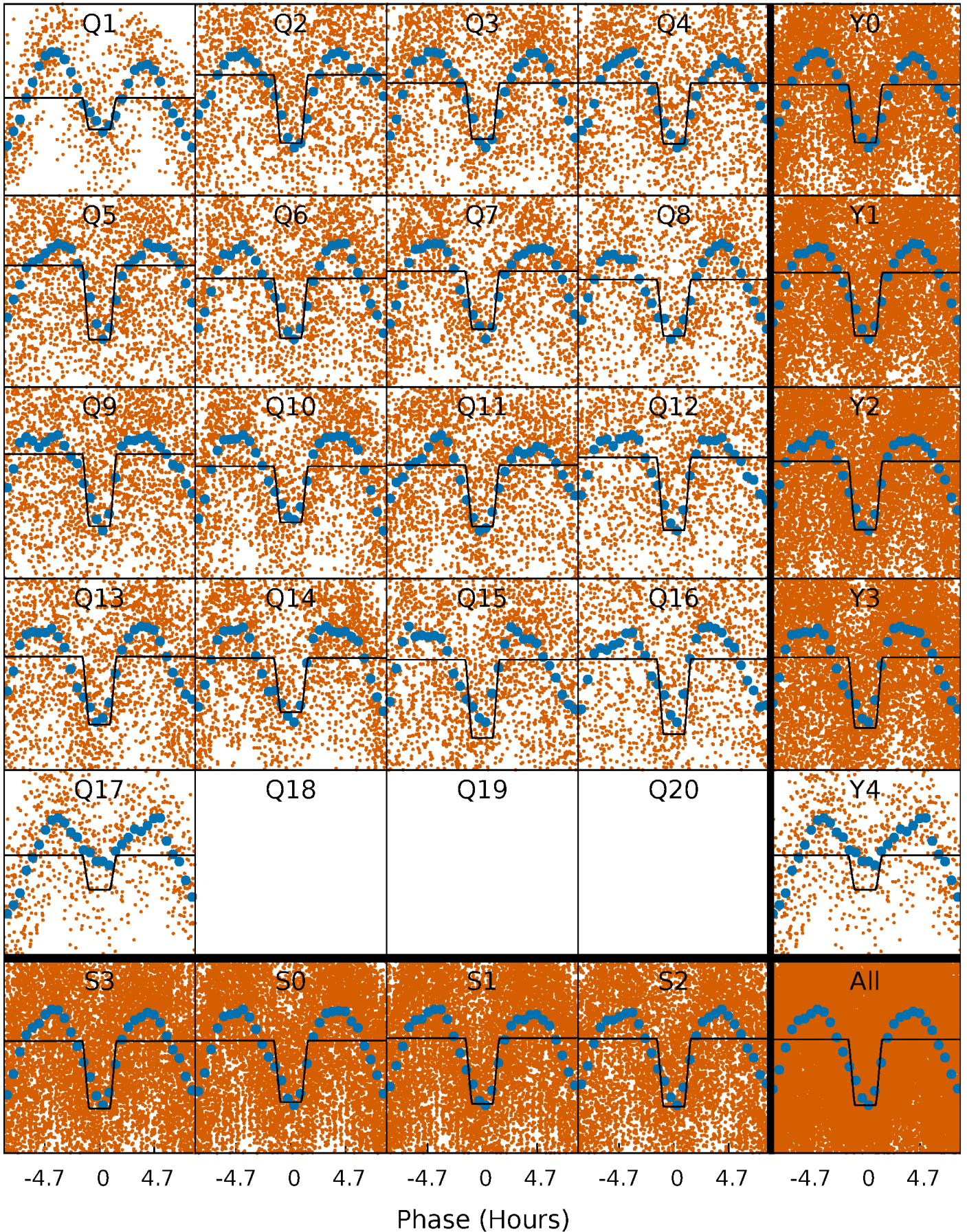
DV Quarter-Phased Transit Curves

TCE 010470294-02 $P = 0.734397$ Days $T_0 = 132.131578$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

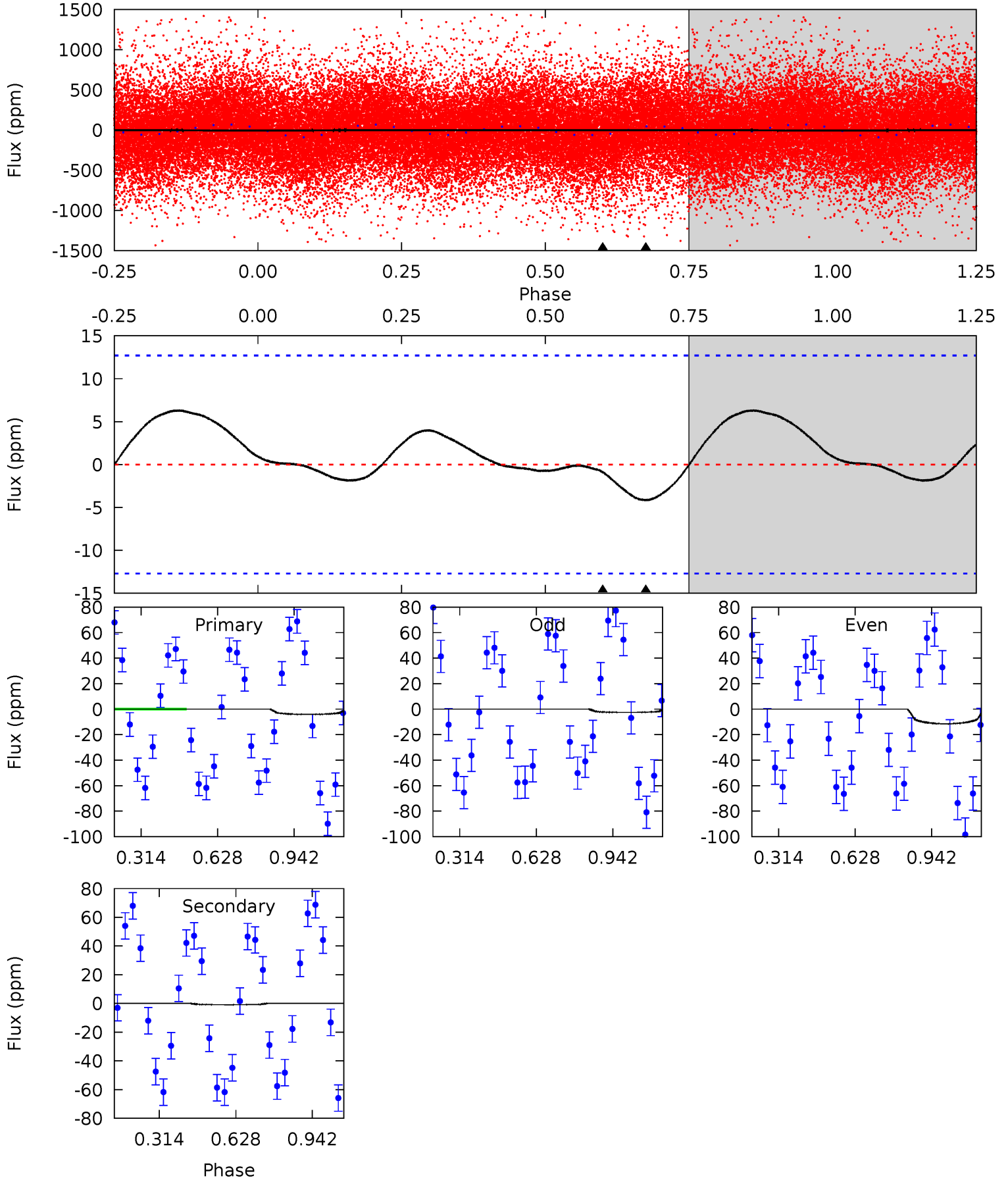
TCE 010470294-02 $P = 0.734451$ Days $T_0 = 132.133712$ (BKJD)



DV Model-Shift Uniqueness Test

010470294-02, P = 0.734397 Days, E = 131.397181 Days

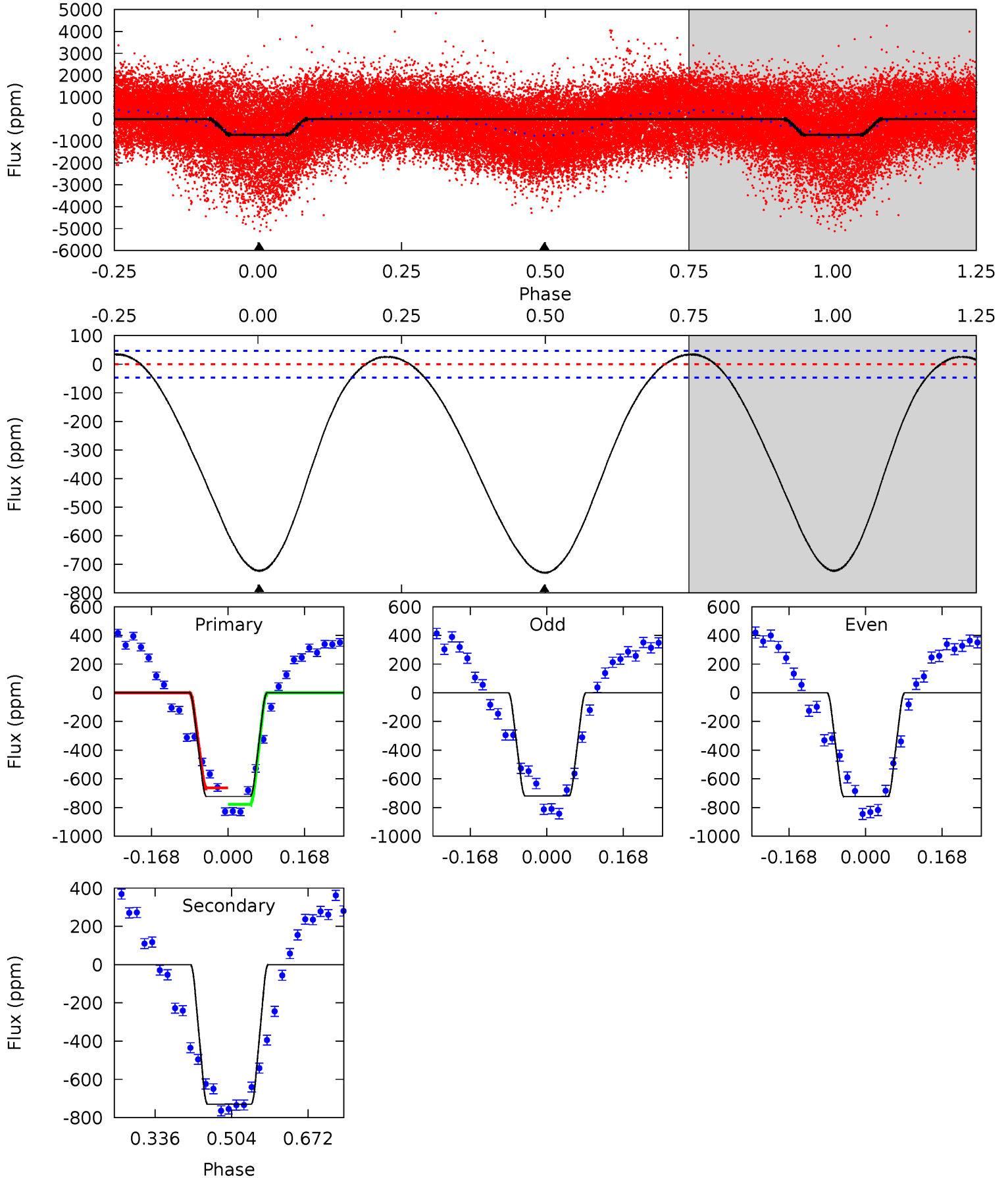
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.41	0.30	0	0	4.32	1.01	0.53	1.41	1.41	0.30	0.30	1.53	-2.18	0.60	1.29



Alt Model-Shift Uniqueness Test

010470294-02, P = 0.734451 Days, E = 131.399261 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
68.6	69.2	0	0	4.45	1.38	4.43	68.6	68.6	69.2	69.2	0.21	1.20	0.04	5.53



Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1 ± 3	$2.06^{+2.13}_{-1.43}$	5961^{+400}_{-795}	-4759^{+8506}_{-629}	$0.021^{+0.365}_{-0.161}$
Alt.	-730 ± 11	$10.77^{+3.41}_{-3.54}$	5964^{+366}_{-759}	6419^{+1270}_{-940}	$1.317^{+1.499}_{-0.541}$

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

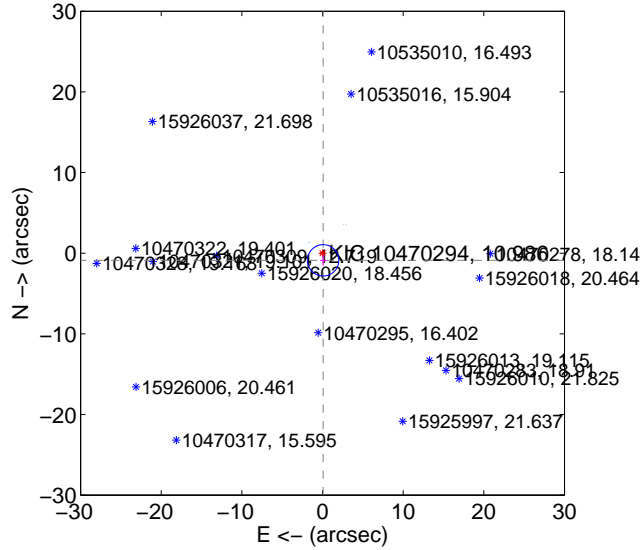
Supplemental centroid analysis for 010470294-02. **Kepler magnitude: 10.99.** Transit SNR 1.16

There are 11 quarters with good PRF difference image offsets

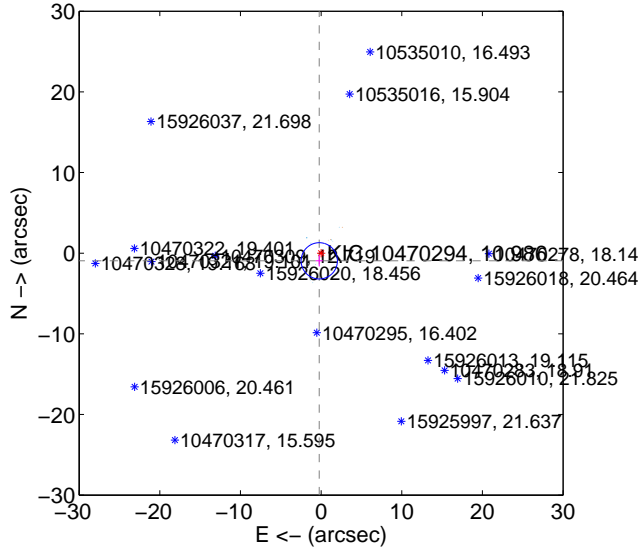
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.892 ± 0.648	1.38	-0.079 ± 0.385	-0.888 ± 0.650
PRF-fit source offset from KIC position	0.978 ± 0.749	1.30	0.228 ± 0.429	-0.951 ± 0.684
photometric centroid source offset	—	—	—	—

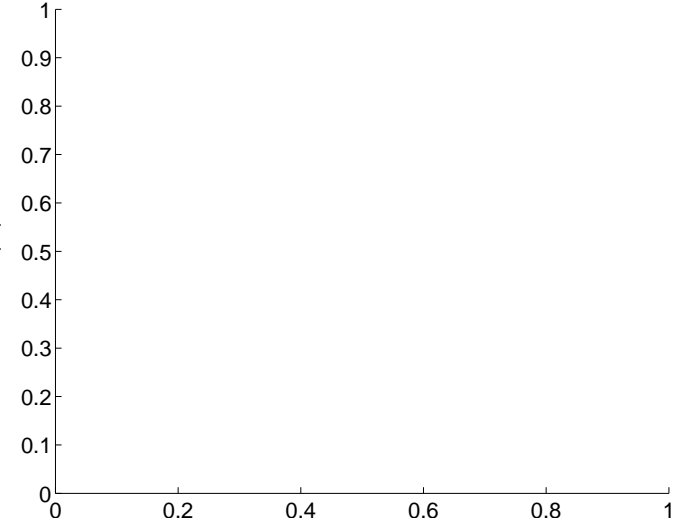
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

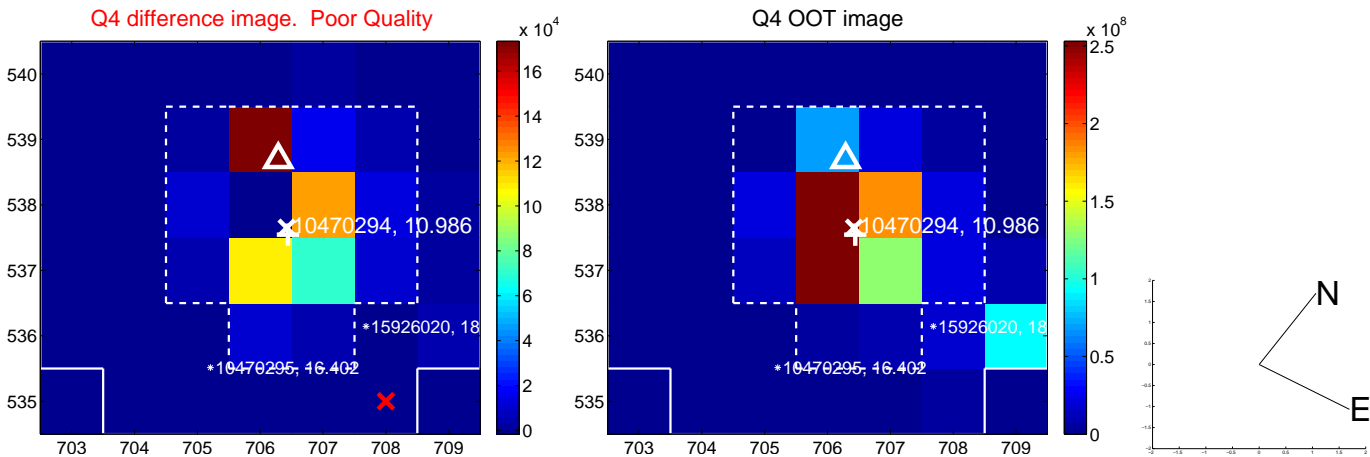
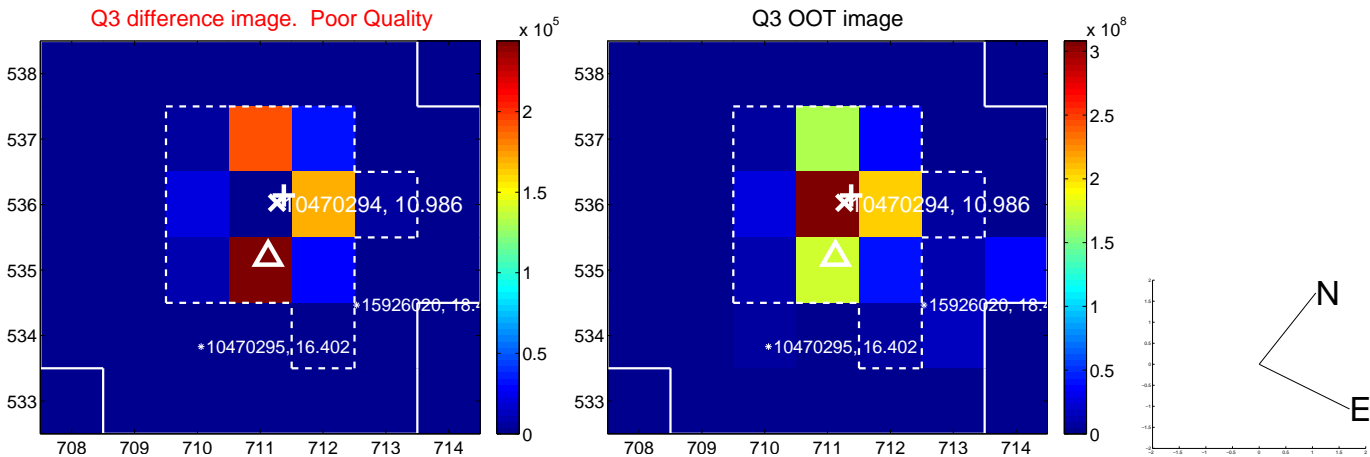
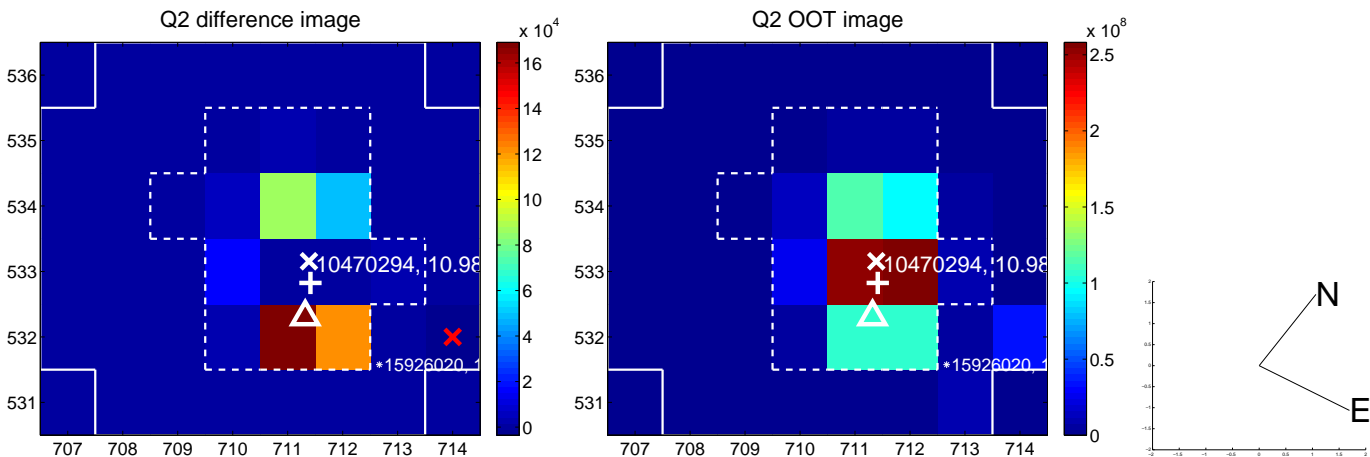
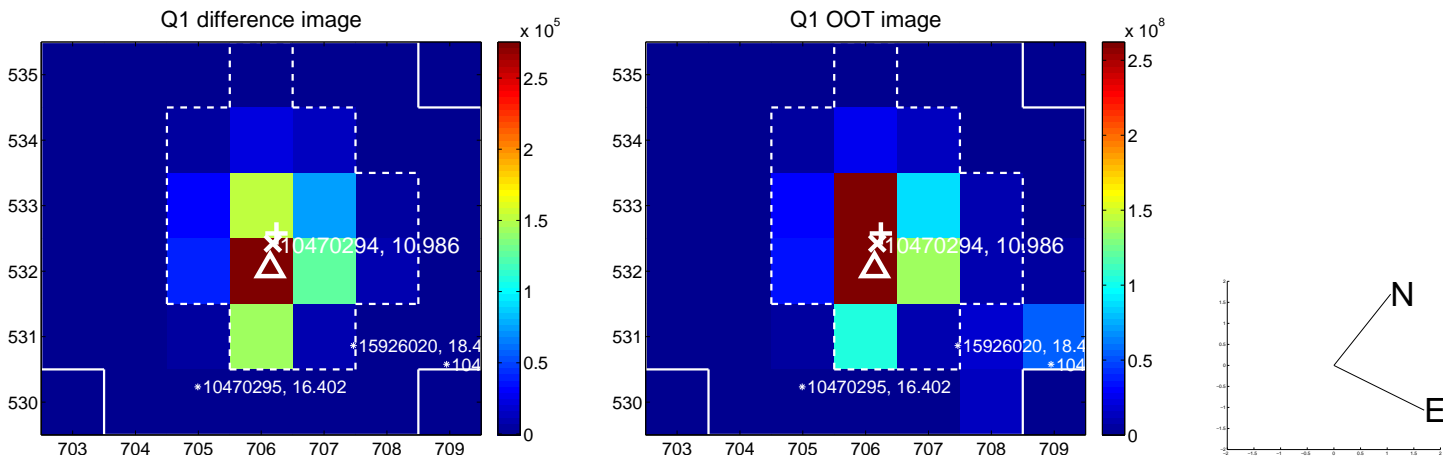


There are no photometric centroids

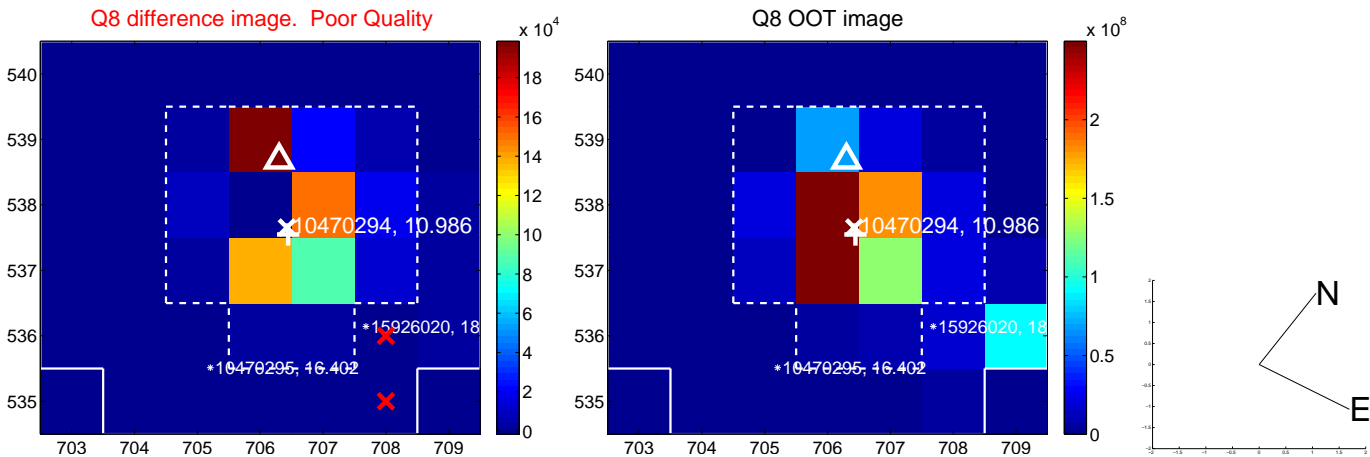
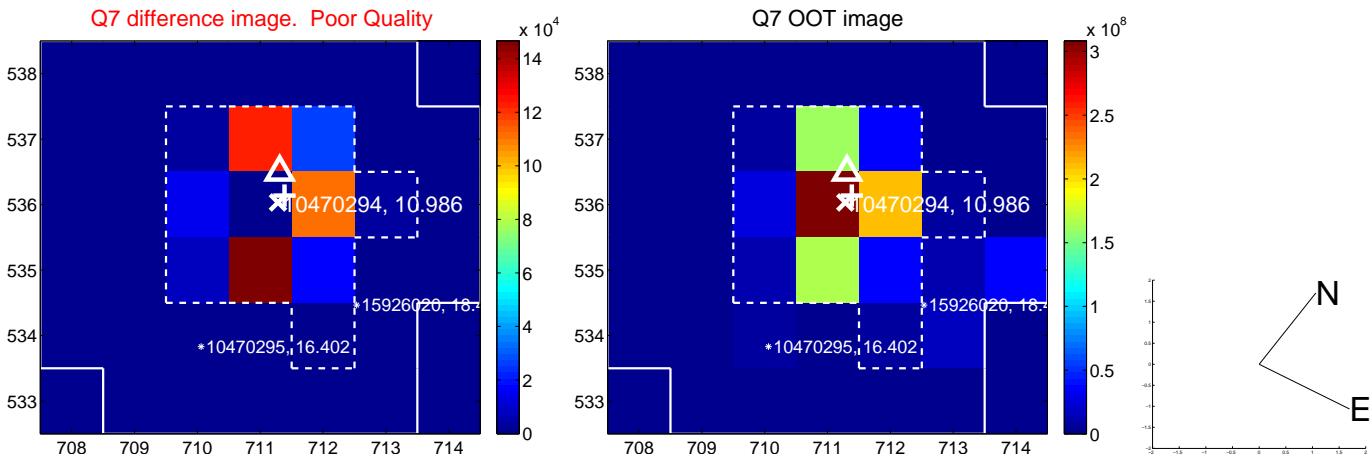
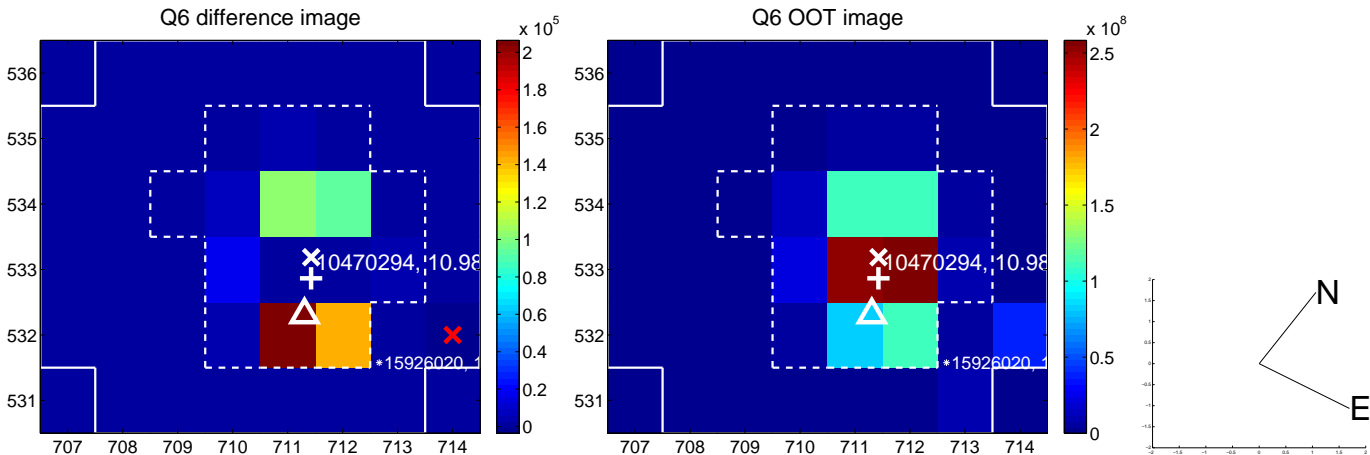
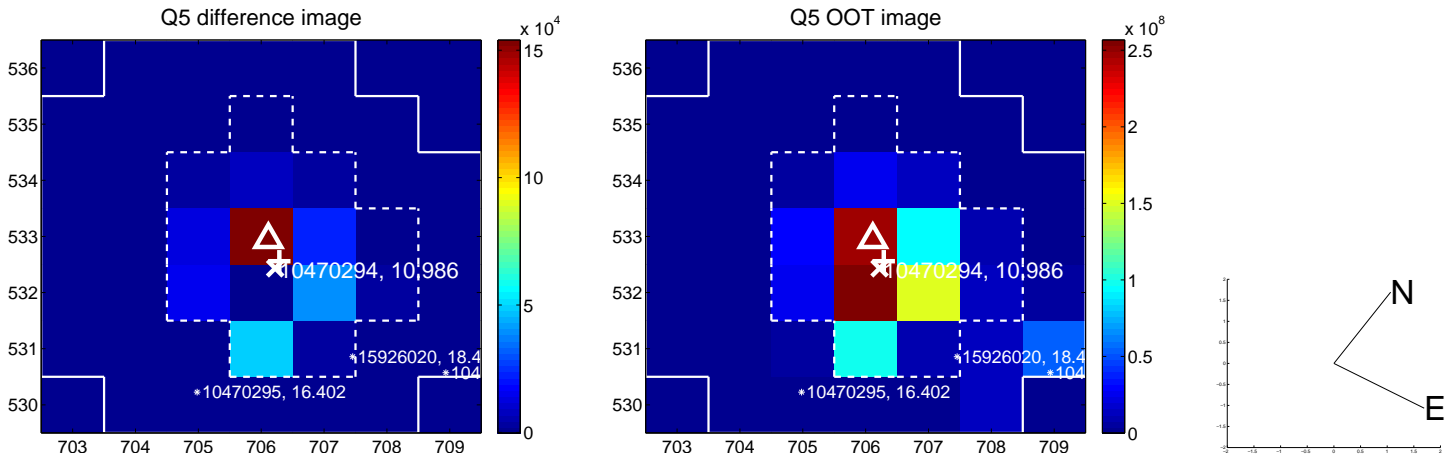


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

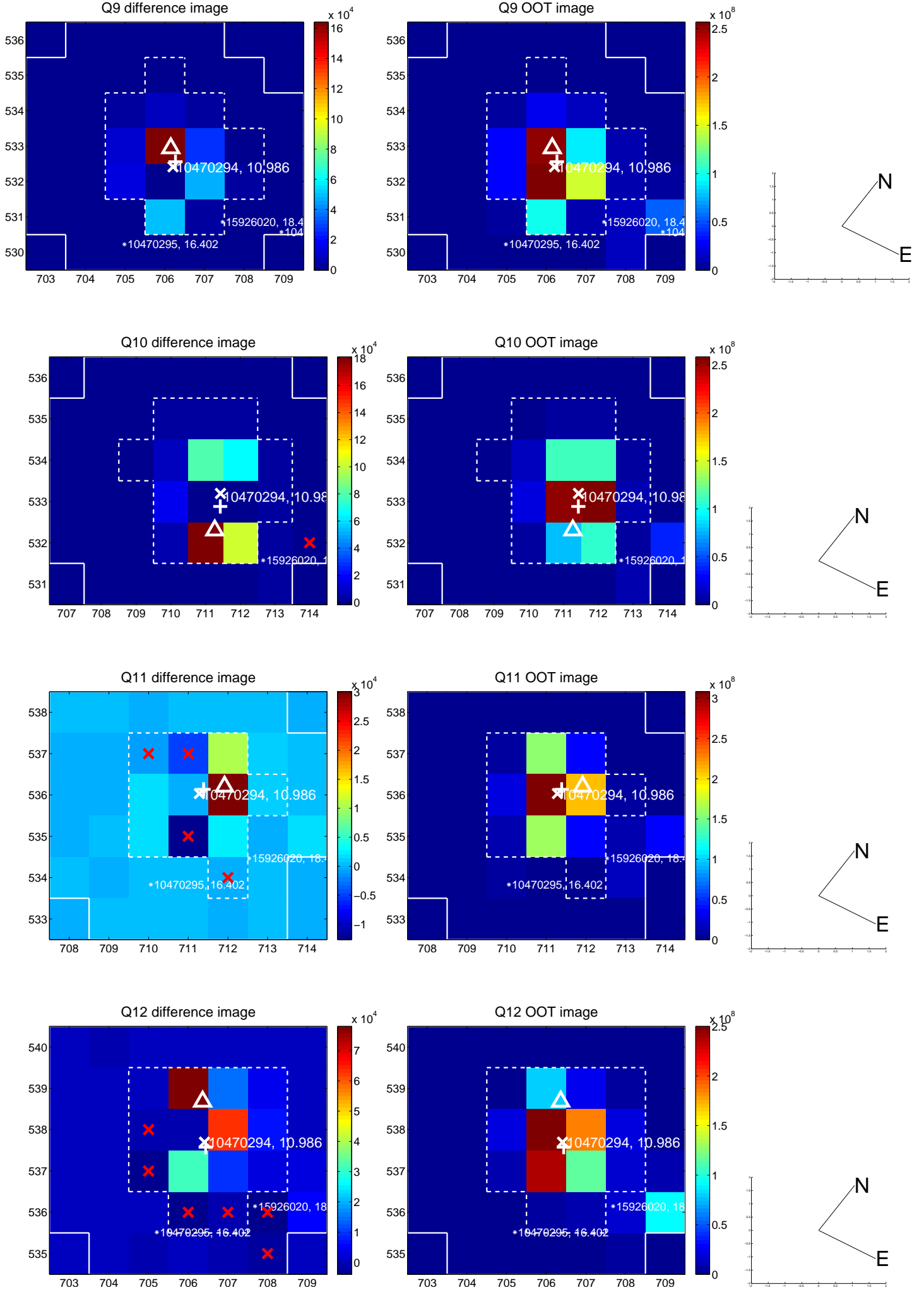
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



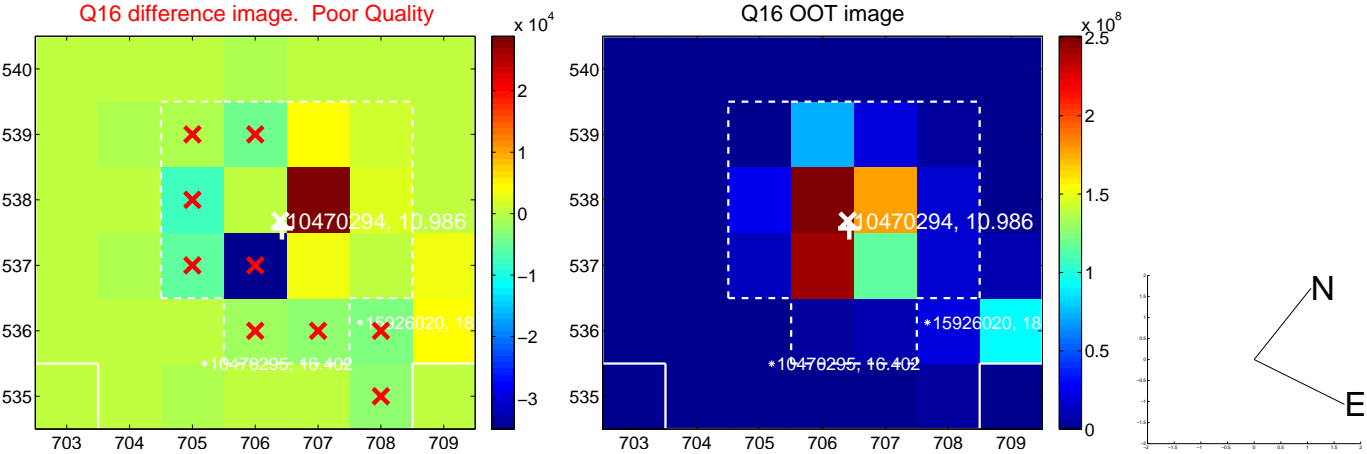
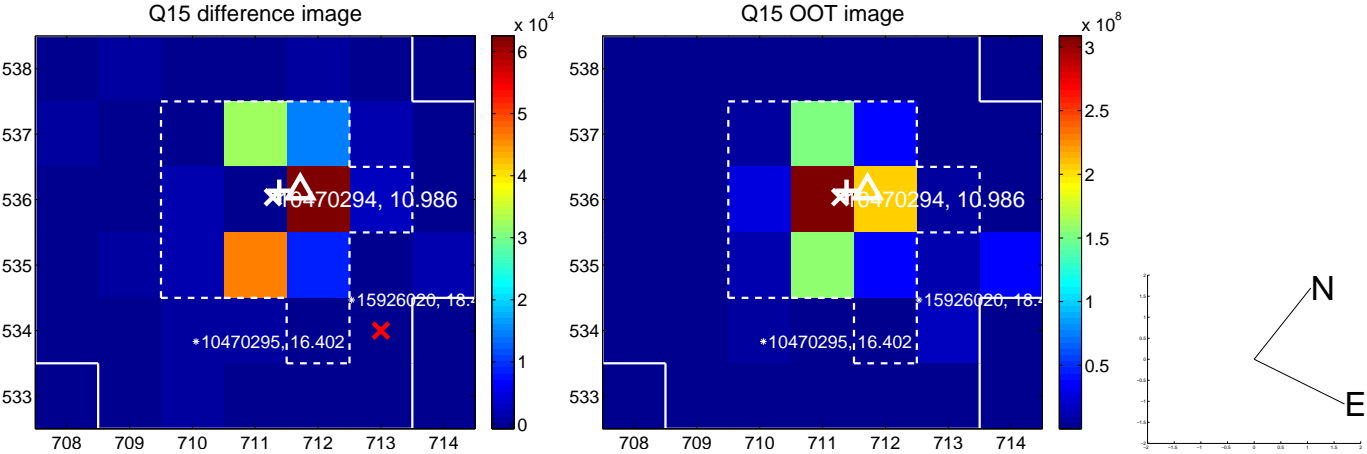
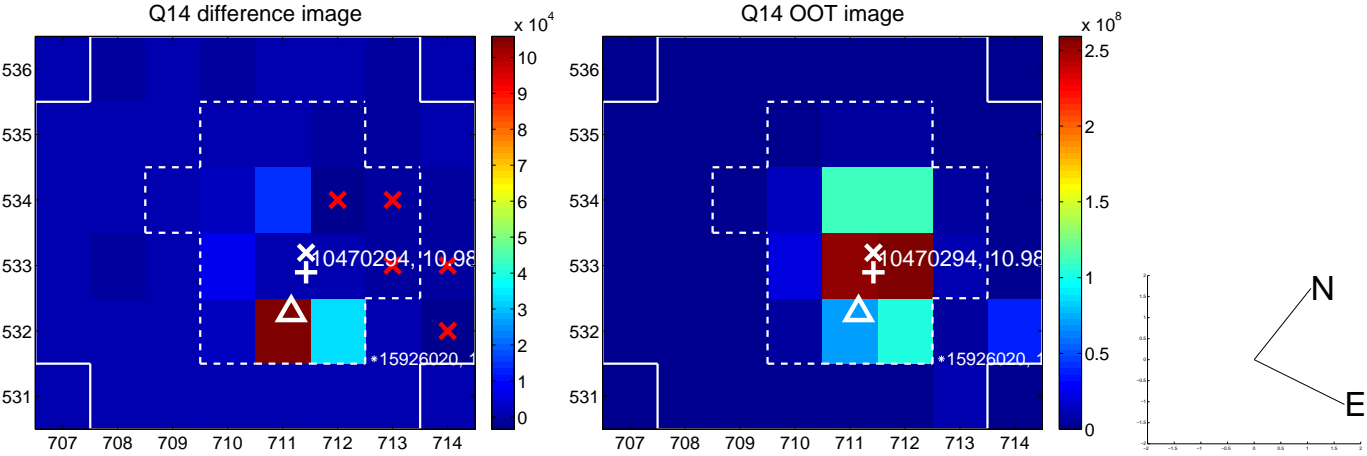
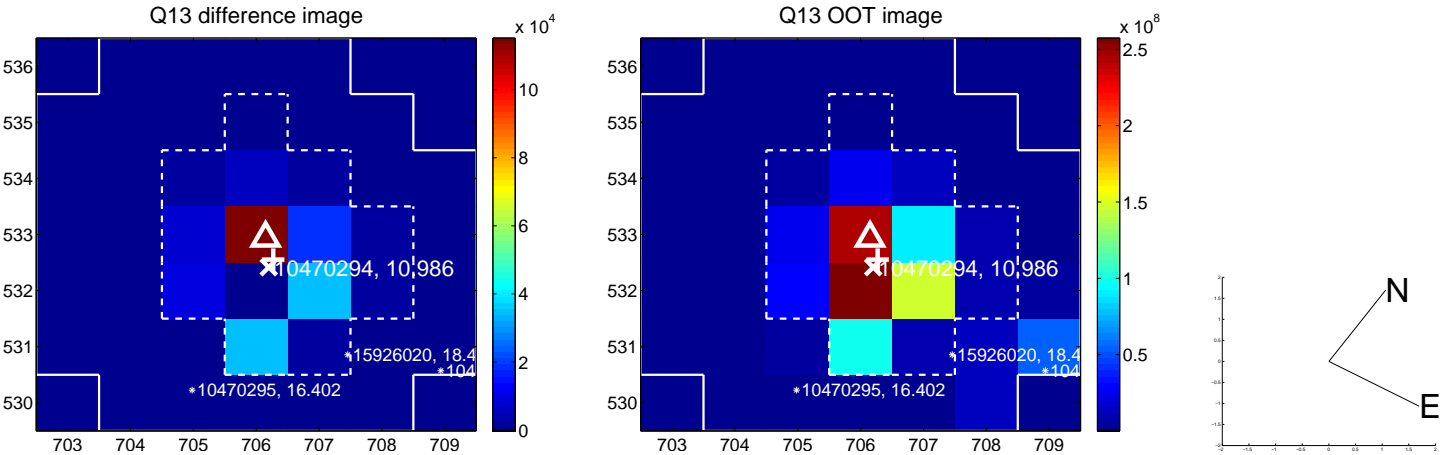
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



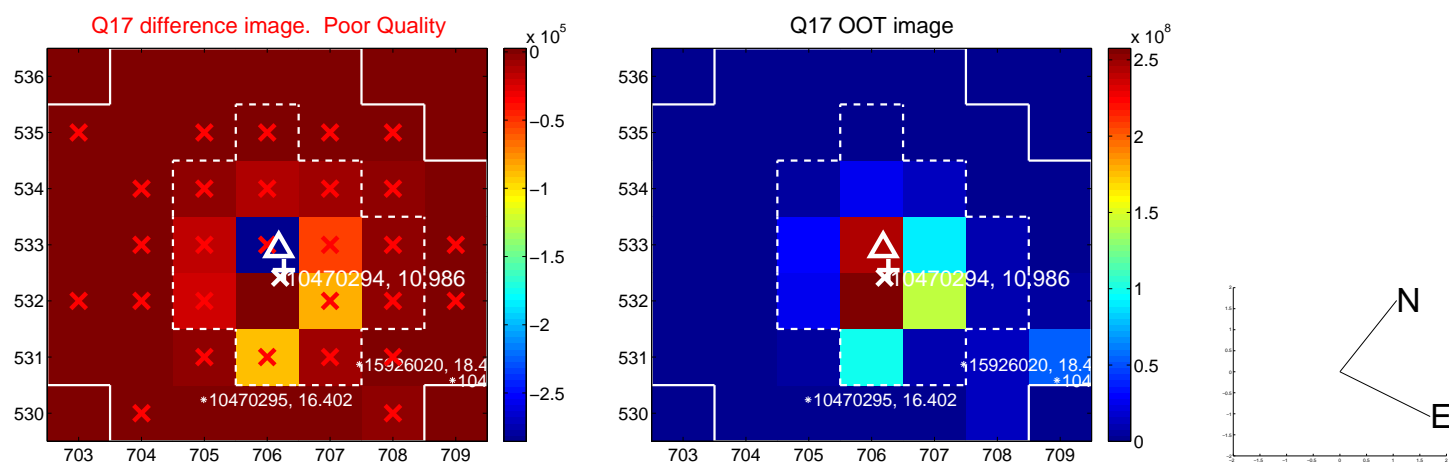
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

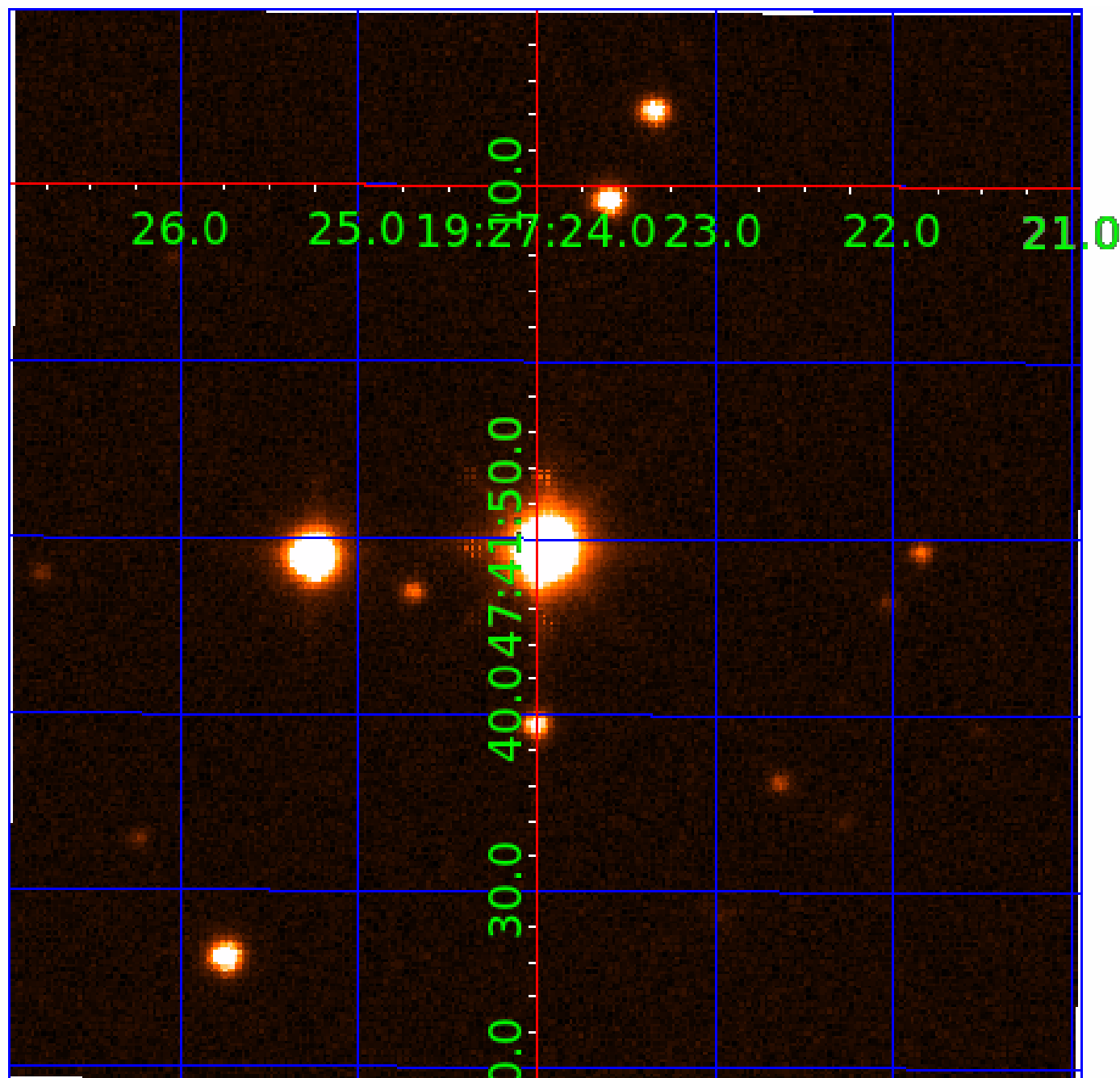


folded centroid time series figure for this object.



UKIRT Image

Declination



KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
010470294-05	OBS	No	36.620359	149.395812	784.4	1.620	15.3	11.6	3.67	7186	10.35	464.21
010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

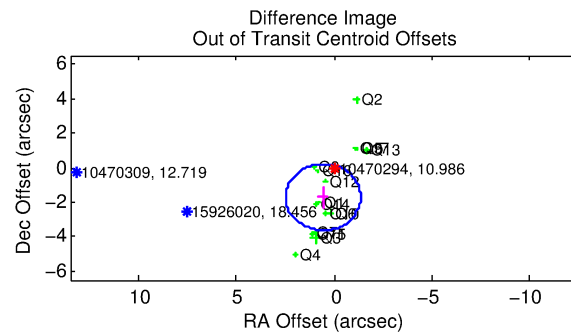
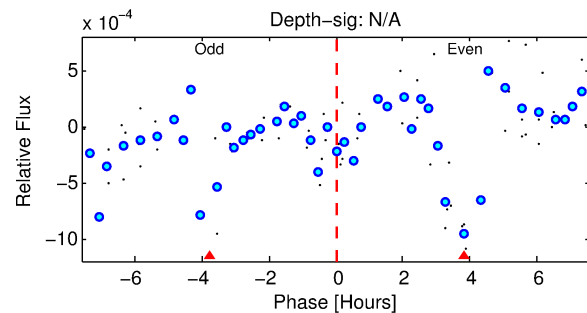
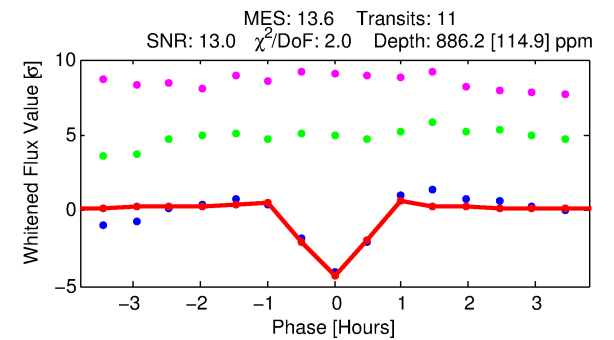
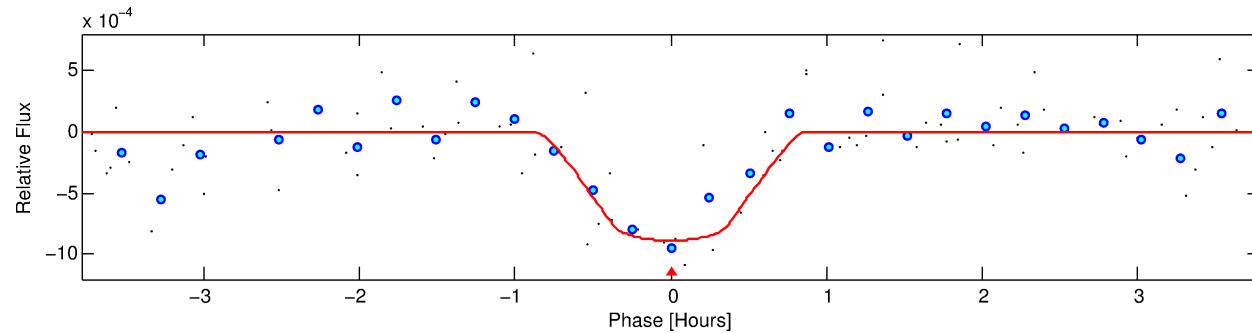
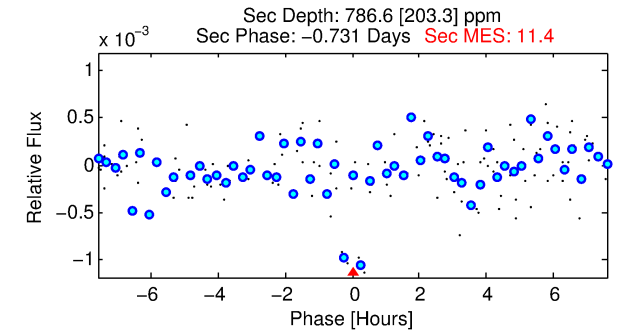
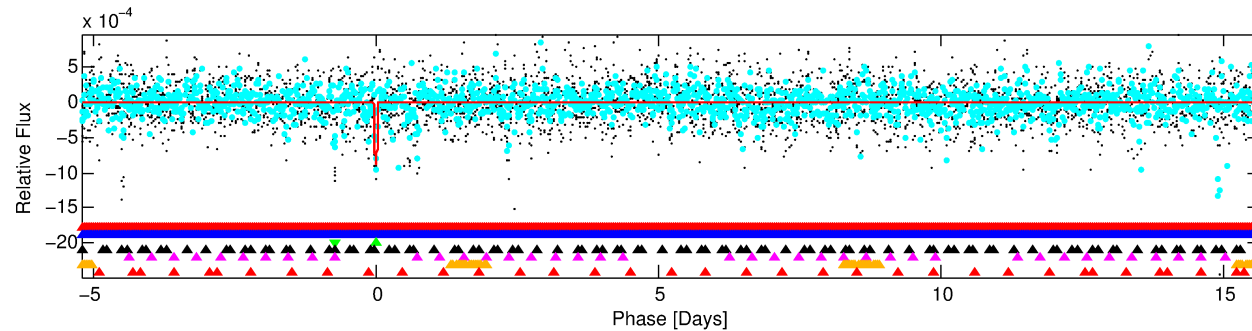
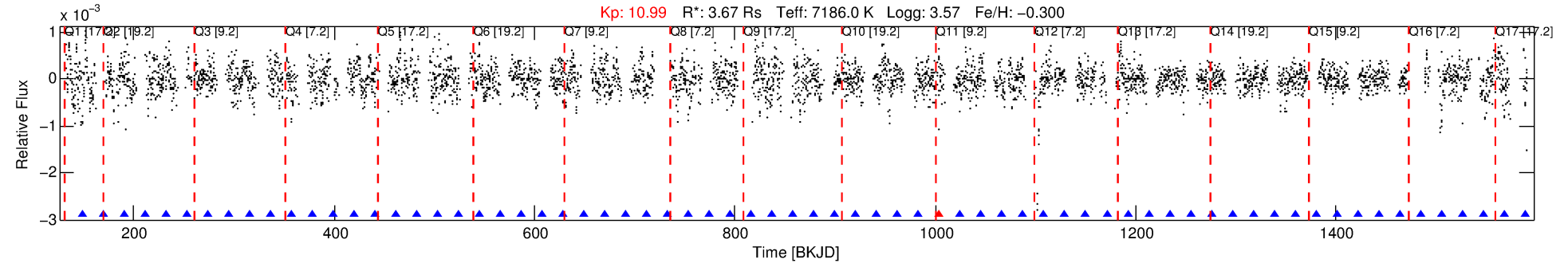
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-03

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 3 of 7 Period: 20.868 d



DV Fit Results:

Period = 20.86789 [0.00010] d
Epoch = 148.6654 [0.0043] BKJD
 $R_p/R^* = 0.0293$ [0.0576]
 $a/R^* = 95.51$ [952.59]
 $b = 0.70$ [7.44]
 $S_{\text{eff}} = 982.60$ [941.78]
 $T_{\text{eq}} = 1428$ [342] K
 $R_p = 11.76$ [24.12] R_e
 $a = 0.1812$ [0.1055] AU
 $A_g = 102.67$ [415.71] [0.24σ]
 $T_{\text{effp}} = 7026$ [6921] K [0.81σ]

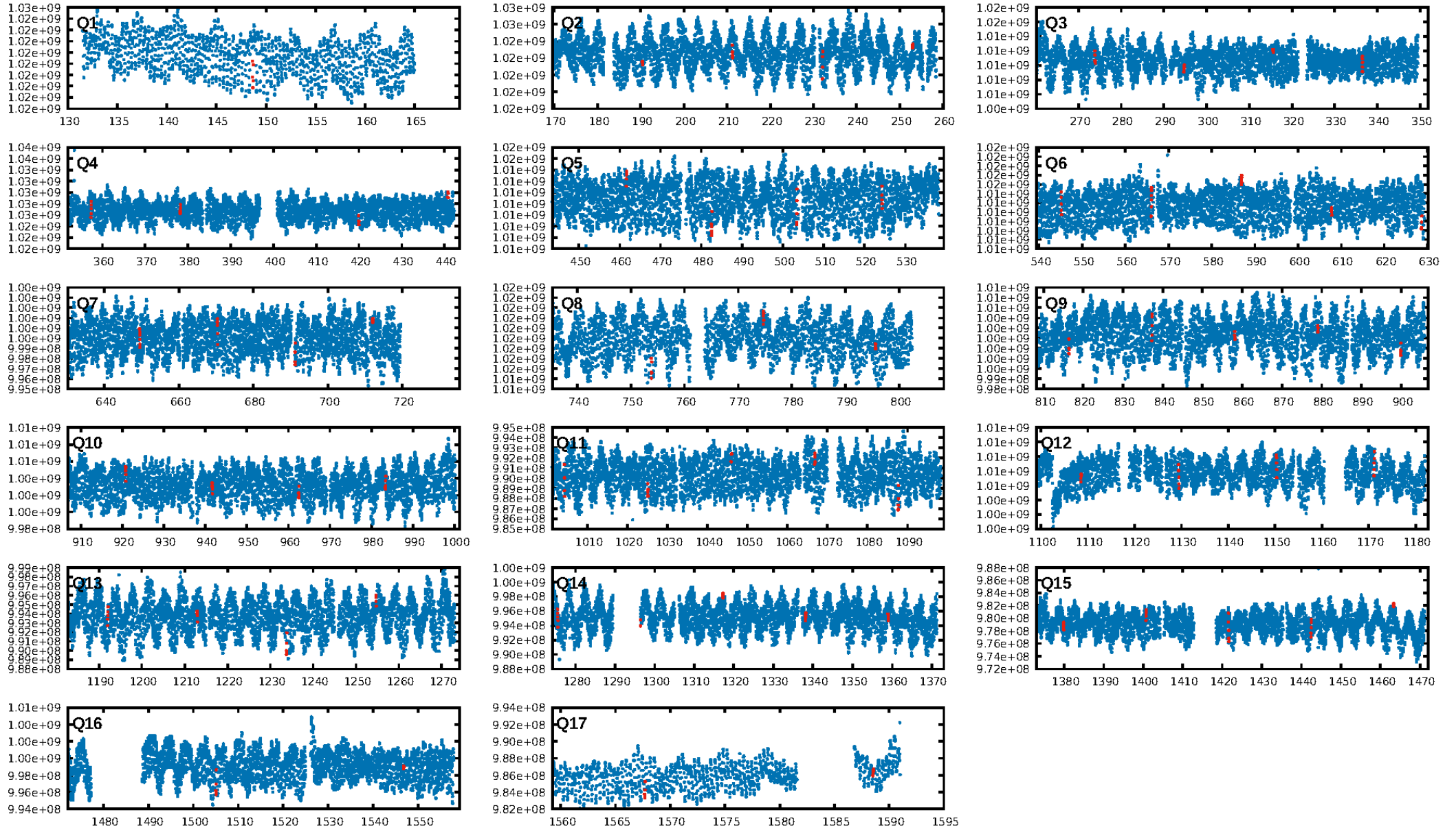
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [87.55σ]
LongPeriod-sig: 100.0% [64.10σ]
ModelChiSquare2-sig: 19.2%
ModelChiSquareGof-sig: 96.7%
Bootstrap-pfa: 7.35e-16
RollingBand-fgt: 0.90 [9/10]
GhostDiagnostic-chr: -0.6371
Centroid-sig: 0.0%
Centroid-so: 1.011 arcsec [9.37σ]
OotOffset-rm: 1.804 arcsec [2.82σ]
KicOffset-rm: 1.464 arcsec [2.23σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.41 [7/17]
DiffImageOverlap-fno: 0.06 [1/17]

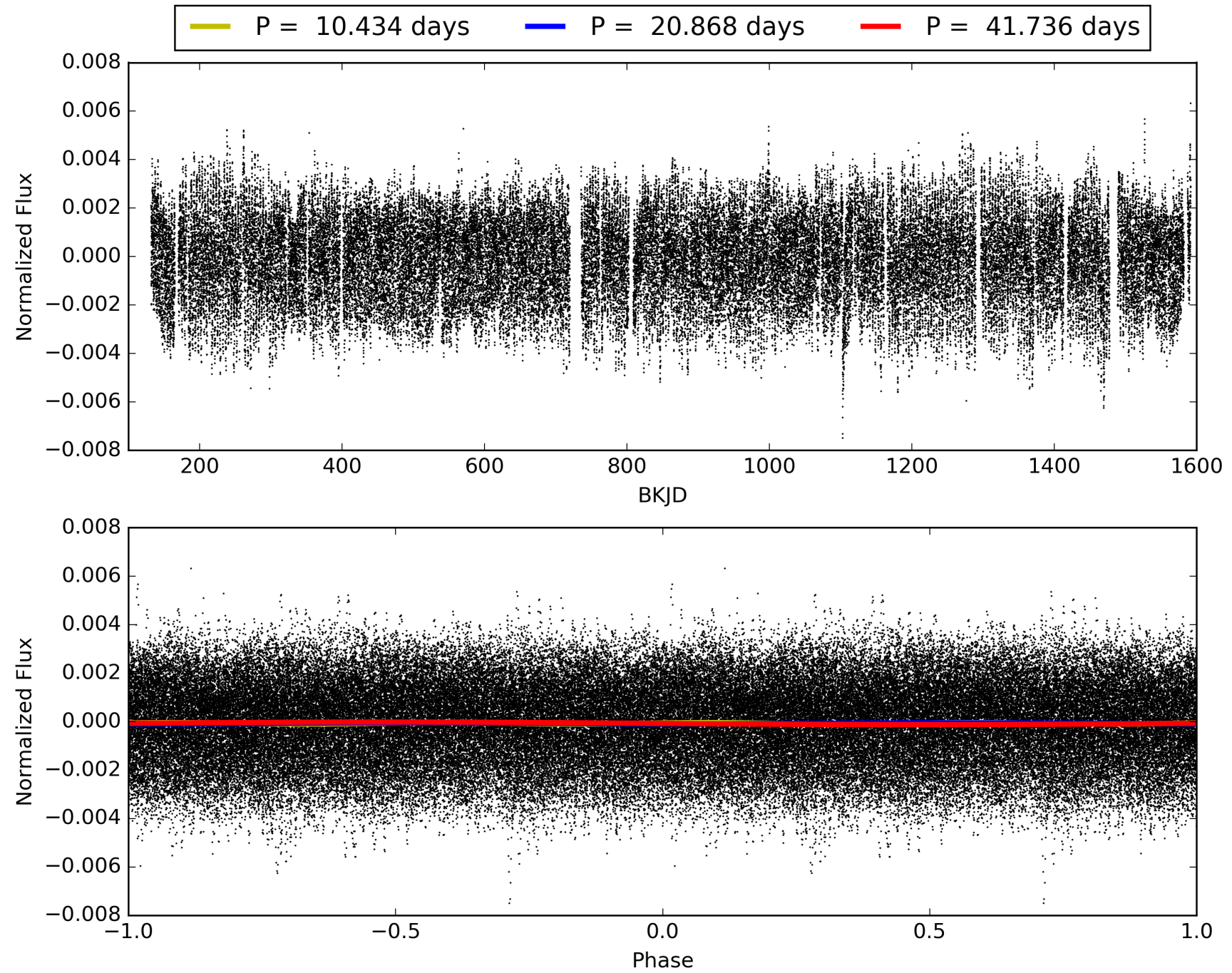
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:31 Z

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

TCE 010470294-03, PDC Light Curves

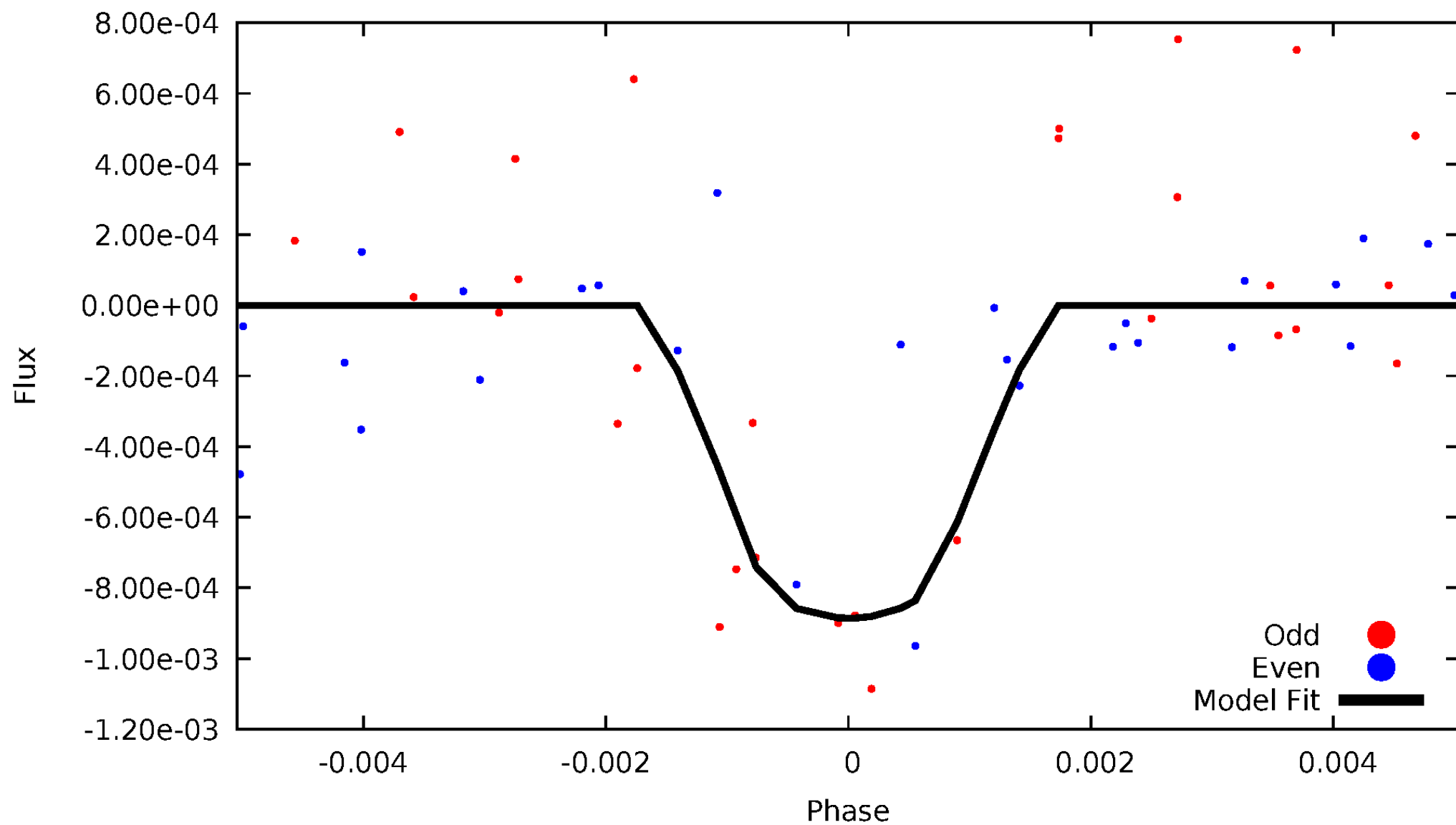


TCE 010470294-03



DV Odd/Even

TCE 010470294-03

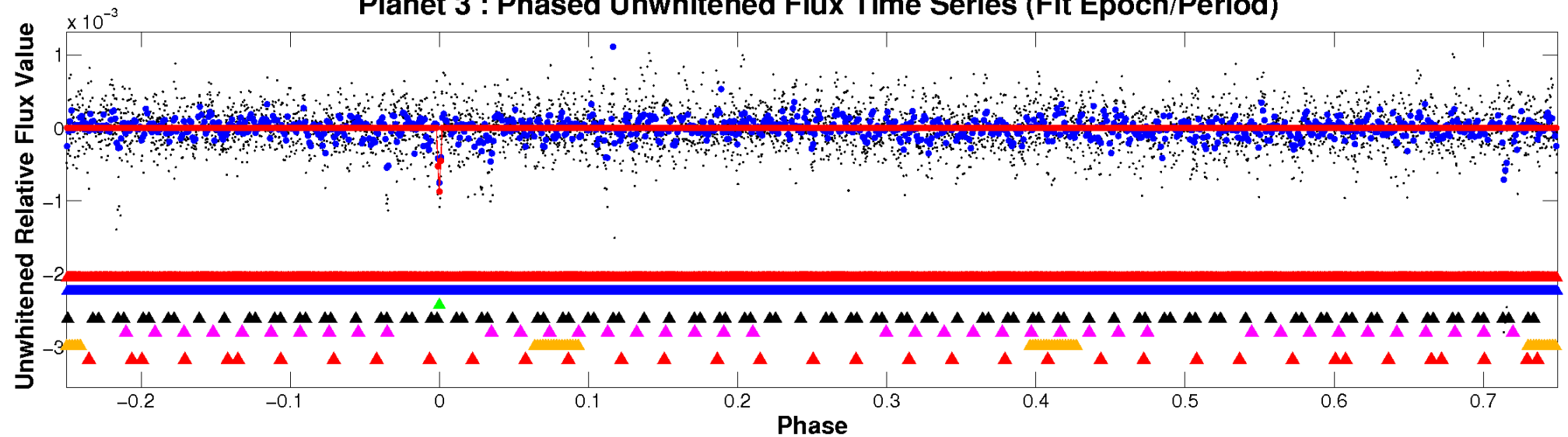


ALT Odd/Even

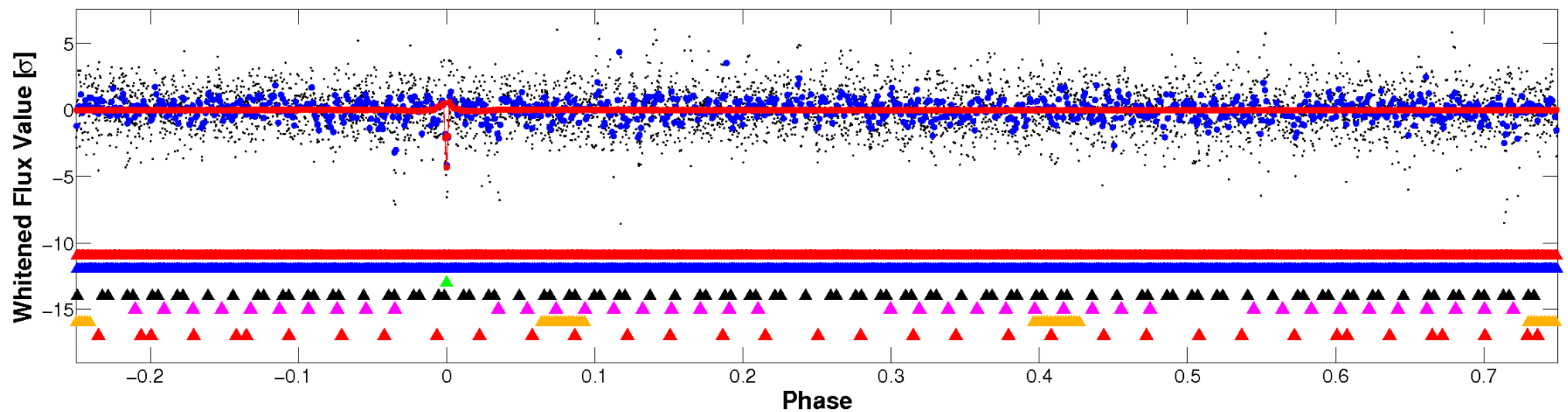
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

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

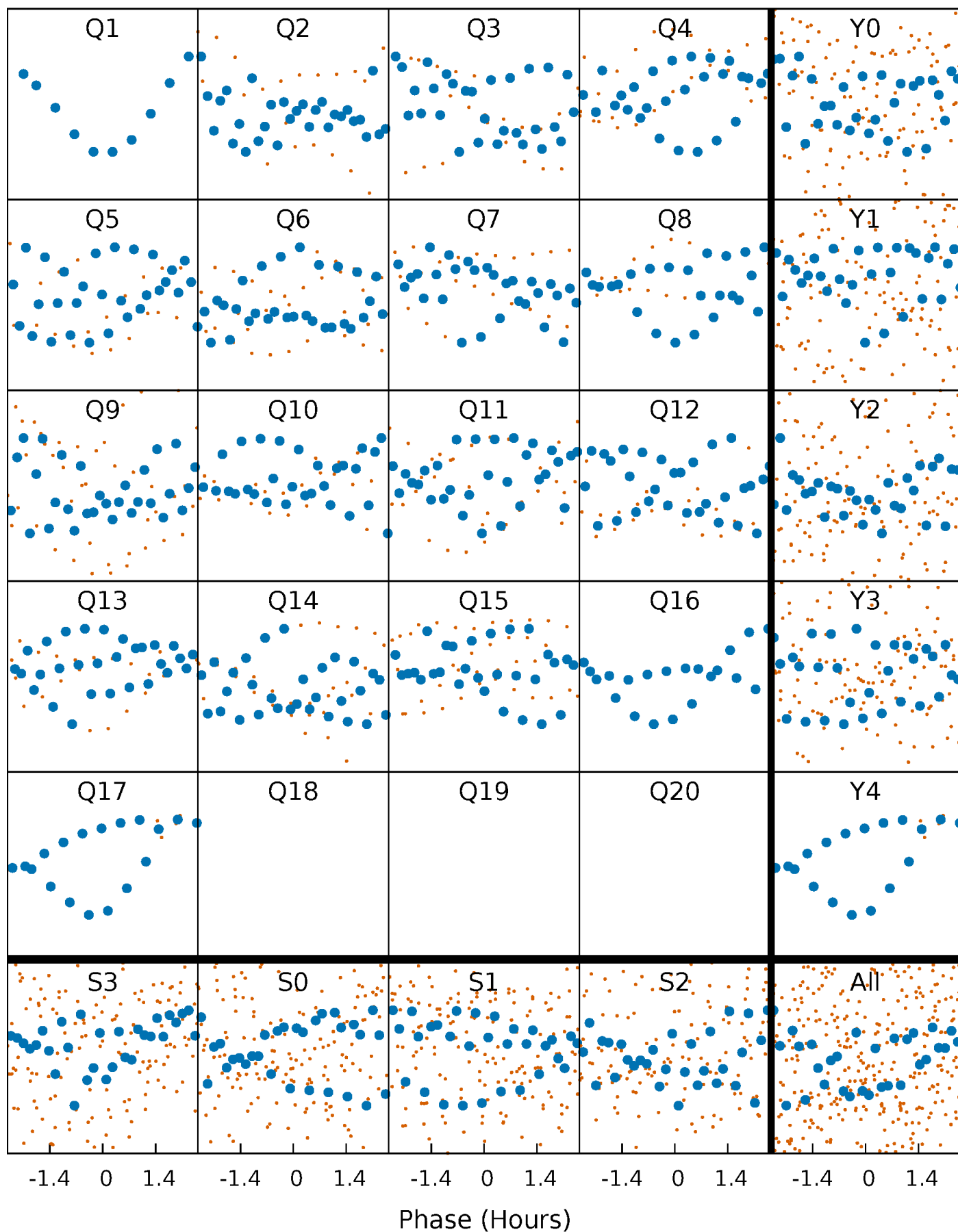


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



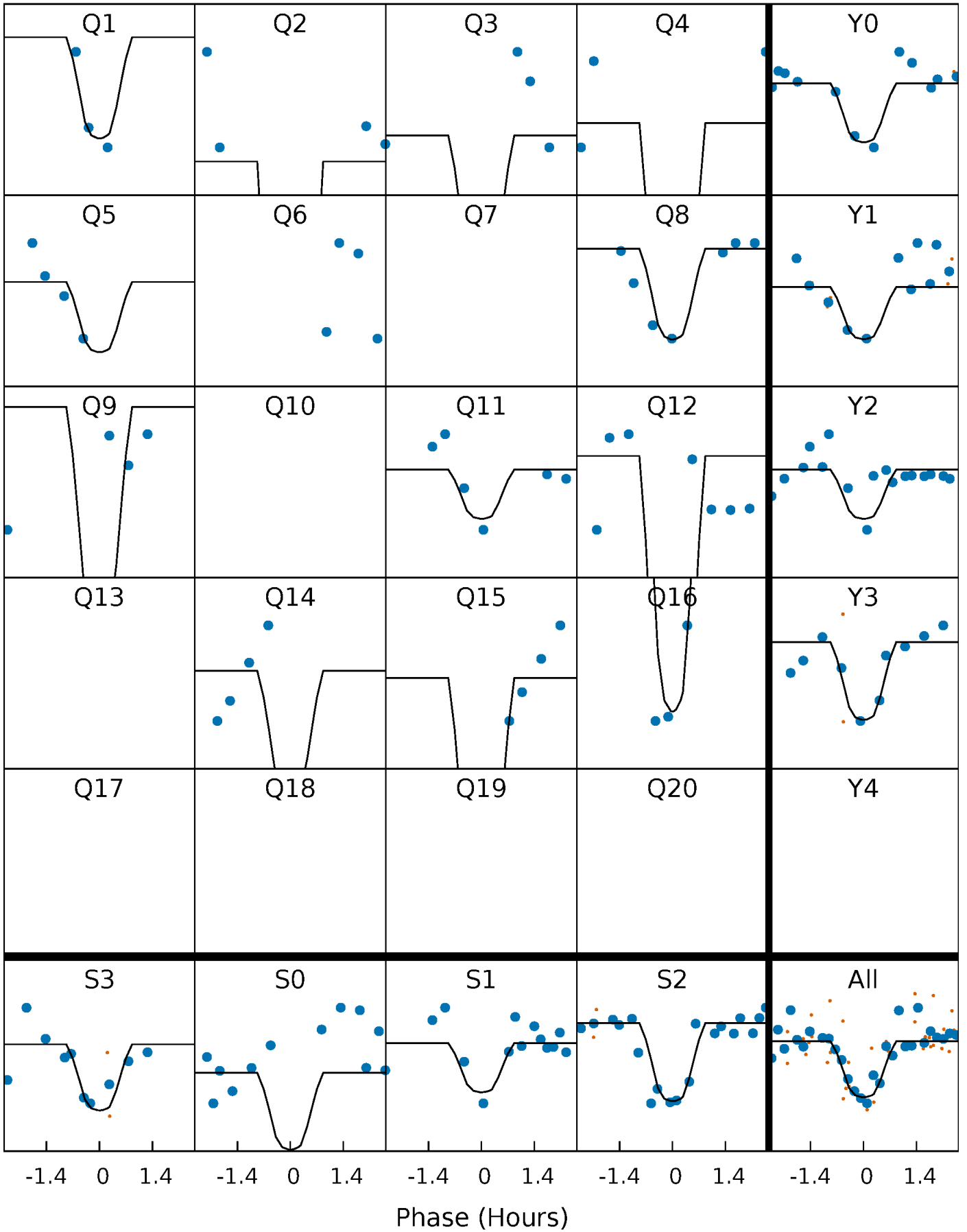
PDC Quarter-Phased Transit Curves

TCE 010470294-03 $P = 20.867890$ Days $T_0 = 148.665403$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 010470294-03 $P = 20.867890$ Days $T_0 = 148.665403$ (BKJD)

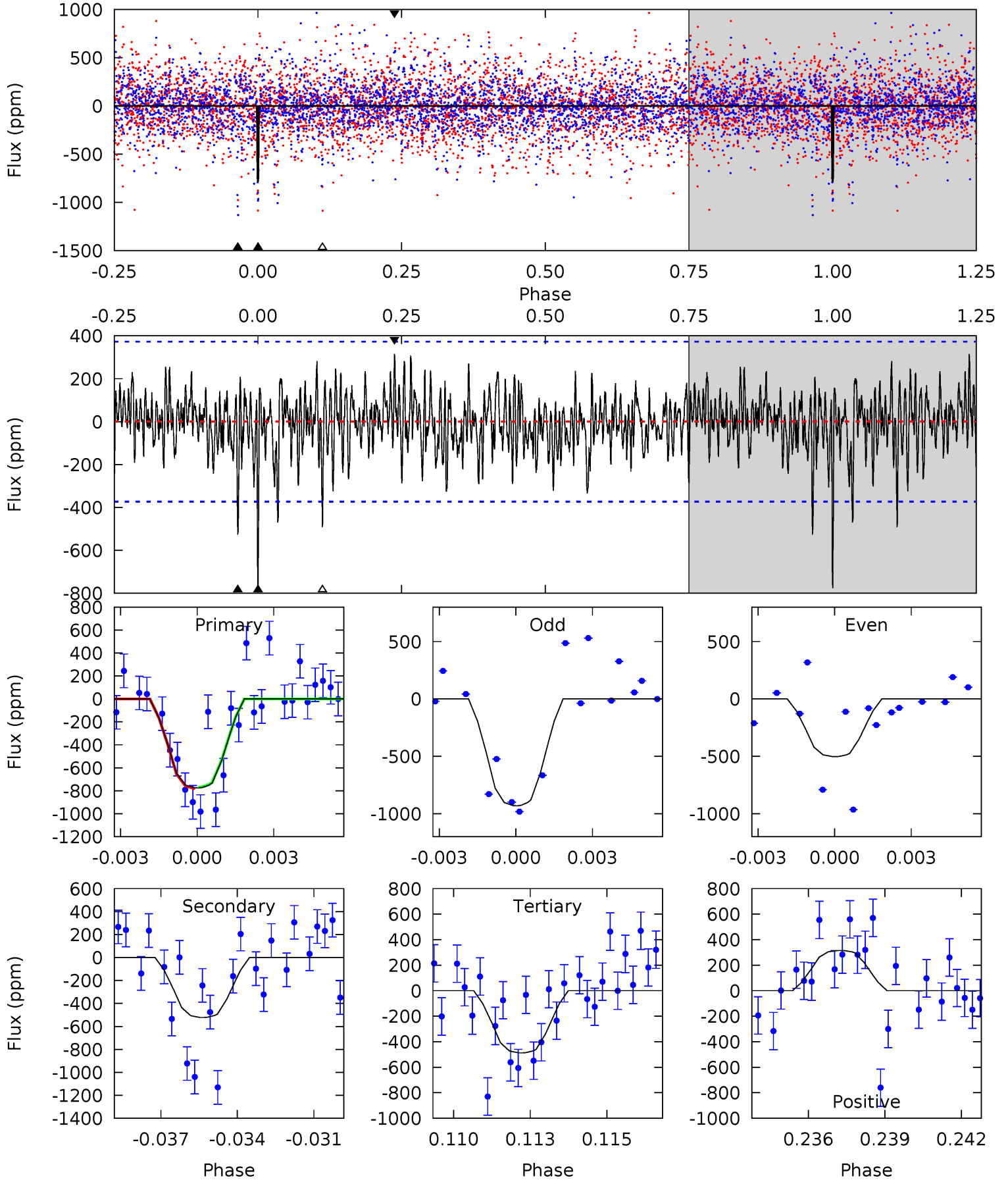


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

010470294-03, P = 20.867890 Days, E = 127.797513 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	7.38	6.89	4.45	5.26	2.99	1.60	4.07	6.51	0.50	2.94	3.01	0.86	0.29	0.08



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-523 ± 71	$16.85^{+20.40}_{-11.48}$	1950^{+129}_{-245}	5043^{+4180}_{-1295}	33^{+298}_{-26}
Alt.	N/A	N/A	N/A	N/A	N/A

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

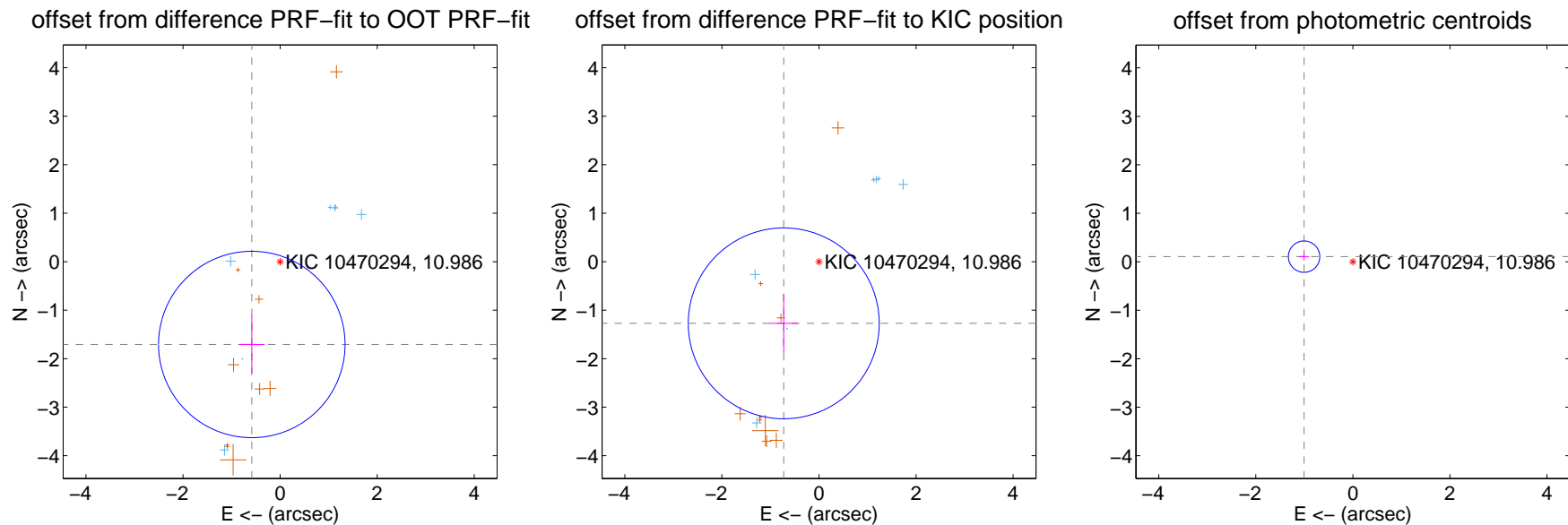
DV Centroid Data

Supplemental centroid analysis for 010470294-03. **Kepler magnitude: 10.99.** Transit SNR 12.96

There are 7 quarters with good PRF difference image offsets

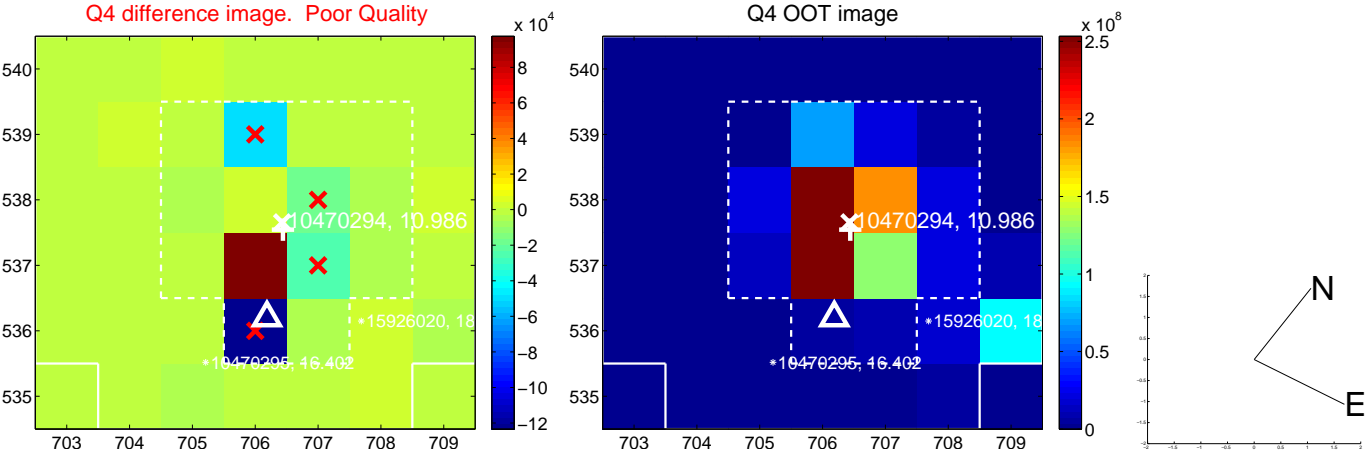
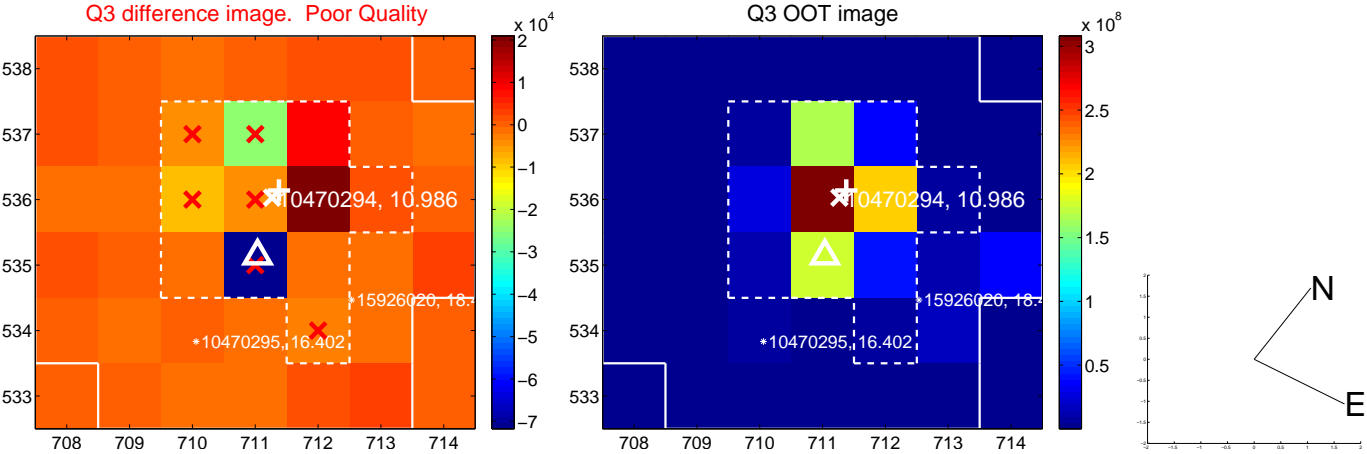
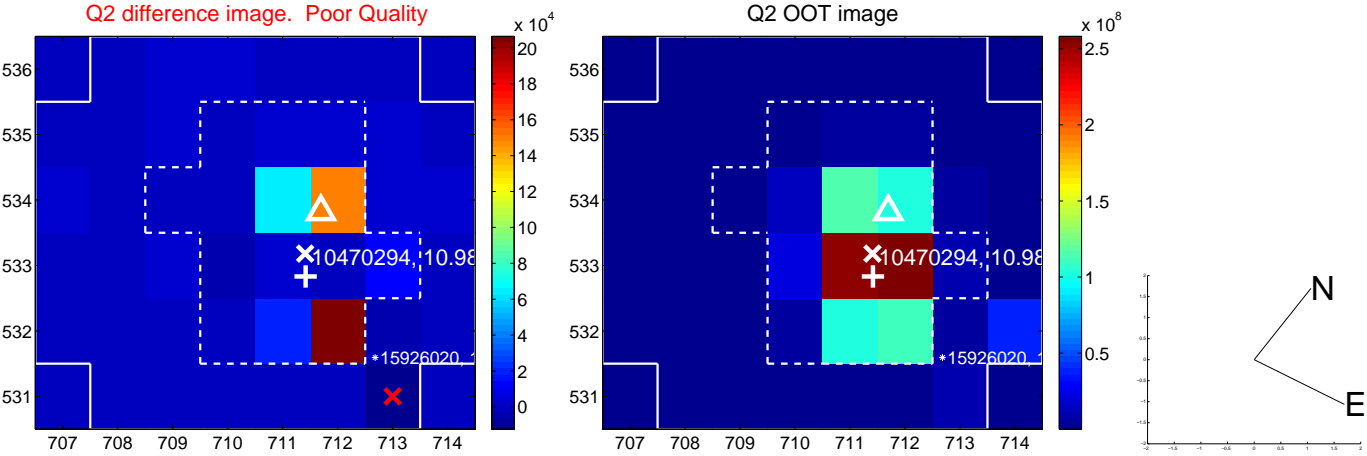
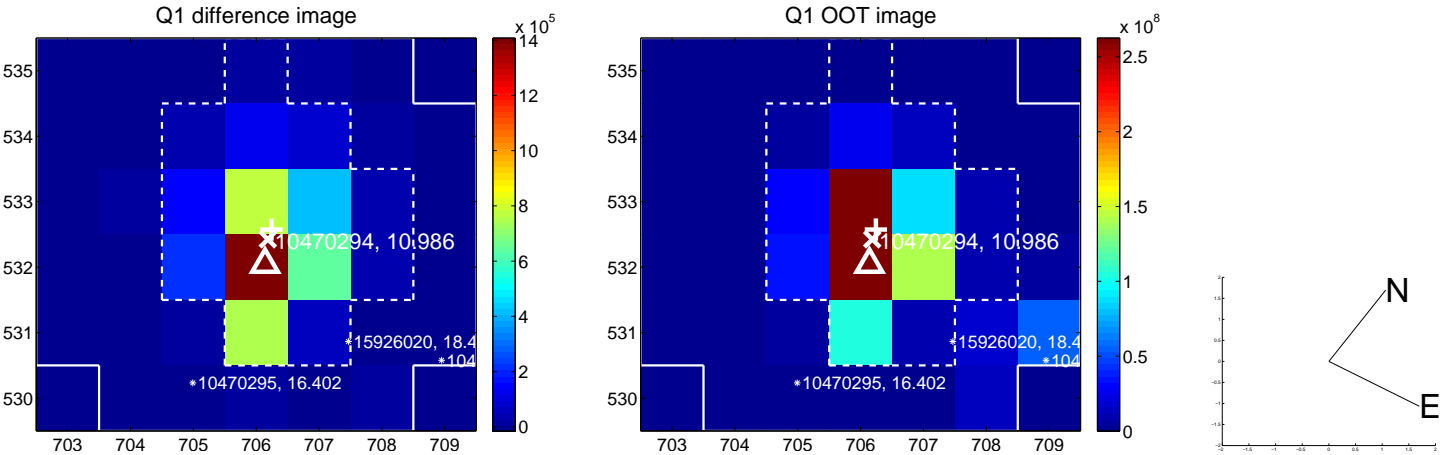
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.804 ± 0.641	2.82	0.584 ± 0.265	-1.707 ± 0.601
PRF-fit source offset from KIC position	1.464 ± 0.656	2.23	0.726 ± 0.291	-1.272 ± 0.610
photometric centroid source offset	1.01 ± 0.11	9.37	1.01 ± 0.11	0.11 ± 0.08

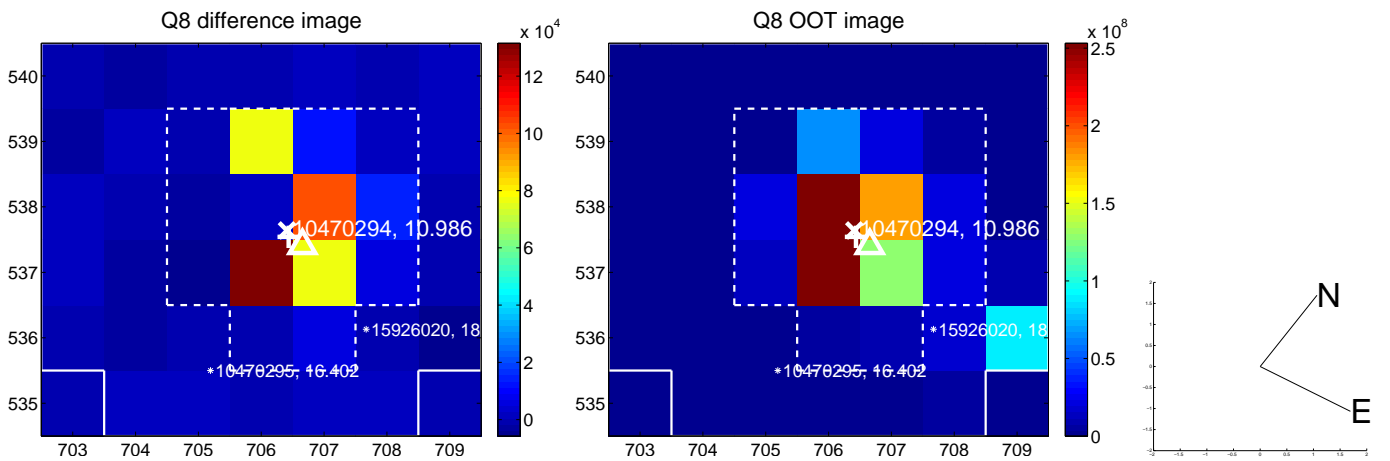
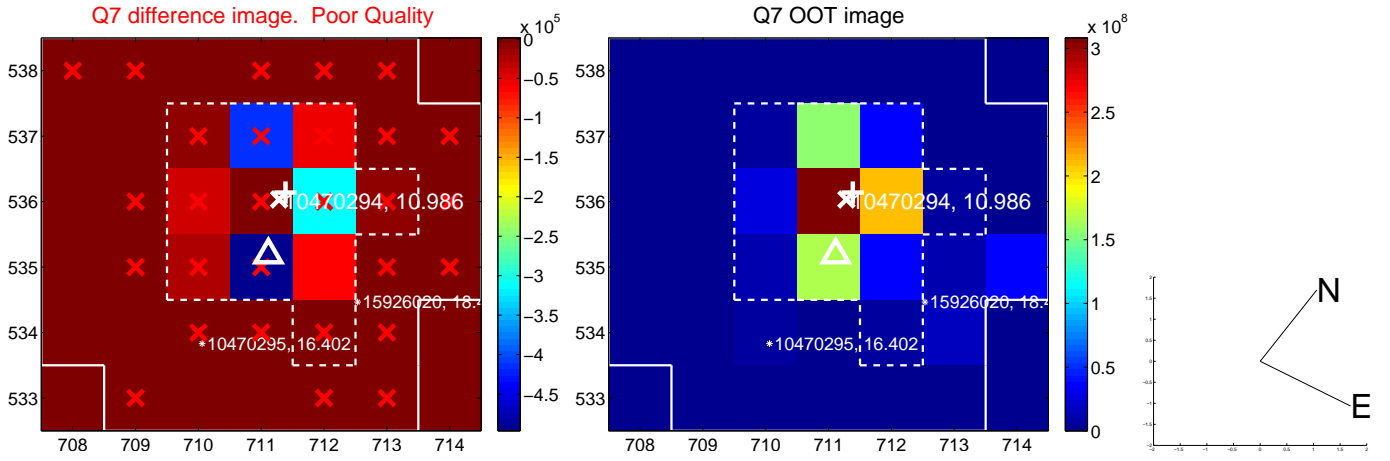
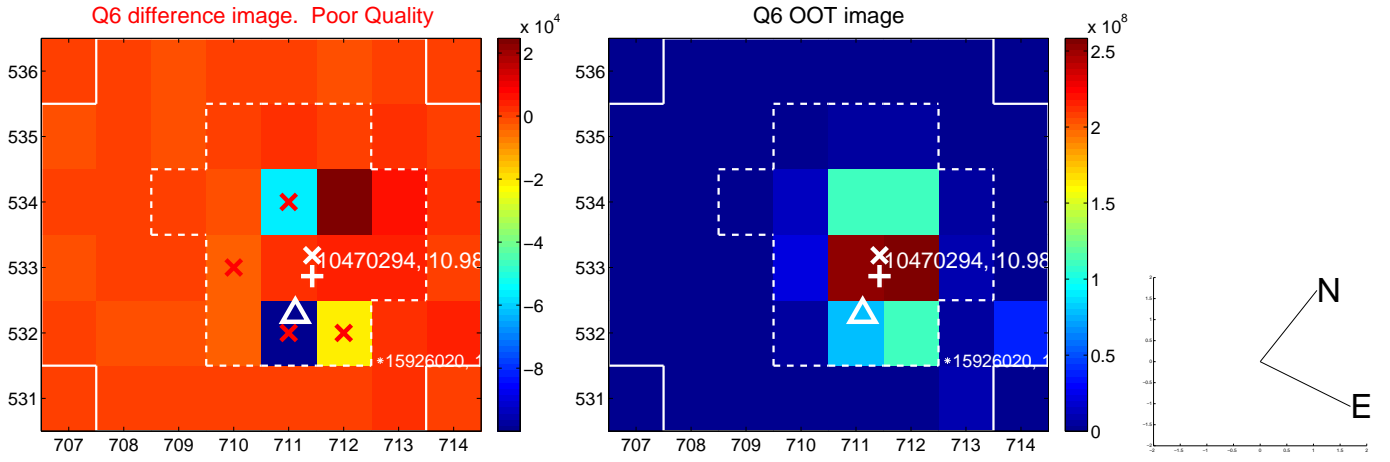
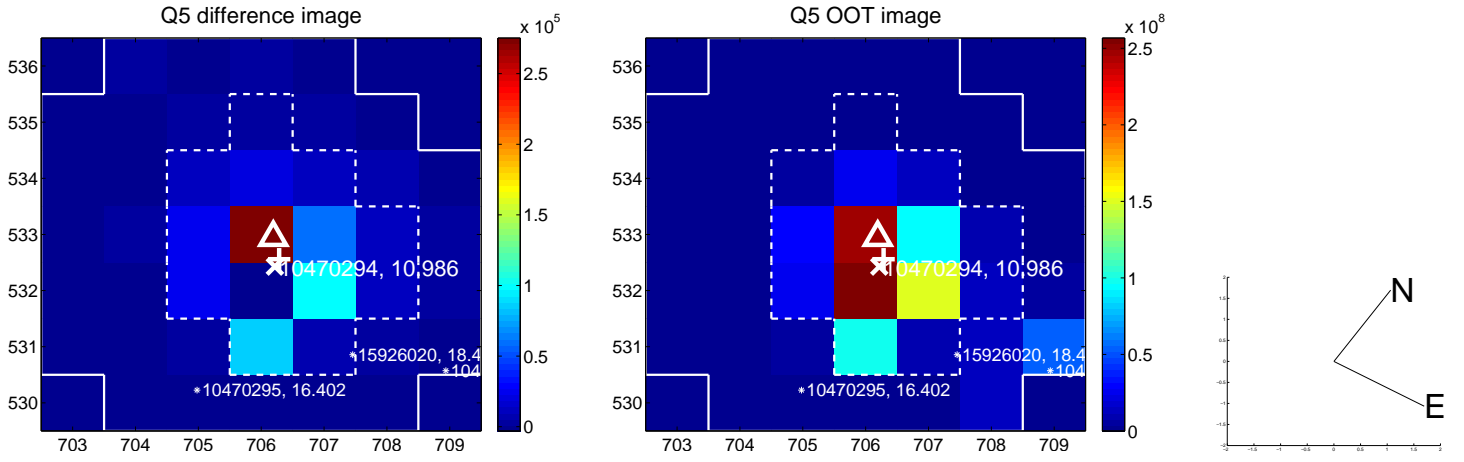


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

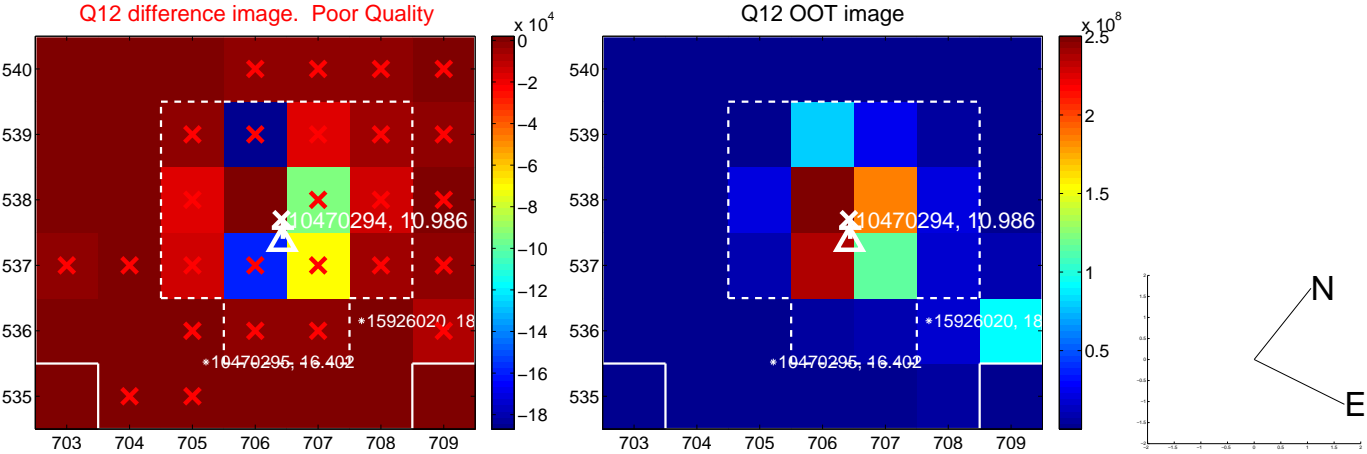
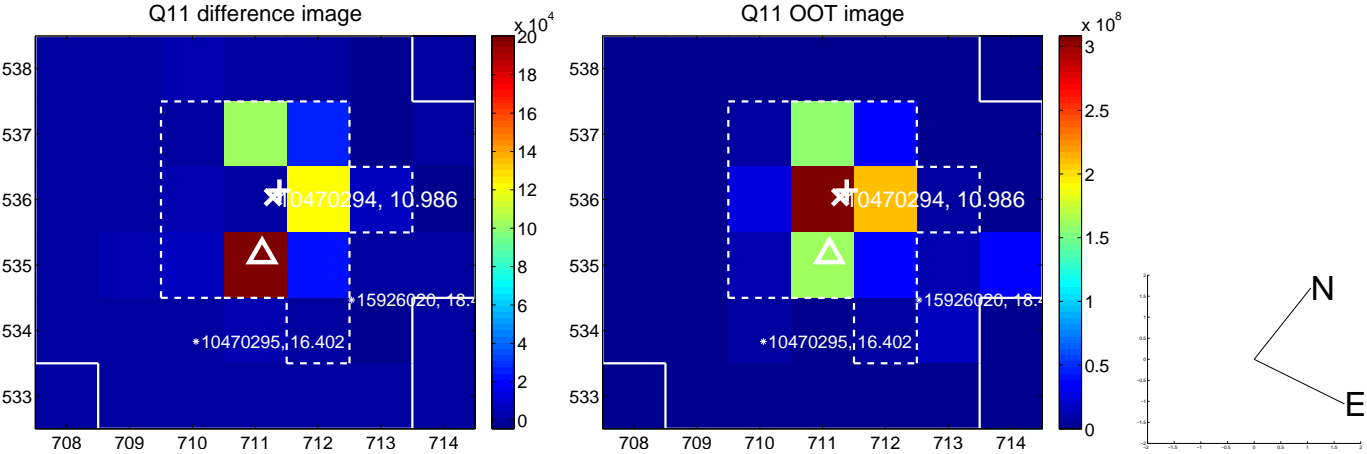
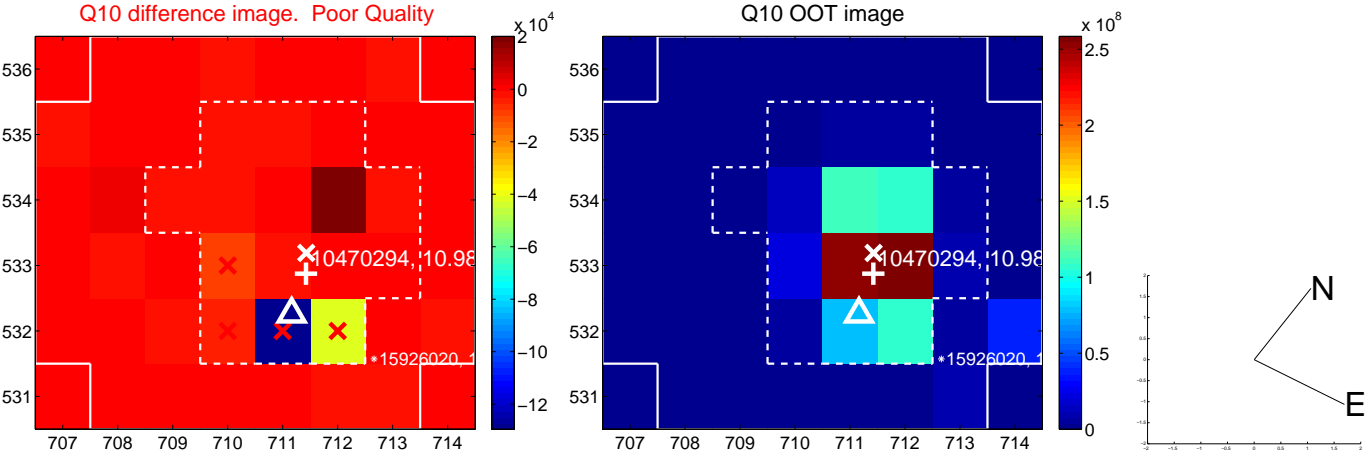
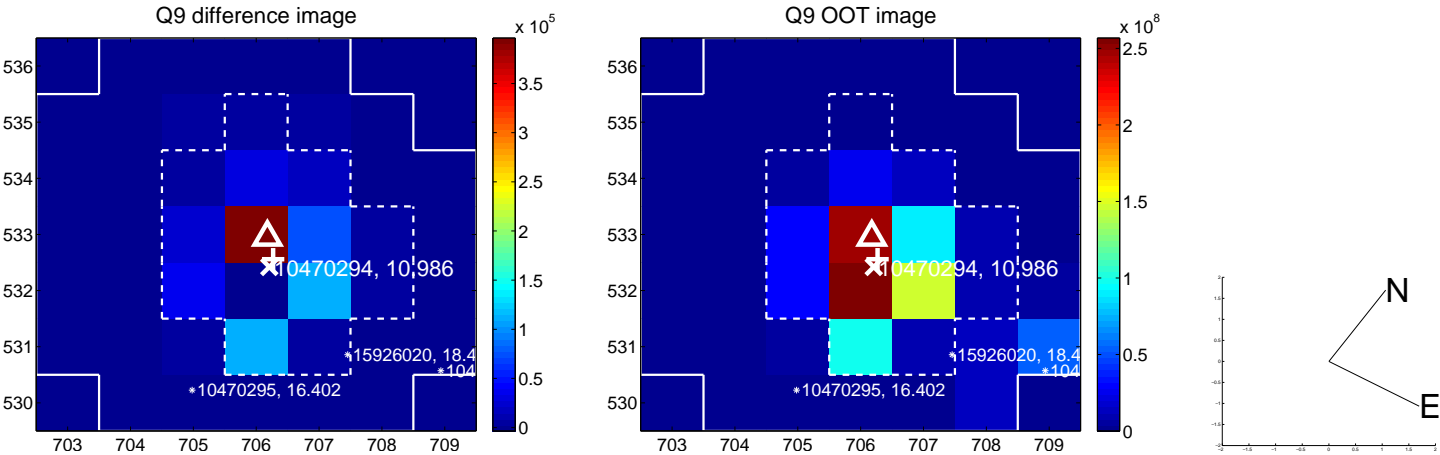
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



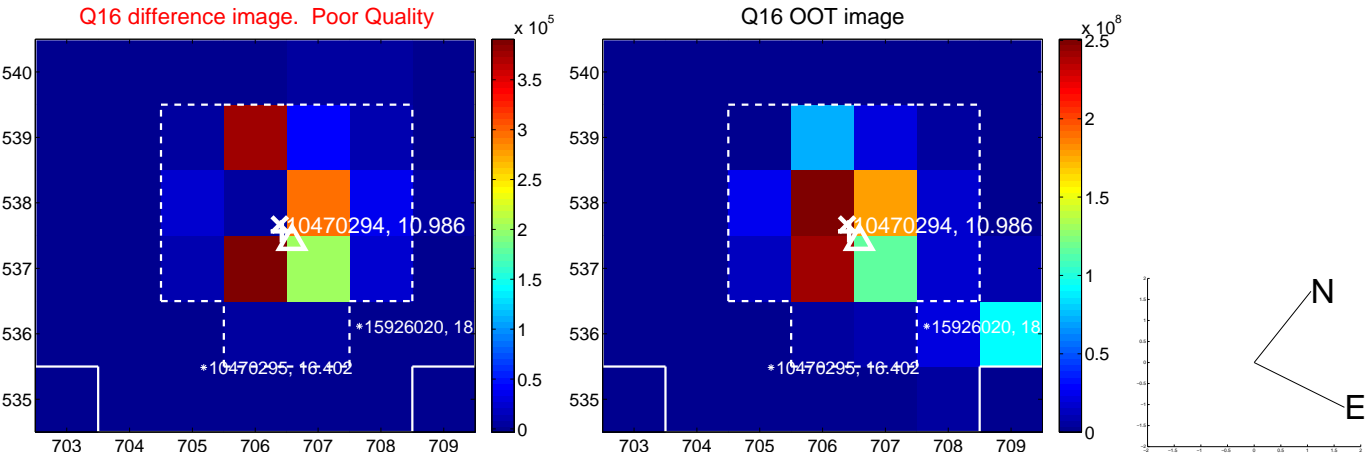
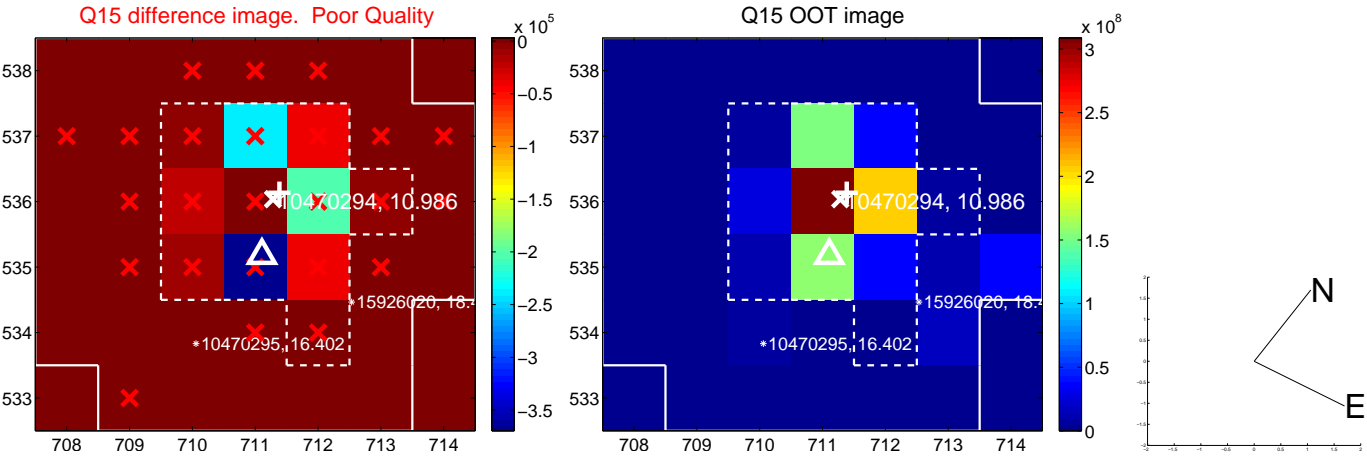
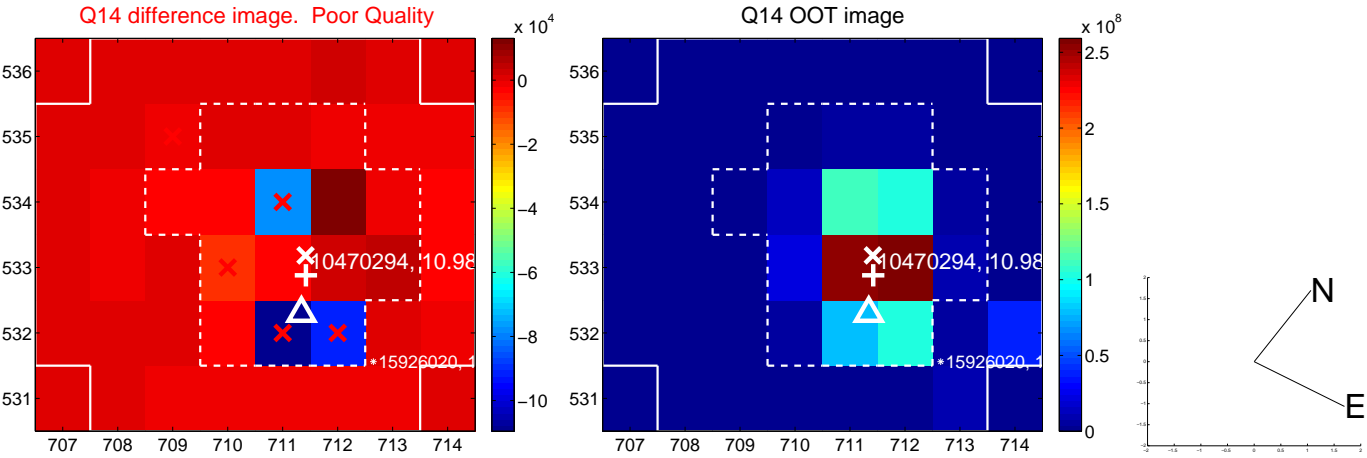
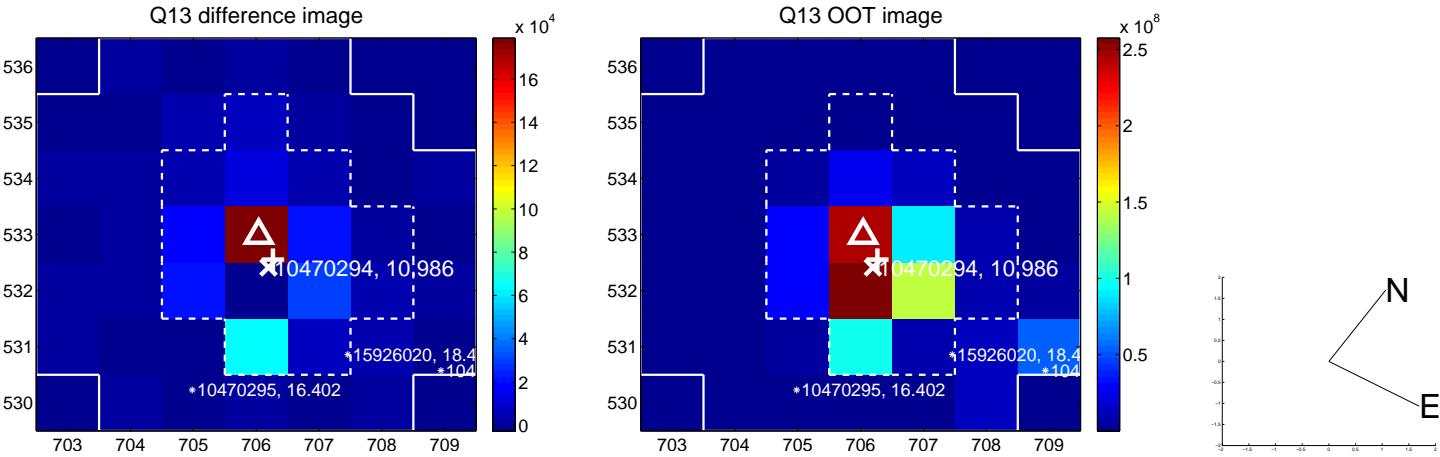
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



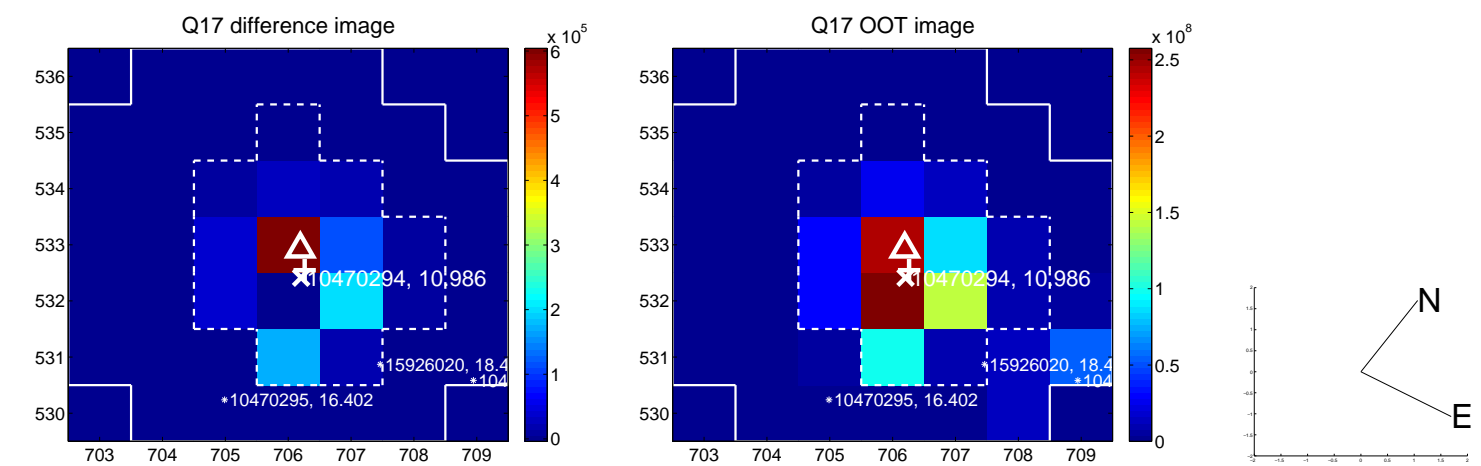
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



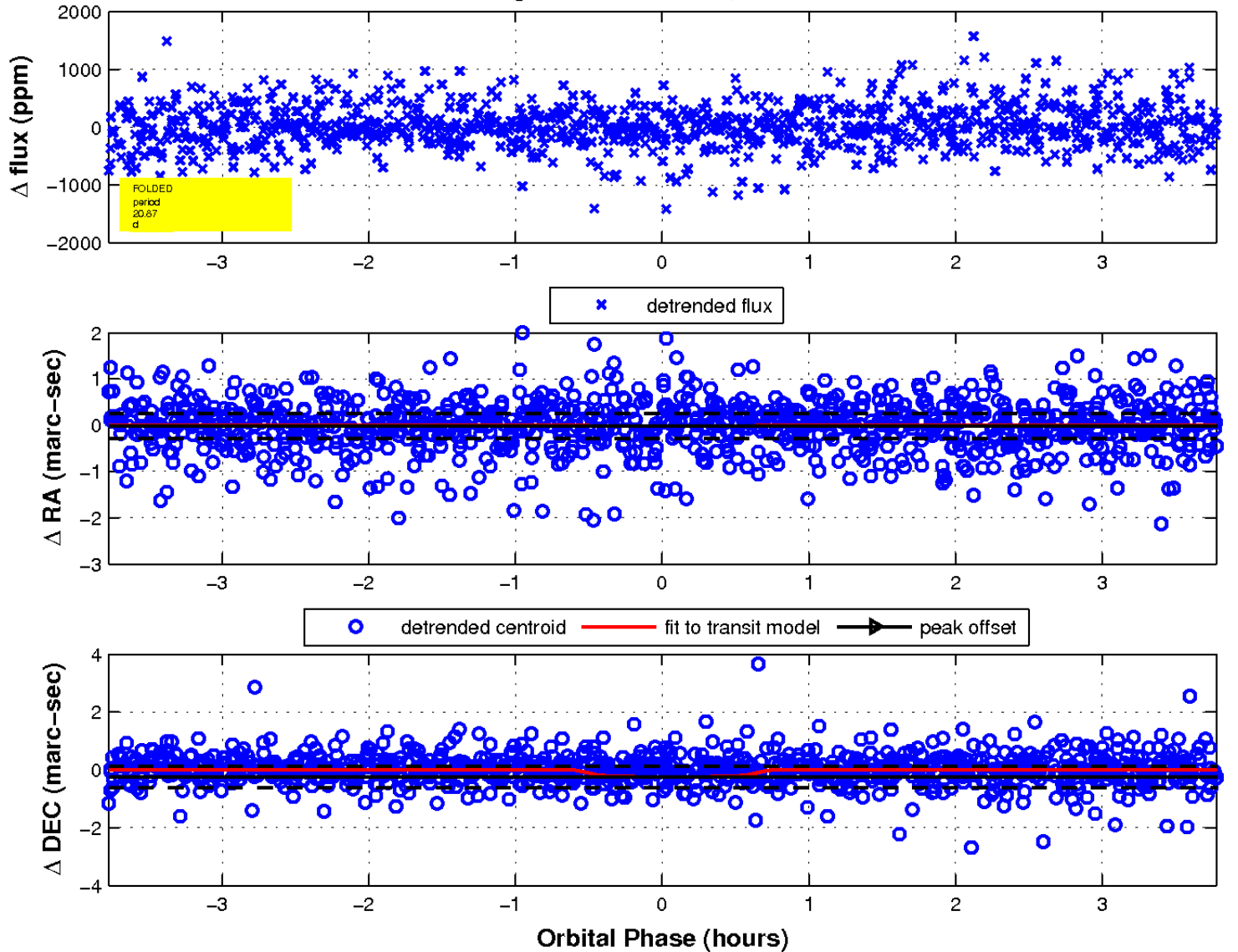
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

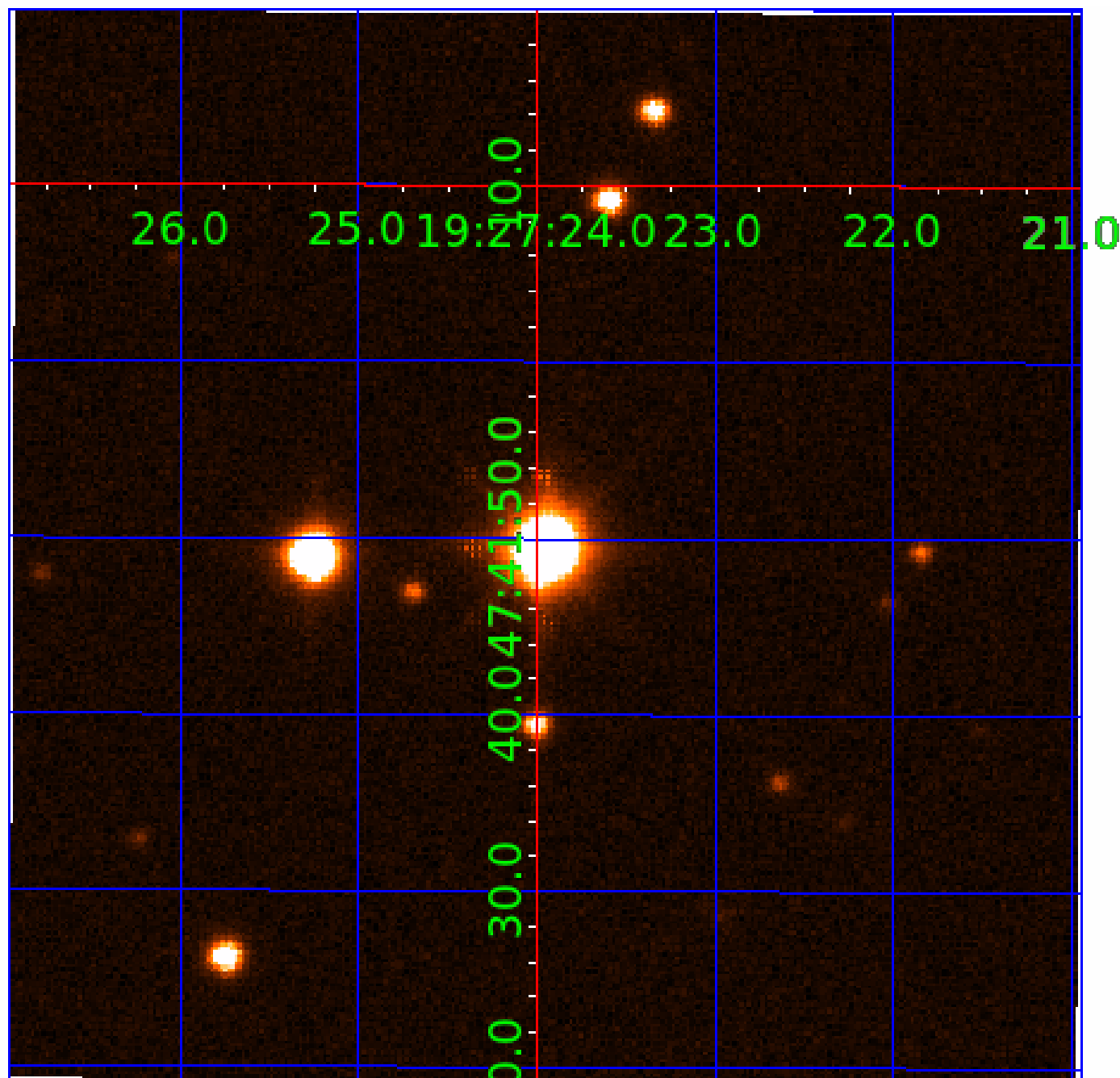


fluxWeightedCentroids, Planet 3 of 7



UKIRT Image

Declination



KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
010470294-05	OBS	No	36.620359	149.395812	784.4	1.620	15.3	11.6	3.67	7186	10.35	464.21
010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

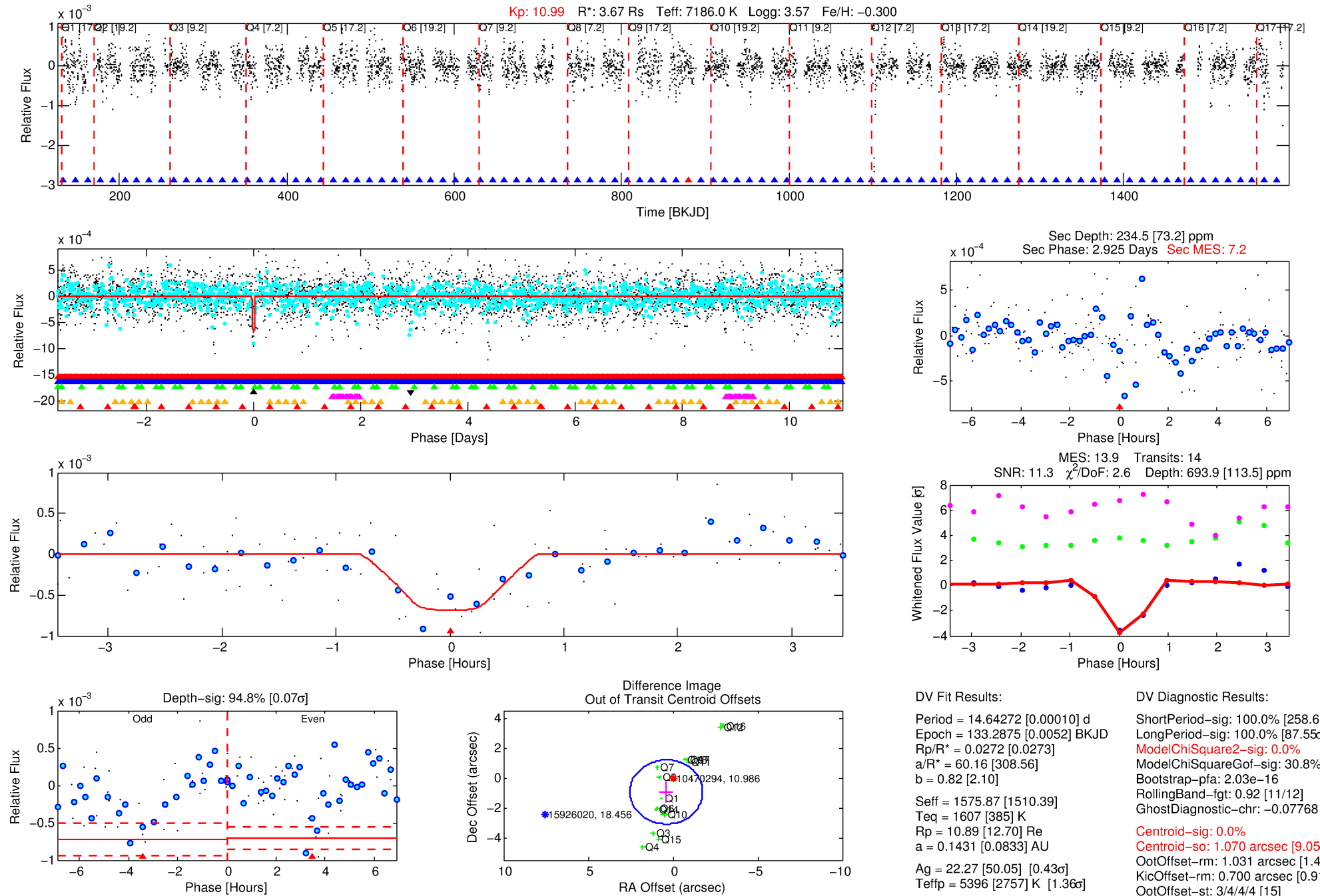
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-04

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 4 of 7 Period: 14.643 d



DV Fit Results:

Period = 14.64272 [0.00010] d
Epoch = 133.2875 [0.0052] BKJD
Rp/R* = 0.0272 [0.0273]
a/R* = 60.16 [308.56]
b = 0.82 [2.10]
Seff = 1575.87 [1510.39]
Teq = 1607 [385] K
Rp = 10.89 [12.70] Re
a = 0.1431 [0.0833] AU
Ag = 22.27 [50.05] [0.43 σ]
Teff = 5396 [2757] K [1.36 σ]

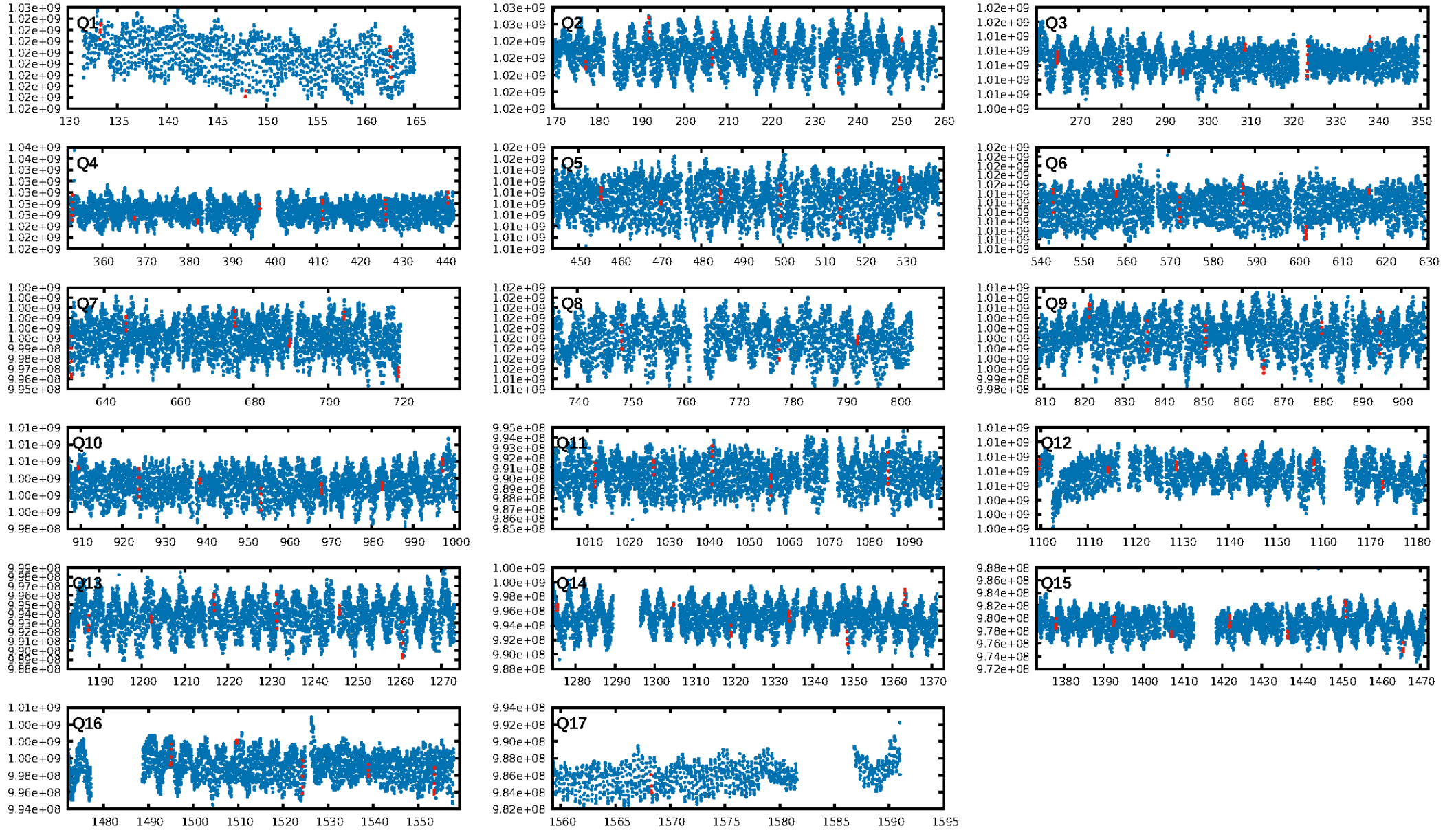
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [258.63 σ]
LongPeriod-sig: 100.0% [87.55 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 30.8%
Bootstrap-pfa: 2.03e-16
RollingBand-fgt: 0.92 [11/12]
GhostDiagnostic-chr: -0.07768
Centroid-sig: 0.0%
Centroid-so: 1.070 arcsec [9.05 σ]
OotOffset-rm: 1.031 arcsec [1.44 σ]
KicOffset-rm: 0.700 arcsec [0.91 σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 0.40 [6/15]
DiffImageOverlap-fno: 0.12 [2/17]

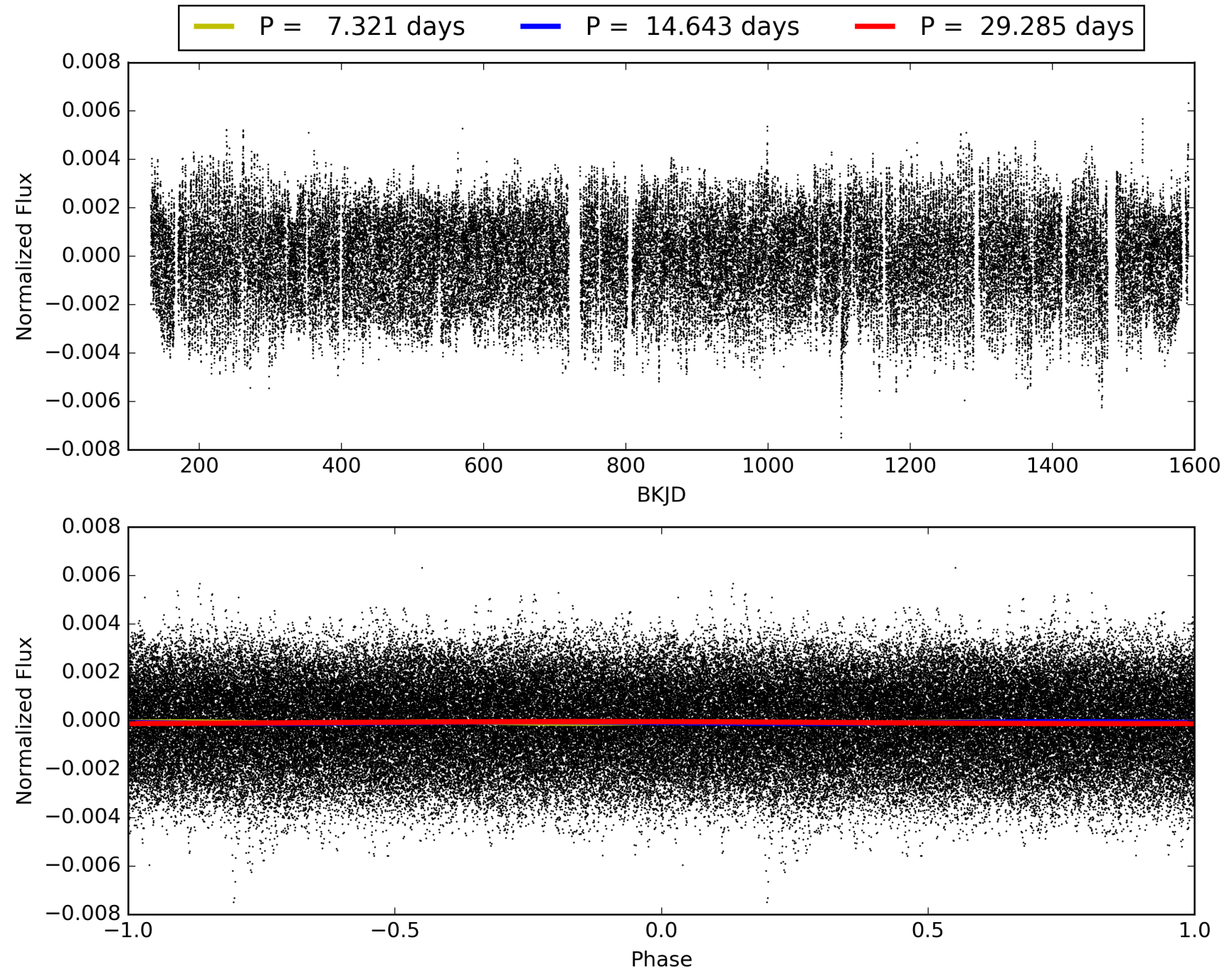
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:34 Z

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

TCE 010470294-04, PDC Light Curves

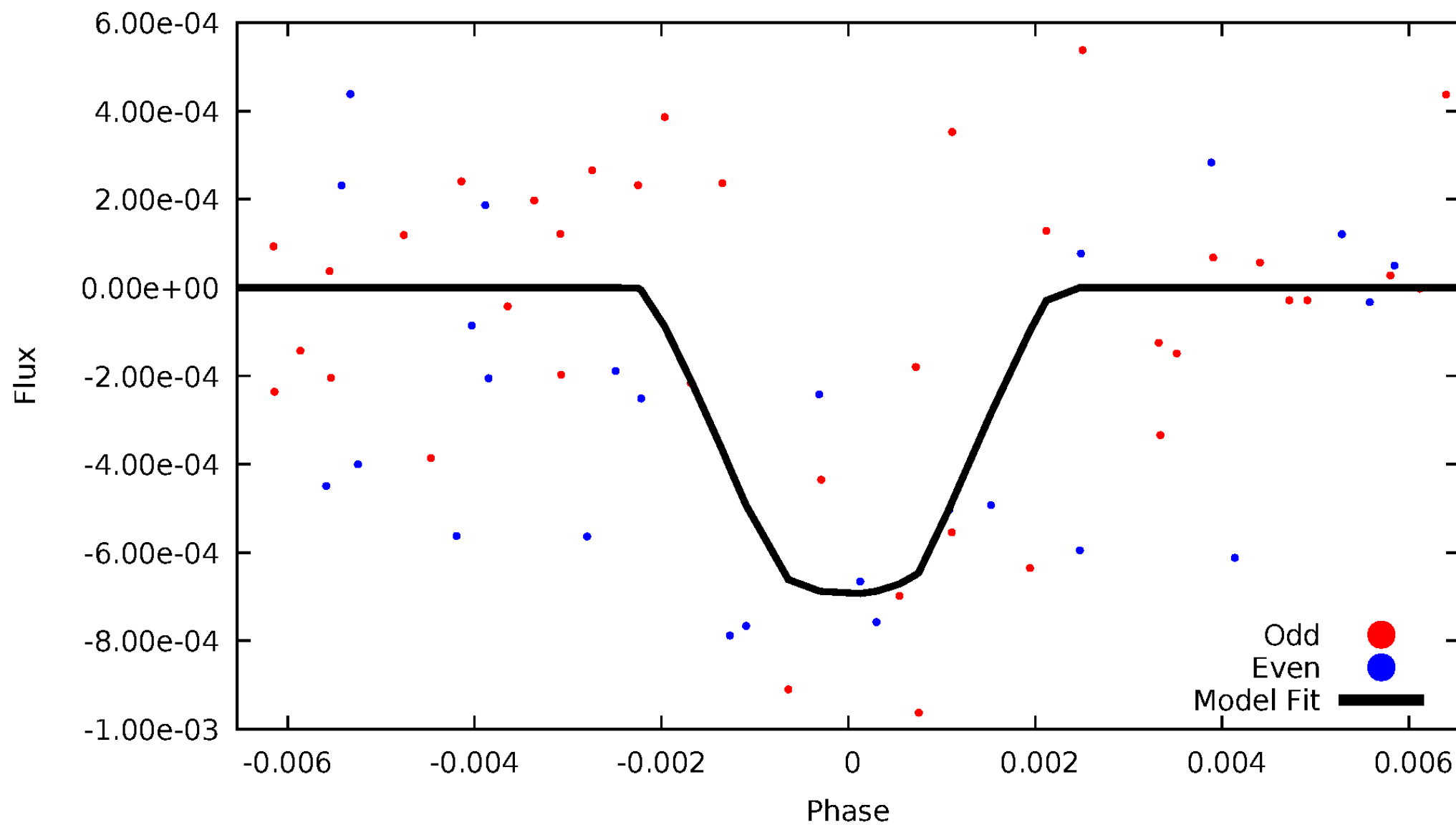


TCE 010470294-04



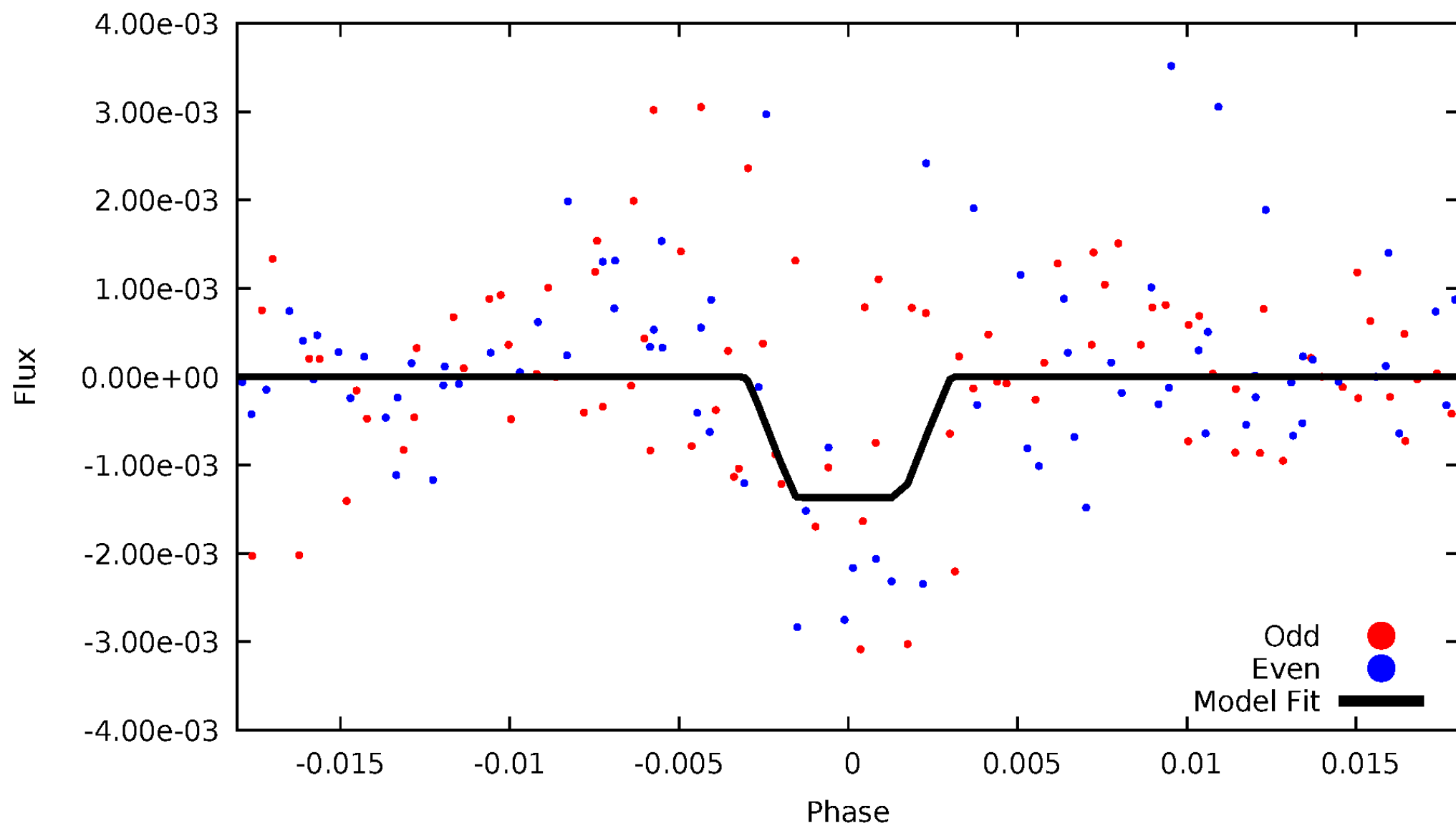
DV Odd/Even

TCE 010470294-04



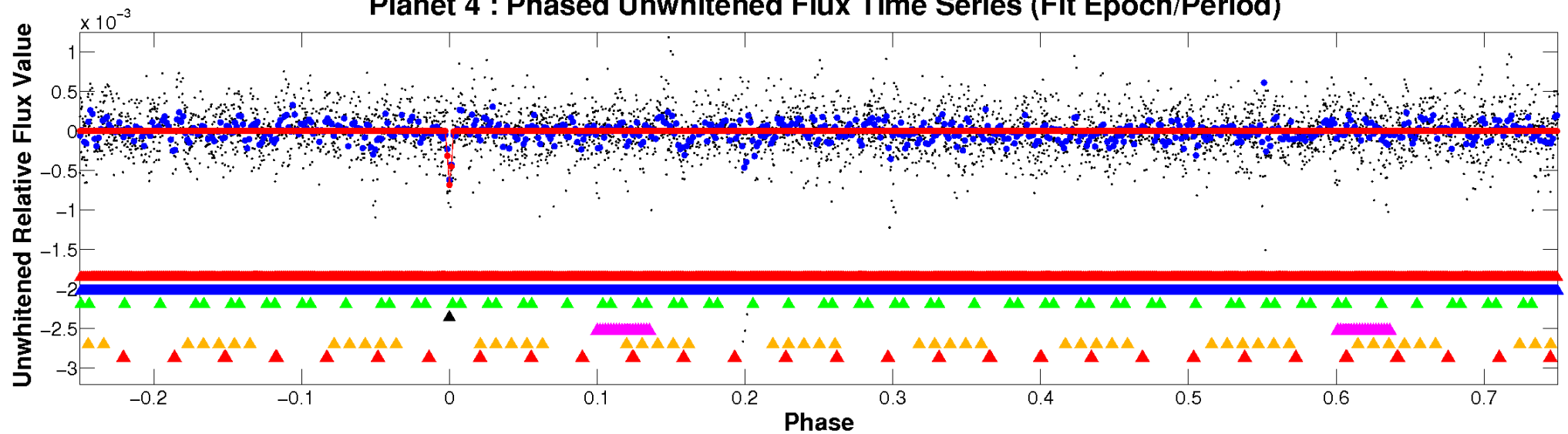
ALT Odd/Even

TCE 010470294-04

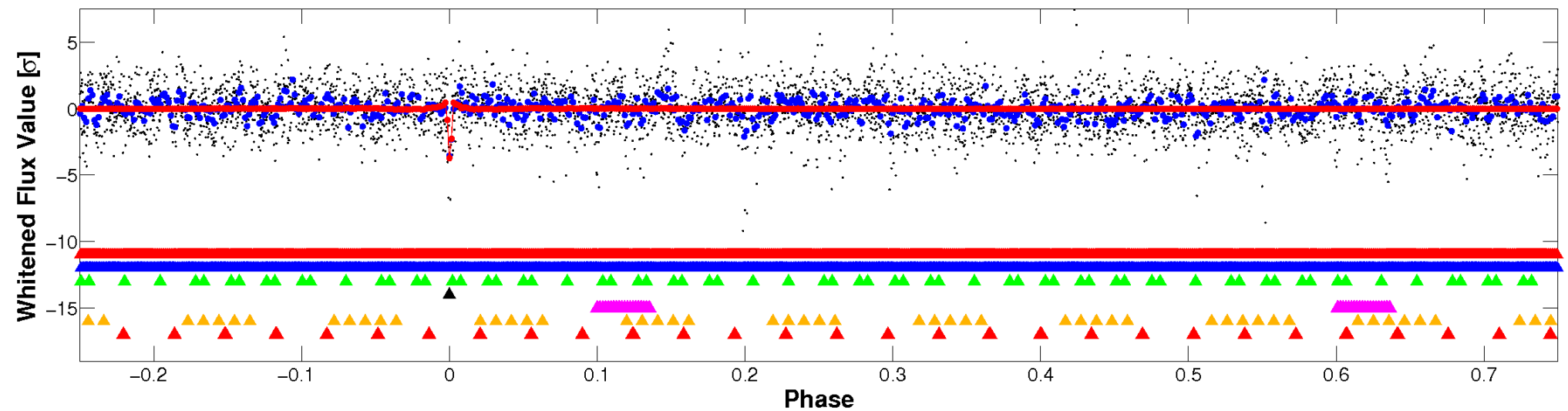


Non-Whitened Vs. Whitened Light Curve

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

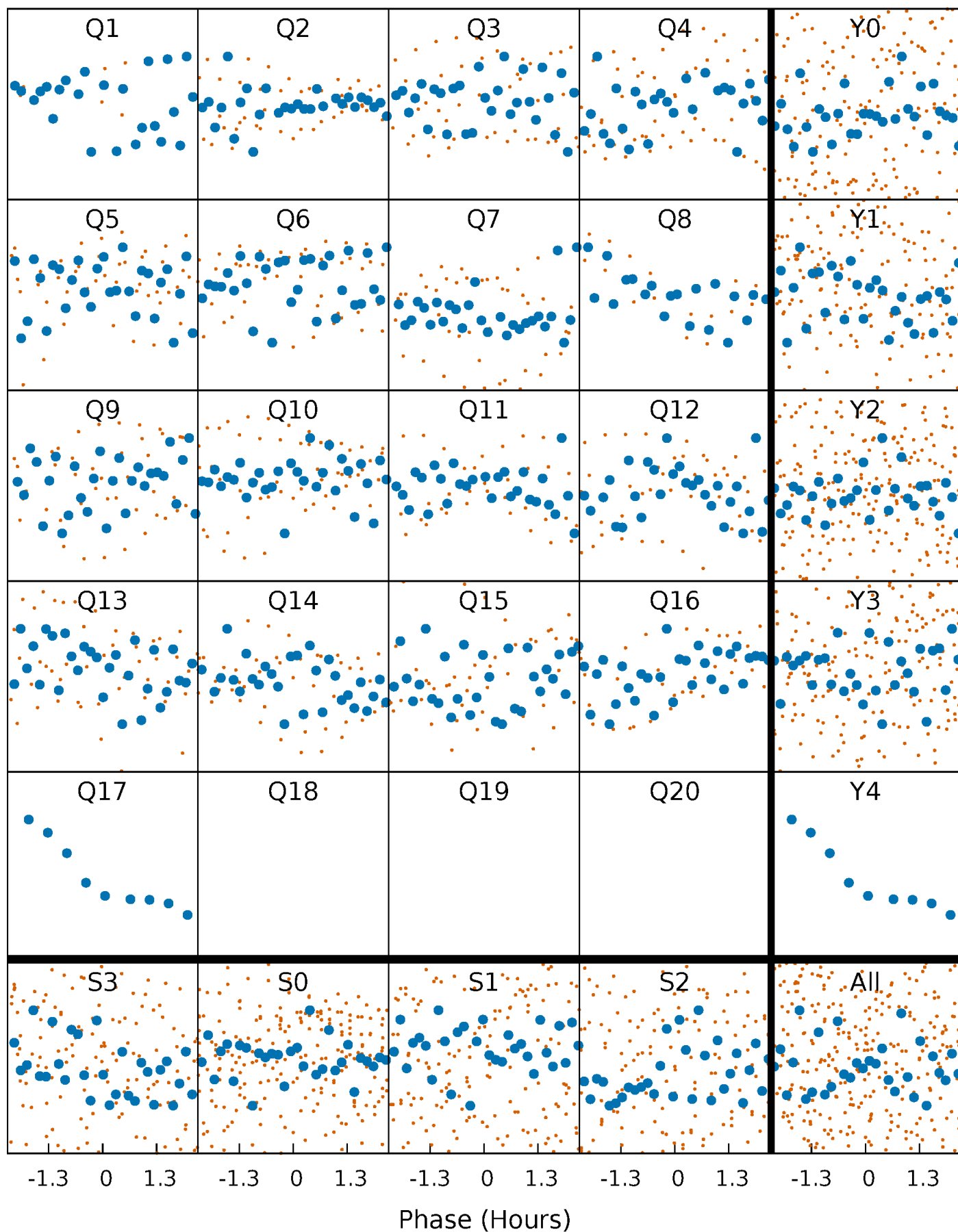


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



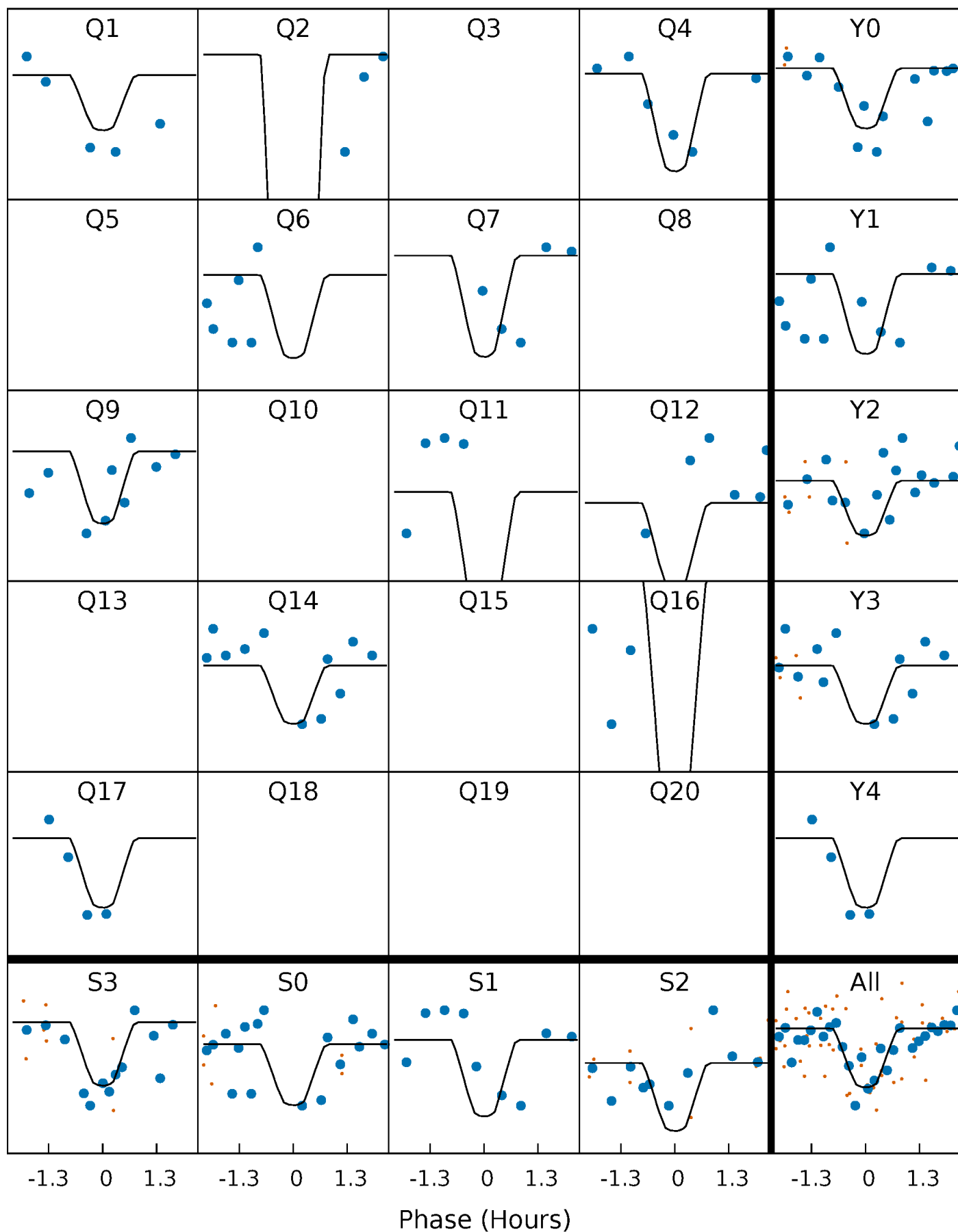
PDC Quarter-Phased Transit Curves

TCE 010470294-04 P= 14.642719 Days $T_0=133.287521$ (BKJD)



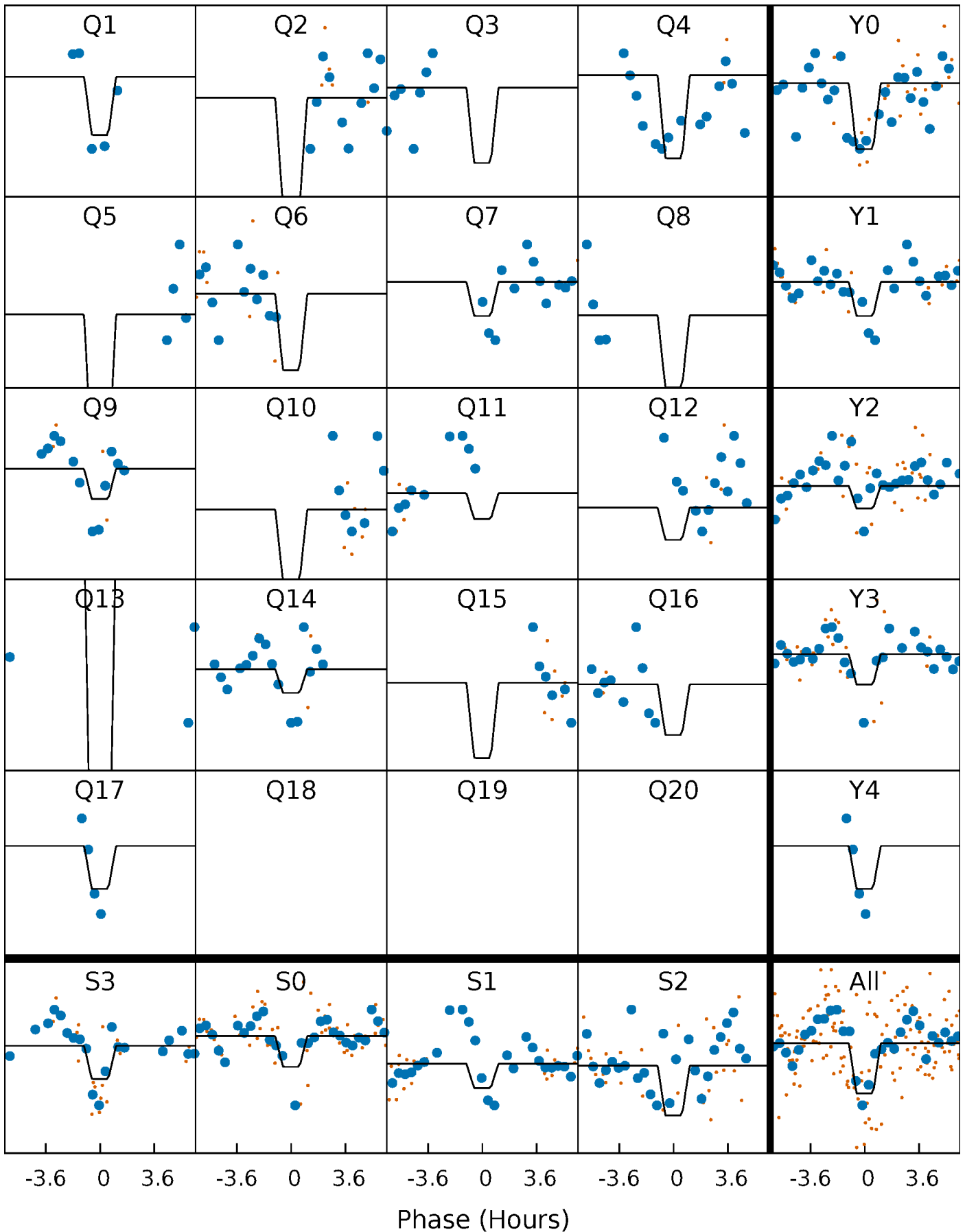
DV Quarter-Phased Transit Curves

TCE 010470294-04 $P = 14.642719$ Days $T_0 = 133.287521$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

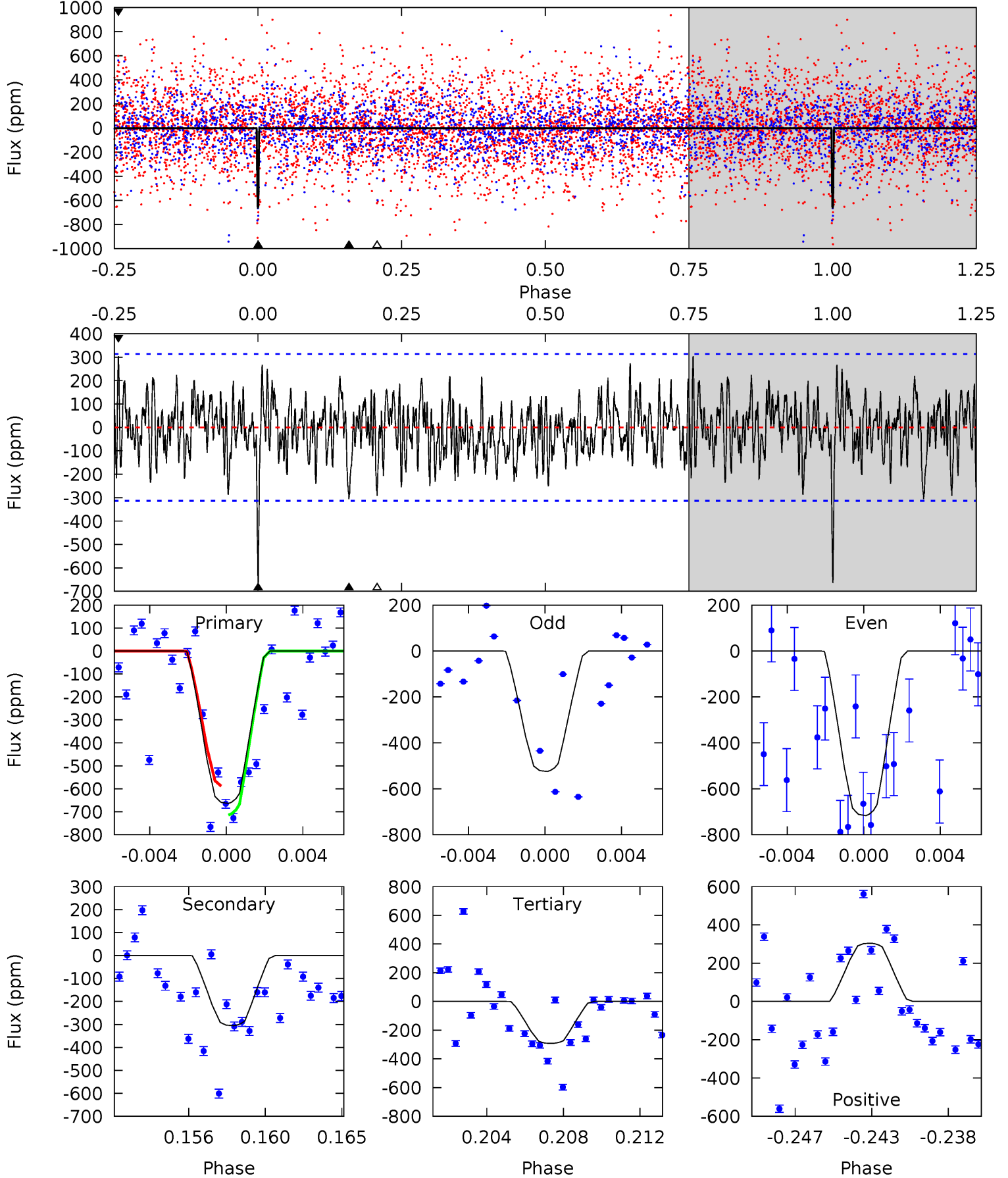
TCE 010470294-04 $P = 14.642694$ Days $T_0 = 133.292307$ (BKJD)



DV Model-Shift Uniqueness Test

010470294-04, P = 14.642719 Days, E = 118.644802 Days

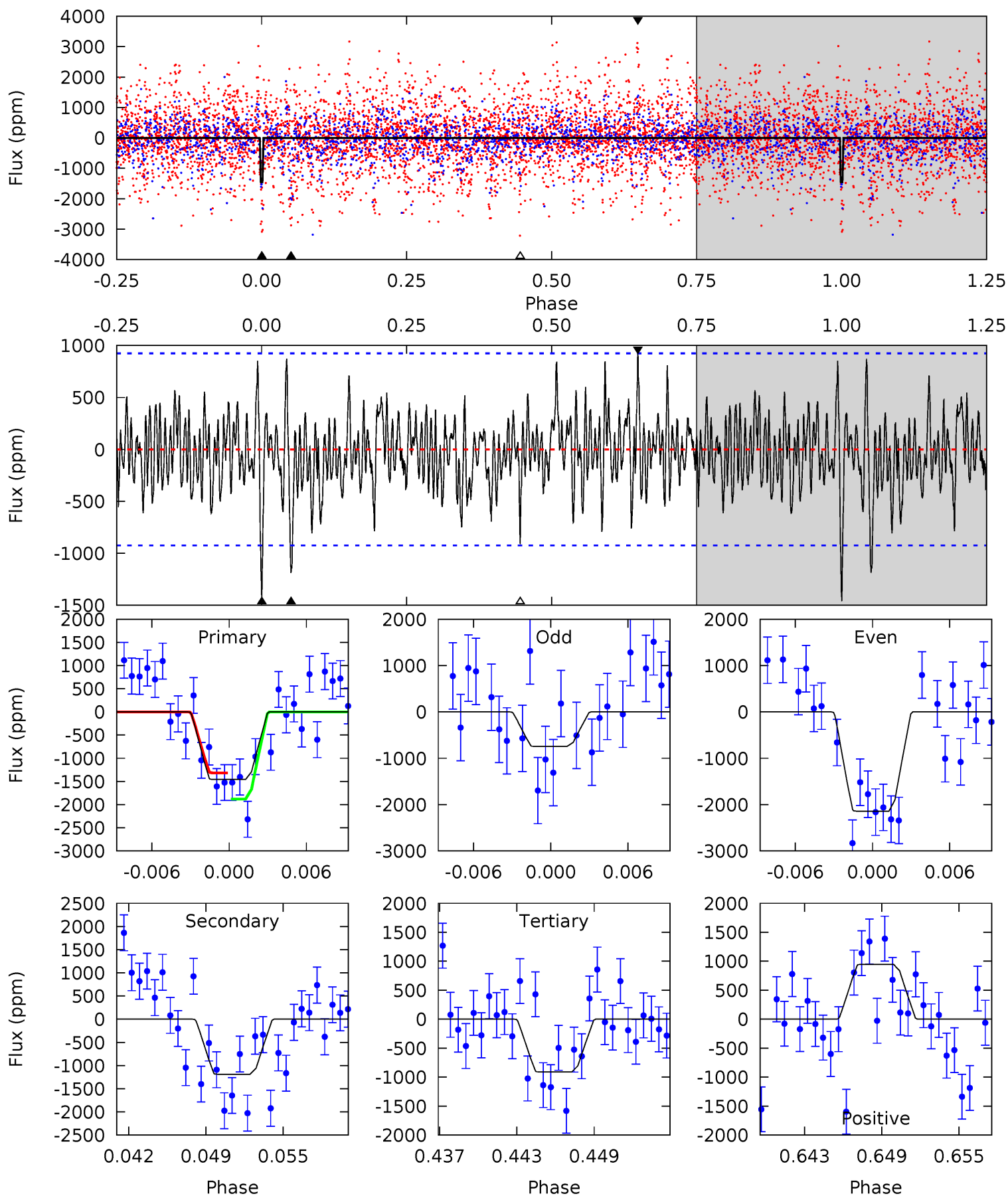
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	5.04	4.83	5.03	5.18	2.85	1.63	6.13	5.93	0.22	0.02	1.58	0.84	0.31	1.05



Alt Model-Shift Uniqueness Test

010470294-04, P = 14.642694 Days, E = 118.649613 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.08	6.58	5.05	5.24	5.12	2.74	1.58	3.04	2.84	1.54	1.34	3.78	0.58	0.39	1.53



Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-305 ± 61	$11.43^{+10.14}_{-7.39}$	2201^{+133}_{-287}	5206^{+4156}_{-1099}	26^{+177}_{-19}
Alt.	-1188 ± 180	$13.74^{+11.12}_{-7.75}$	2188^{+152}_{-323}	6606^{+4074}_{-1499}	66^{+299}_{-46}

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 $A_{obs} \gg 1.0$

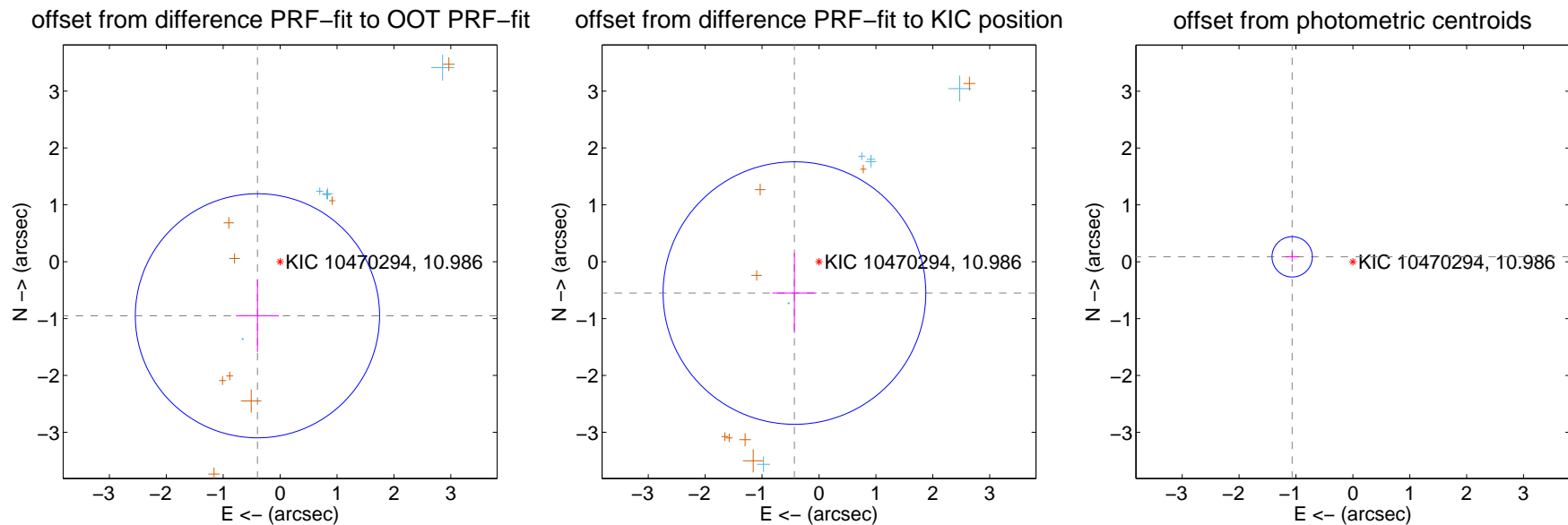
DV Centroid Data

Supplemental centroid analysis for 010470294-04. **Kepler magnitude: 10.99.** Transit SNR 11.30

There are 6 quarters with good PRF difference image offsets

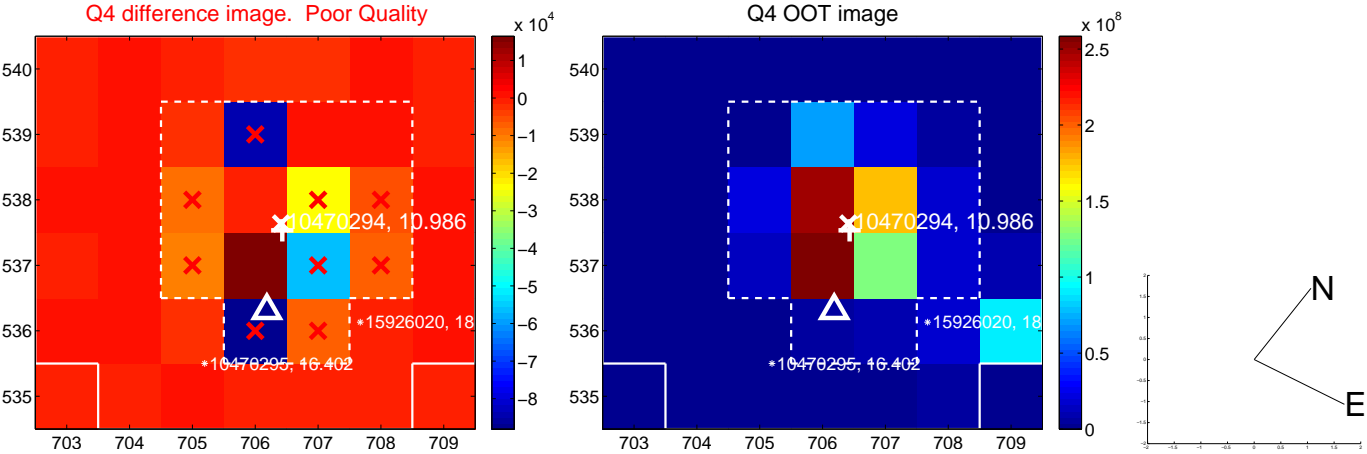
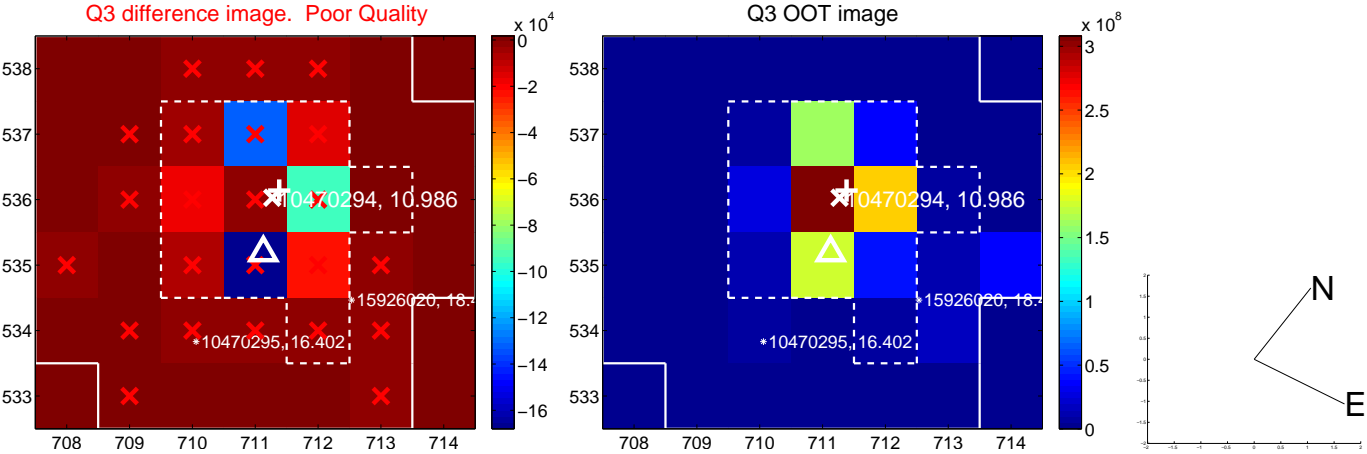
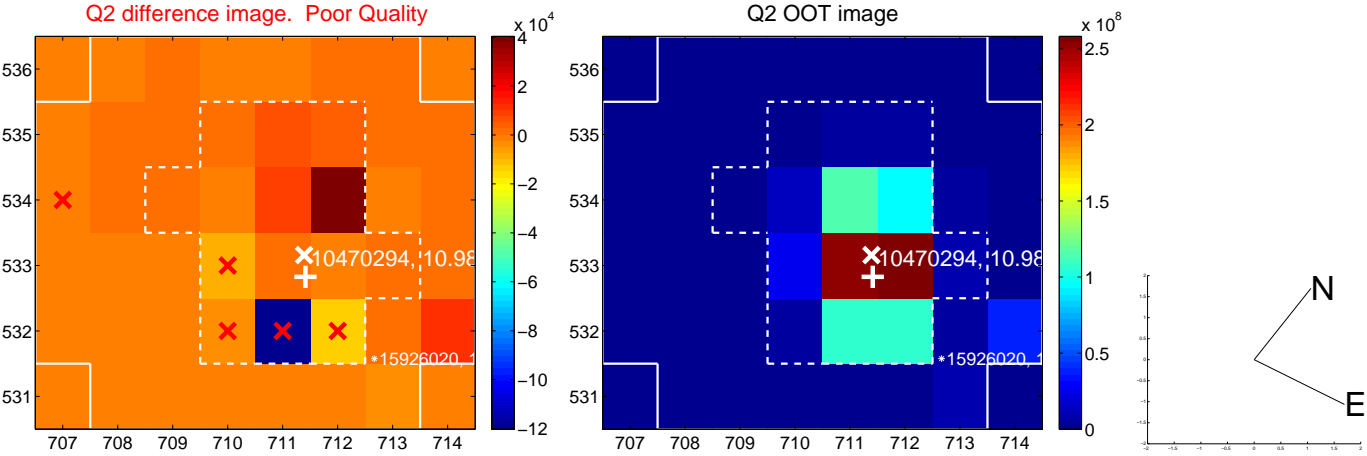
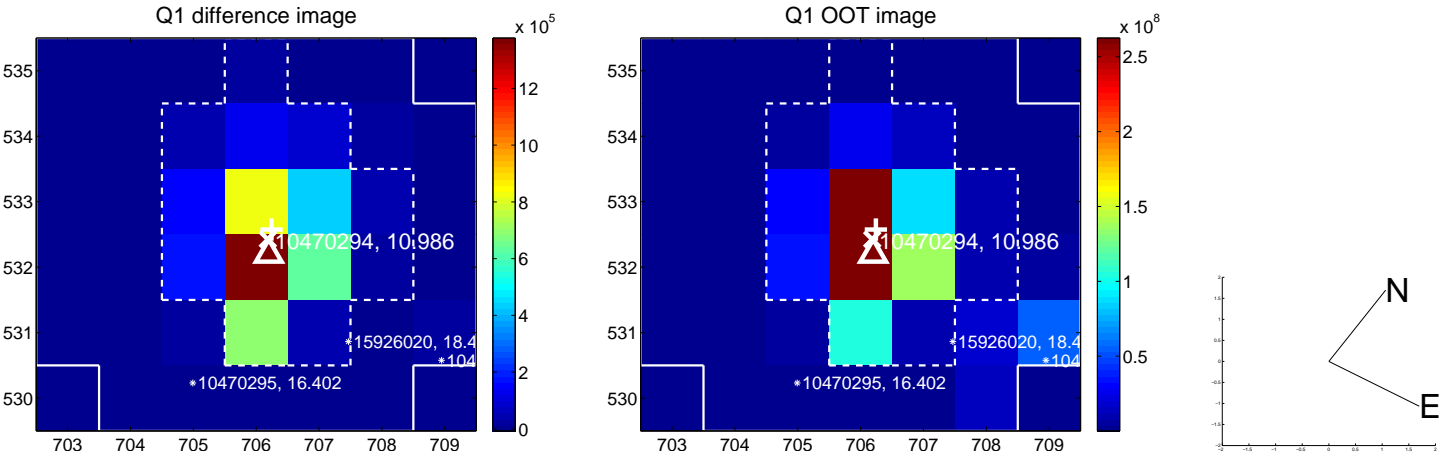
The direct PRF centroid is offset from the target star catalog position by about 0.57 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.031 ± 0.715	1.44	0.398 ± 0.376	-0.951 ± 0.636
PRF-fit source offset from KIC position	0.700 ± 0.769	0.91	0.431 ± 0.388	-0.552 ± 0.702
photometric centroid source offset	1.07 ± 0.12	9.05	1.07 ± 0.12	0.09 ± 0.09

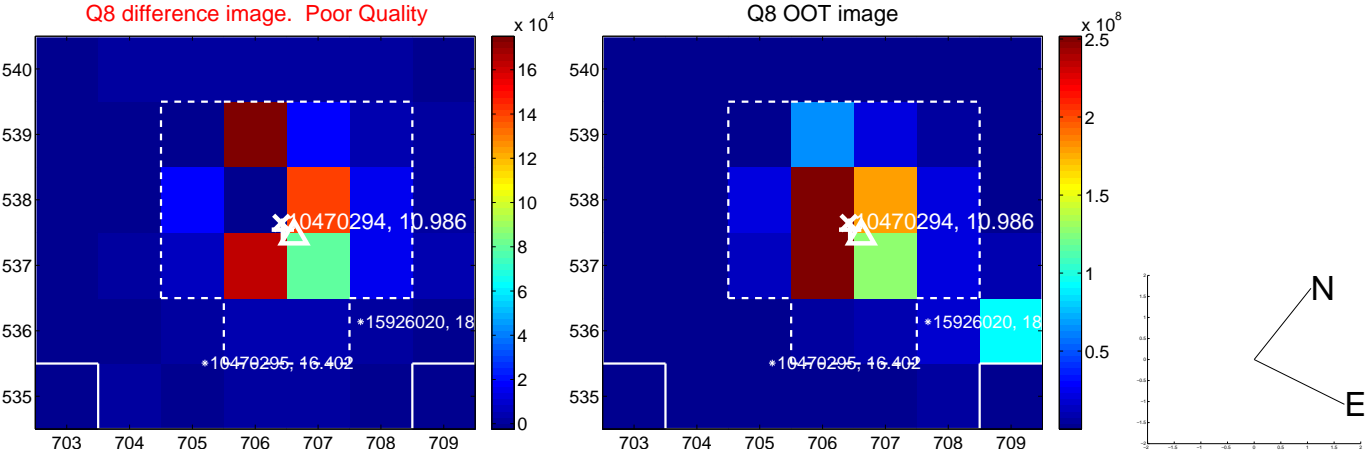
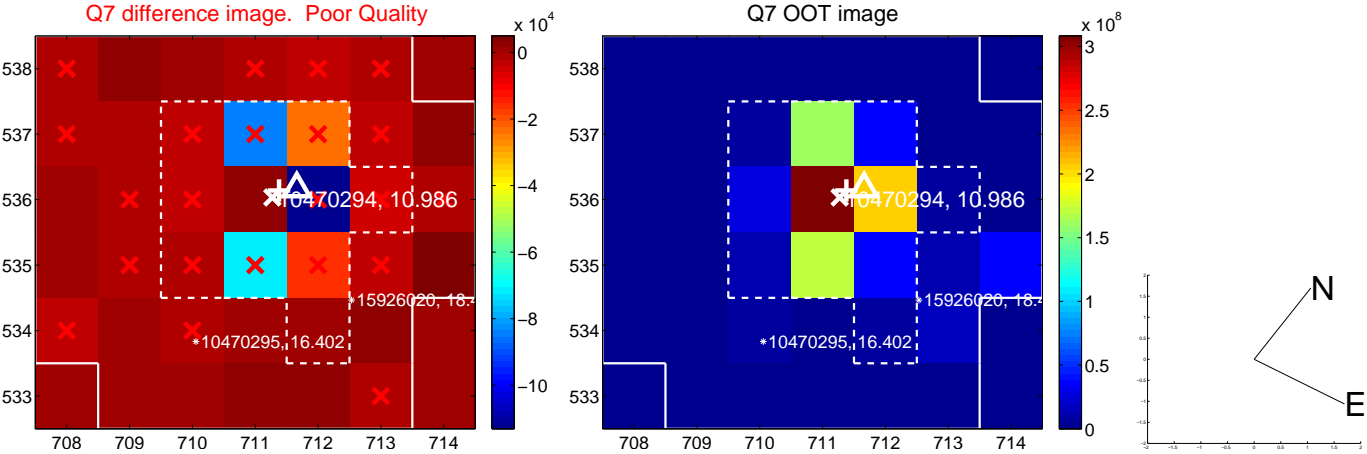
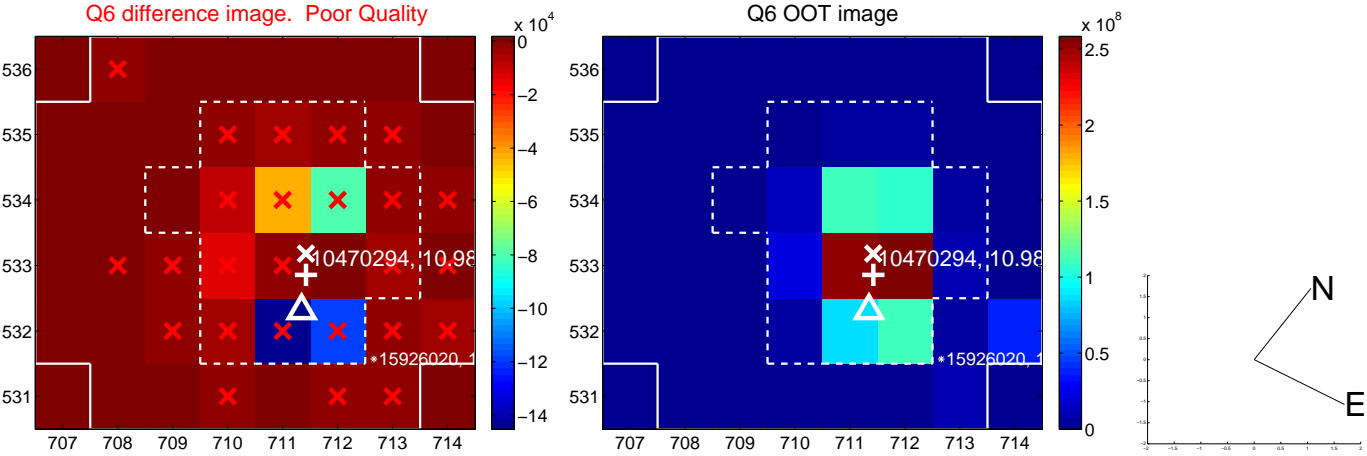
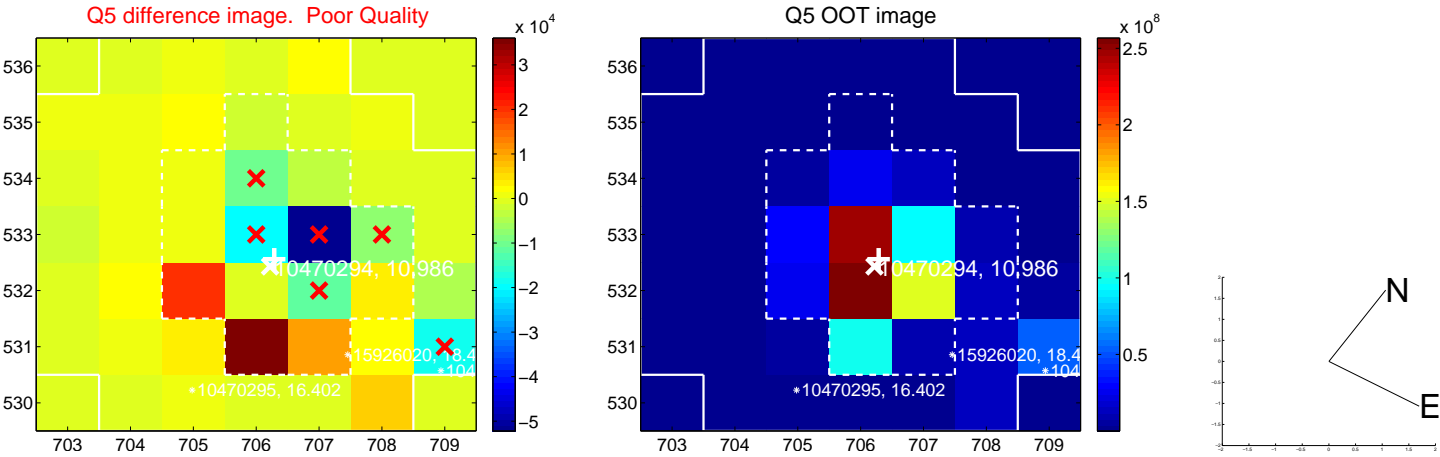


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

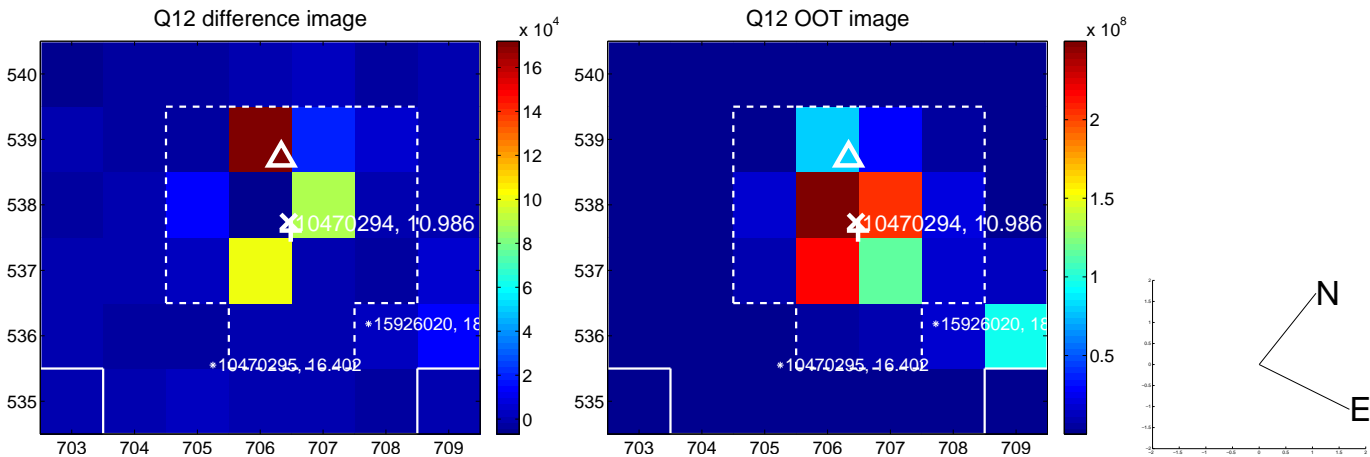
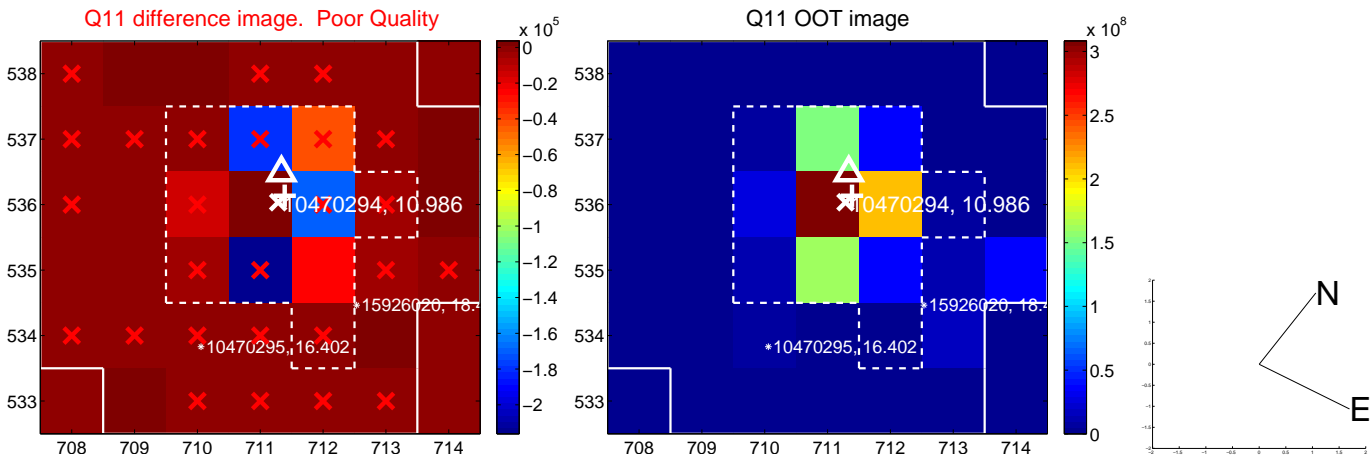
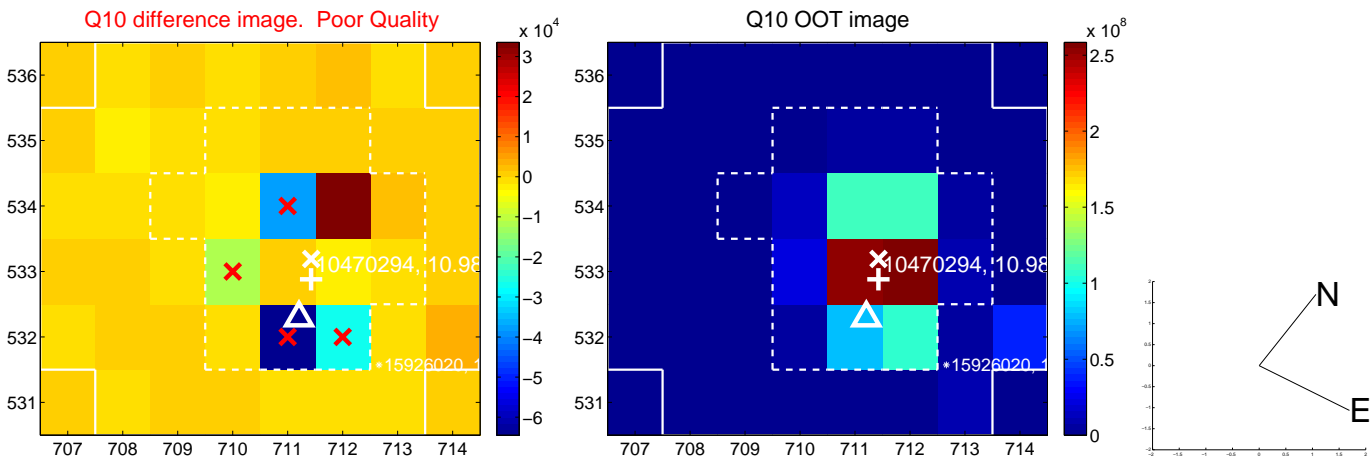
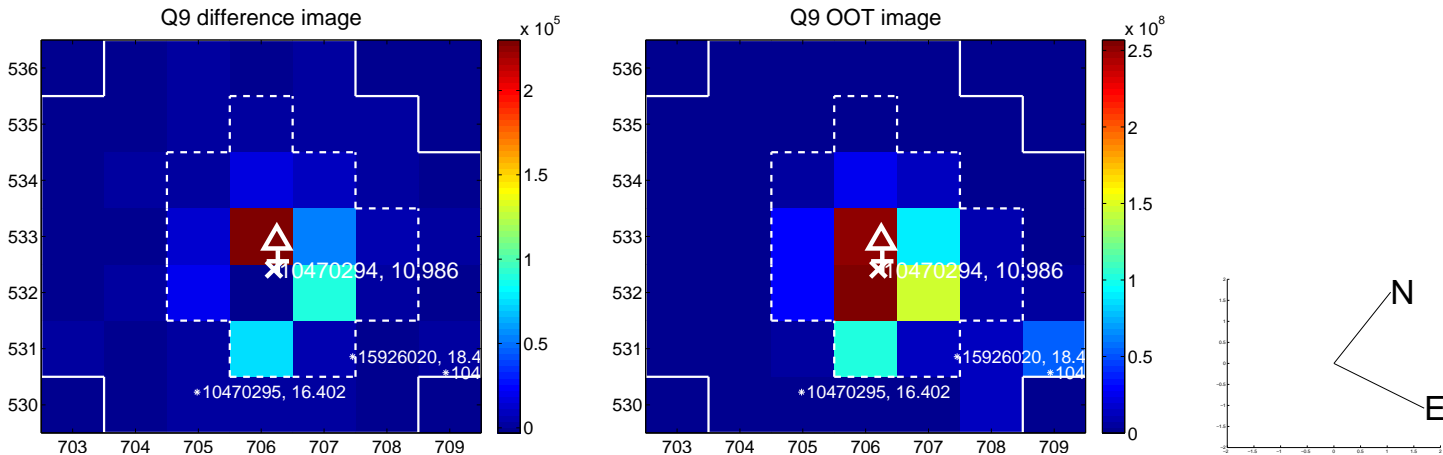
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



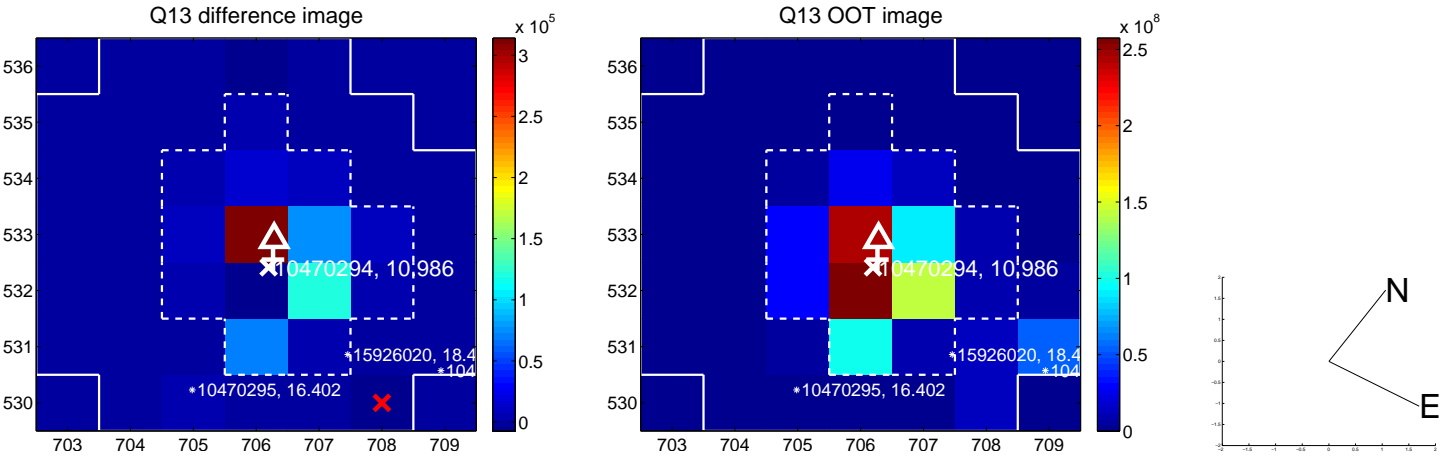
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



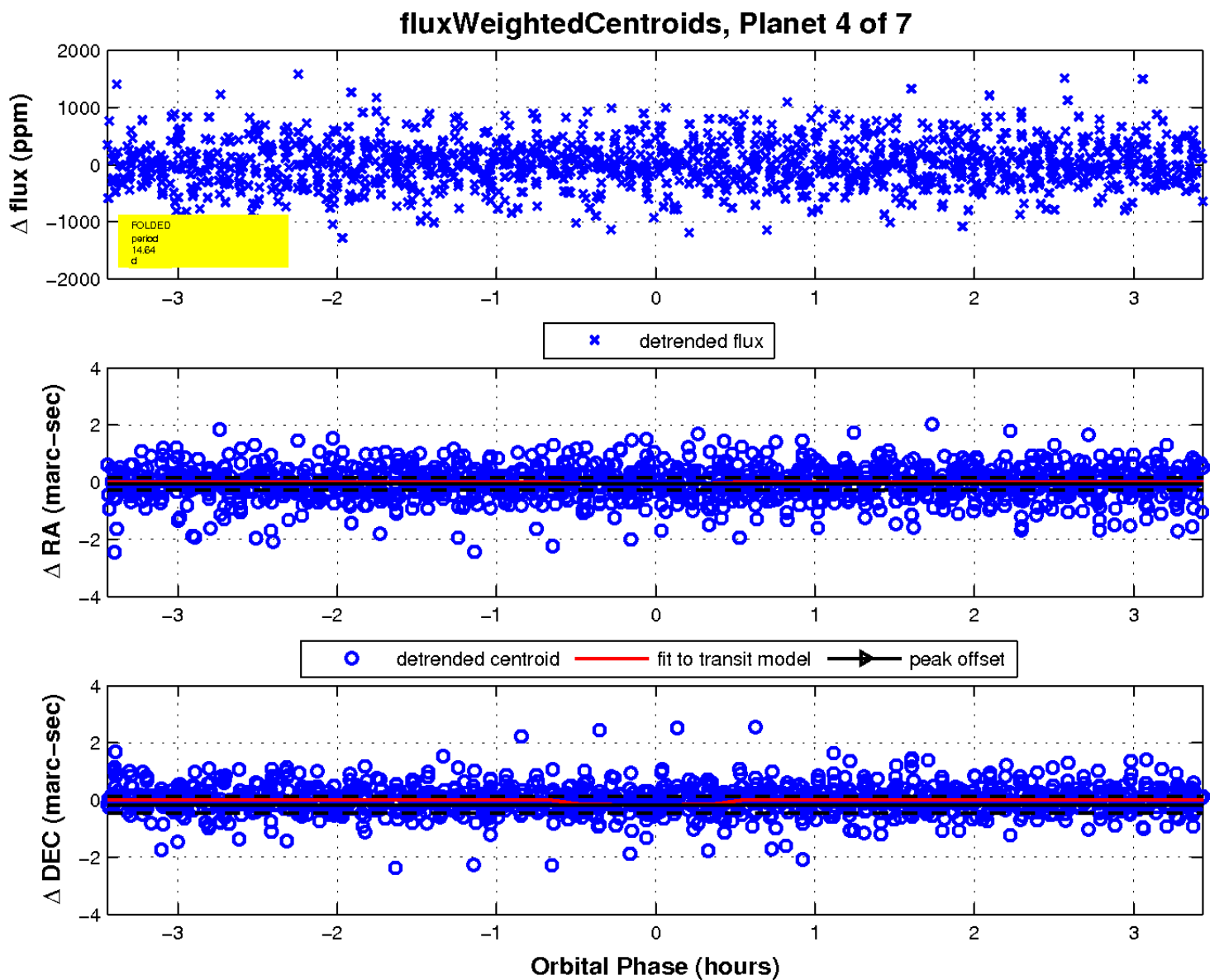
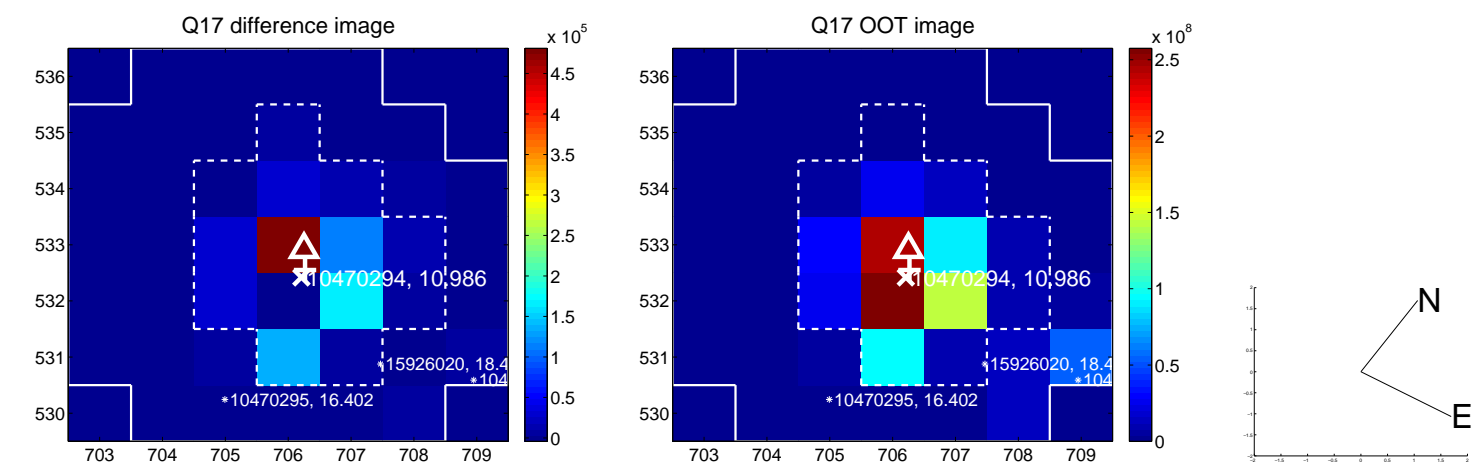
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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

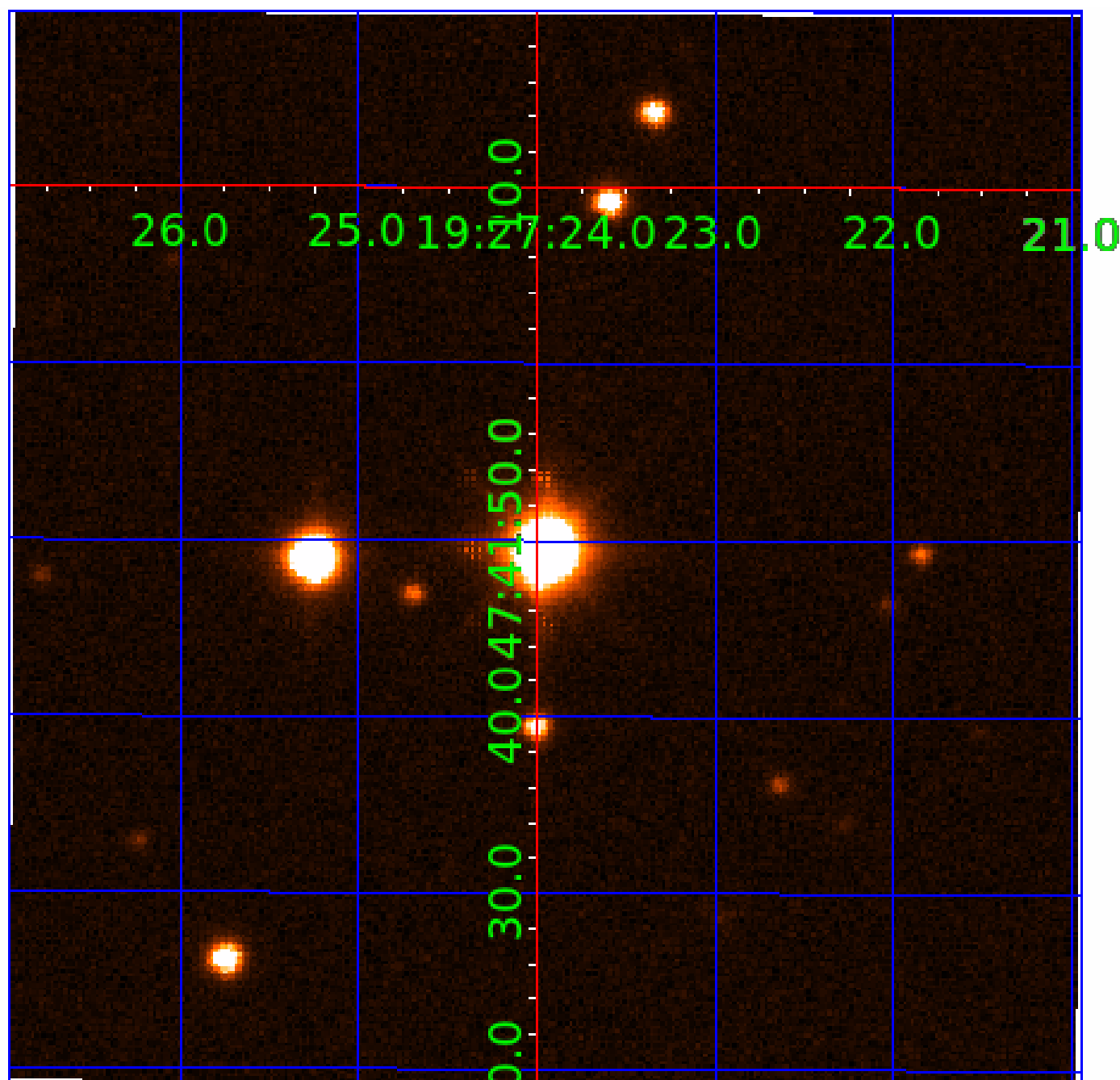


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
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010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

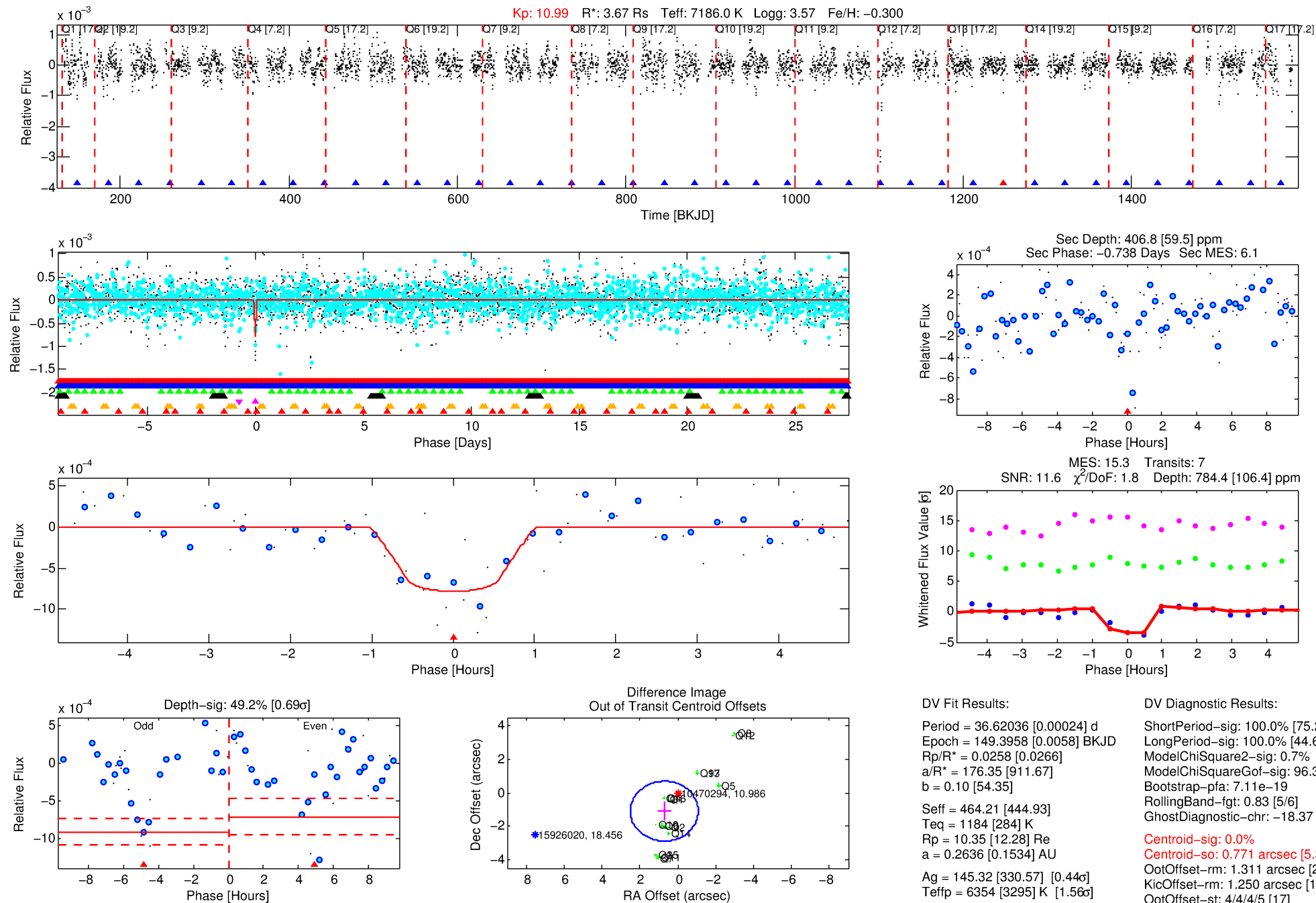
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-05

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 5 of 7 Period: 36.620 d



DV Fit Results:

Period = 36.62036 [0.00024] d
Epoch = 149.3958 [0.0058] BKJD
Rp/R* = 0.0258 [0.0266]
a/R* = 176.35 [911.67]
b = 0.10 [54.35]
Seff = 464.21 [444.93]
Teff = 1184 [284] K
Rp = 10.35 [12.28] Re
a = 0.2636 [0.1534] AU
Ag = 145.32 [330.57] [0.44 σ]
Teffp = 6354 [3295] K [1.56 σ]

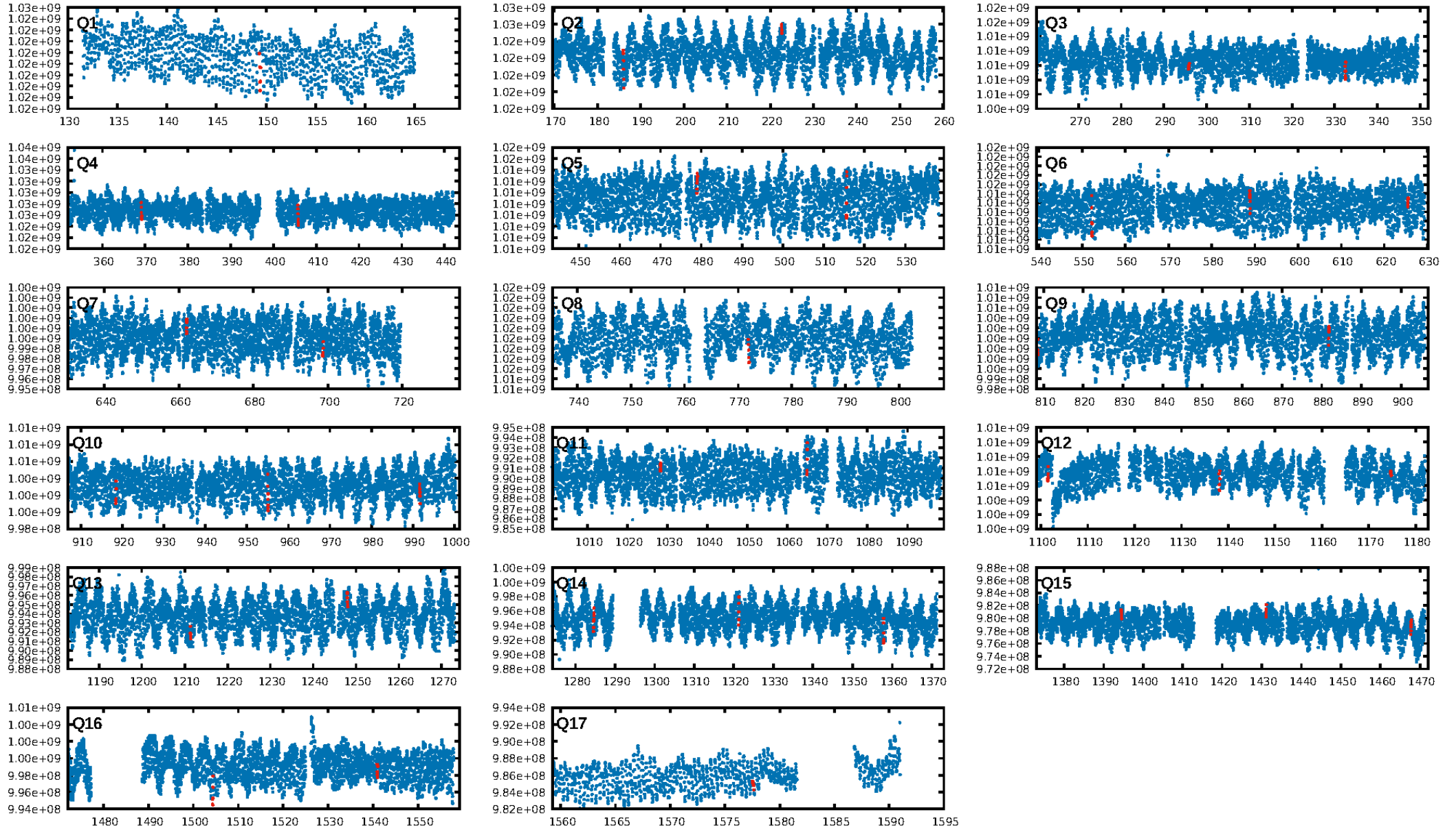
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [75.28 σ]
LongPeriod-sig: 100.0% [44.67 σ]
ModelChiSquare2-sig: 0.7%
ModelChiSquareGof-sig: 96.3%
Bootstrap-pfa: 7.11e-19
RollingBand-fgt: 0.83 [5/6]
GhostDiagnostic-chr: -18.37
Centroid-sig: 0.0%
Centroid-so: 0.771 arcsec [5.35 σ]
OotOffset-rm: 1.311 arcsec [2.20 σ]
KicOffset-rm: 1.250 arcsec [1.99 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.18 [3/17]
DiffImageOverlap-fno: 0.12 [2/17]

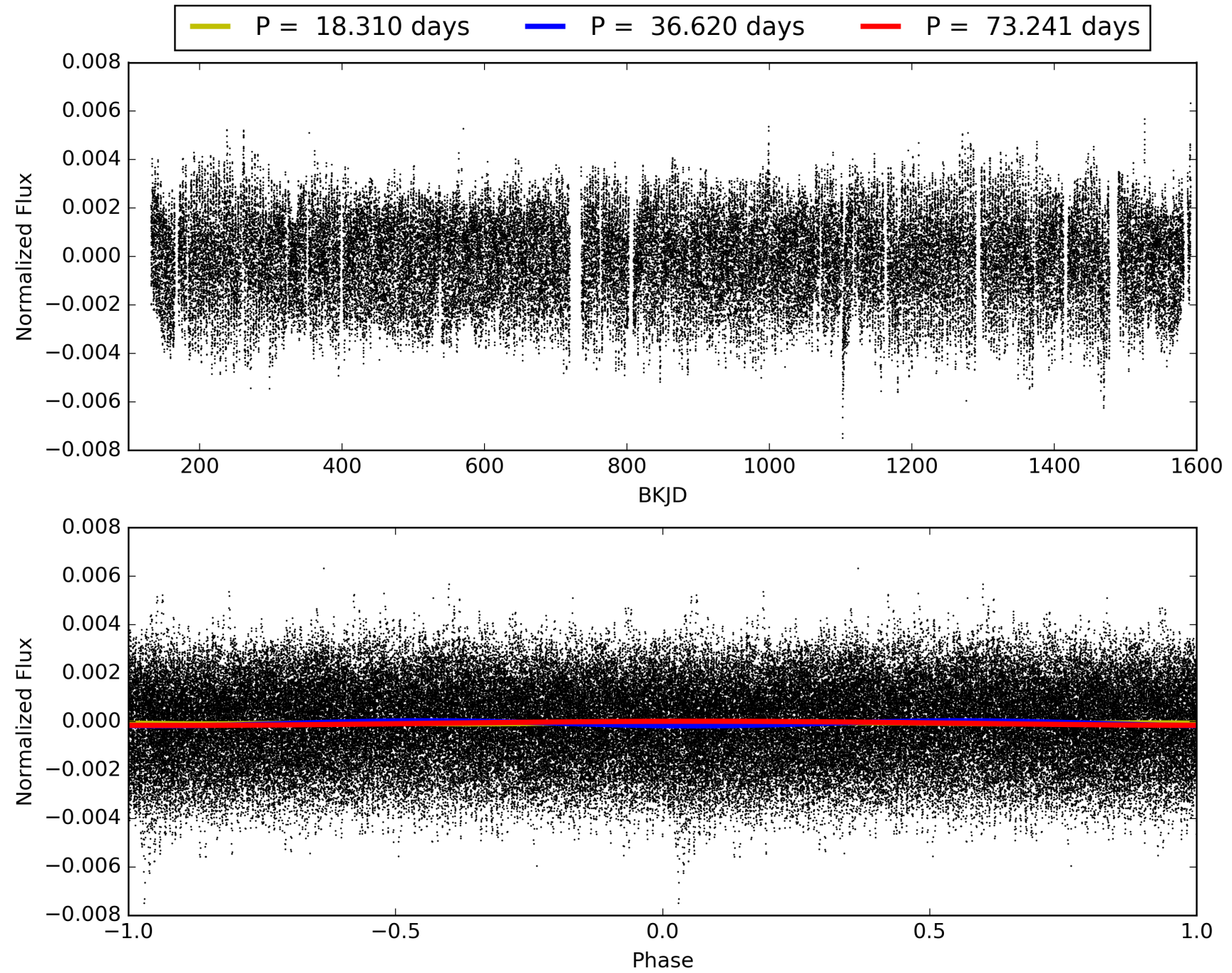
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:37 Z

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

TCE 010470294-05, PDC Light Curves

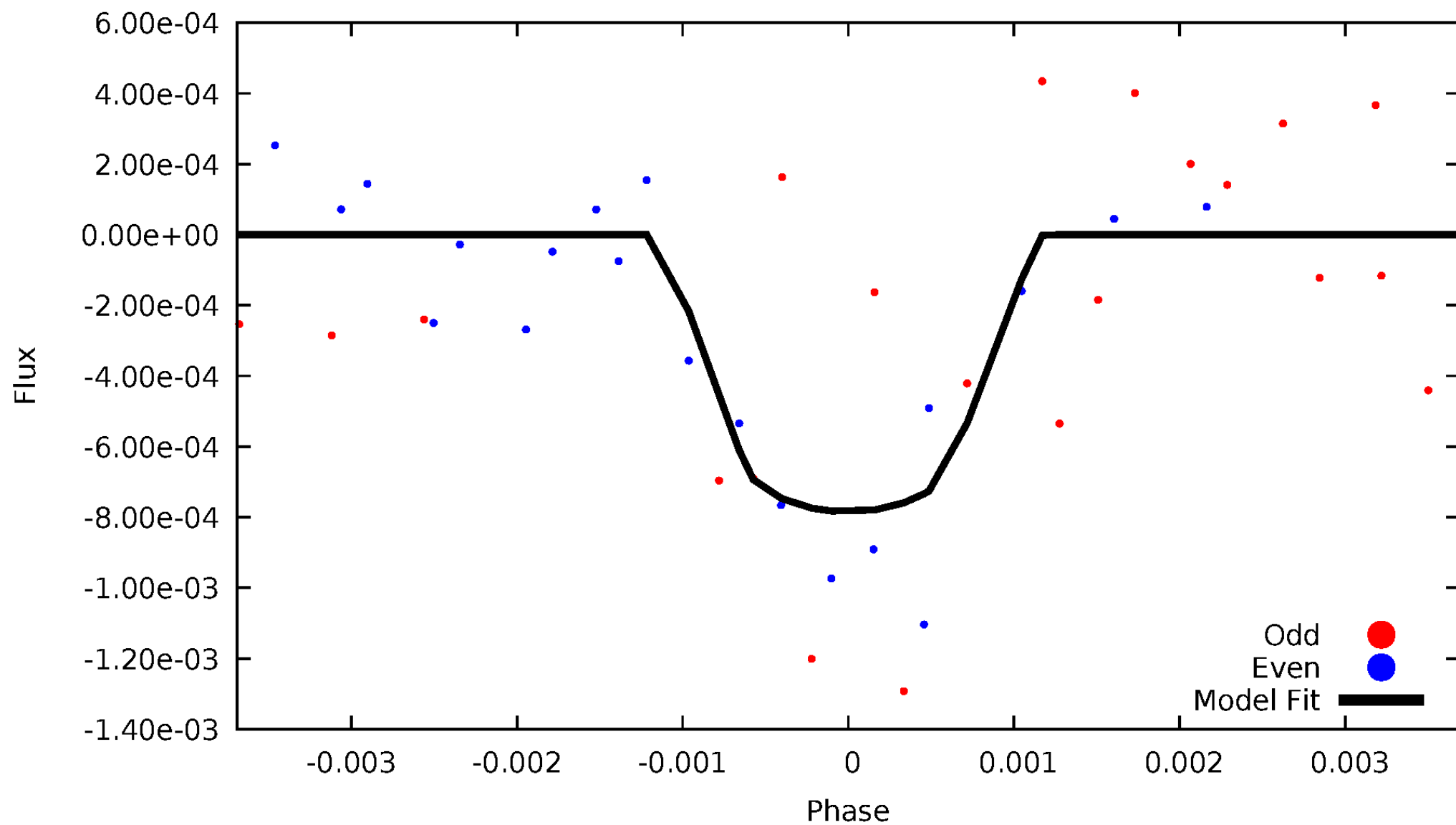


TCE 010470294-05



DV Odd/Even

TCE 010470294-05

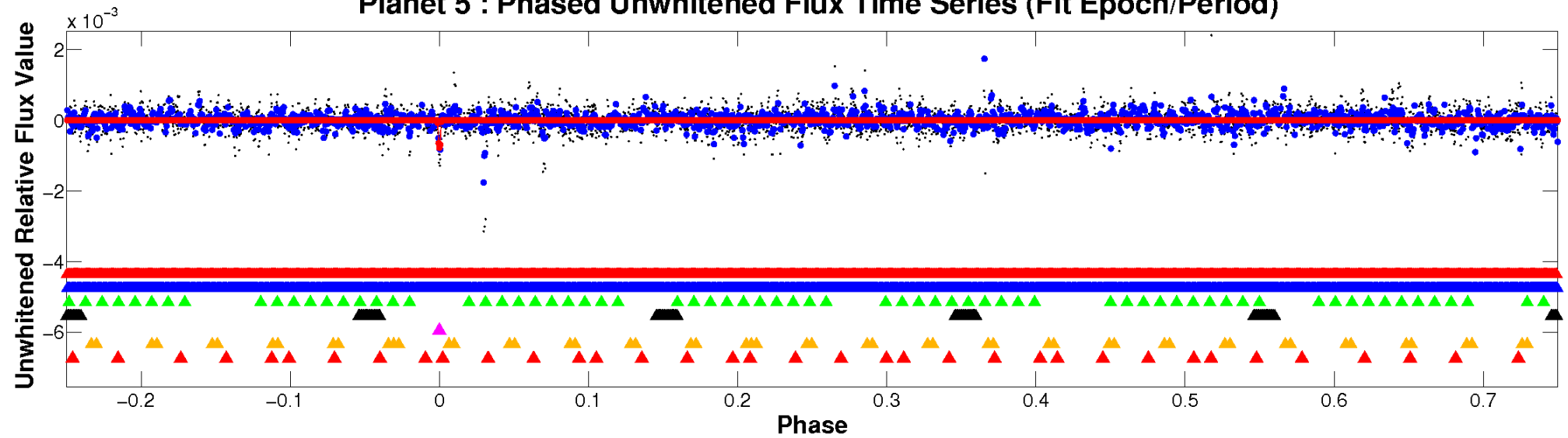


ALT Odd/Even

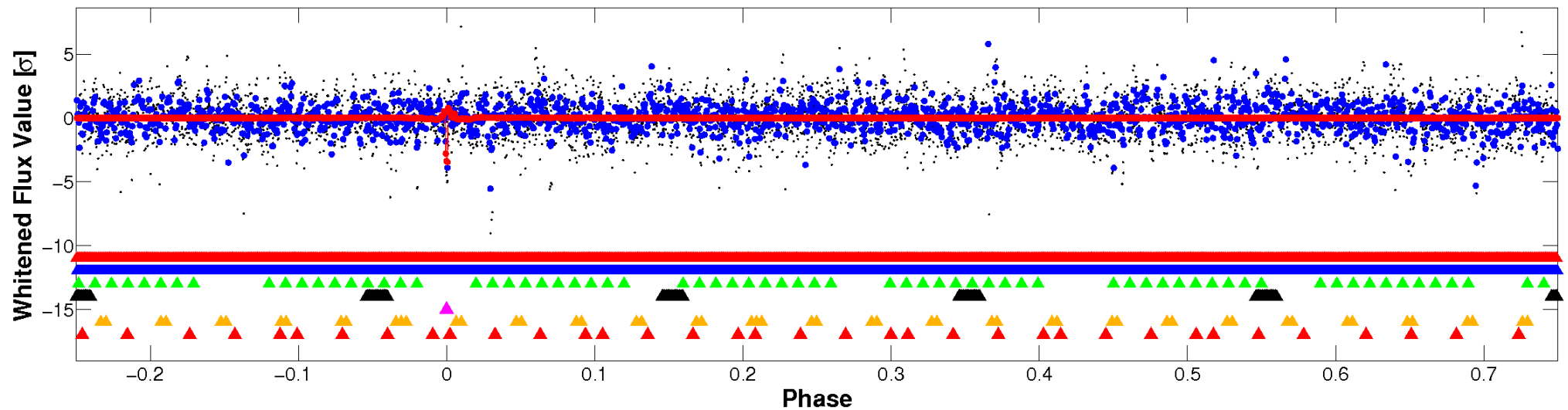
This plot does not exist for this TCE.

Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

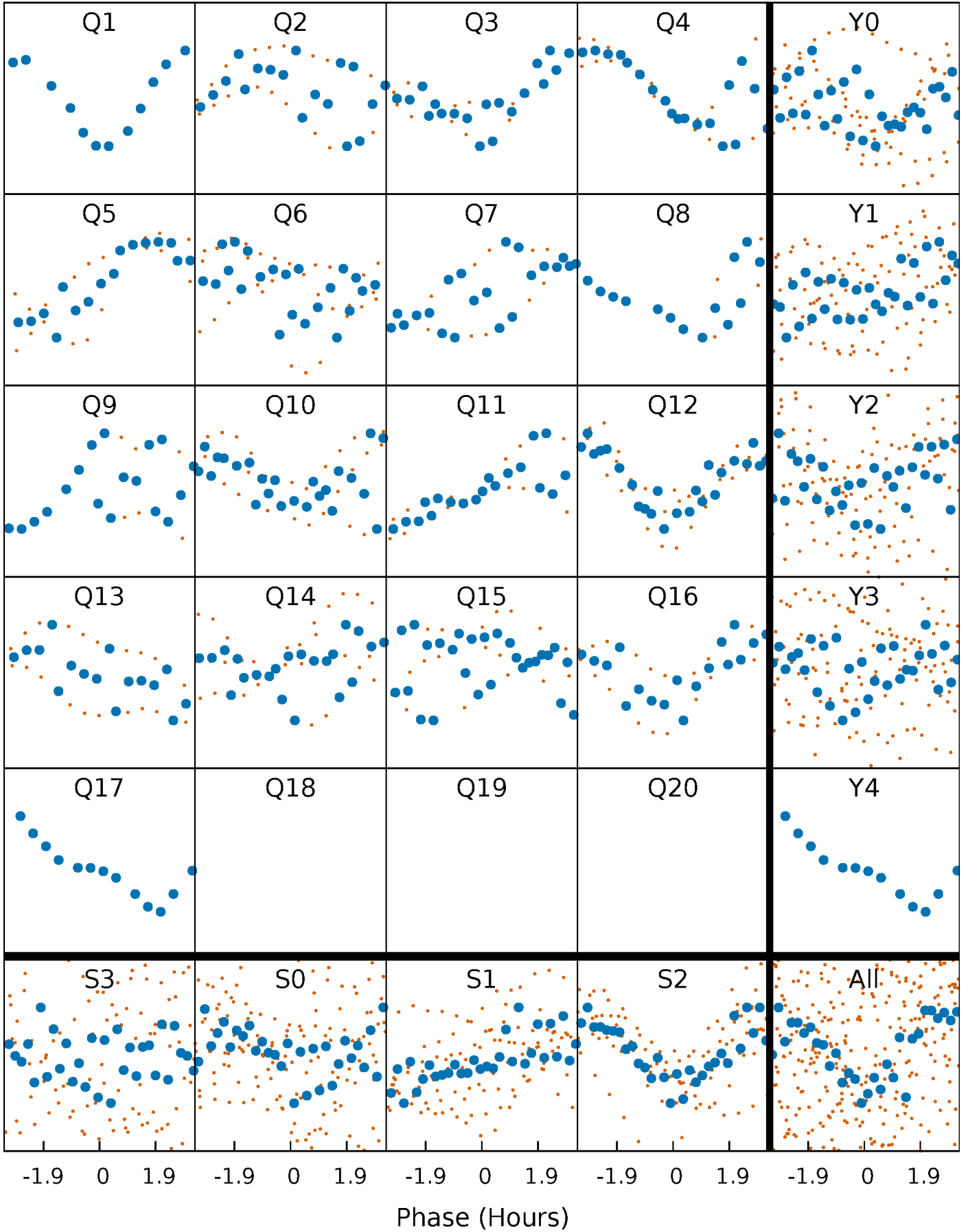


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



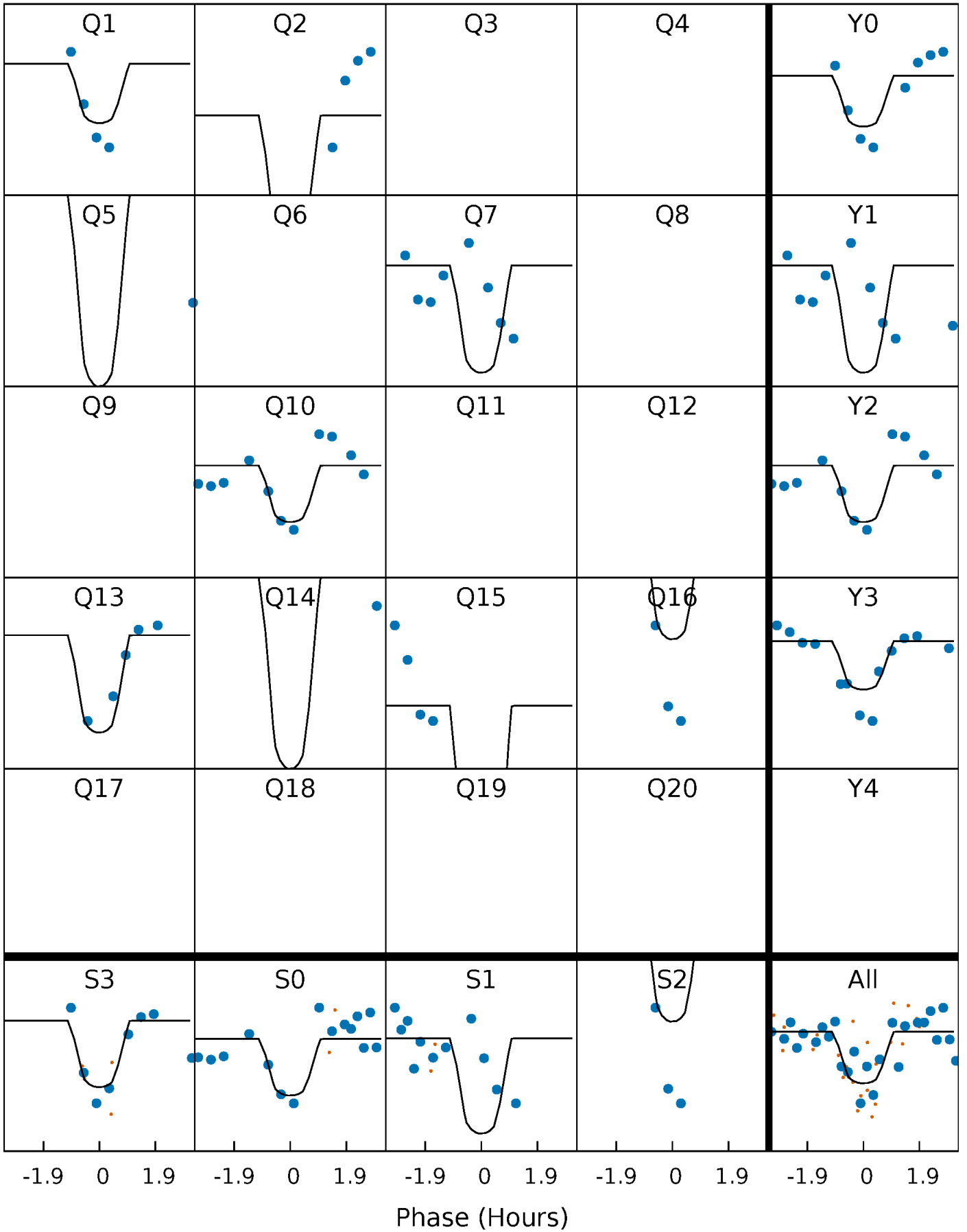
PDC Quarter-Phased Transit Curves

TCE 010470294-05 $P = 36.620359$ Days $T_0 = 149.395812$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 010470294-05 $P = 36.620359$ Days $T_0 = 149.395812$ (BKJD)

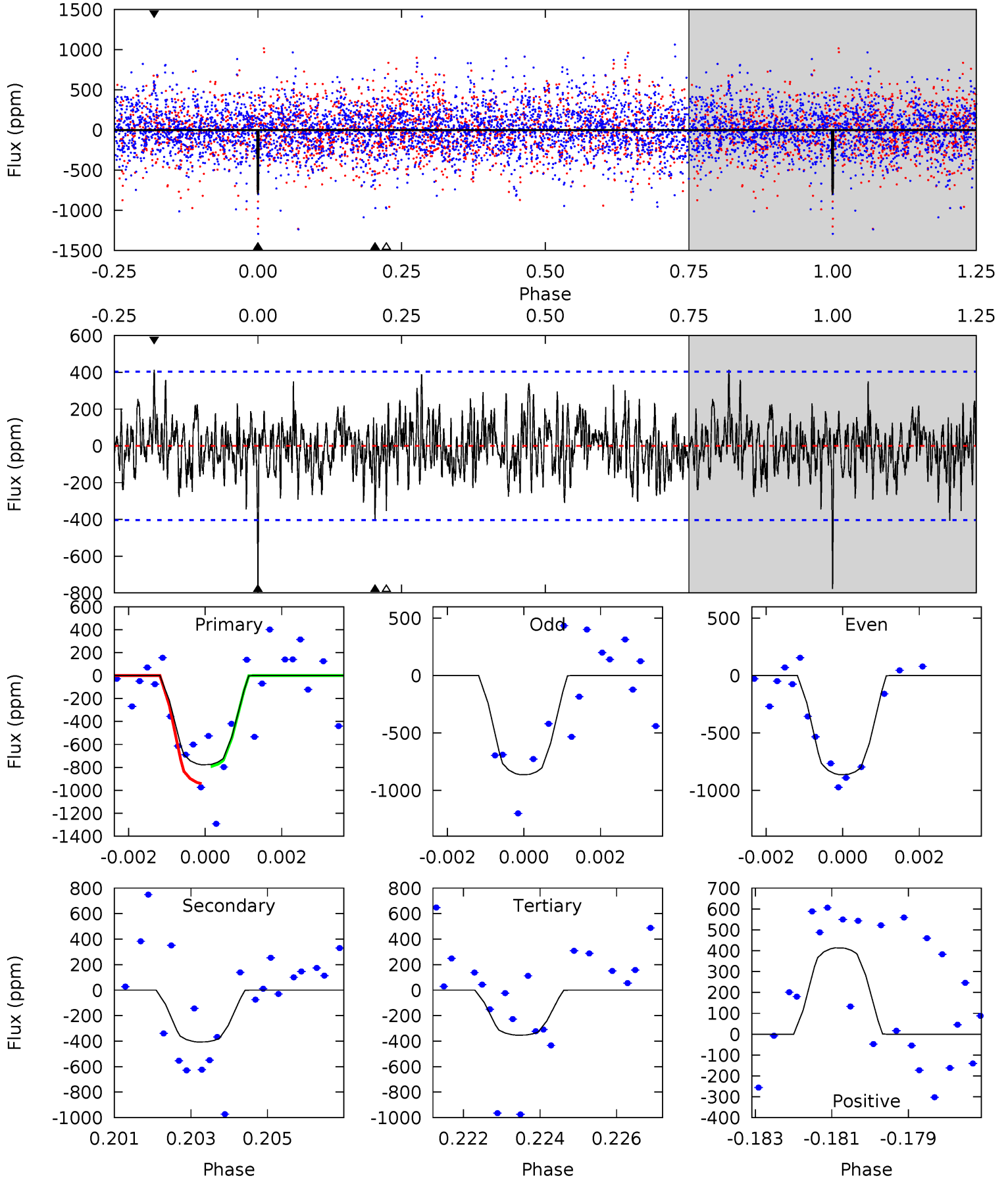


This plot does not exist for this TCE.

DV Model-Shift Uniqueness Test

010470294-05, P = 36.620359 Days, E = 112.775453 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	5.36	4.66	5.45	5.32	3.08	1.55	5.60	4.80	0.71	-0.09	0.00	0.87	0.35	0.92



Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-407 ± 76	$10.49^{+10.11}_{-6.98}$	1618^{+102}_{-220}	5904^{+5073}_{-1431}	140^{+990}_{-106}
Alt.	N/A	N/A	N/A	N/A	N/A

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 $A_{obs} \gg 1.0$

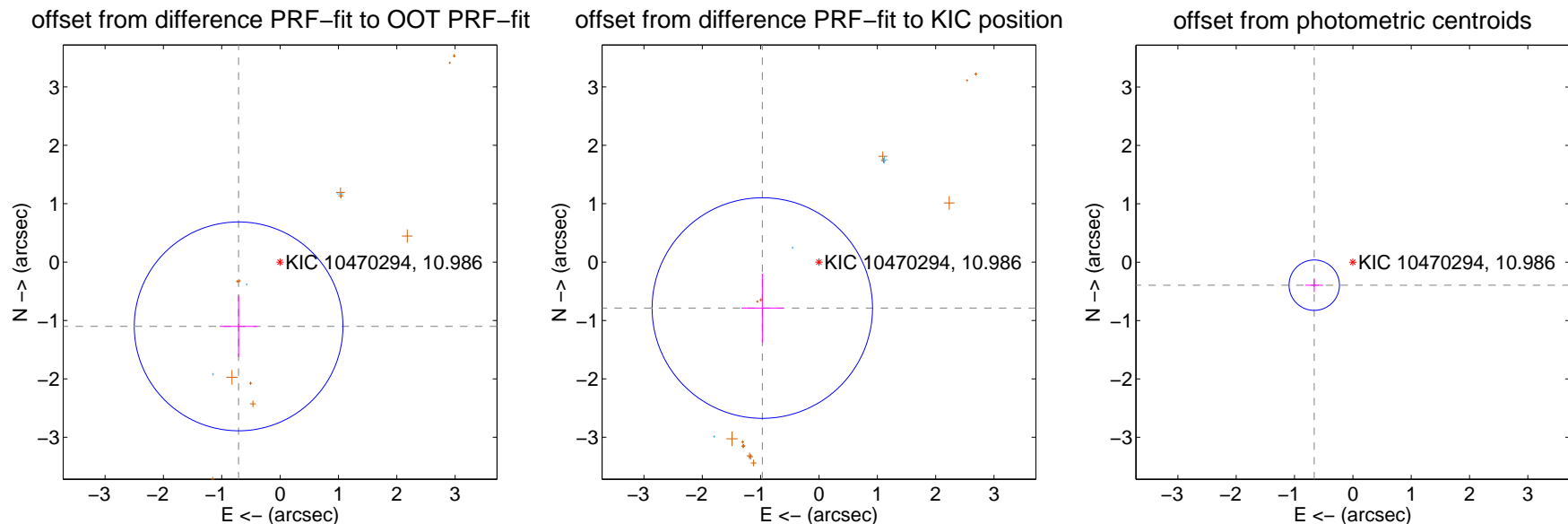
DV Centroid Data

Supplemental centroid analysis for 010470294-05. **Kepler magnitude: 10.99.** Transit SNR 11.58

There are 3 quarters with good PRF difference image offsets

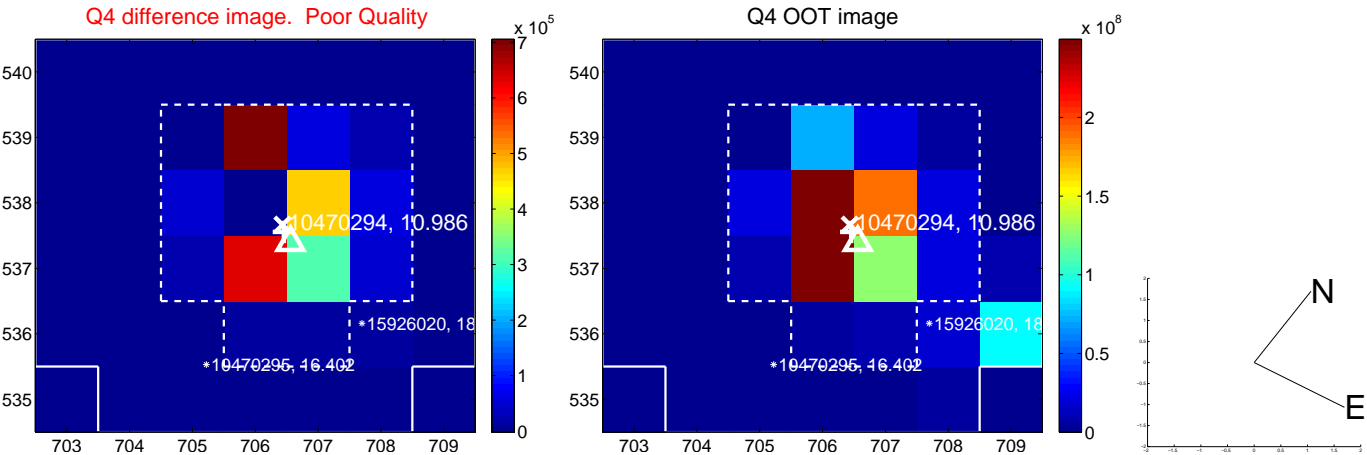
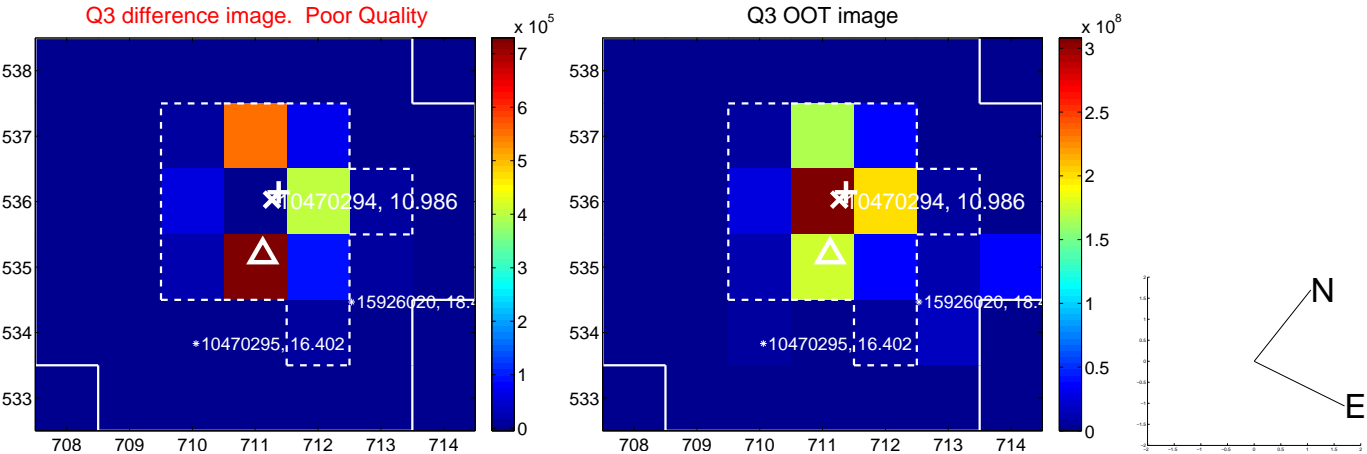
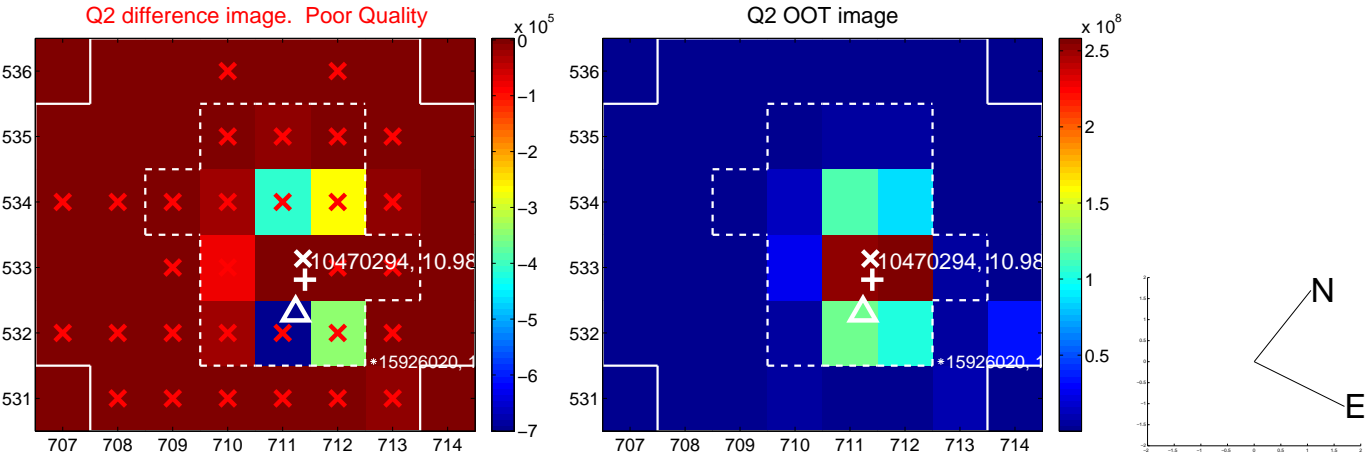
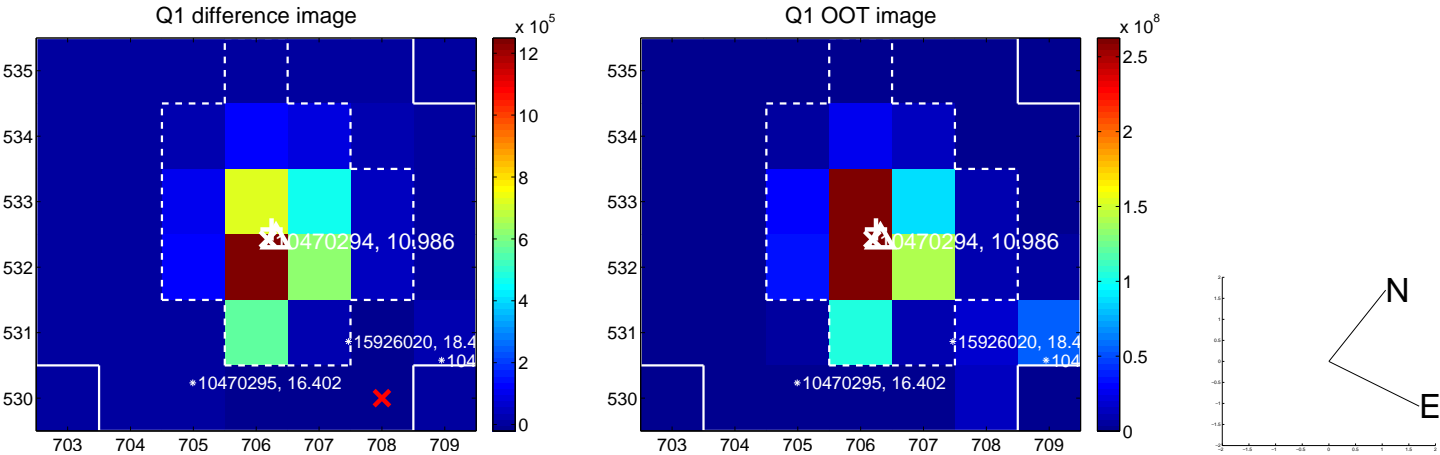
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.311 ± 0.596	2.20	0.711 ± 0.323	-1.101 ± 0.526
PRF-fit source offset from KIC position	1.250 ± 0.630	1.99	0.971 ± 0.356	-0.787 ± 0.589
photometric centroid source offset	0.77 ± 0.14	5.35	0.66 ± 0.15	-0.39 ± 0.12

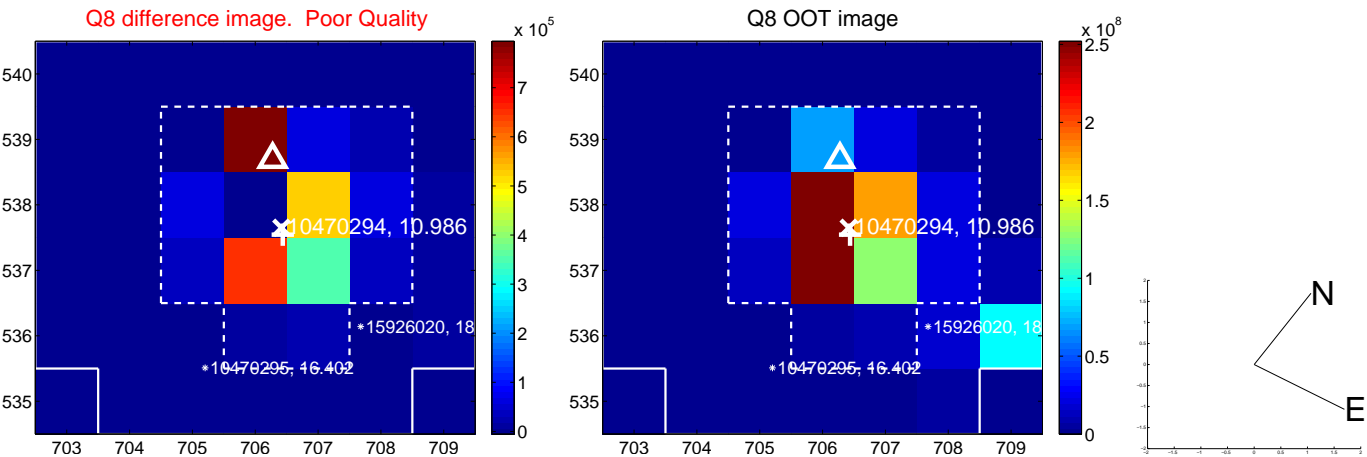
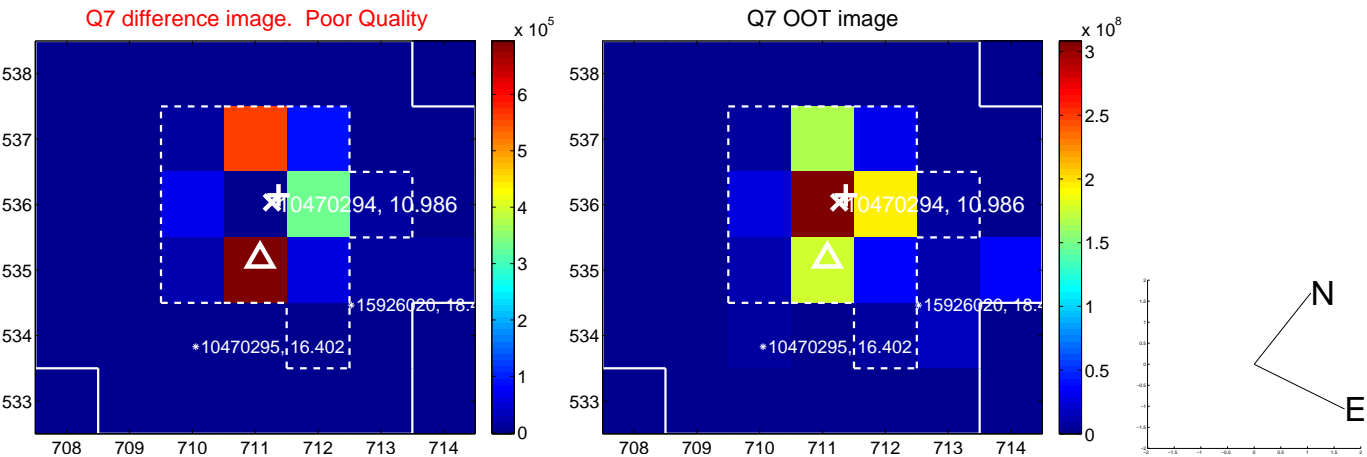
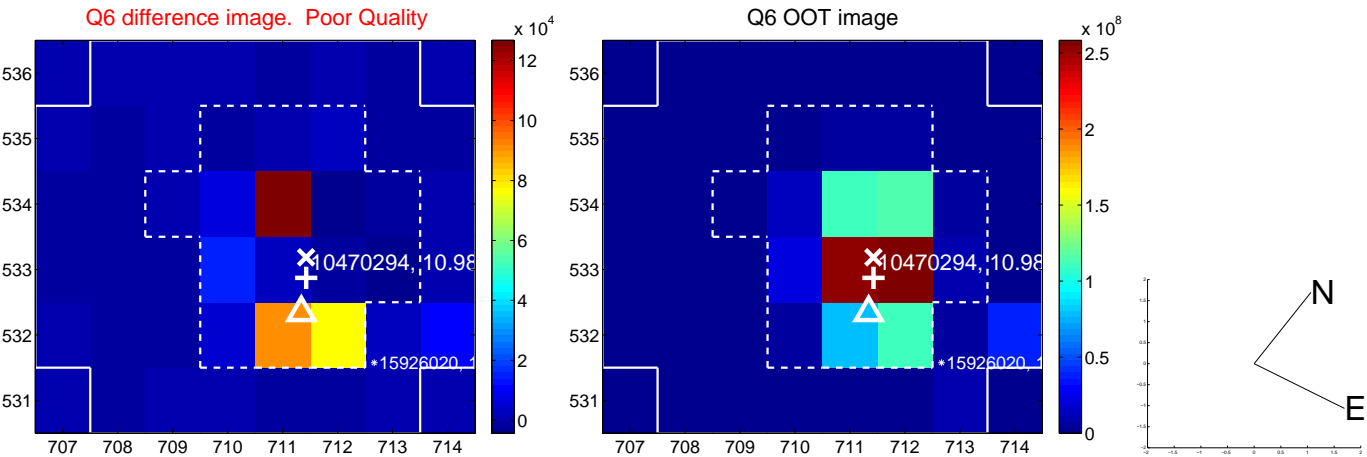
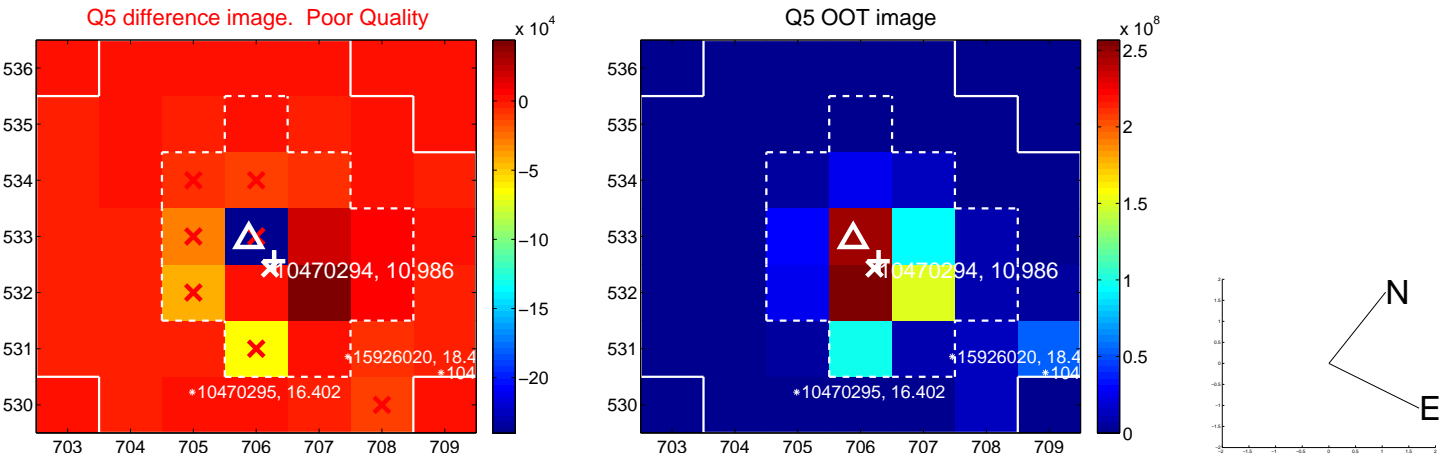


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

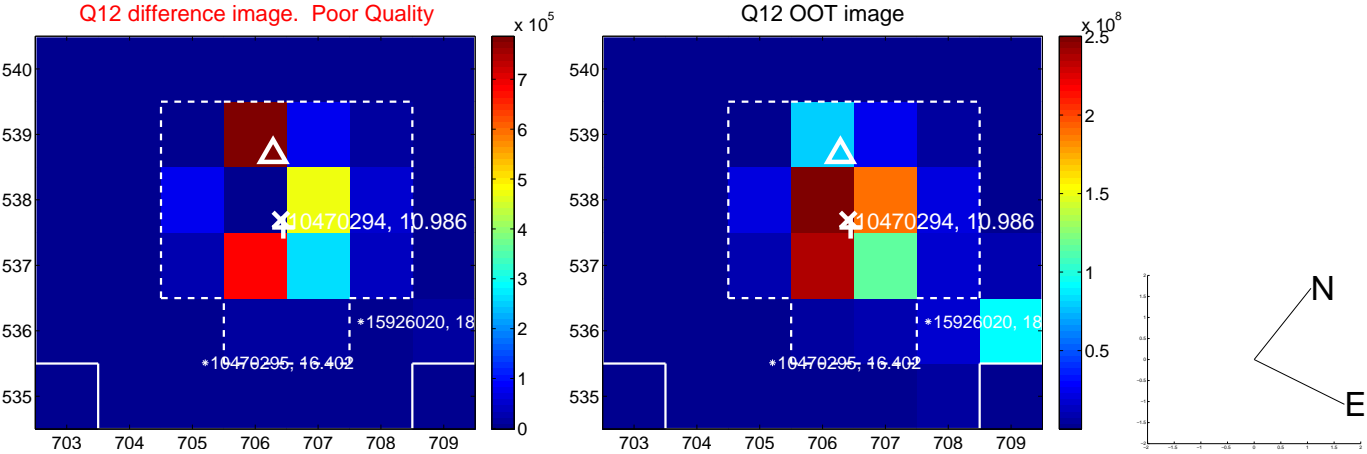
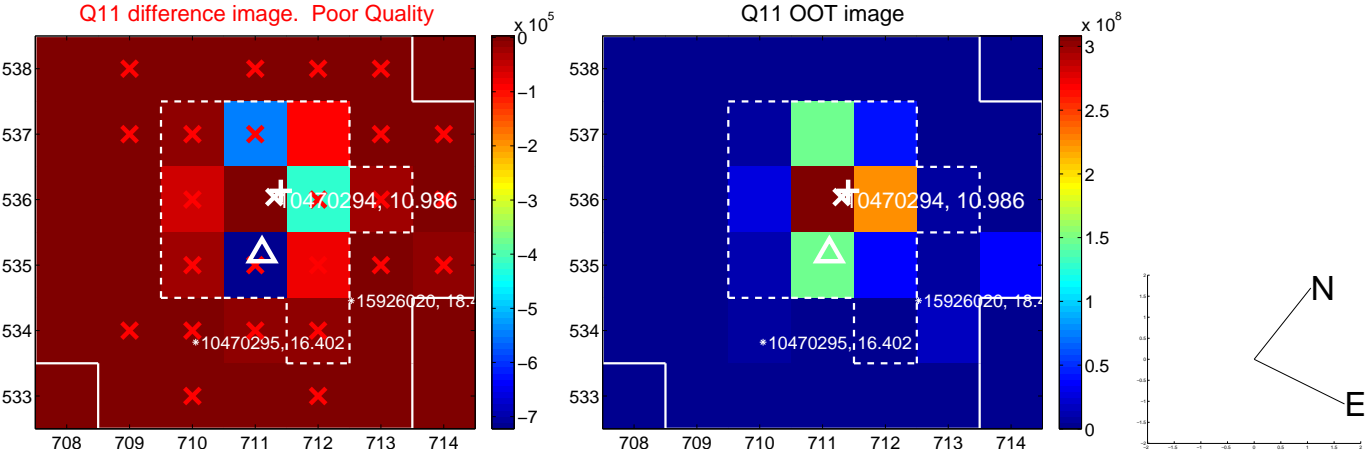
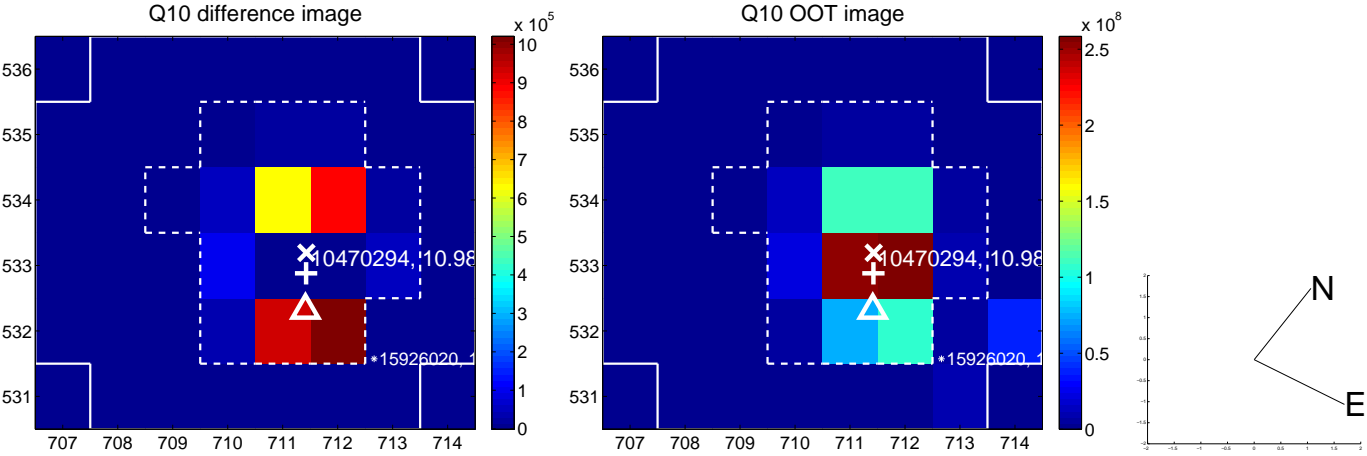
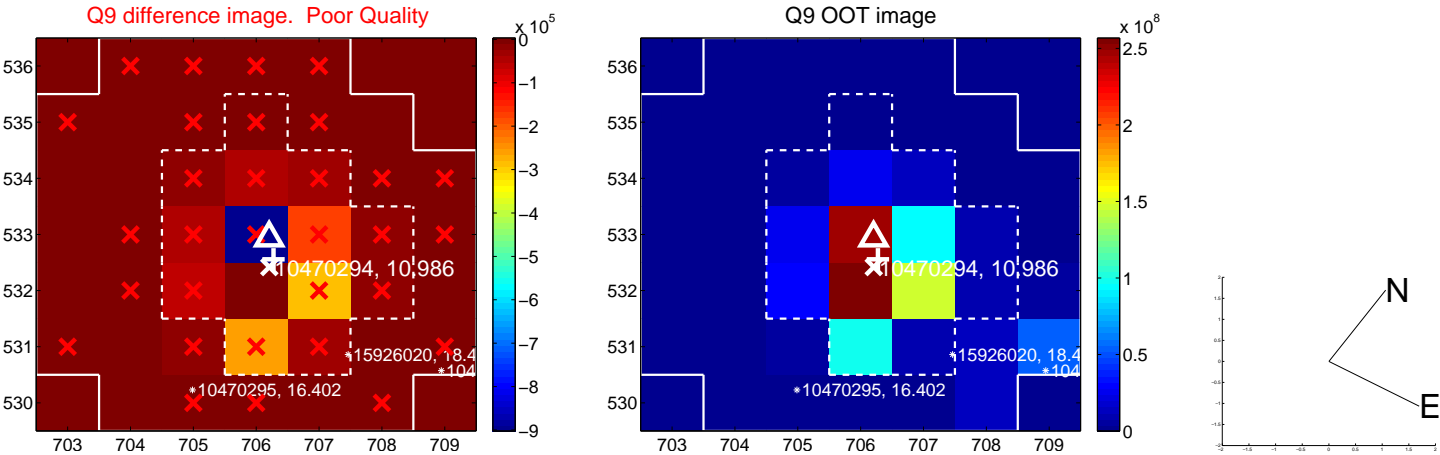
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



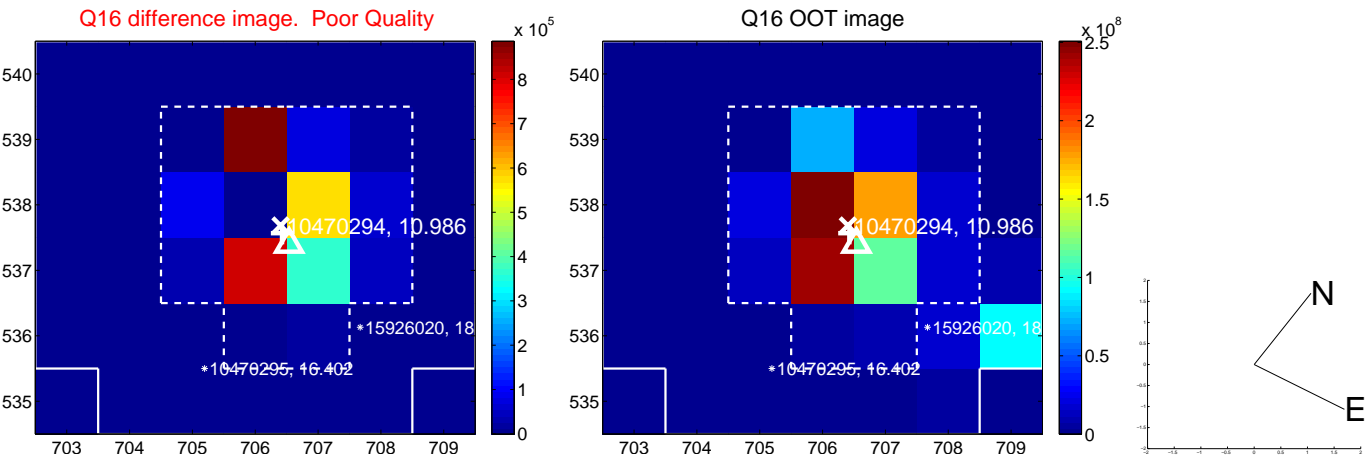
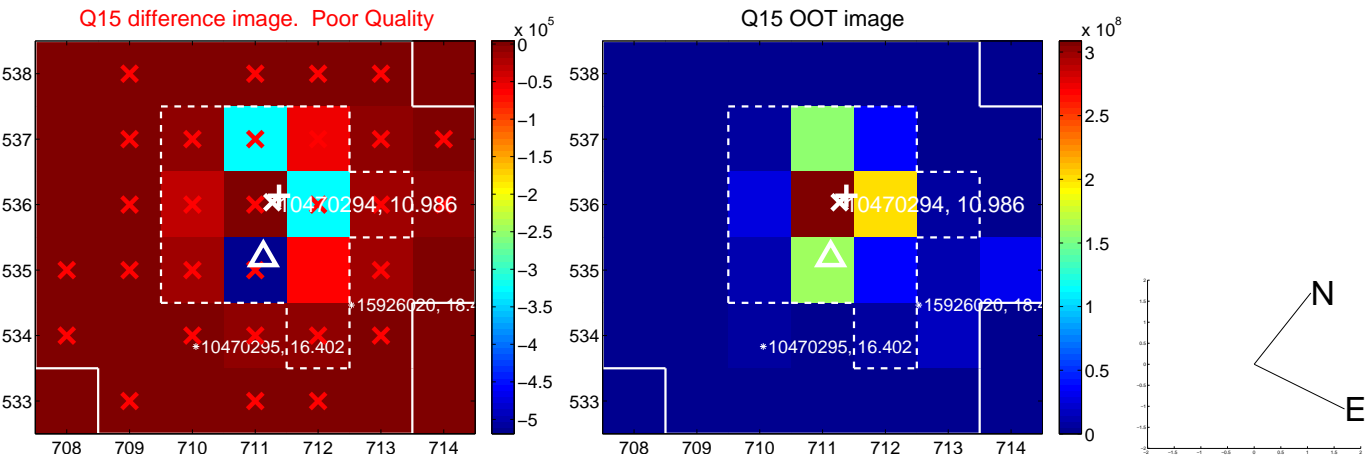
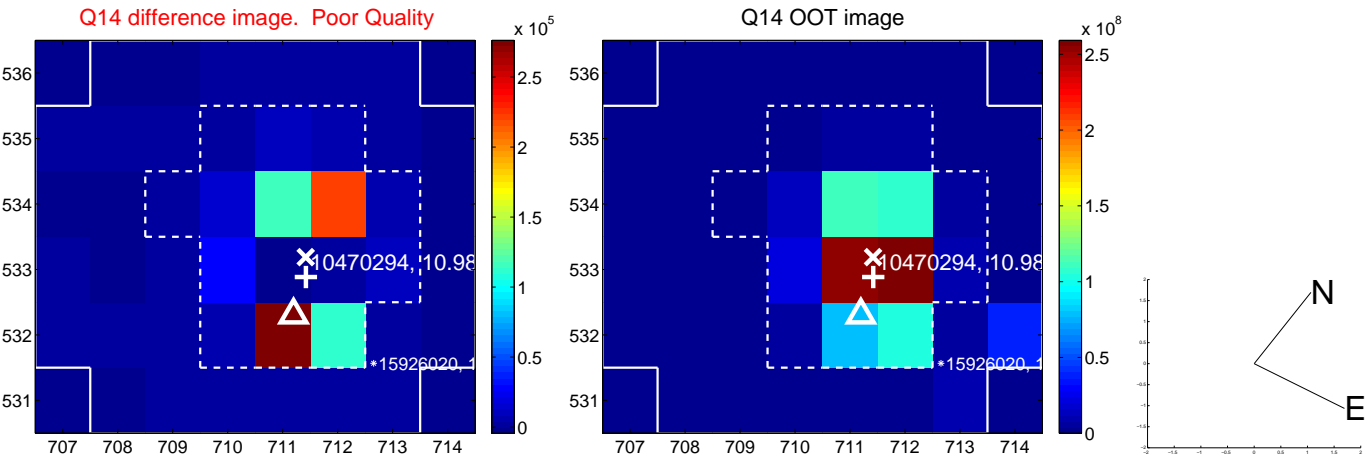
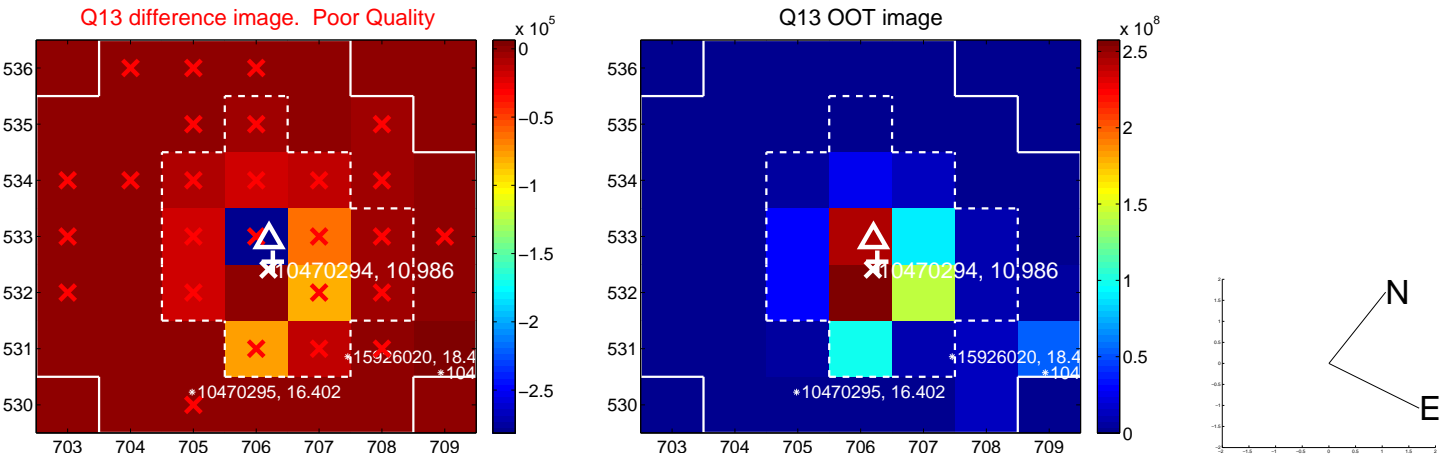
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



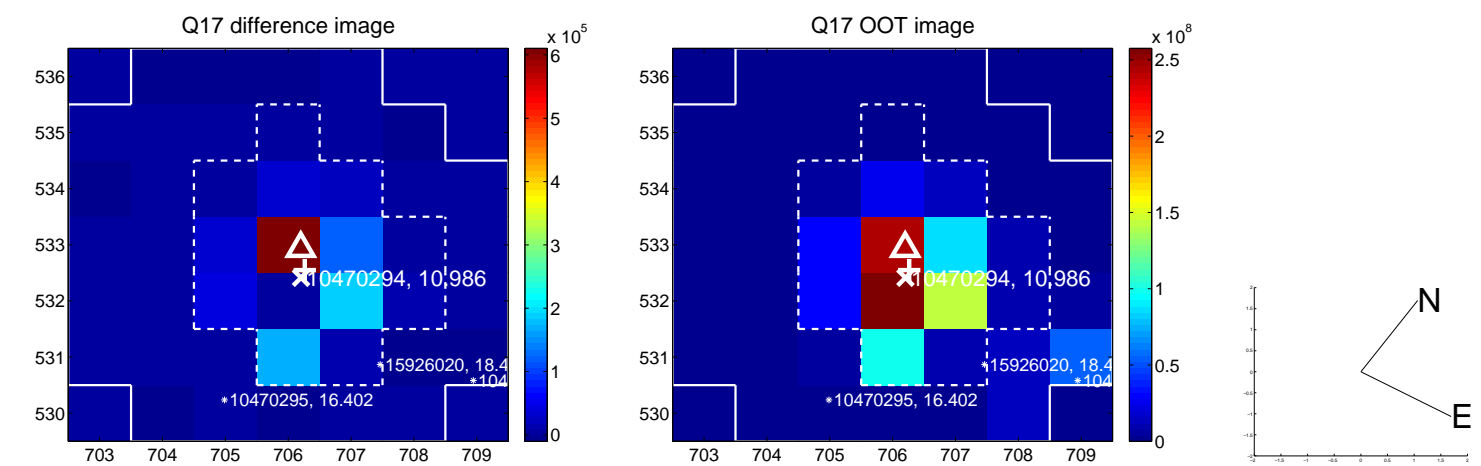
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



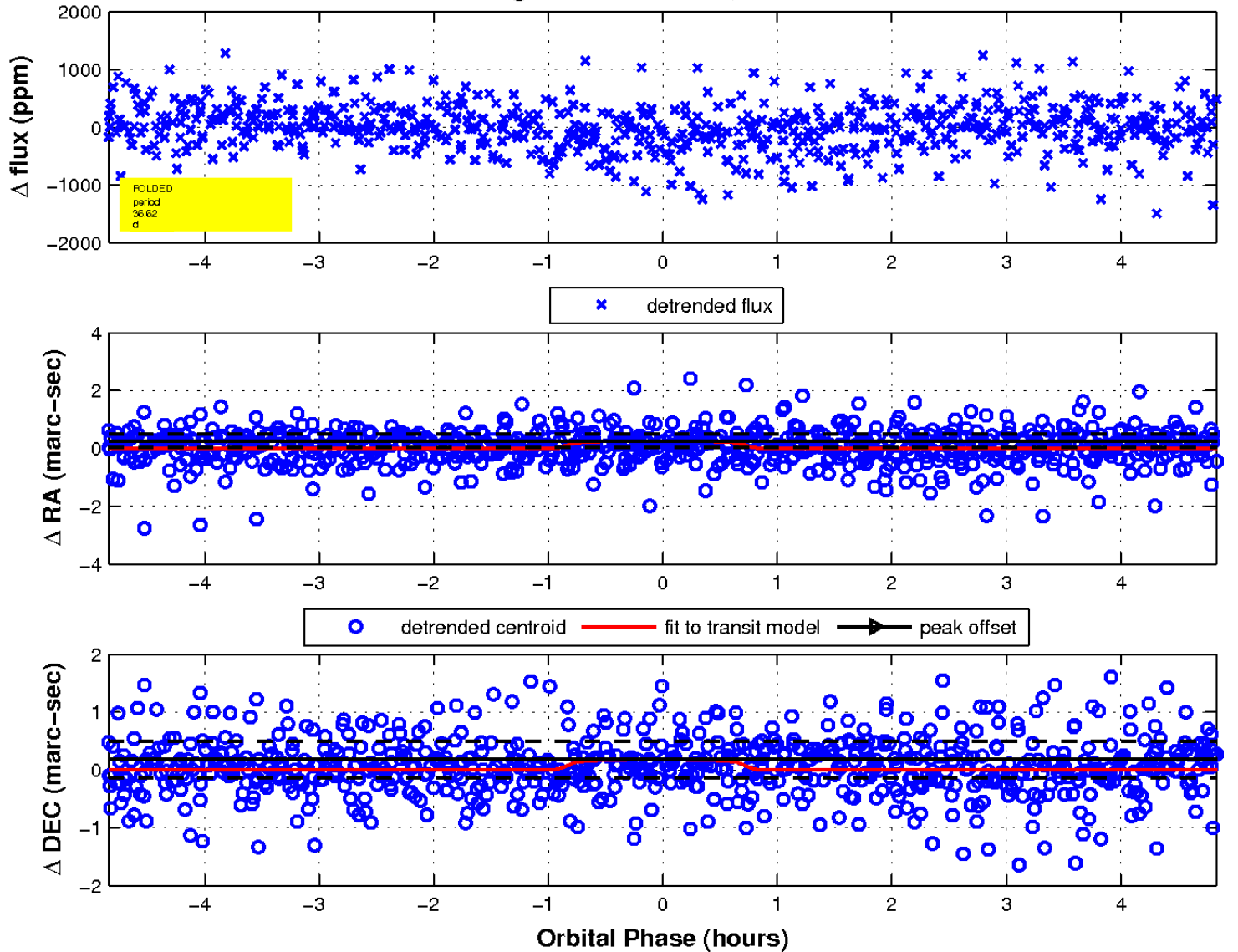
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

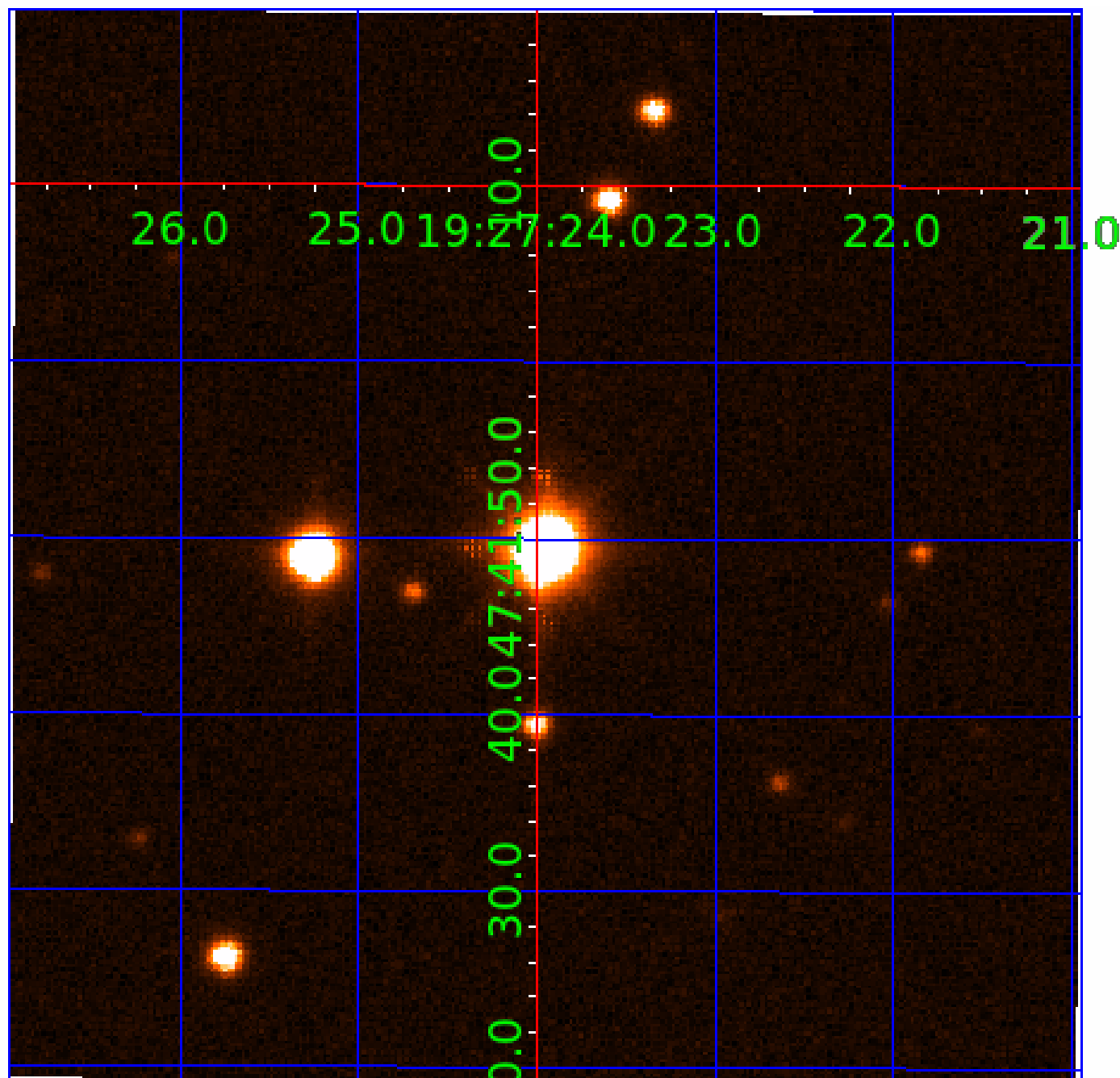


fluxWeightedCentroids, Planet 5 of 7



UKIRT Image

Declination



KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
010470294-05	OBS	No	36.620359	149.395812	784.4	1.620	15.3	11.6	3.67	7186	10.35	464.21
010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

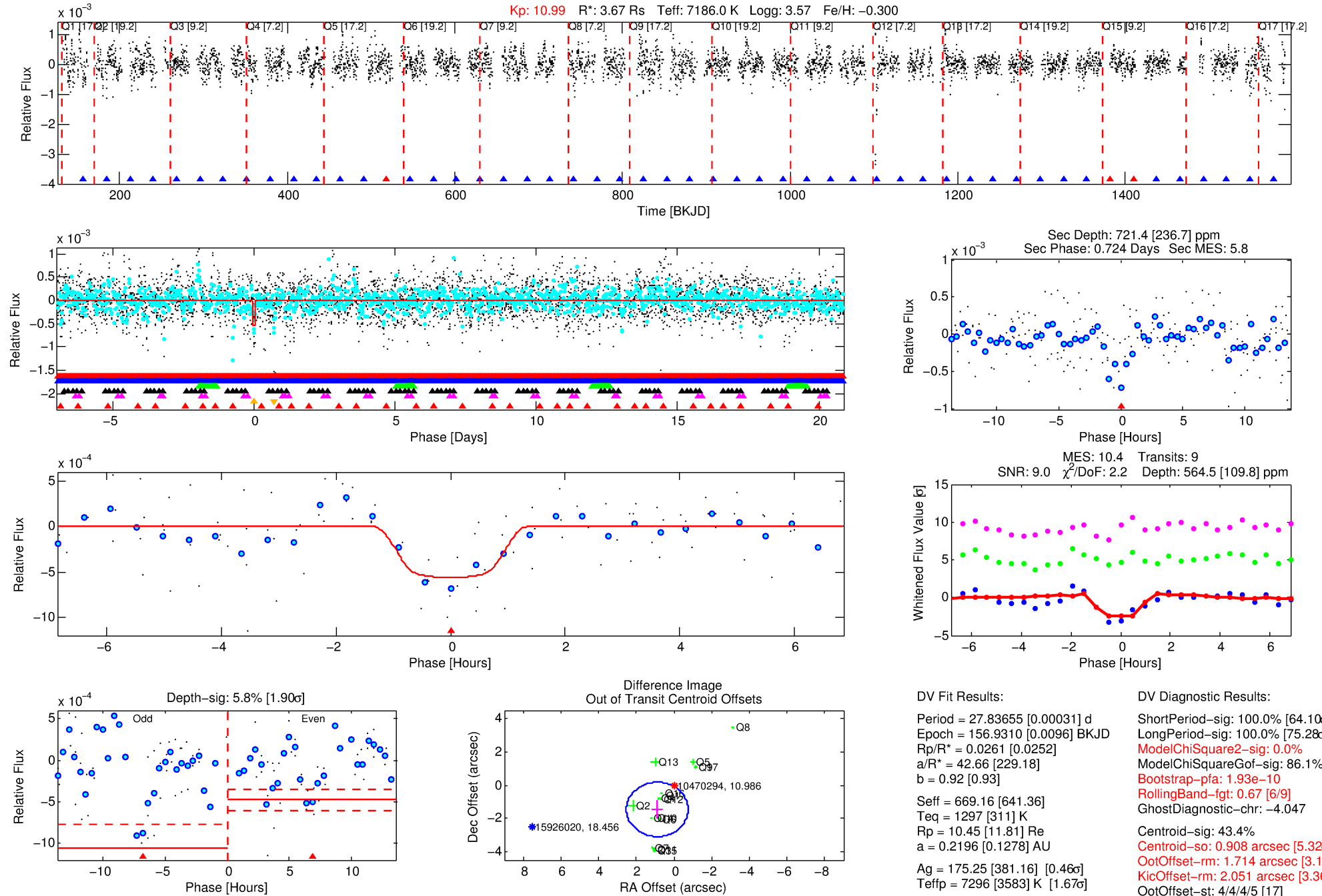
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-06

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 6 of 7 Period: 27.837 d



DV Fit Results:

Period = 27.83655 [0.00031] d
Epoch = 156.9310 [0.0096] BKJD
Rp/R* = 0.0261 [0.0252]
a/R* = 42.66 [229.18]
b = 0.92 [0.93]
Seff = 669.16 [641.36]
Teff = 1297 [311] K
Rp = 10.45 [11.81] Re
a = 0.2196 [0.1278] AU
Ag = 175.25 [381.16] [0.46σ]
Teffp = 7296 [3583] K [1.67σ]

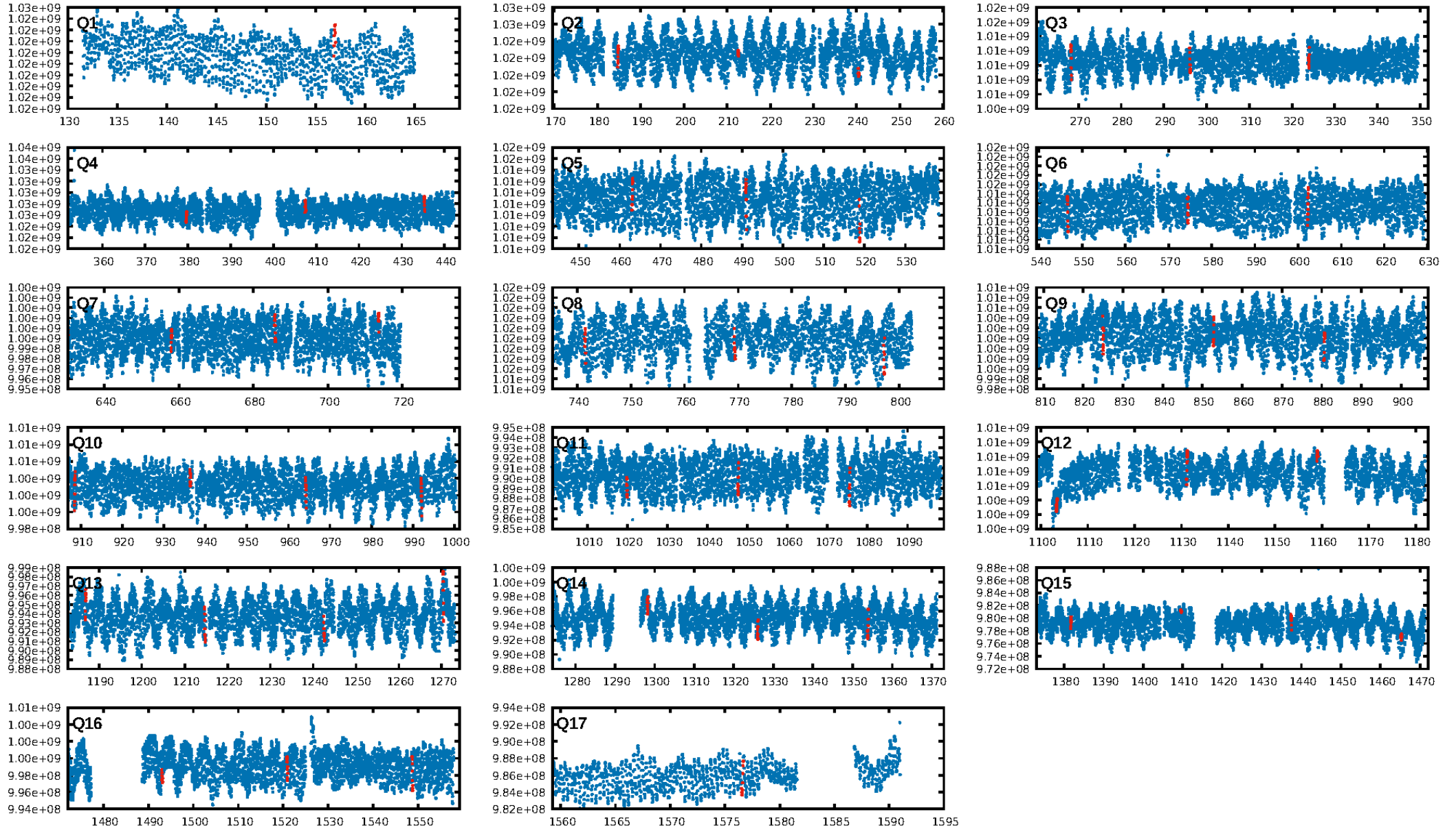
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [64.10σ]
LongPeriod-sig: 100.0% [75.28σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 86.1%
Bootstrap-pfa: 1.93e-10
RollingBand-fgt: 0.67 [6/9]
GhostDiagnostic-chr: -4.047
Centroid-sig: 43.4%
Centroid-so: 0.908 arcsec [5.32σ]
OotOffset-rm: 1.714 arcsec [3.14σ]
KicOffset-rm: 2.051 arcsec [3.36σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.29 [5/17]
DiffImageOverlap-fno: 0.00 [0/17]

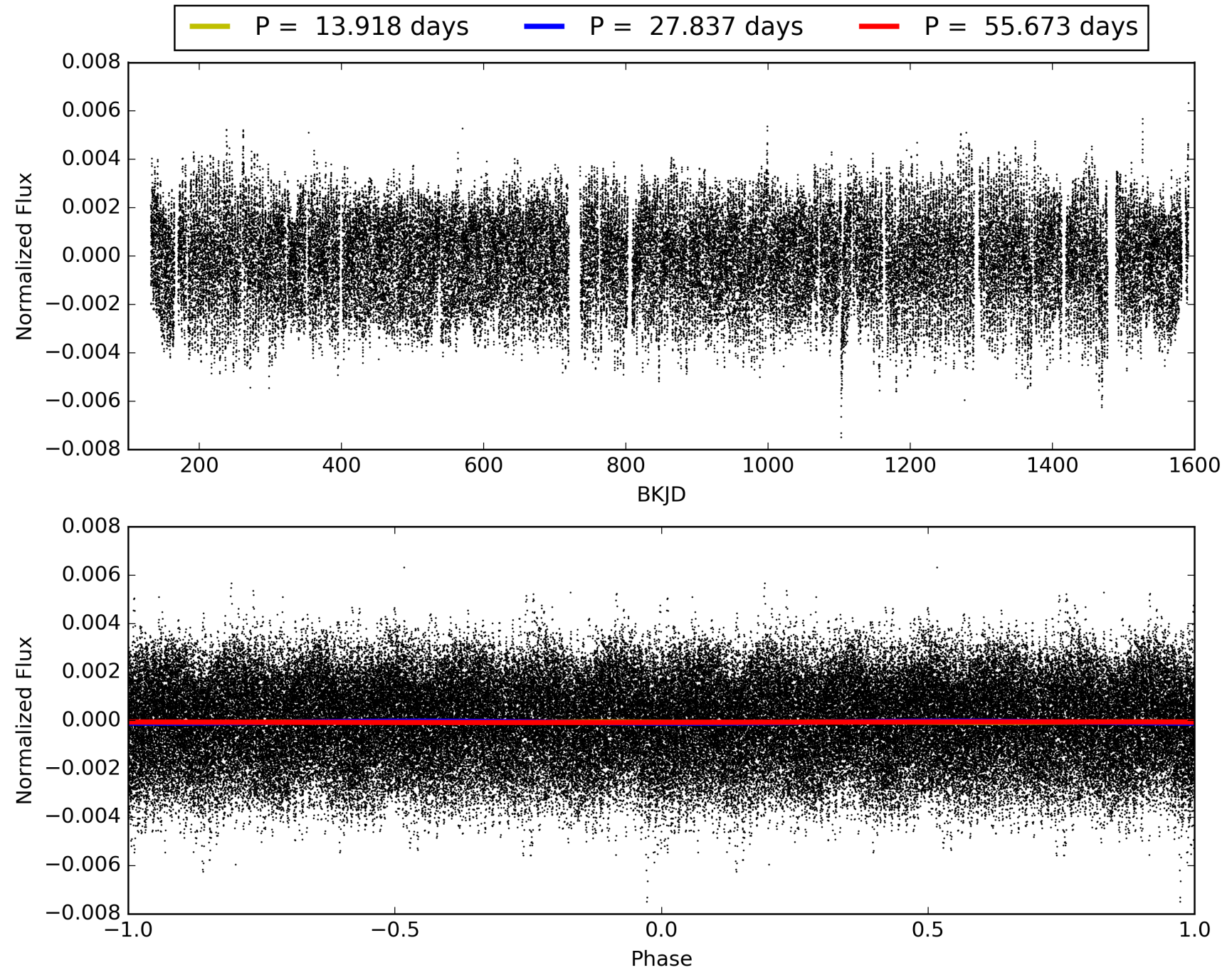
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:41:40 Z

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TCE 010470294-06, PDC Light Curves

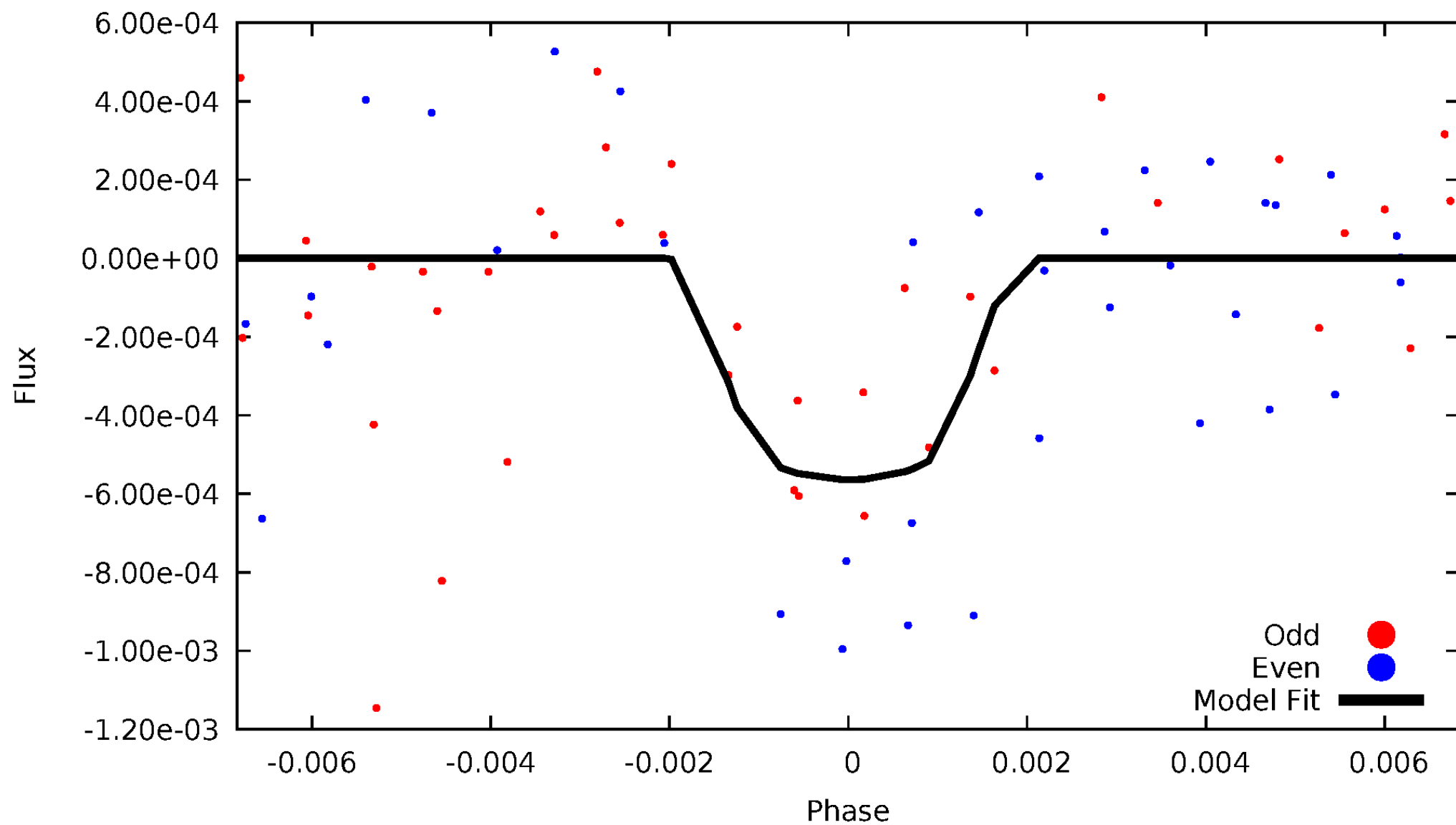


TCE 010470294-06



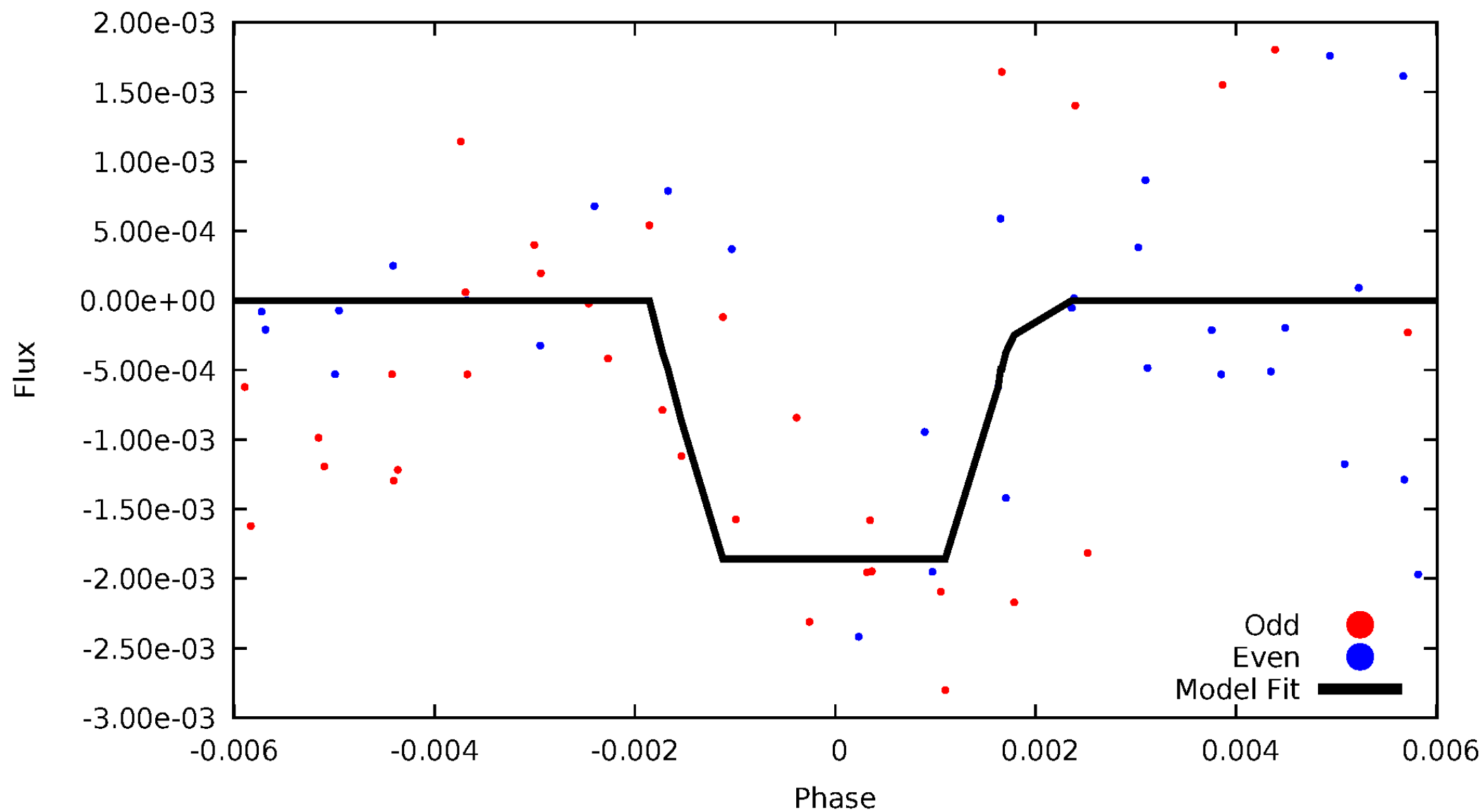
DV Odd/Even

TCE 010470294-06



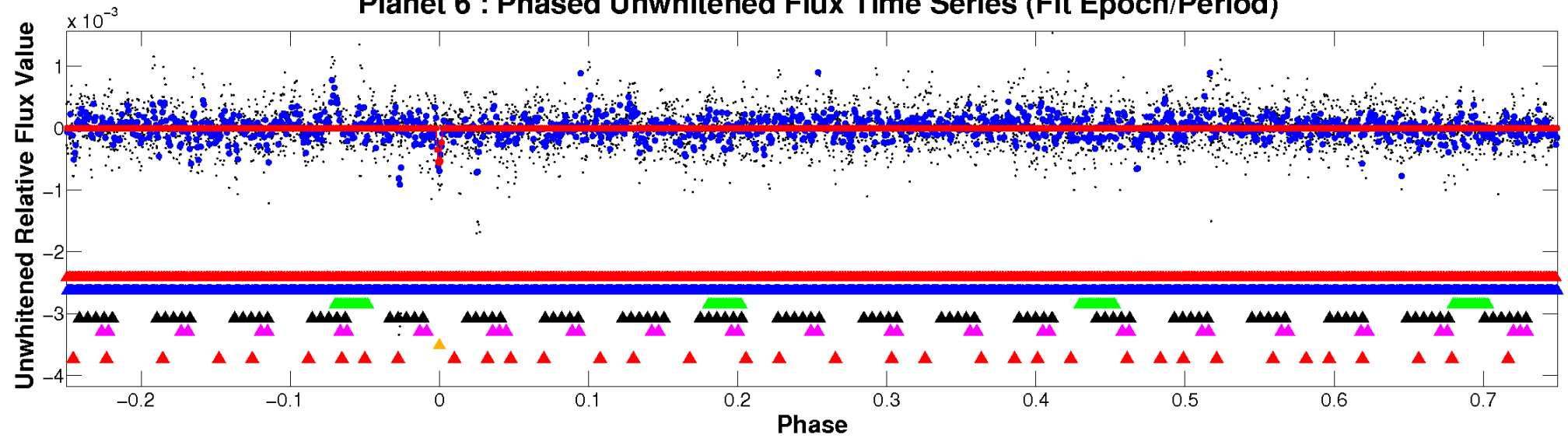
ALT Odd/Even

TCE 010470294-06

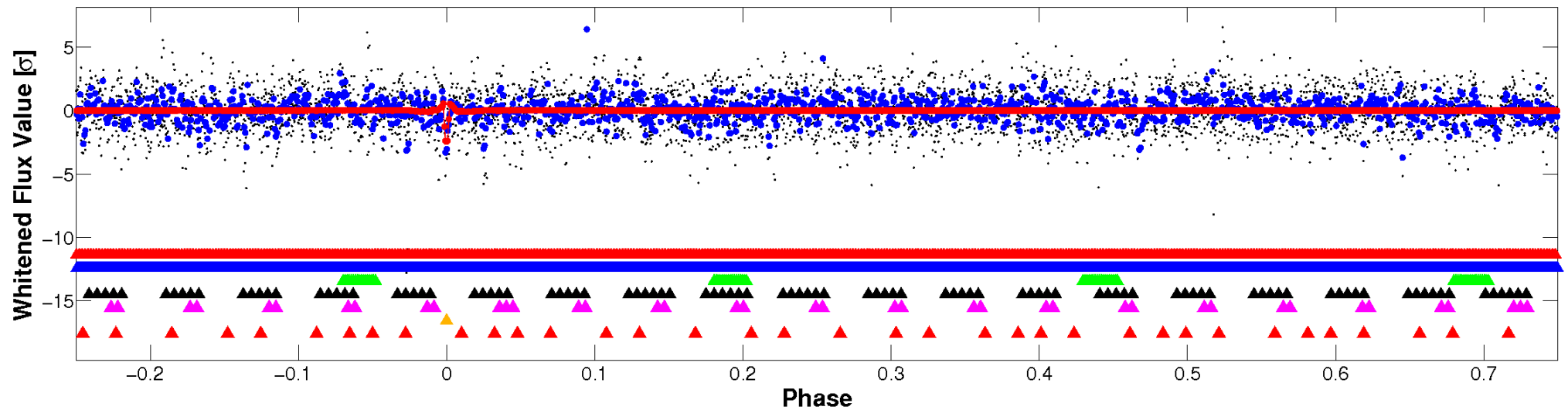


Non-Whitened Vs. Whitened Light Curve

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

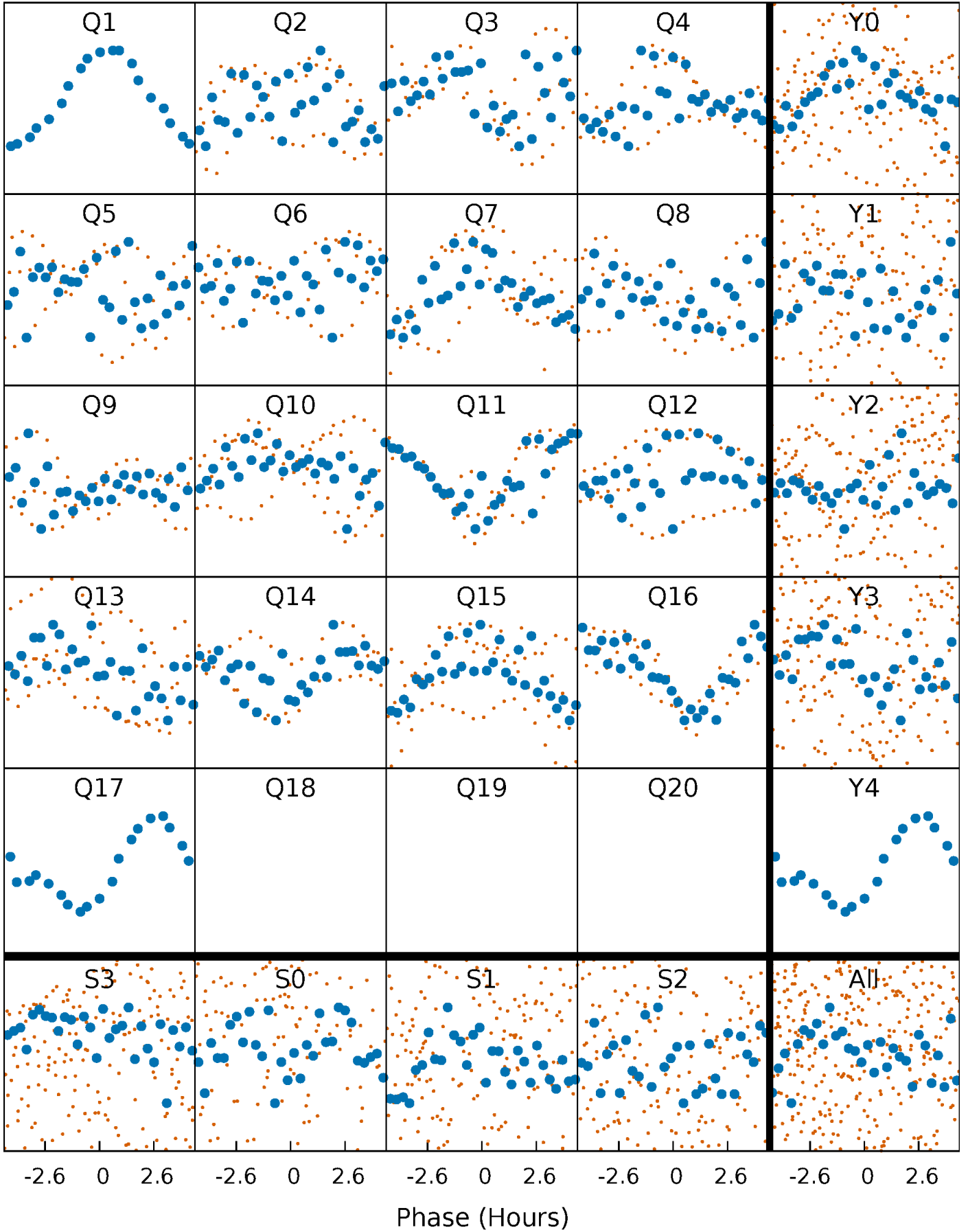


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



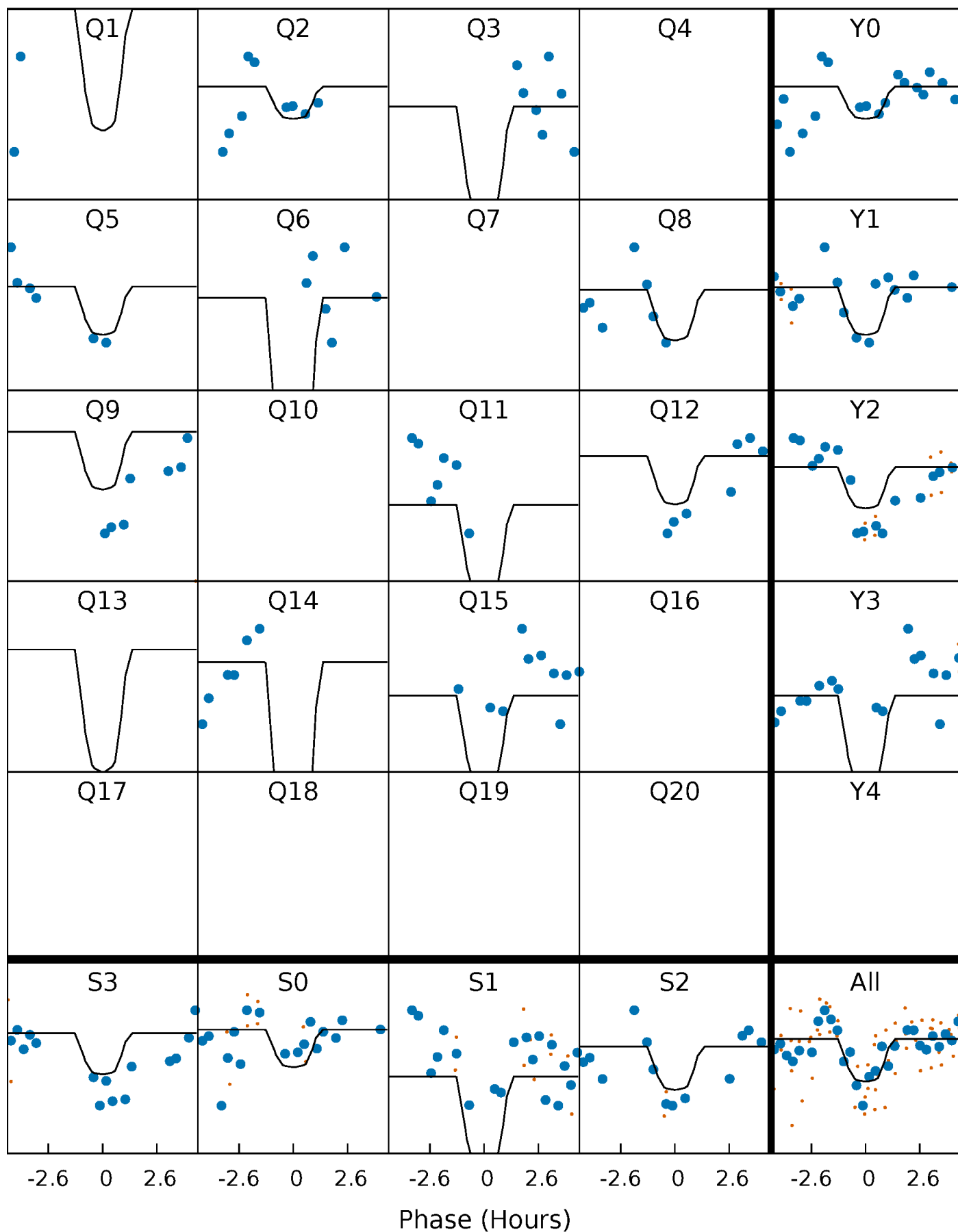
PDC Quarter-Phased Transit Curves

TCE 010470294-06 P= 27.836545 Days $T_0=156.931039$ (BKJD)



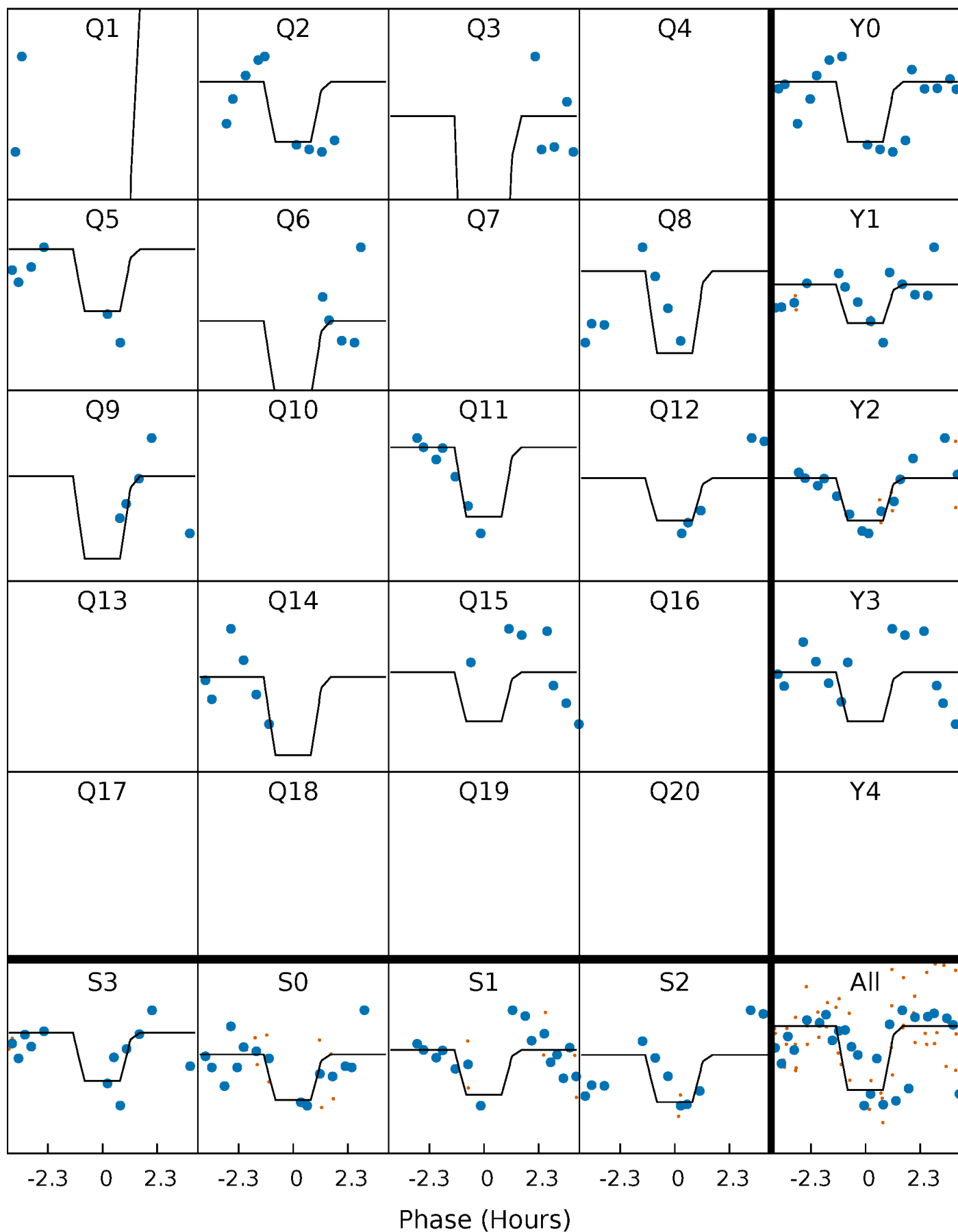
DV Quarter-Phased Transit Curves

TCE 010470294-06 P= 27.836545 Days $T_0=156.931039$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

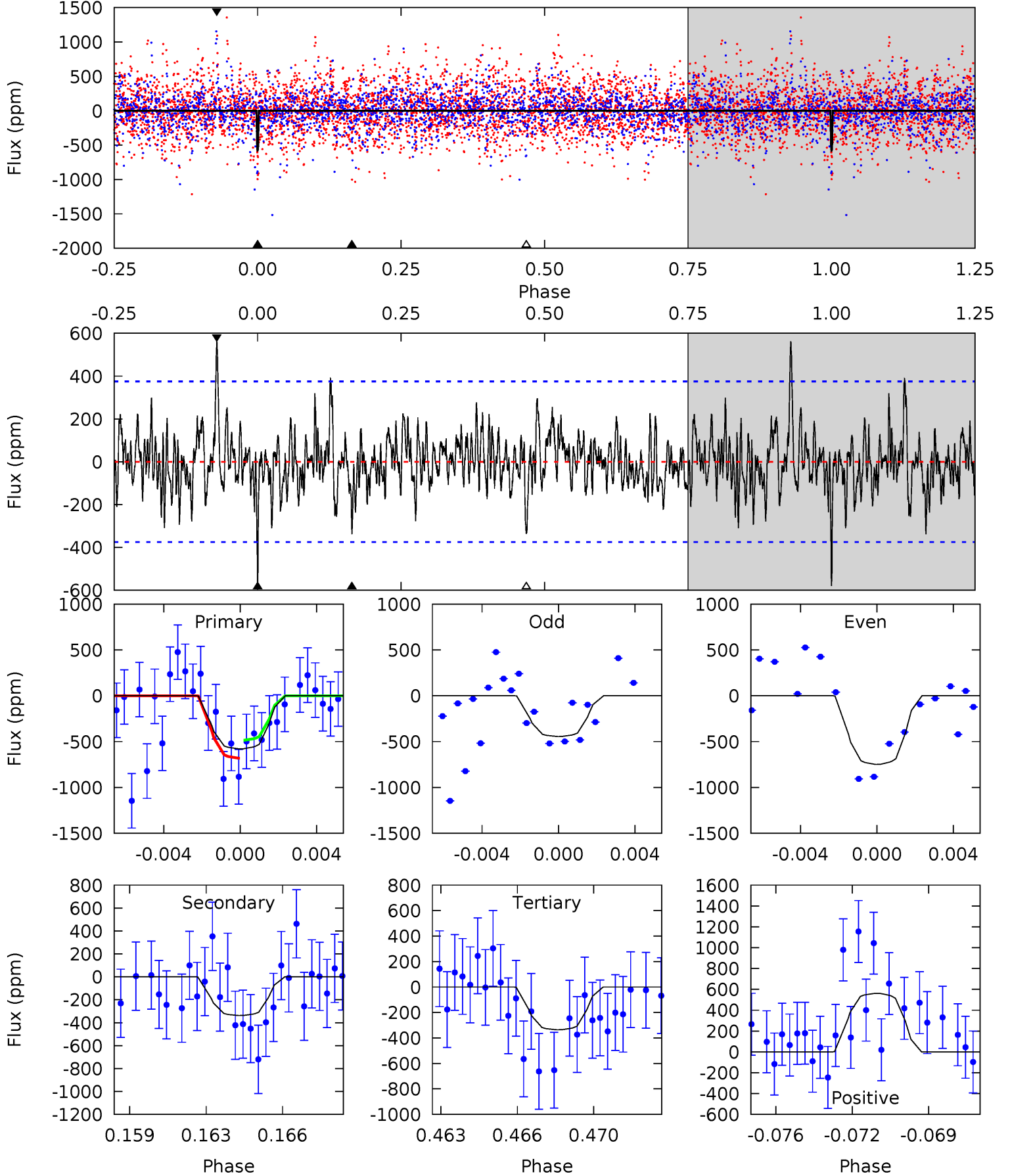
TCE 010470294-06 P= 27.836449 Days $T_0=156.906716$ (BKJD)



DV Model-Shift Uniqueness Test

010470294-06, P = 27.836545 Days, E = 129.094494 Days

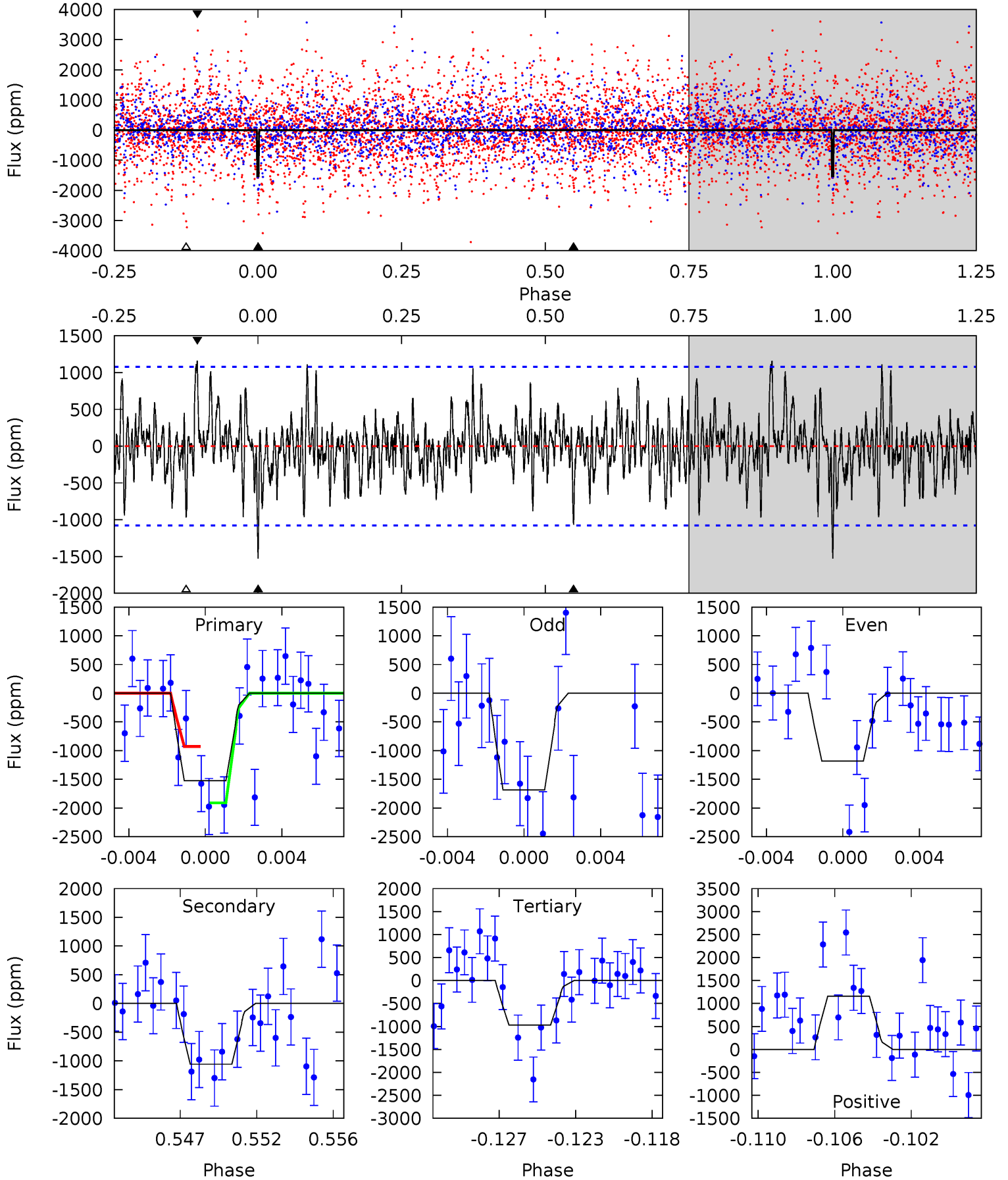
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.06	4.70	4.68	7.82	5.22	2.91	1.51	3.38	0.24	0.02	-3.13	2.08	0.94	0.49	1.37



Alt Model-Shift Uniqueness Test

010470294-06, P = 27.836449 Days, E = 129.070267 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.35	5.10	4.67	5.59	5.20	2.87	1.55	2.68	1.77	0.43	-0.49	1.18	0.86	0.43	2.28



Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-337 ± 72	$10.40^{+8.90}_{-6.66}$	1759^{+128}_{-234}	5587^{+3951}_{-1202}	82^{+556}_{-59}
Alt.	-1058 ± 208	$15.88^{+10.37}_{-8.62}$	1774^{+114}_{-255}	6017^{+3091}_{-1123}	110^{+407}_{-71}

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 $A_{obs} \gg 1.0$

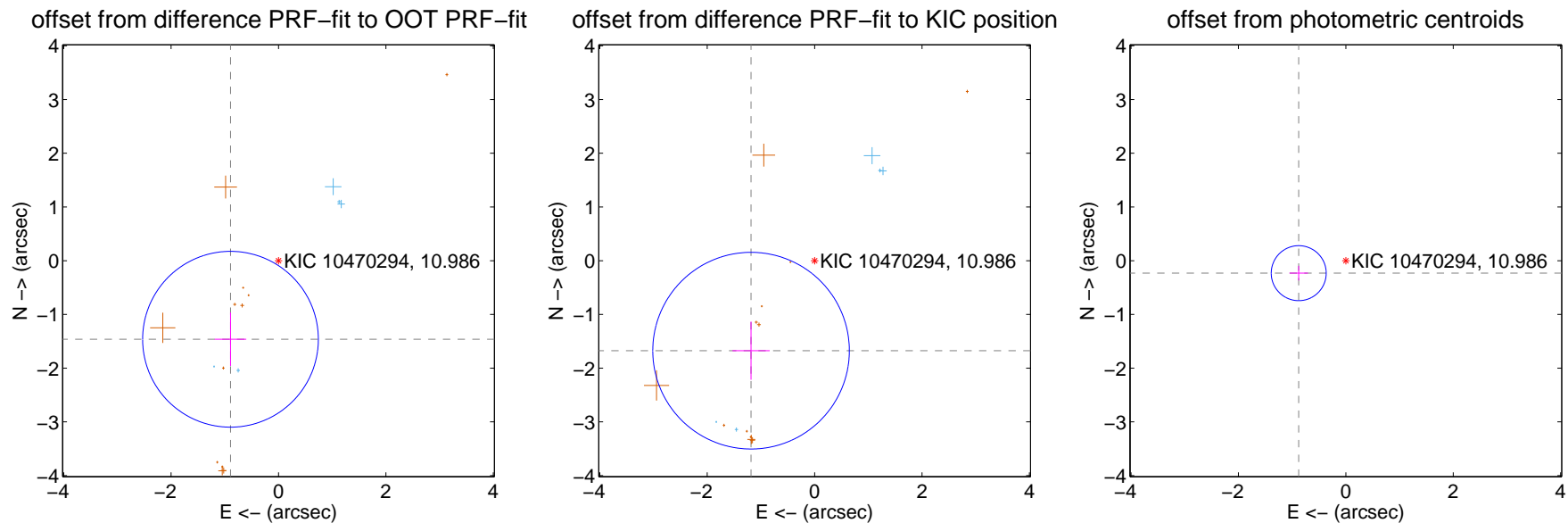
DV Centroid Data

Supplemental centroid analysis for 010470294-06. **Kepler magnitude: 10.99.** Transit SNR 8.95

There are 5 quarters with good PRF difference image offsets

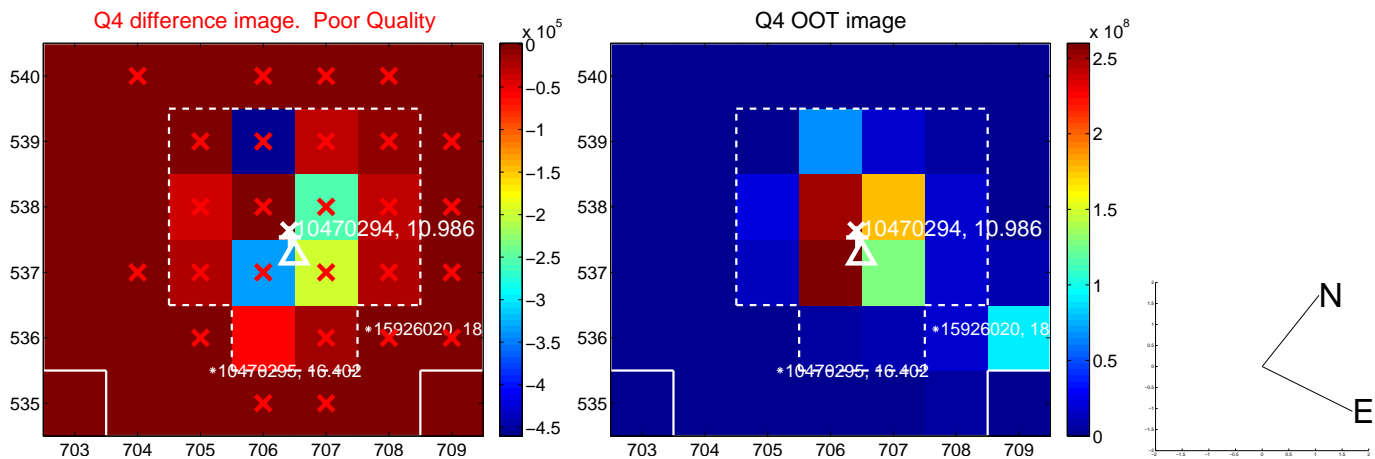
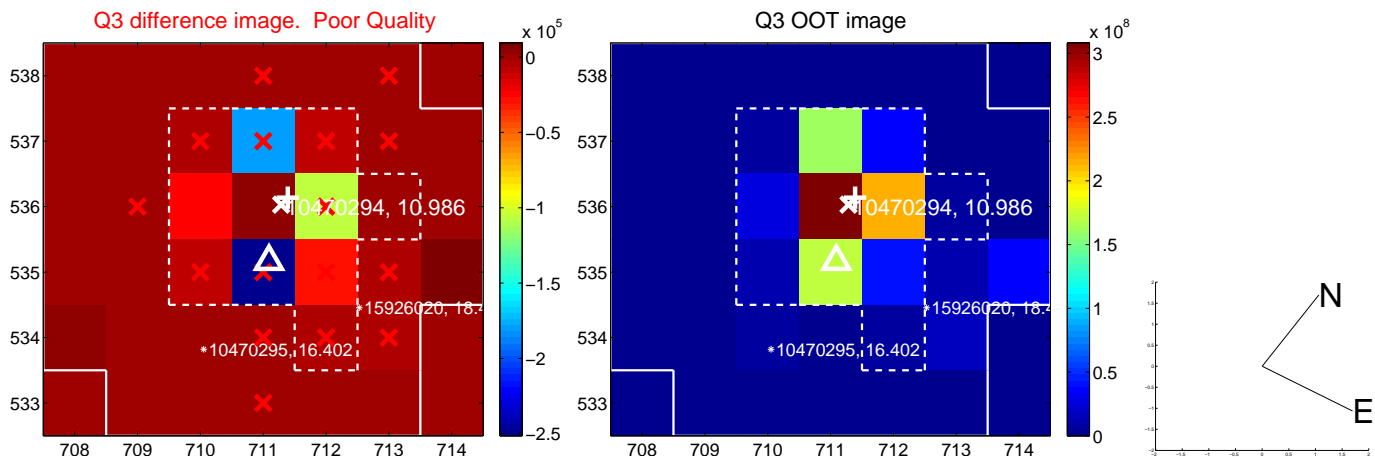
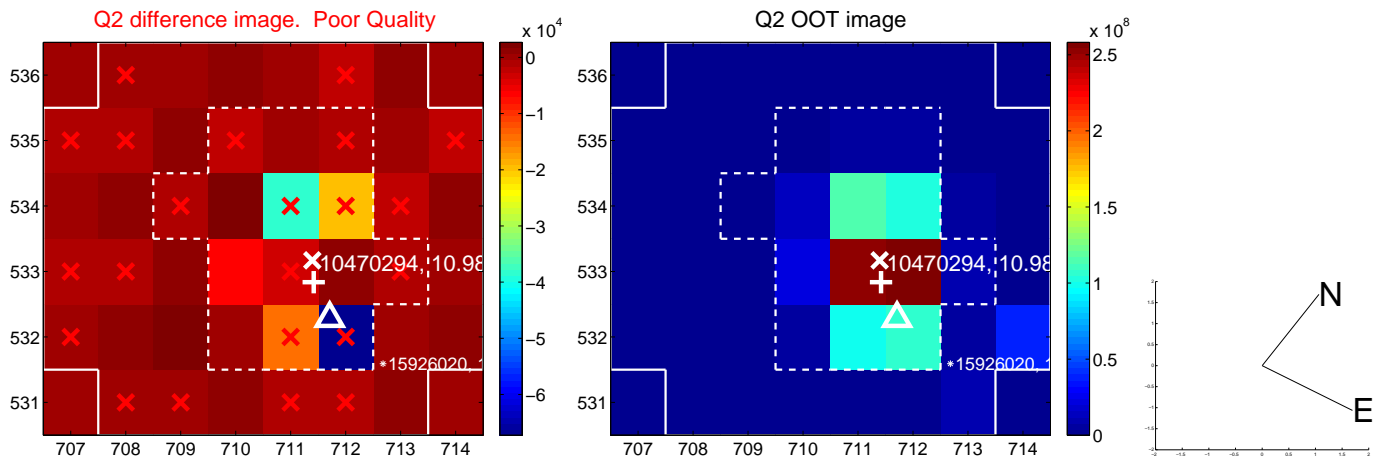
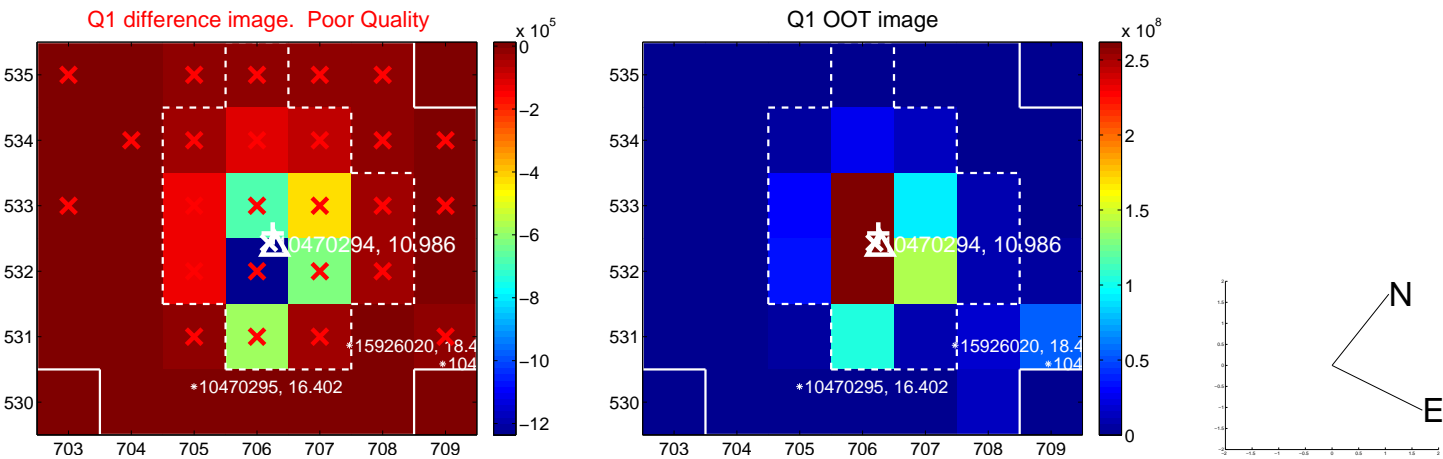
The direct PRF centroid is offset from the target star catalog position by about 0.59 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.714 ± 0.545	3.14	0.894 ± 0.294	-1.462 ± 0.497
PRF-fit source offset from KIC position	2.051 ± 0.610	3.36	1.184 ± 0.347	-1.675 ± 0.541
photometric centroid source offset	0.91 ± 0.17	5.32	0.88 ± 0.17	-0.23 ± 0.14

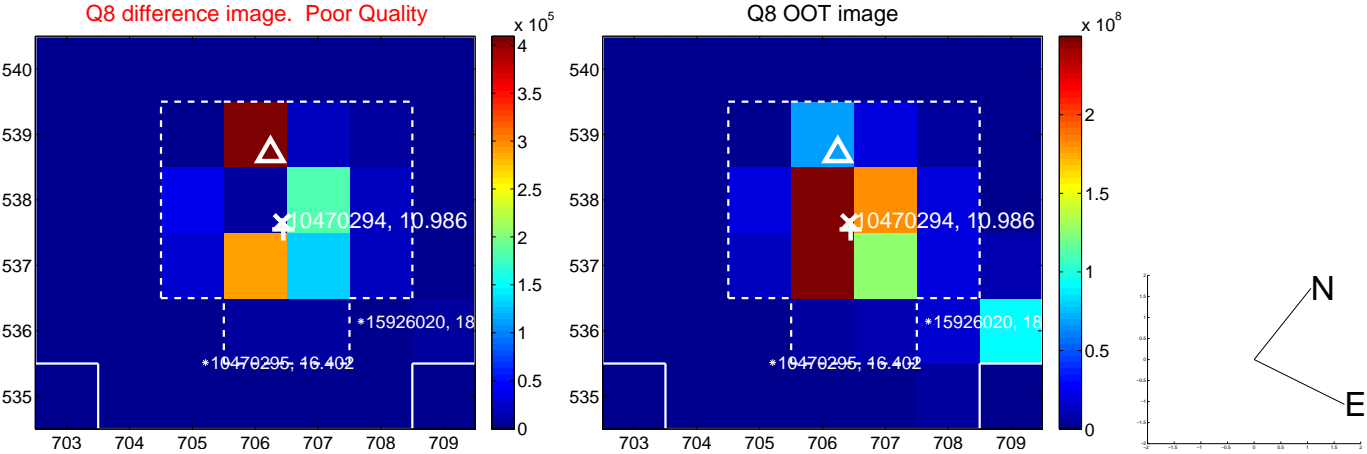
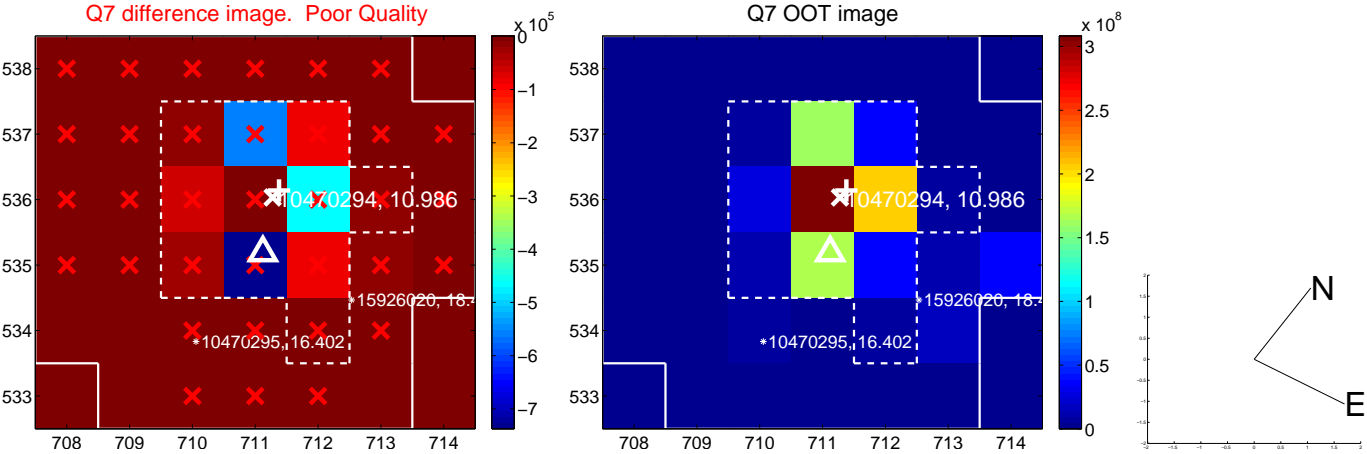
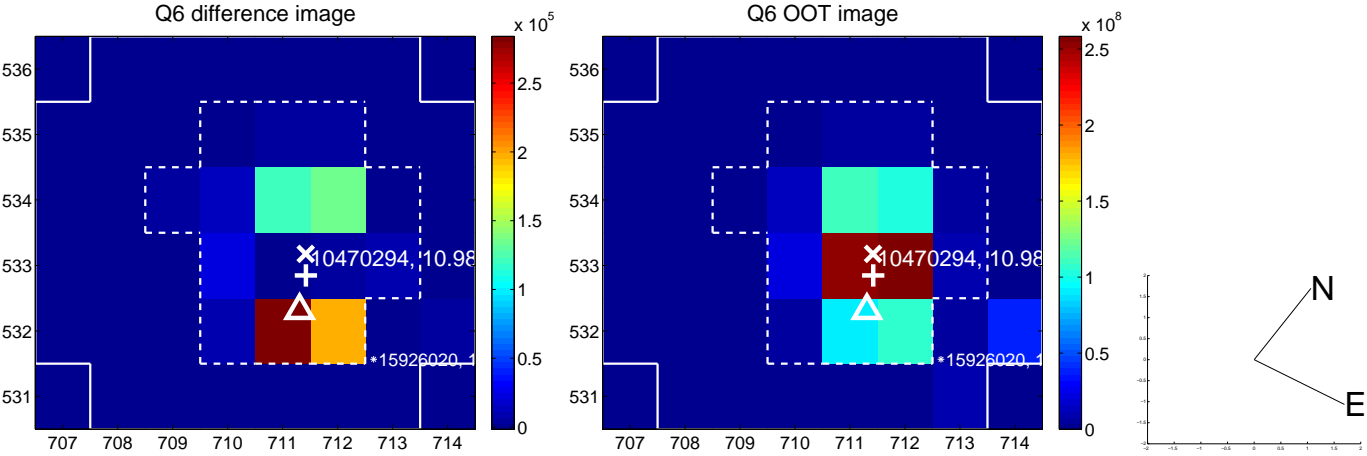
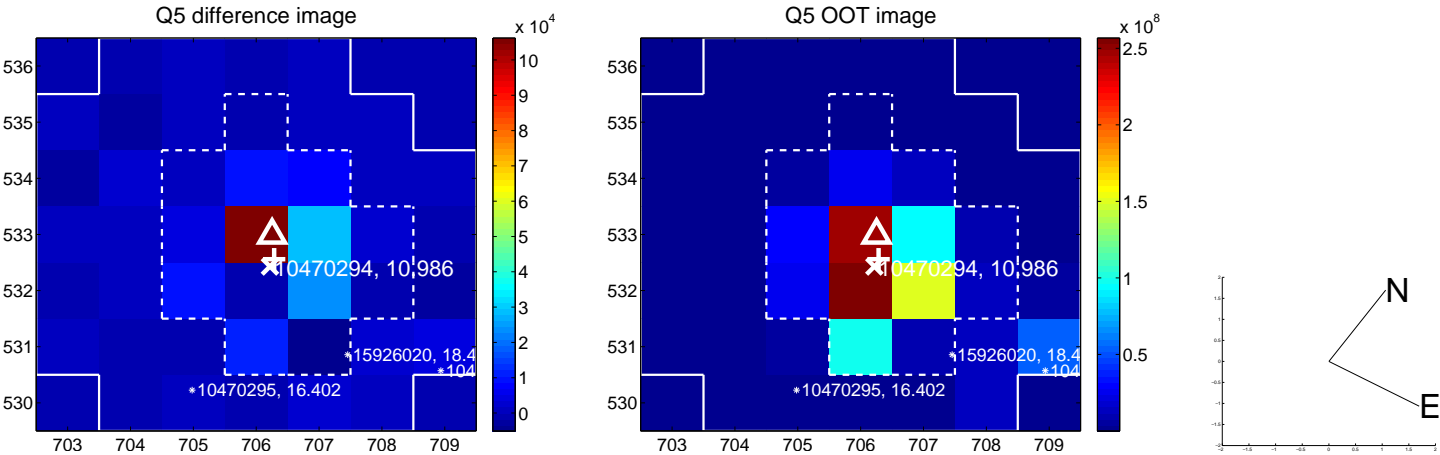


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

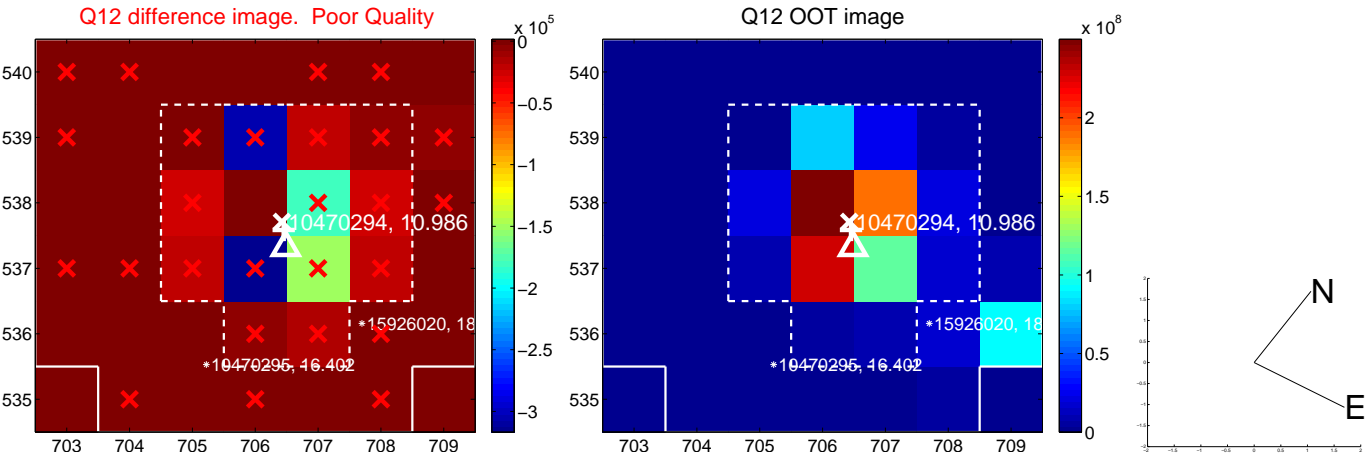
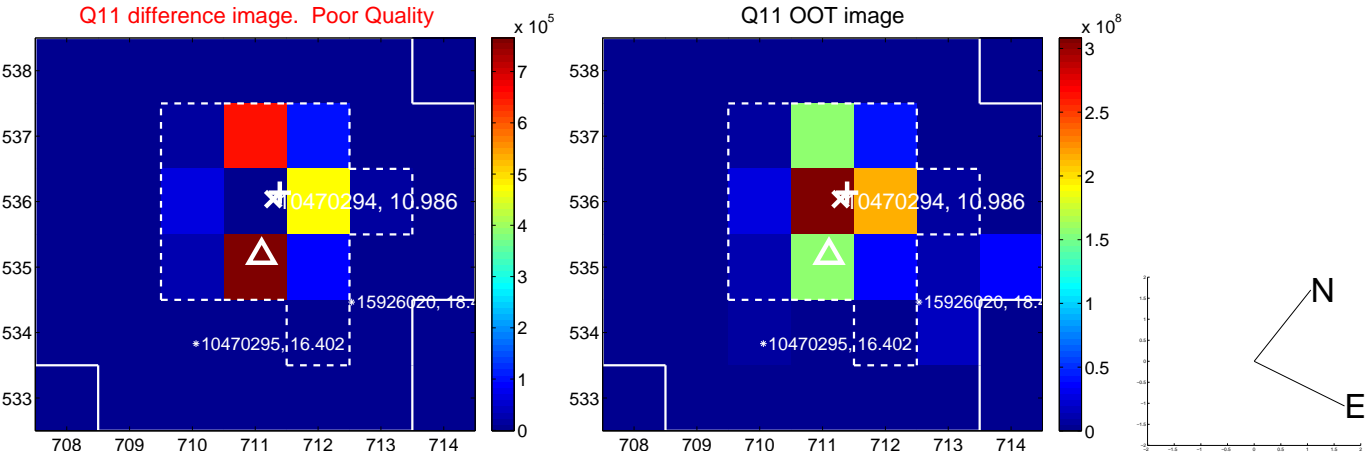
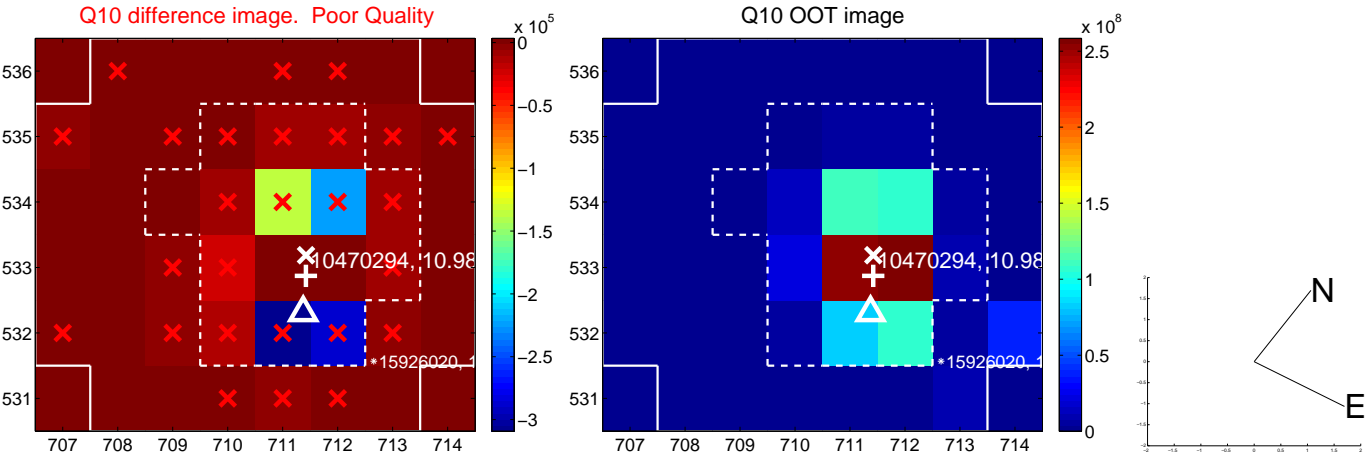
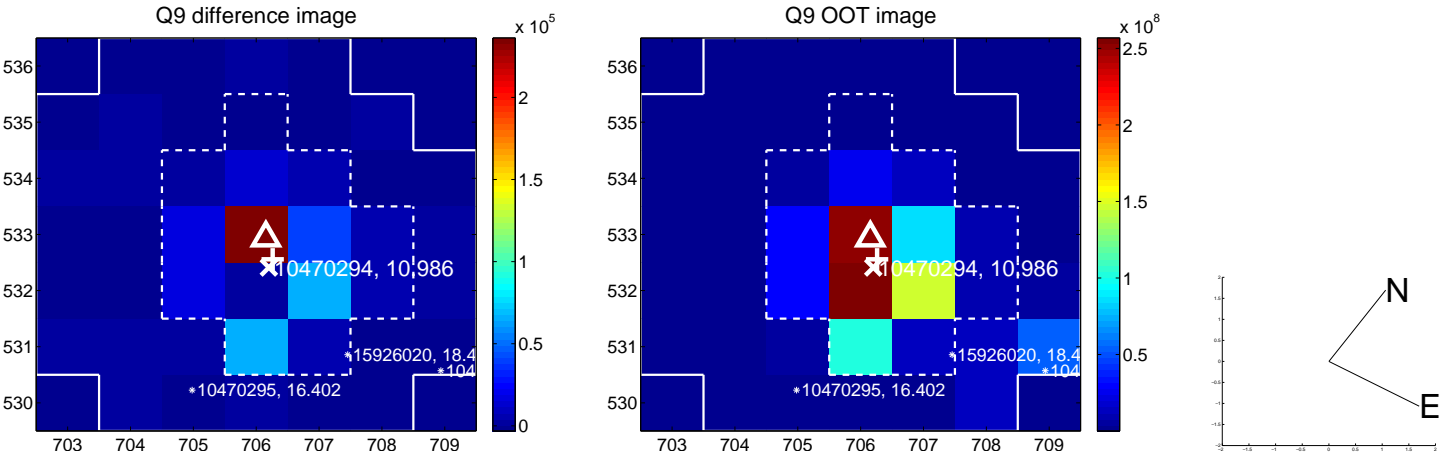
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



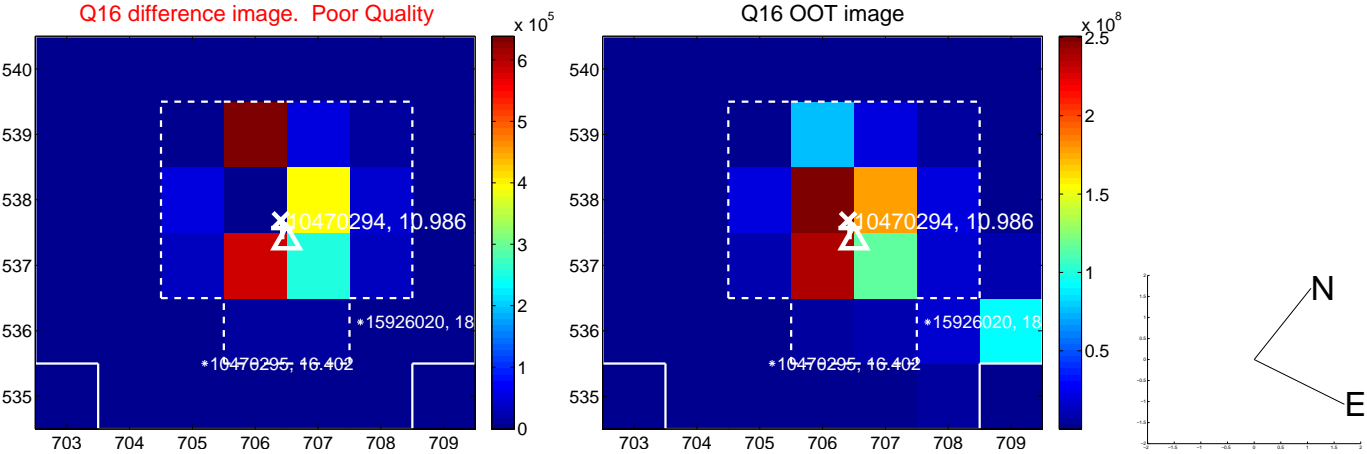
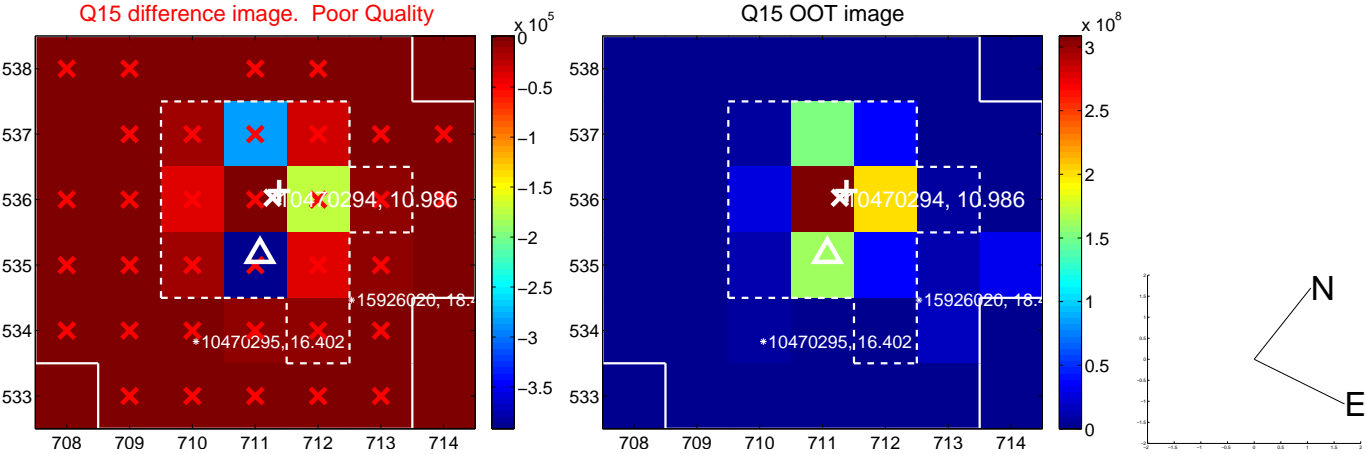
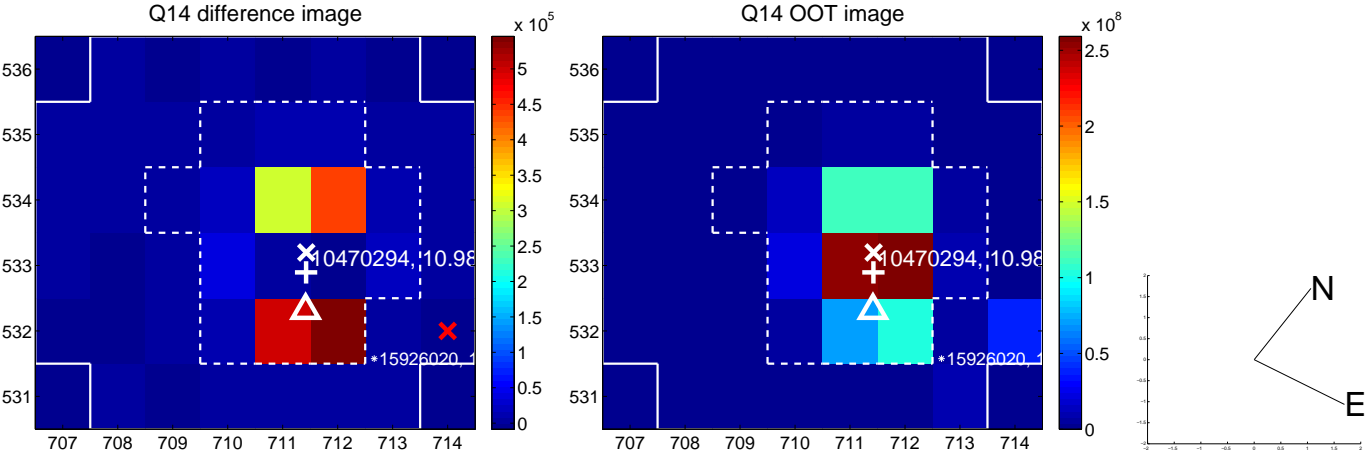
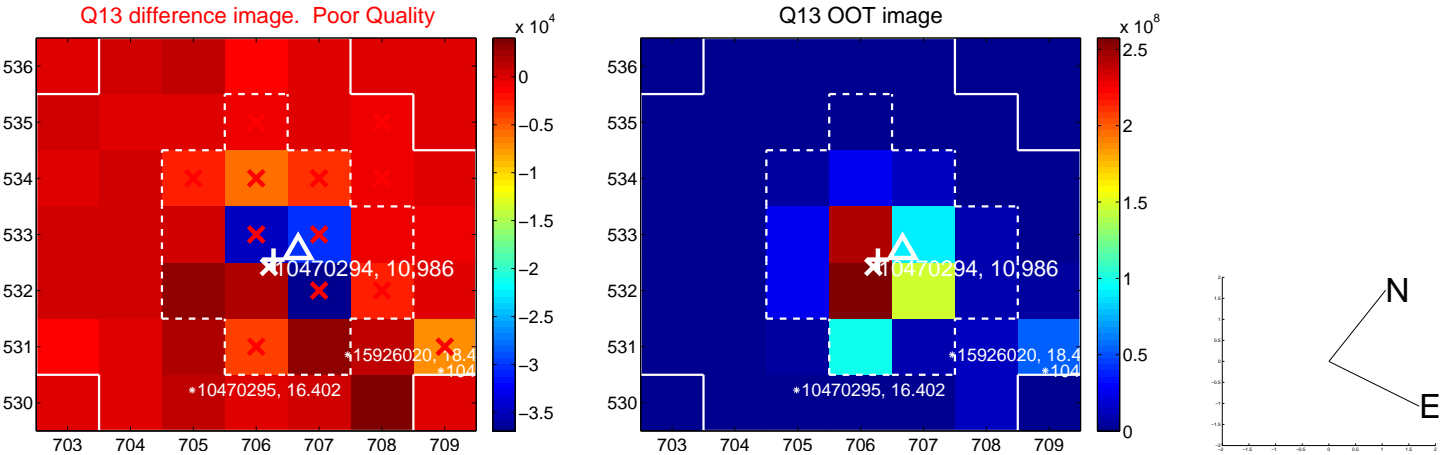
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



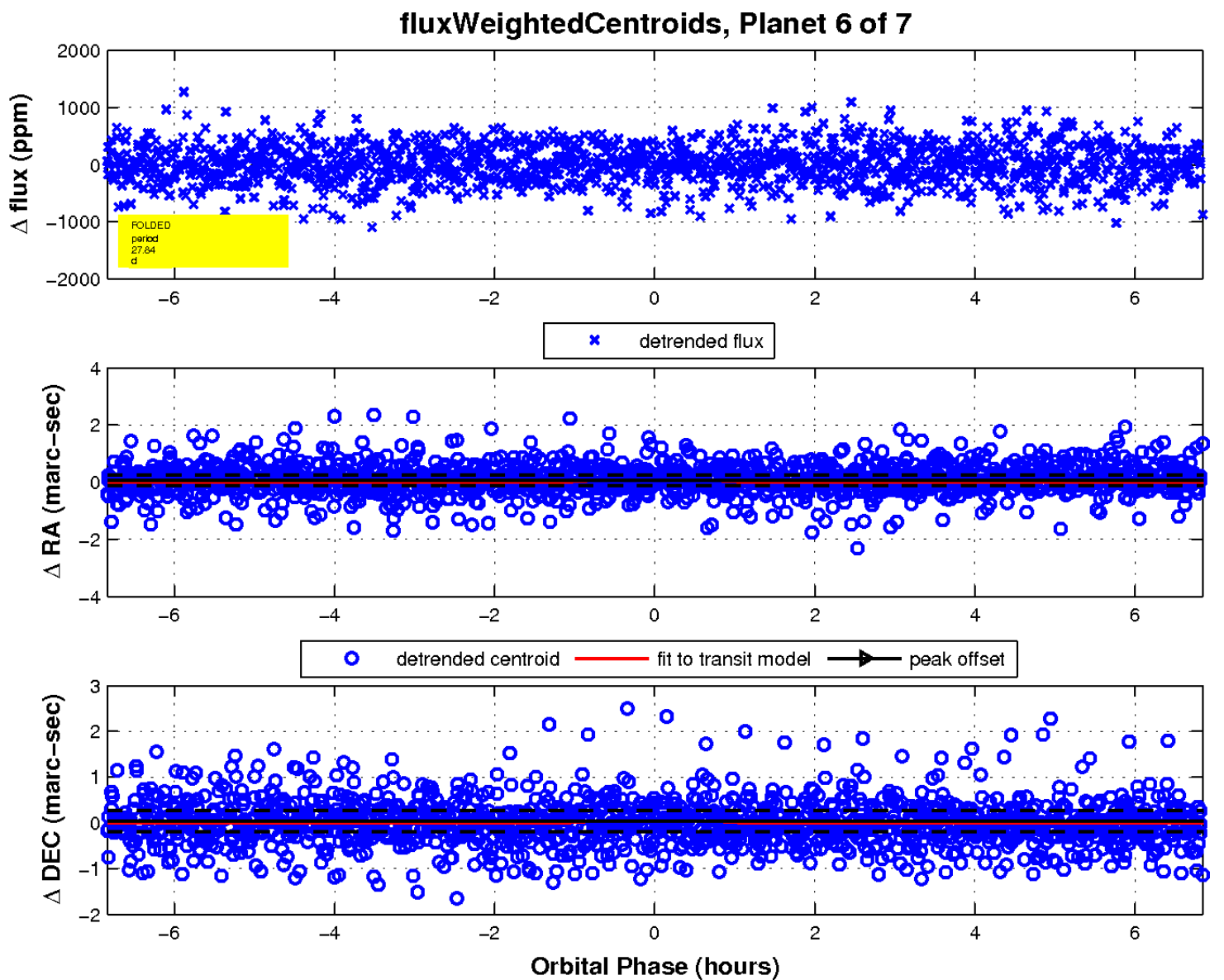
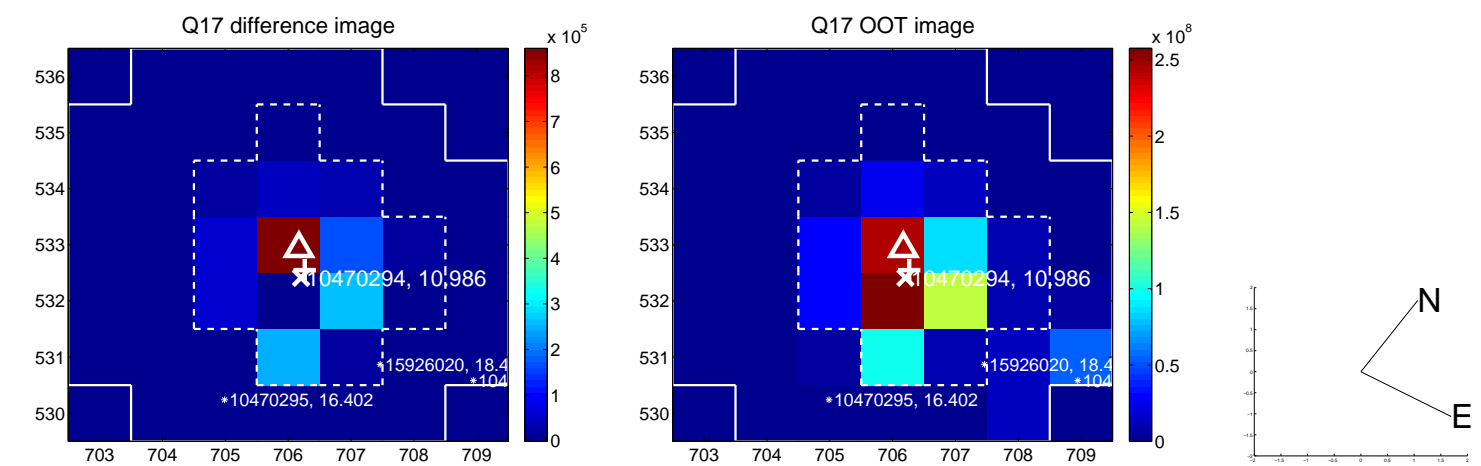
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

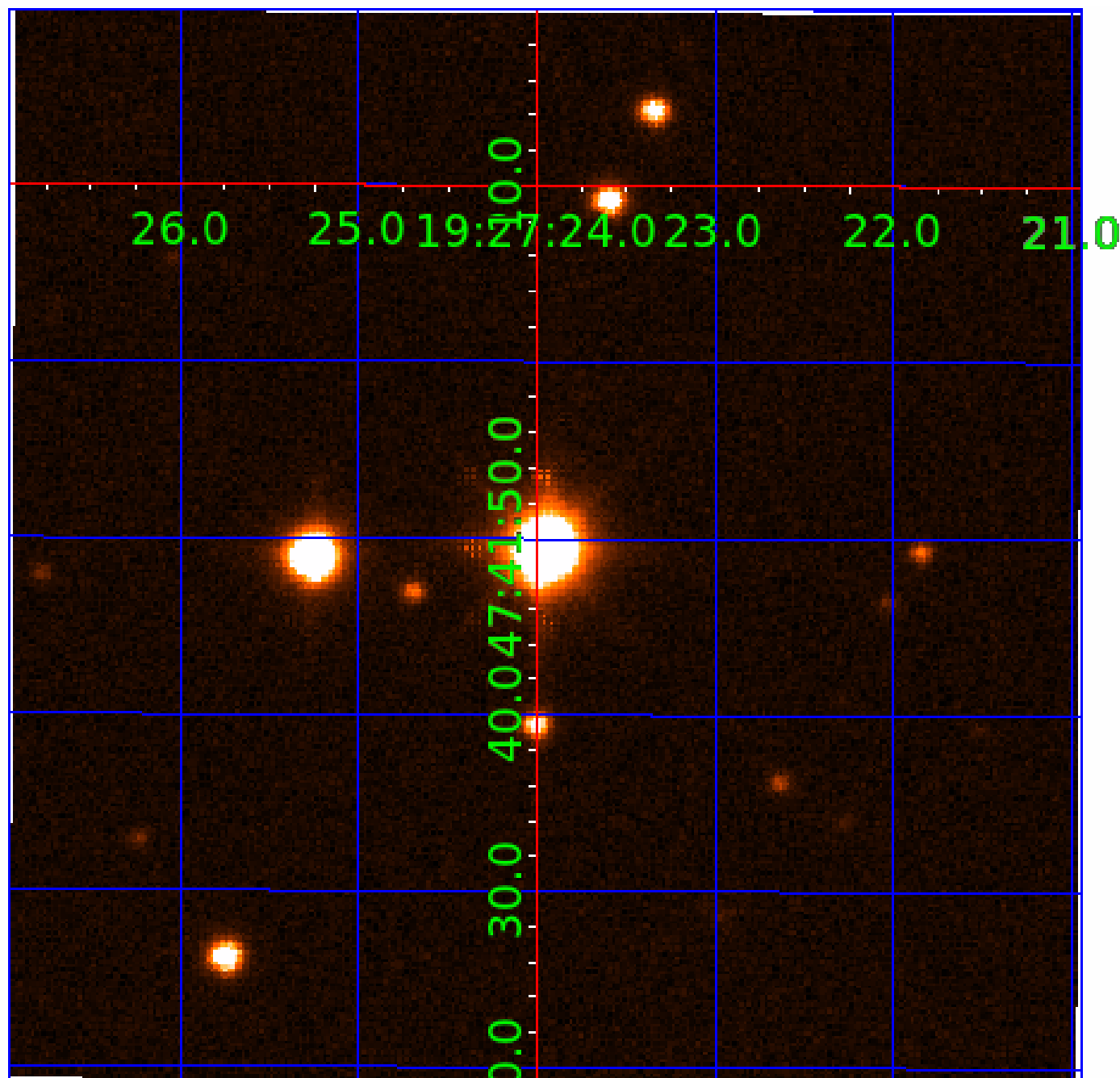


white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010470294

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})
010470294-01	OBS	No	0.748017	131.855273	5.5	0.586	9.3	1.4	3.67	7186	0.89	83137.95
010470294-02	OBS	No	0.734397	132.131578	4.8	5.090	12.2	1.2	3.67	7186	0.80	85200.08
010470294-03	OBS	No	20.867890	148.665403	886.2	1.262	13.6	13.0	3.67	7186	11.77	982.60
010470294-04	OBS	No	14.642719	133.287521	693.9	1.149	13.9	11.3	3.67	7186	10.89	1575.87
010470294-05	OBS	No	36.620359	149.395812	784.4	1.620	15.3	11.6	3.67	7186	10.35	464.21
010470294-06	OBS	No	27.836545	156.931039	564.5	2.284	10.4	9.0	3.67	7186	10.45	669.16
010470294-07	OBS	No	40.394038	145.704186	402.4	1.219	11.7	14.1	3.67	7186	7.76	407.31

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010470294-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
010470294-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_SATURATED
010470294-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
010470294-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—CENT_SATURATED
010470294-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
010470294-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

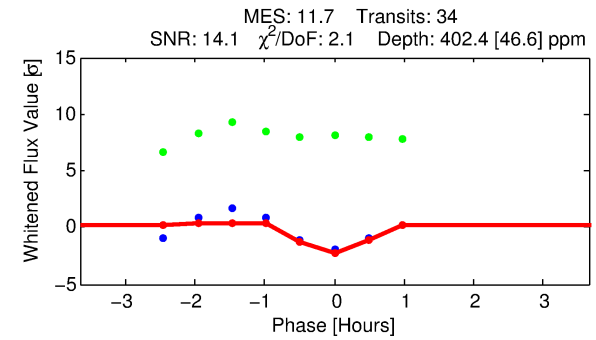
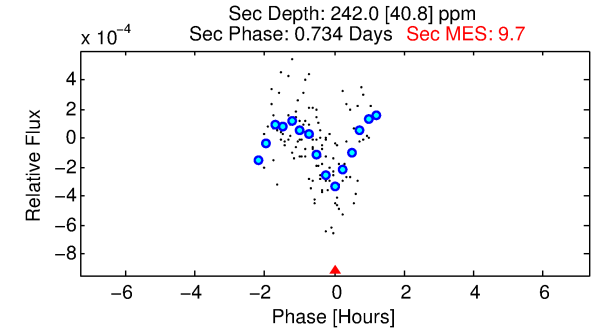
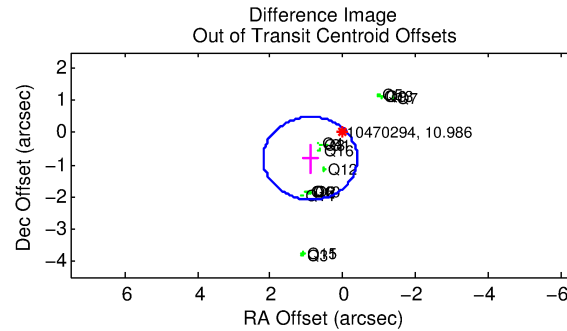
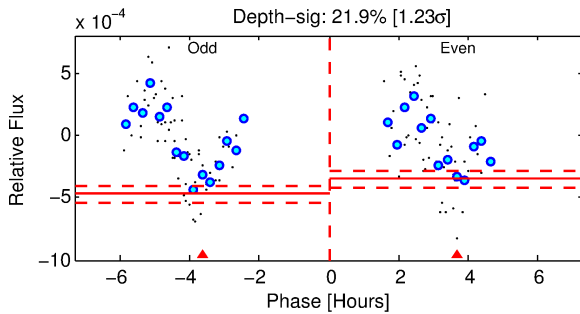
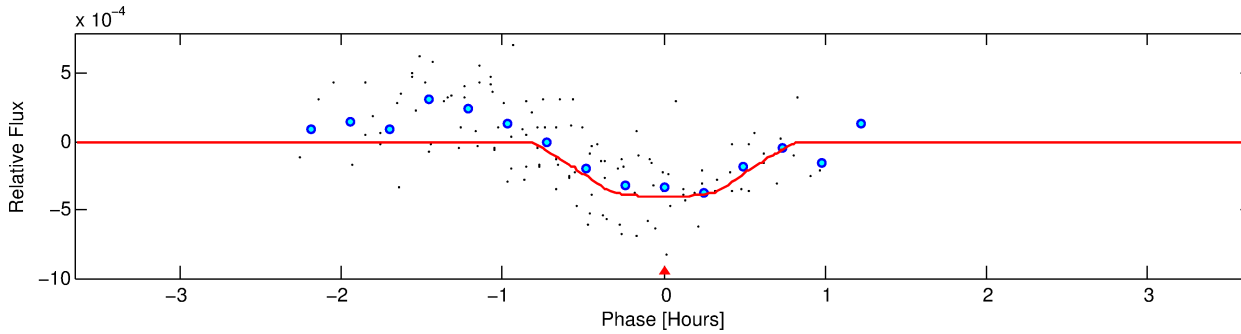
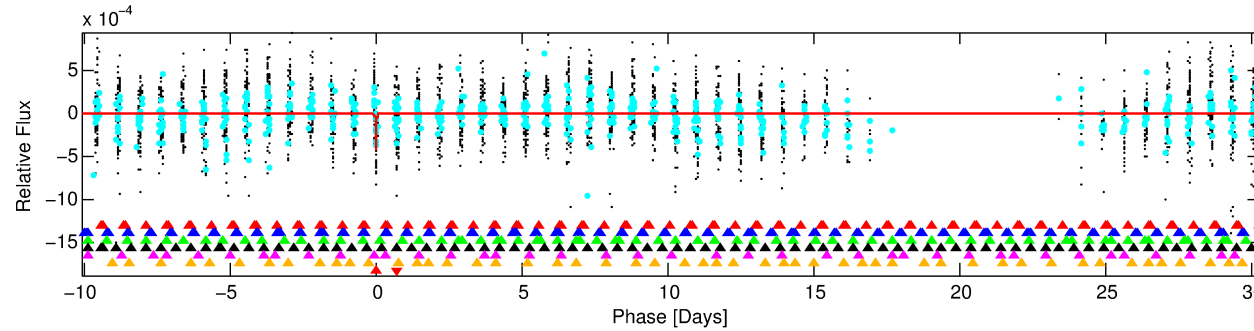
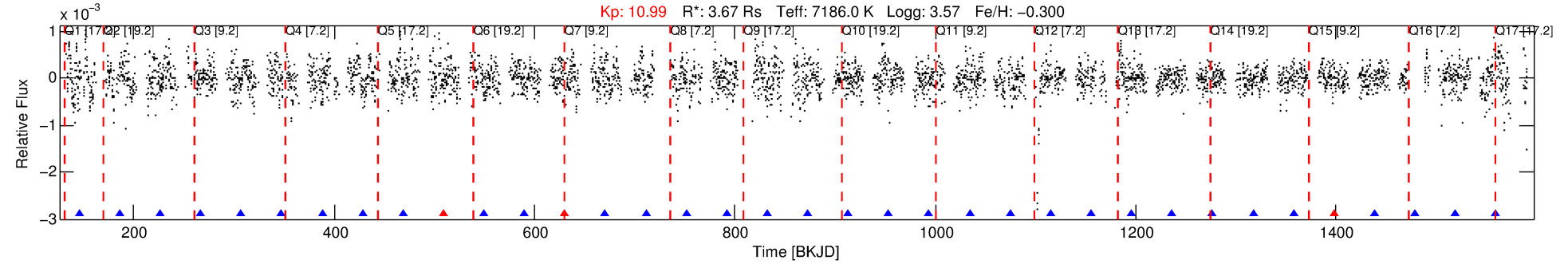
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010470294-07

No Significant Match Found

DV One-Page Summary

KIC: 10470294 Candidate: 7 of 7 Period: 40.394 d



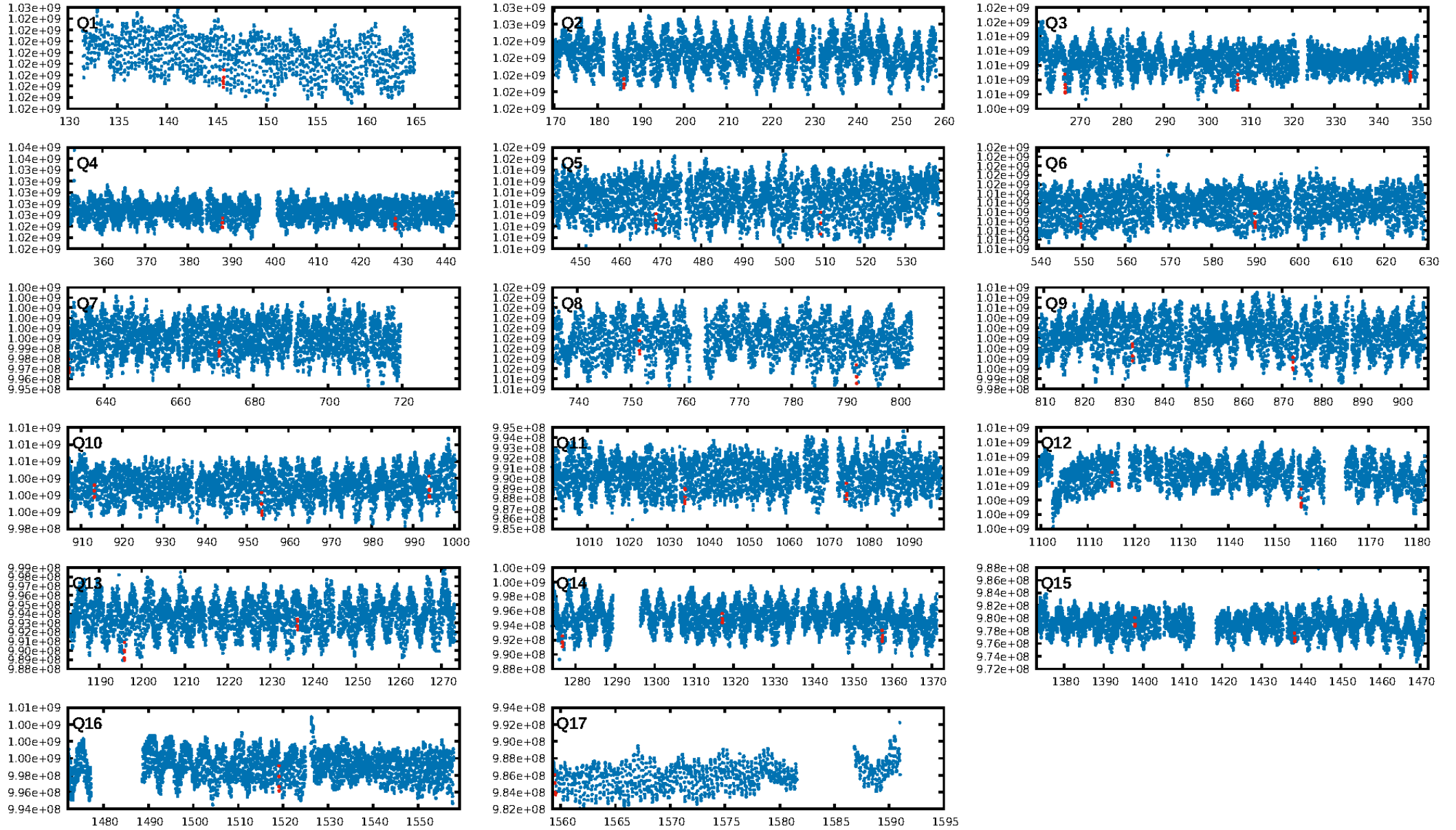
DV Fit Results:

Period = 40.39404 [0.00023] d
Epoch = 145.7042 [0.0035] BKJD
Rp/R* = 0.0193 [0.0127]
a/R* = 208.62 [689.83]
b = 0.60 [3.55]
Seff = 407.31 [390.39]
Teq = 1146 [274] K
Rp = 7.76 [6.84] Re
a = 0.2815 [0.1638] AU
Ag = 175.28 [285.44] [0.61 σ]
Teffp = 6444 [2150] K [2.44 σ]

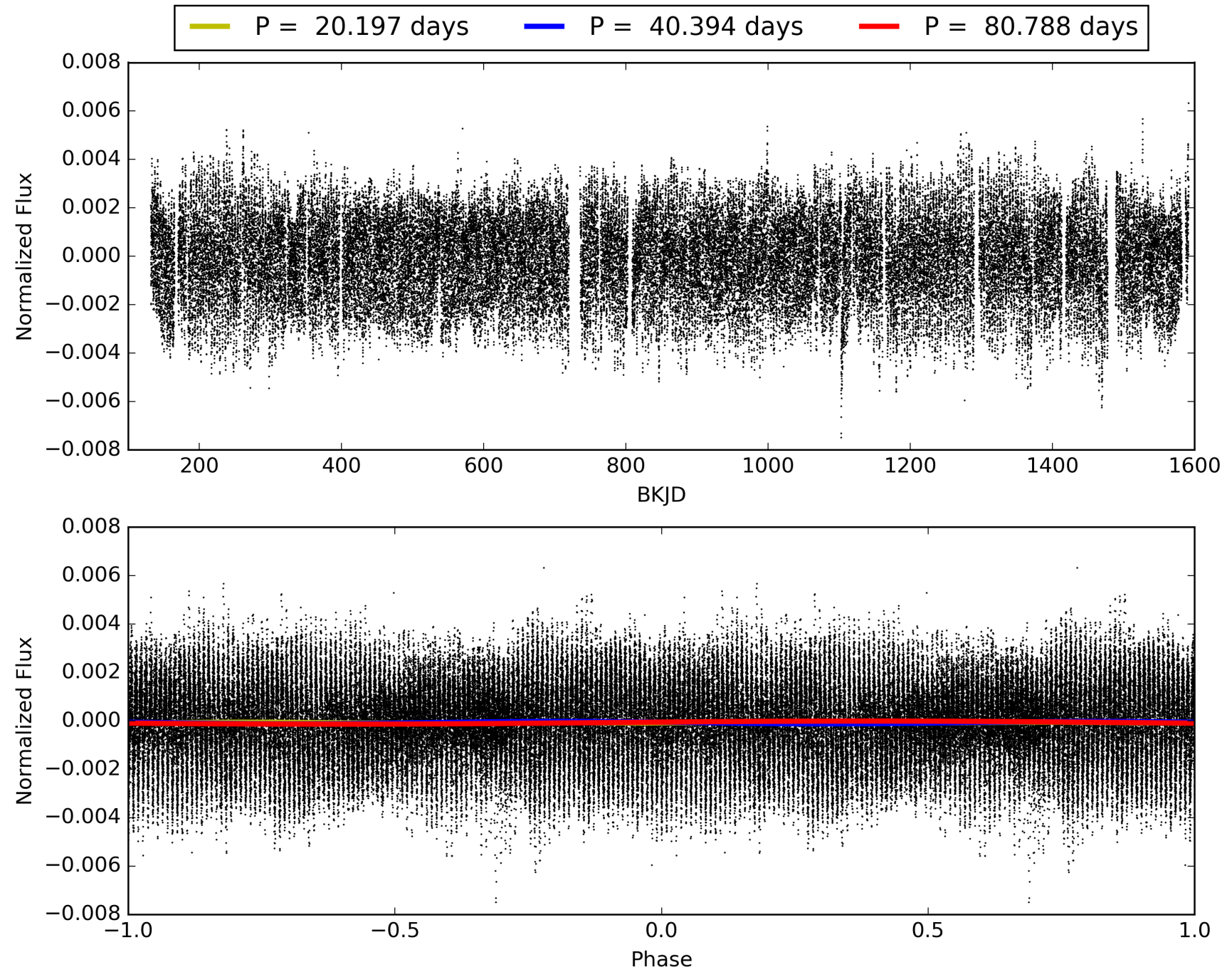
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [44.67 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.3%
ModelChiSquareGof-sig: 96.6%
Bootstrap-pfa: 6.78e-12
RollingBand-fgt: 0.91 [29/32]
GhostDiagnostic-chr: 1.427
Centroid-sig: 10.1%
Centroid-so: 0.683 arcsec [2.26 σ]
OotOffset-rm: 1.203 arcsec [2.79 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-rm: 1.379 arcsec [2.70 σ]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.56 [9/16]
DiffImageOverlap-fno: 0.62 [10/16]

TCE 010470294-07, PDC Light Curves

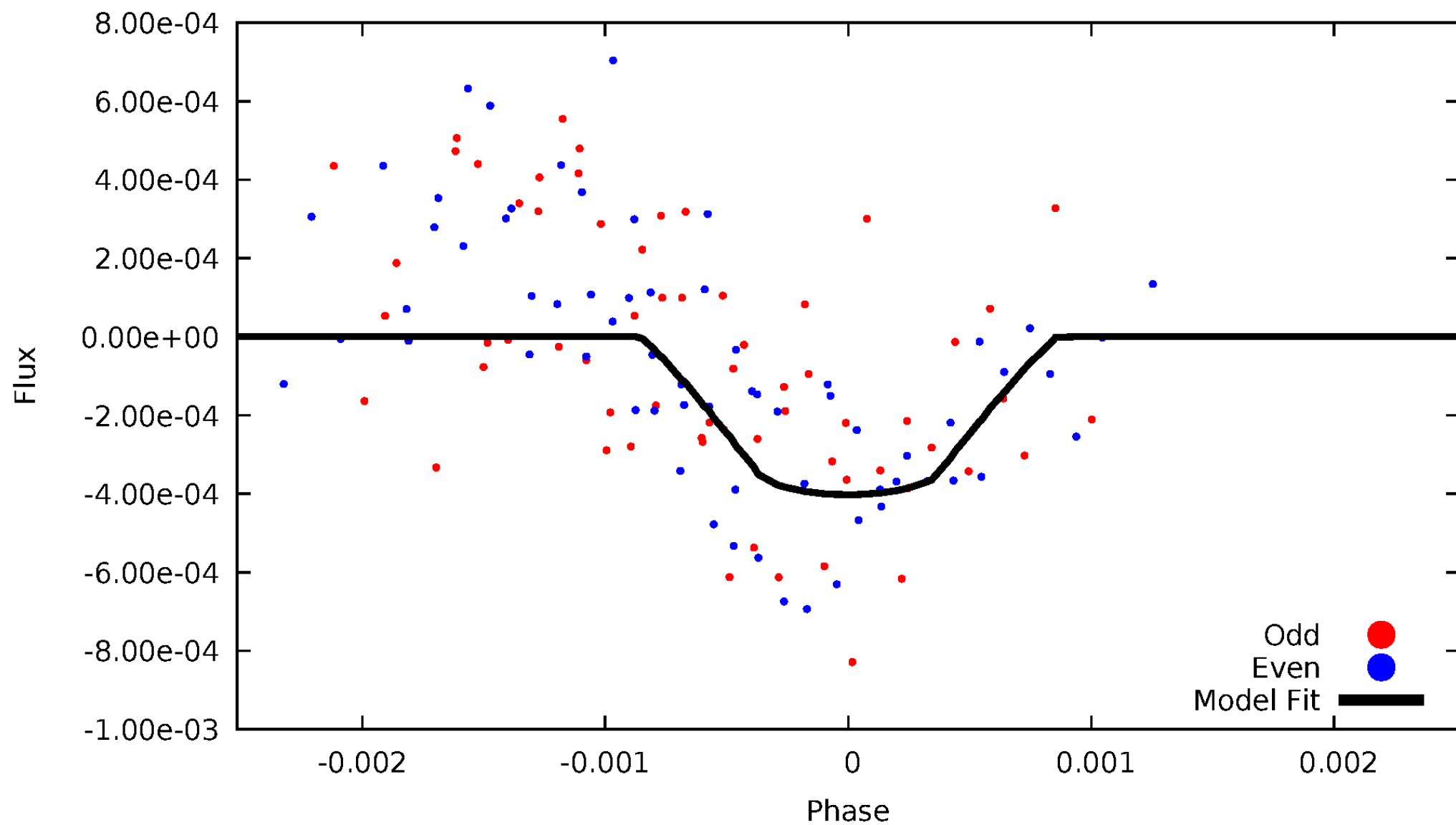


TCE 010470294-07



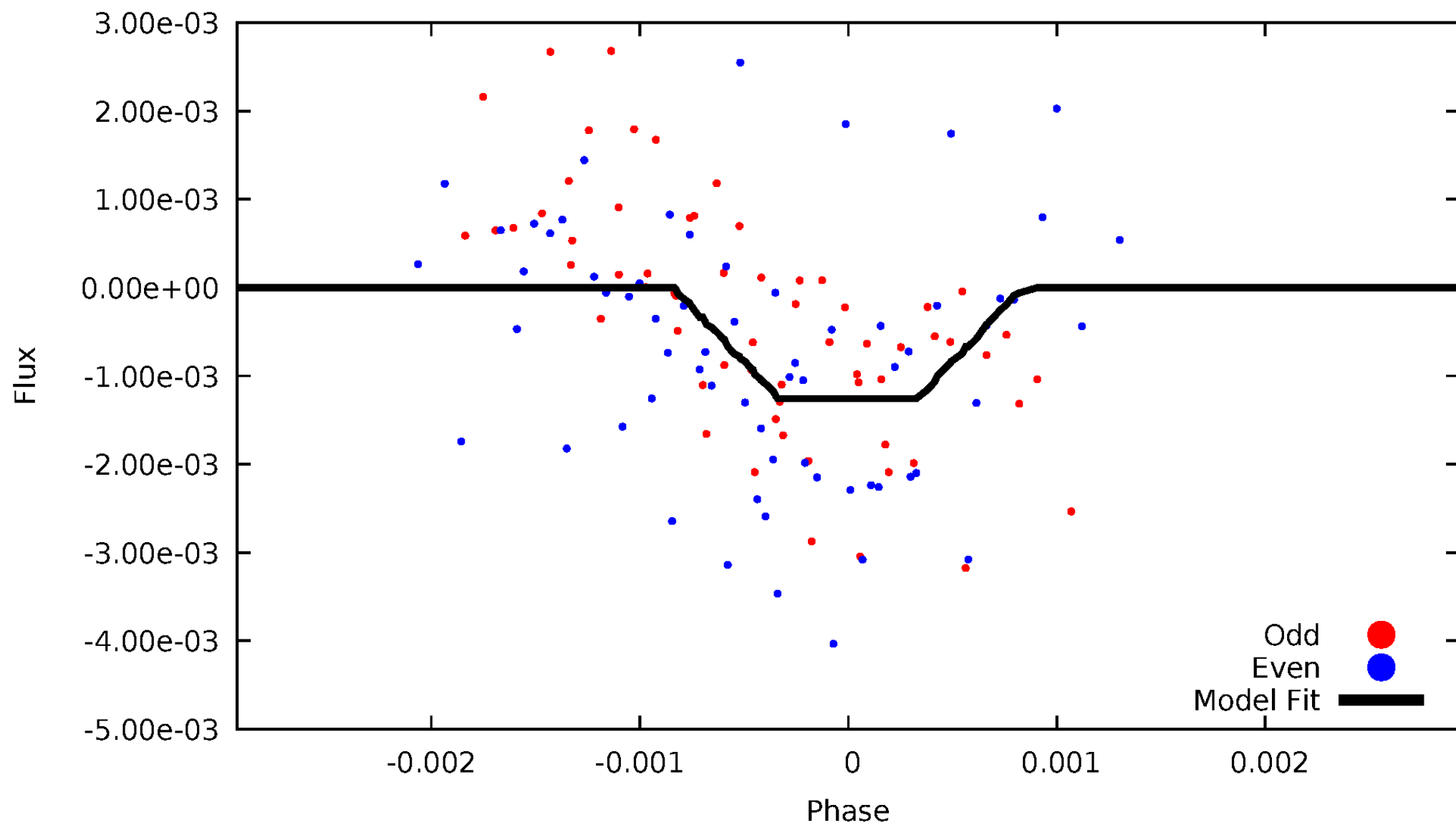
DV Odd/Even

TCE 010470294-07



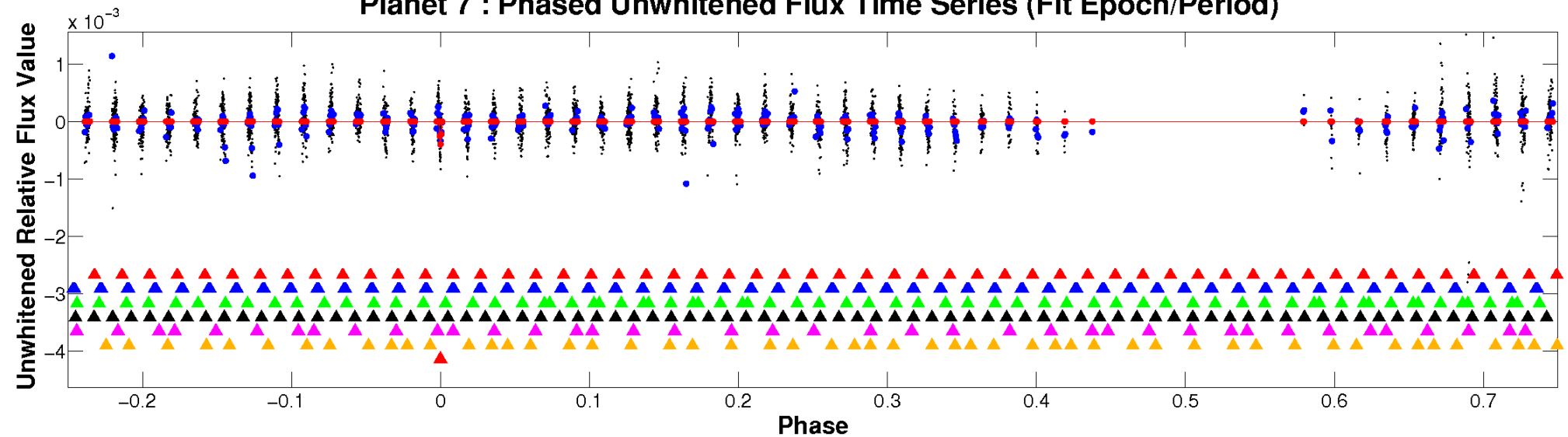
ALT Odd/Even

TCE 010470294-07

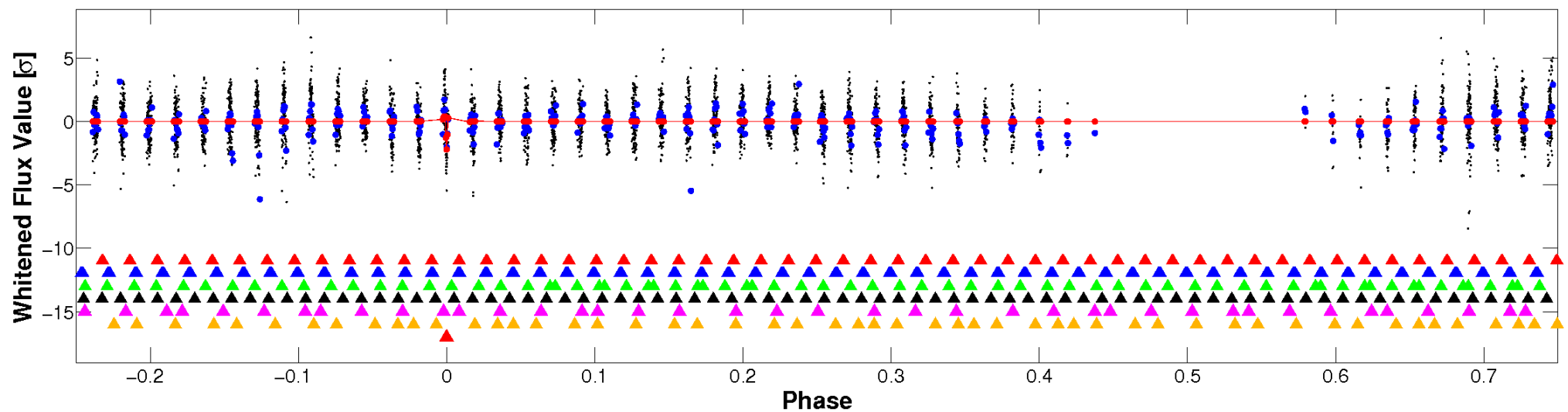


Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

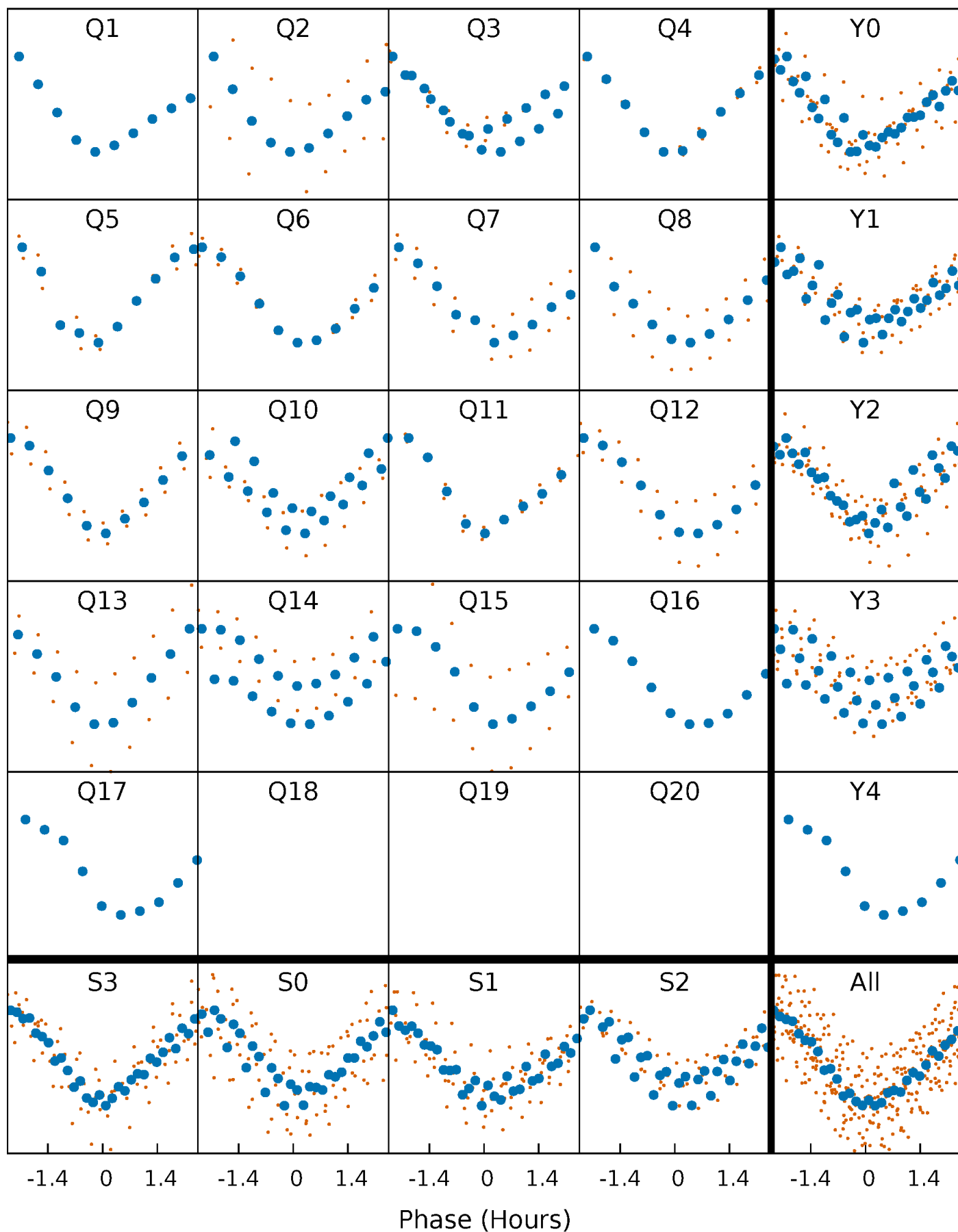


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



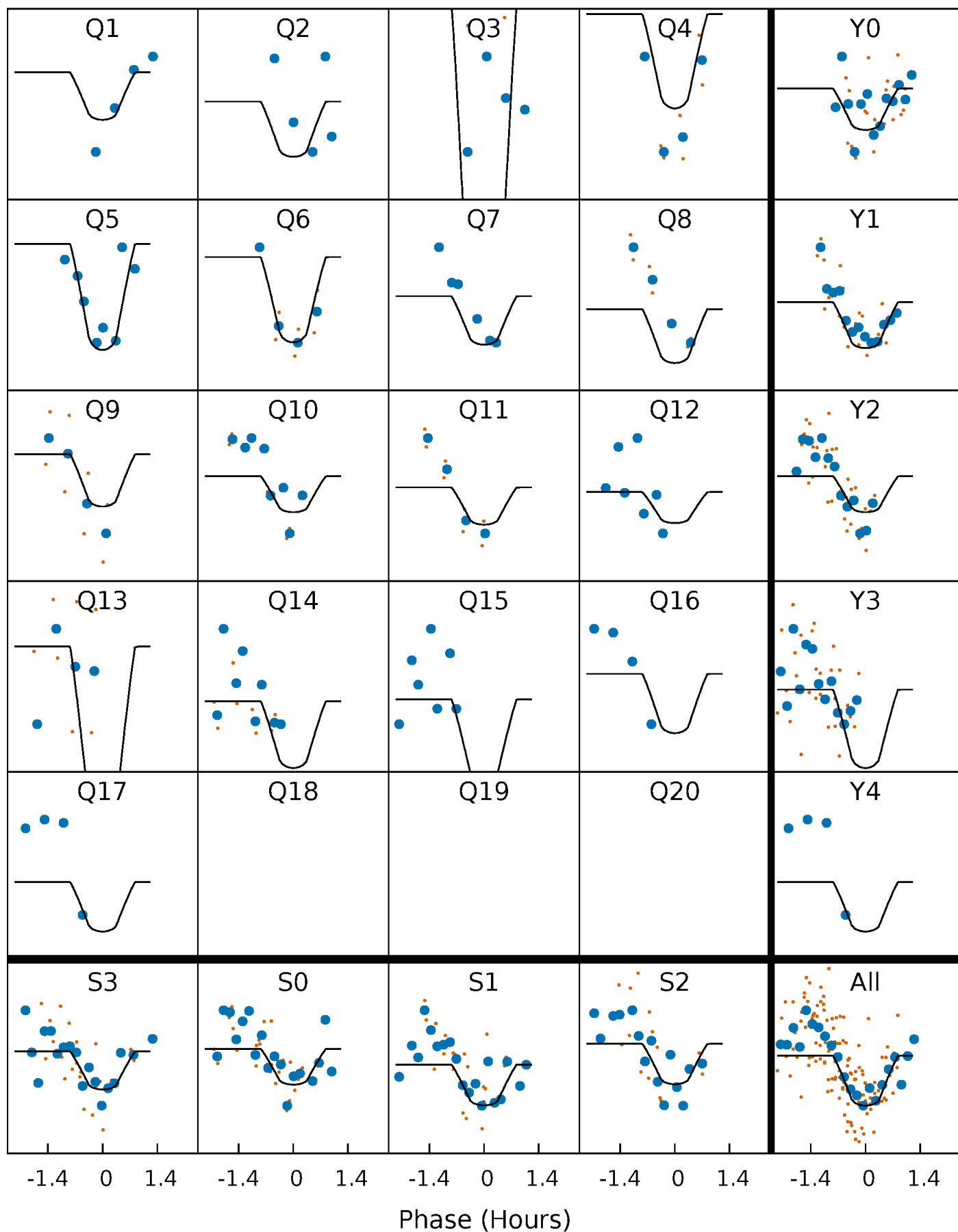
PDC Quarter-Phased Transit Curves

TCE 010470294-07 P= 40.394038 Days $T_0=145.704186$ (BKJD)



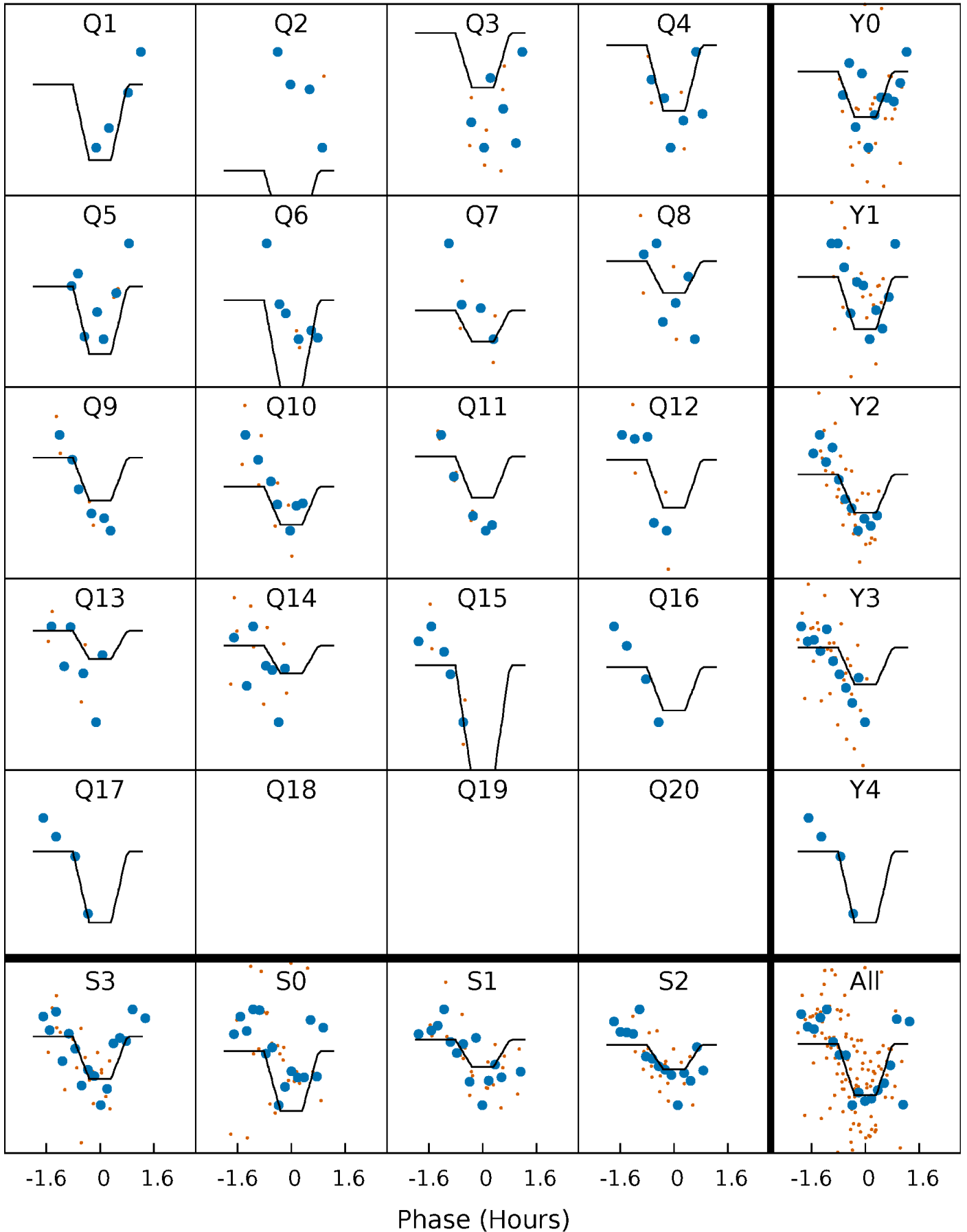
DV Quarter-Phased Transit Curves

TCE 010470294-07 $P = 40.394038$ Days $T_0 = 145.704186$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

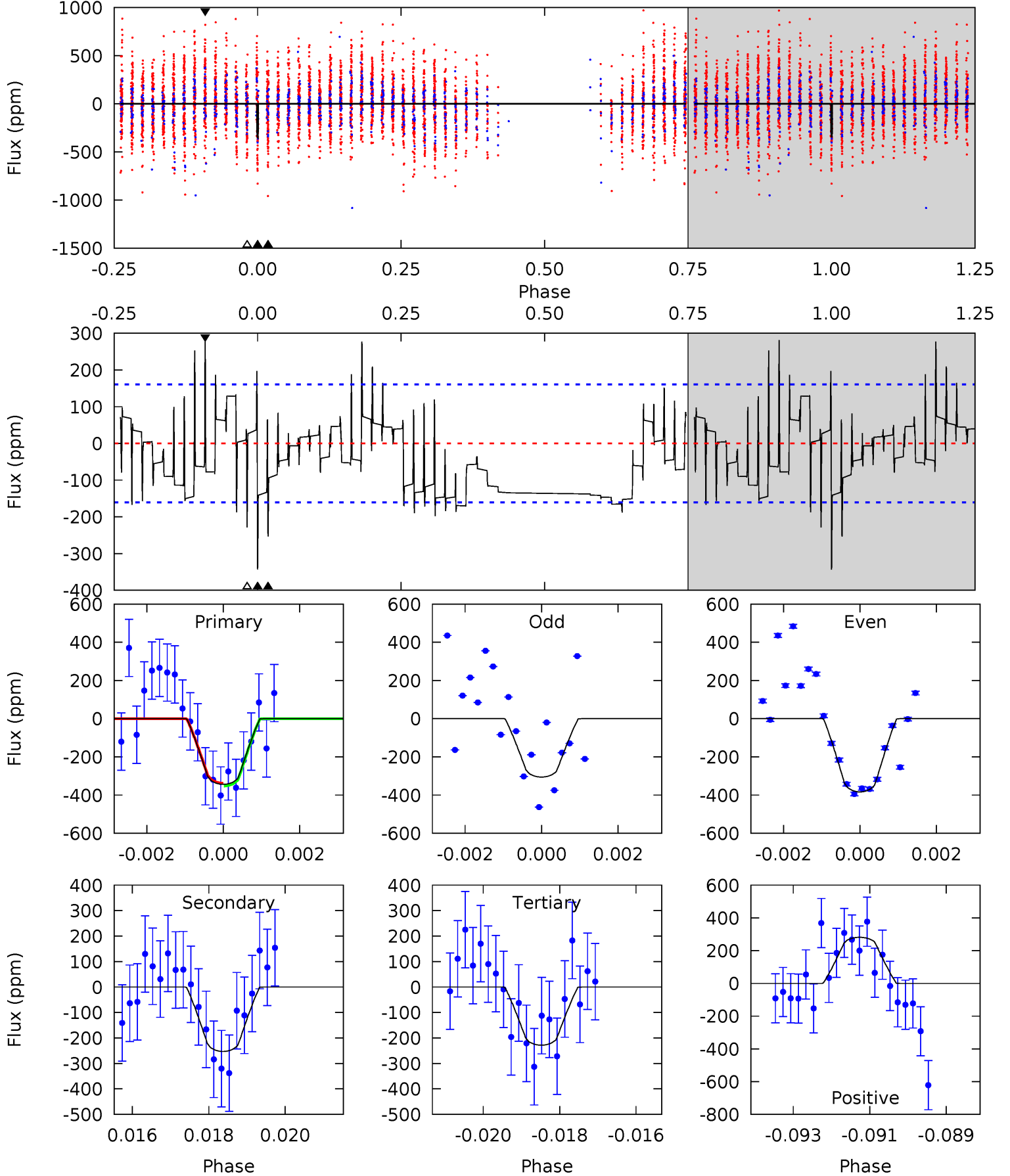
TCE 010470294-07 $P = 40.393770$ Days $T_0 = 145.702254$ (BKJD)



DV Model-Shift Uniqueness Test

010470294-07, P = 40.394038 Days, E = 105.310148 Days

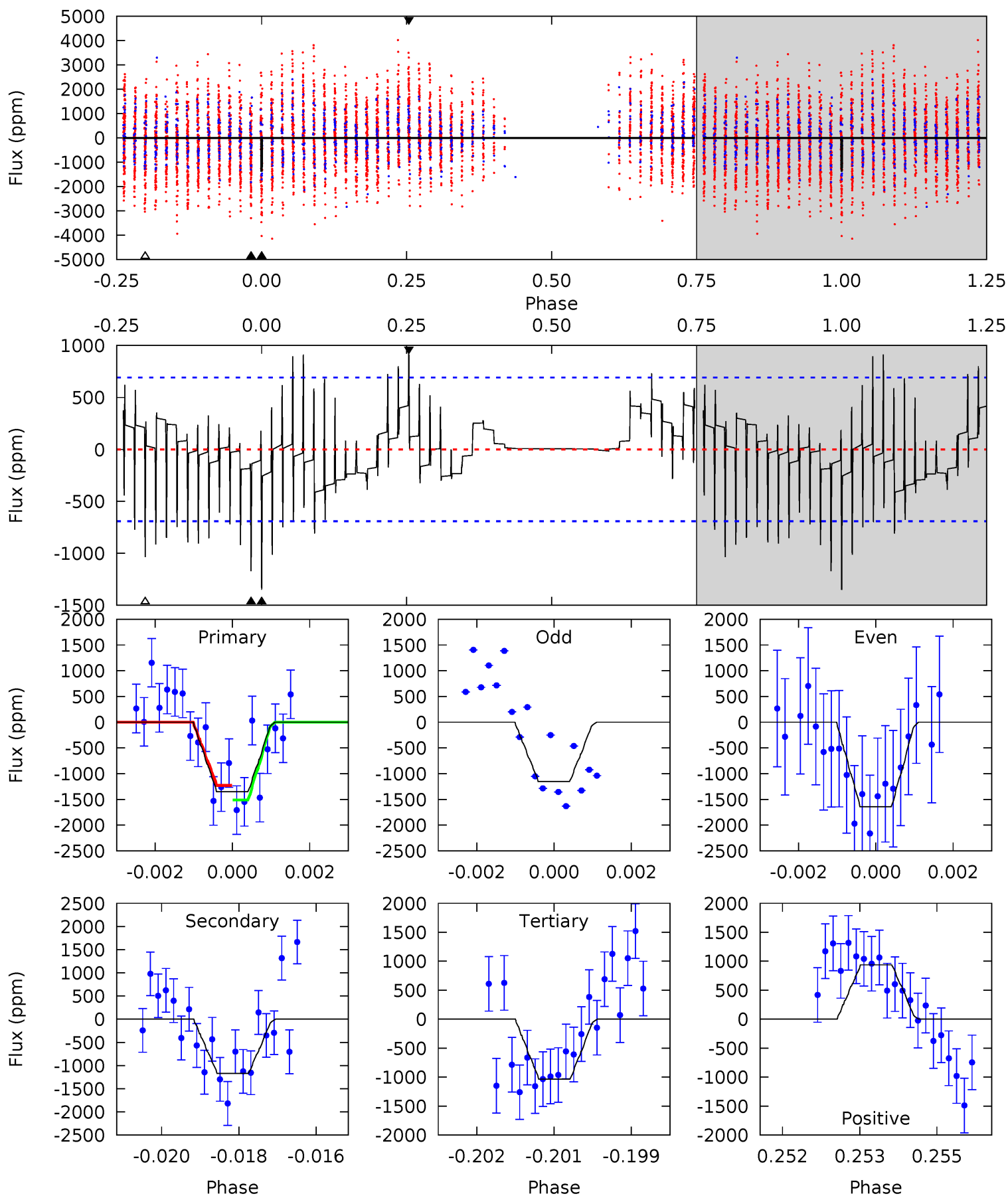
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	8.42	7.60	9.36	5.35	3.12	3.23	3.85	2.09	0.82	-0.93	1.31	1.04	0.45	0.23



Alt Model-Shift Uniqueness Test

010470294-07, P = 40.393770 Days, E = 105.308484 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	9.08	8.02	7.27	5.36	3.15	3.23	2.45	3.21	1.06	1.82	1.90	1.23	0.41	1.08



Stellar Parameters For KIC 010470294

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	7186^{+226}_{-277}	$3.568^{+0.561}_{-0.099}$	$-0.300^{+0.250}_{-0.300}$	$3.675^{+0.360}_{-2.158}$	$1.821^{+0.179}_{-0.536}$	$0.052^{+0.372}_{-0.012}$
	+3%/-4%	+16%/-3%	+83%/-100%	+10%/-59%	+10%/-29%	+719%/-22%
Source	KIC0	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 010470294-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-253 ± 30	$7.03^{+5.01}_{-4.04}$	1571^{+96}_{-222}	6443^{+4224}_{-1385}	221^{+1036}_{-146}
Alt.	-1171 ± 129	$12.46^{+6.38}_{-5.14}$	1561^{+104}_{-212}	7060^{+2257}_{-1096}	314^{+589}_{-166}

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 $A_{obs} \gg 1.0$

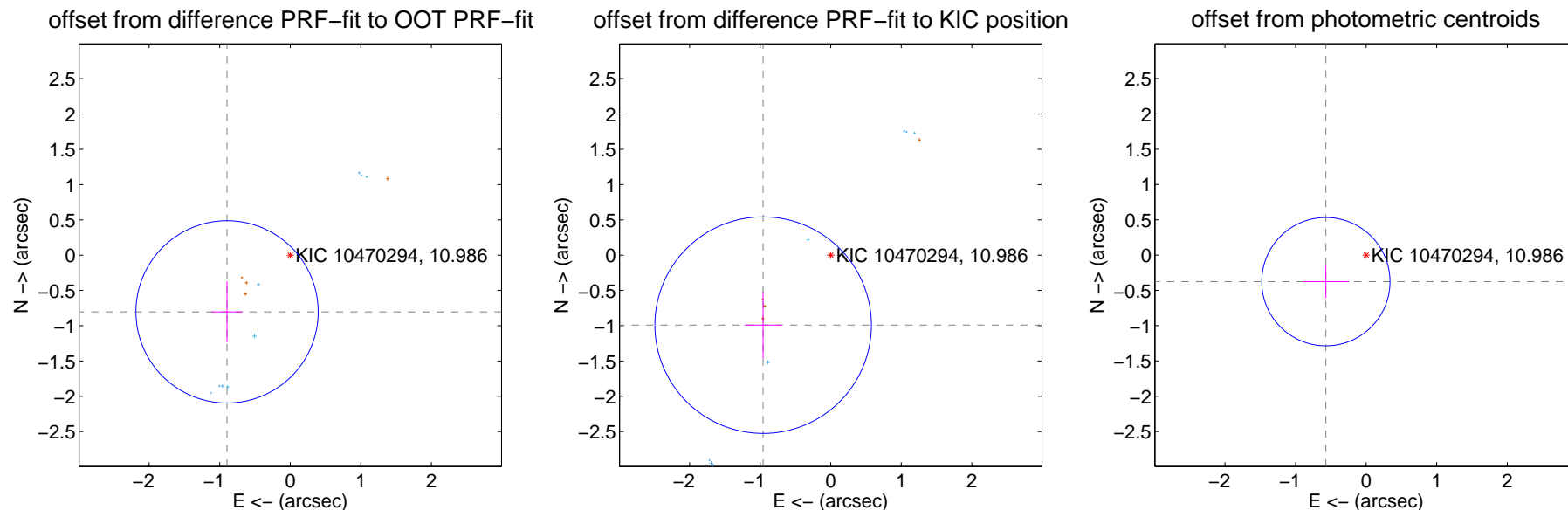
DV Centroid Data

Supplemental centroid analysis for 010470294-07. **Kepler magnitude: 10.99.** Transit SNR 14.14

There are 9 quarters with good PRF difference image offsets

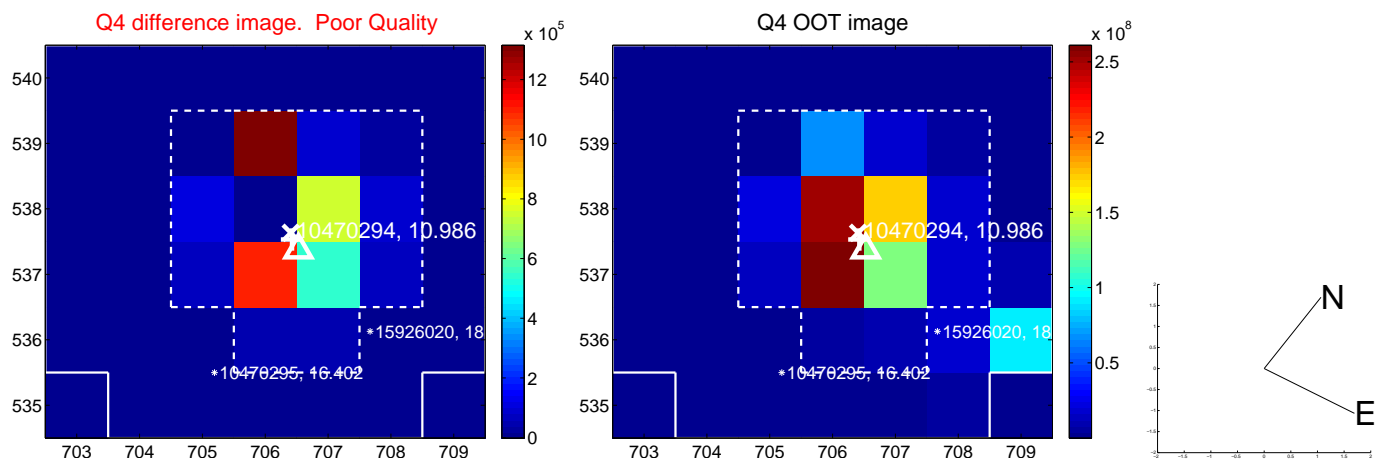
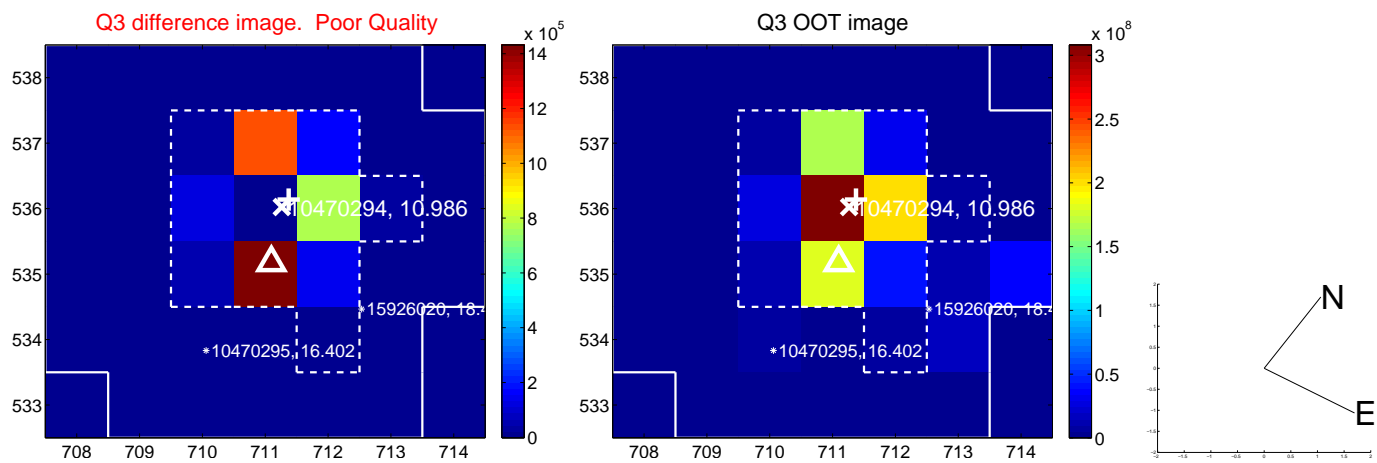
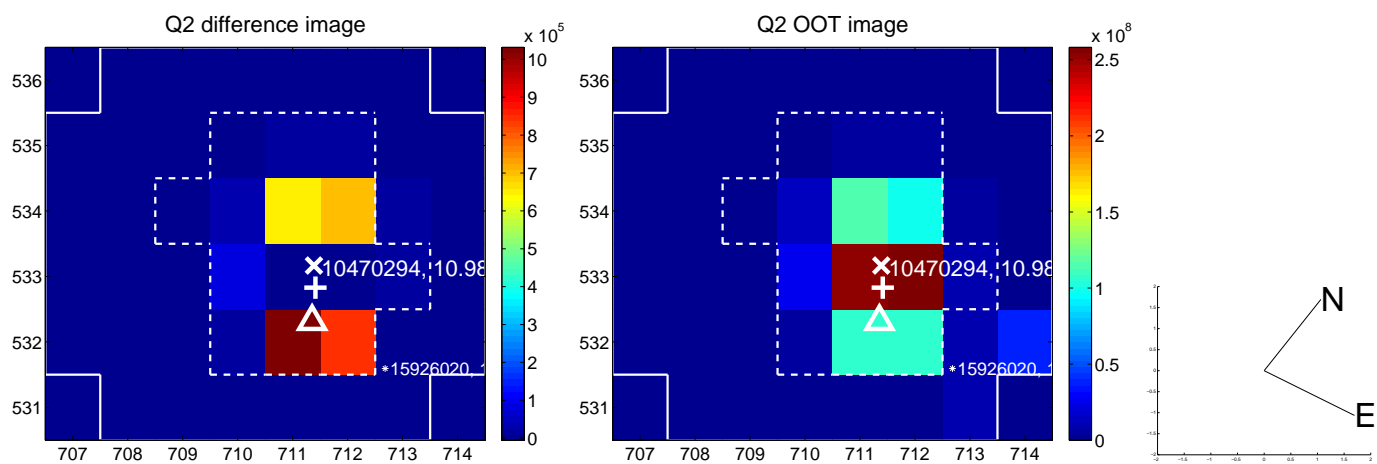
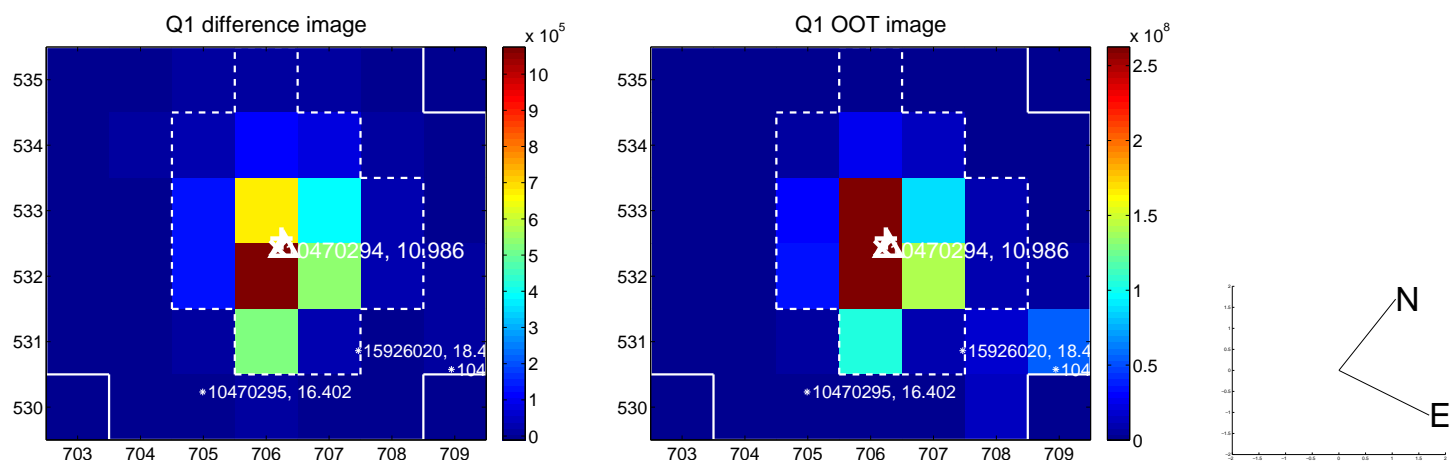
The direct PRF centroid is offset from the target star catalog position by about 0.48 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.203 ± 0.431	2.79	0.896 ± 0.220	-0.804 ± 0.432
PRF-fit source offset from KIC position	1.379 ± 0.511	2.70	0.958 ± 0.264	-0.992 ± 0.473
photometric centroid source offset	0.68 ± 0.30	2.26	0.57 ± 0.33	-0.38 ± 0.24

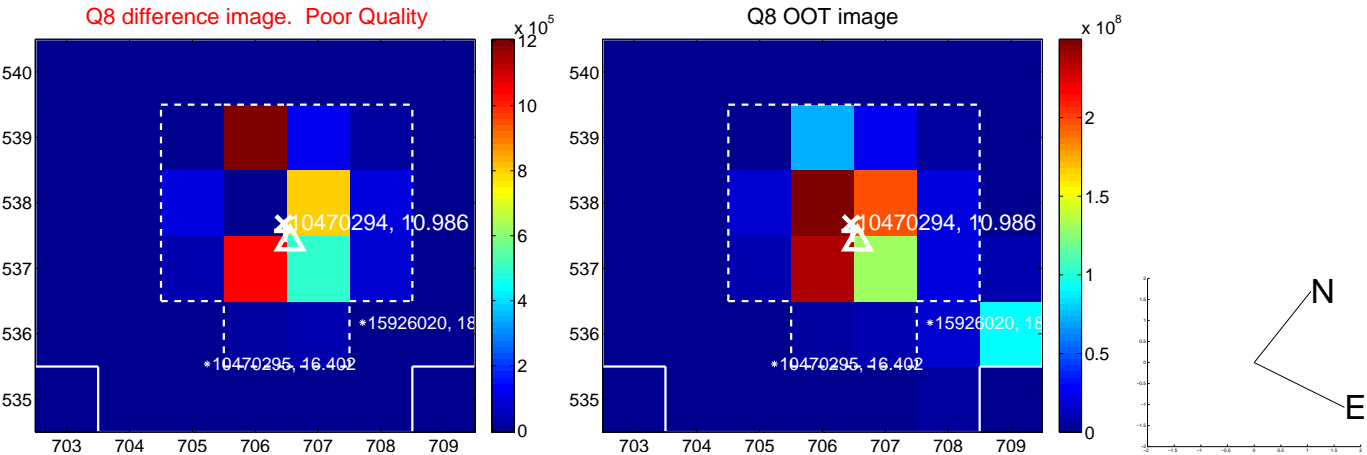
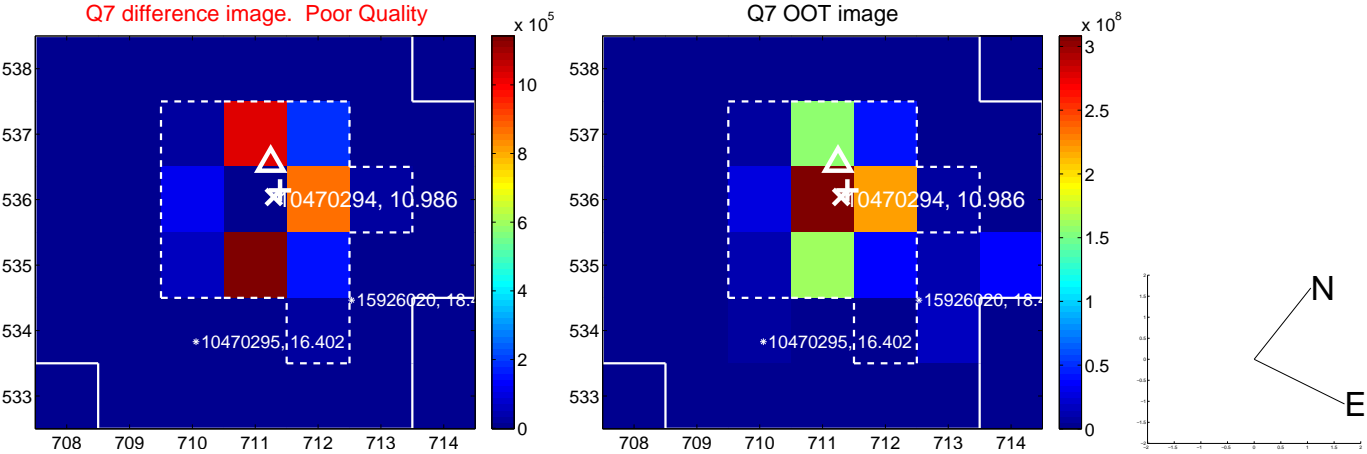
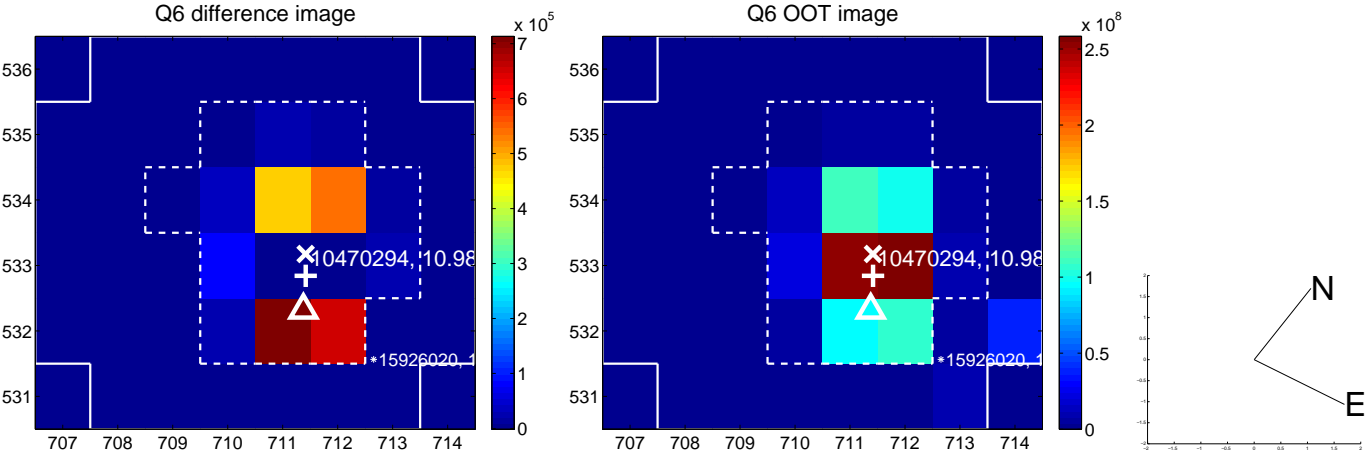
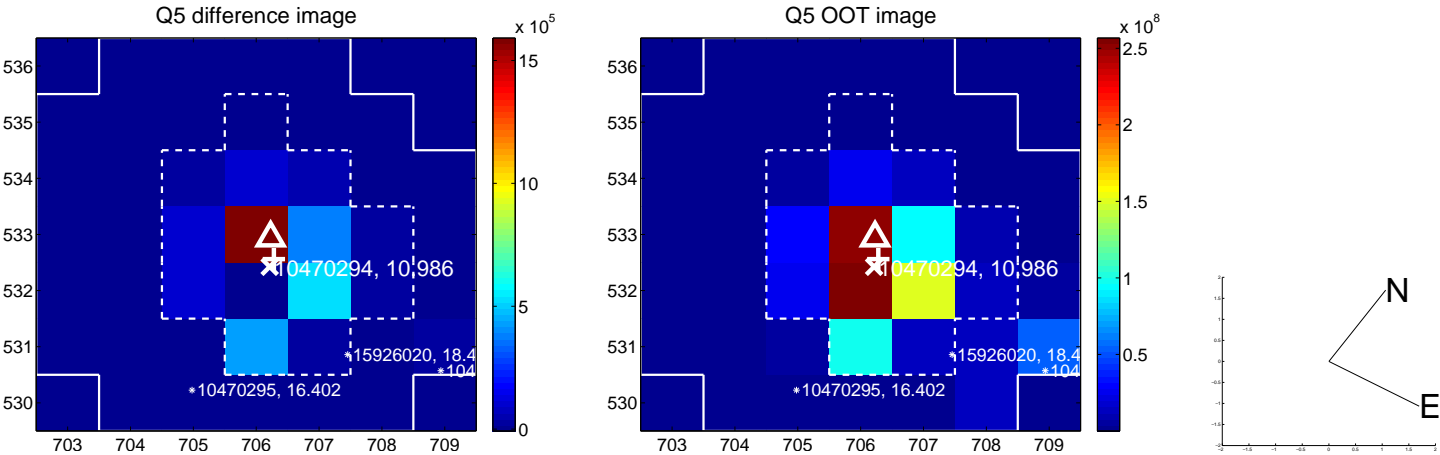


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

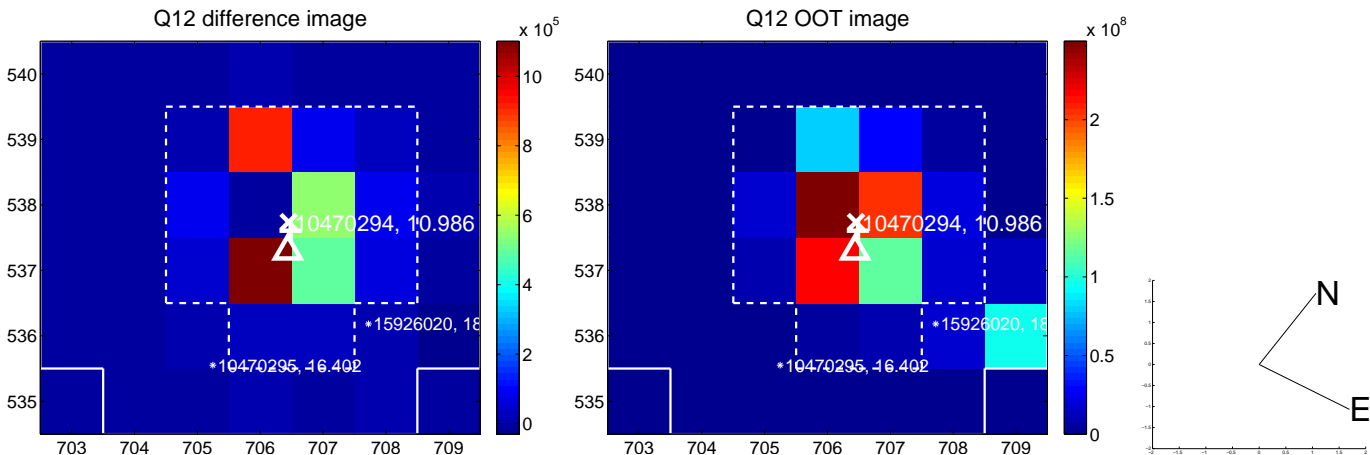
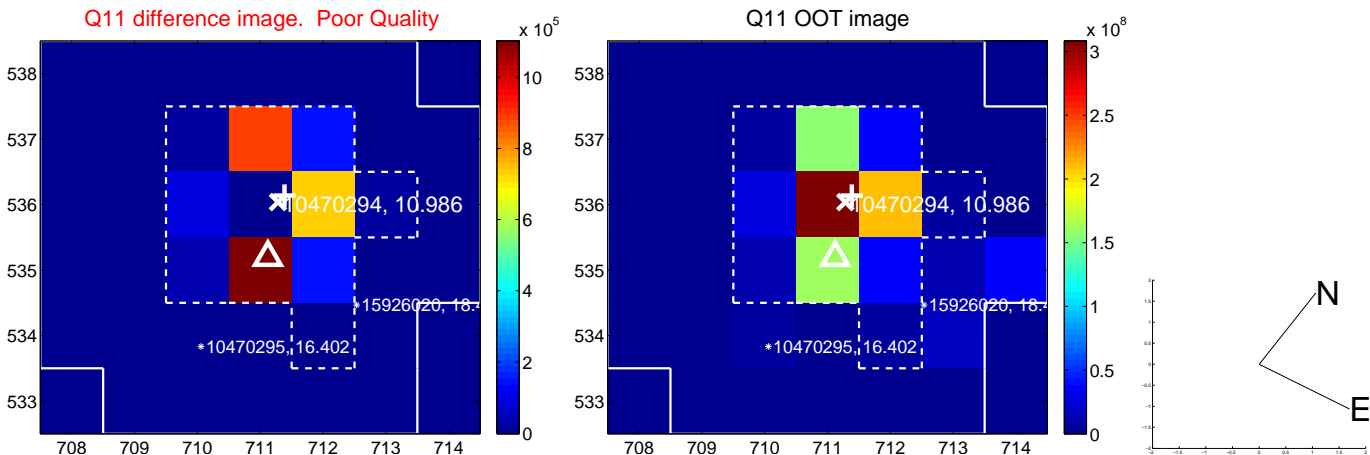
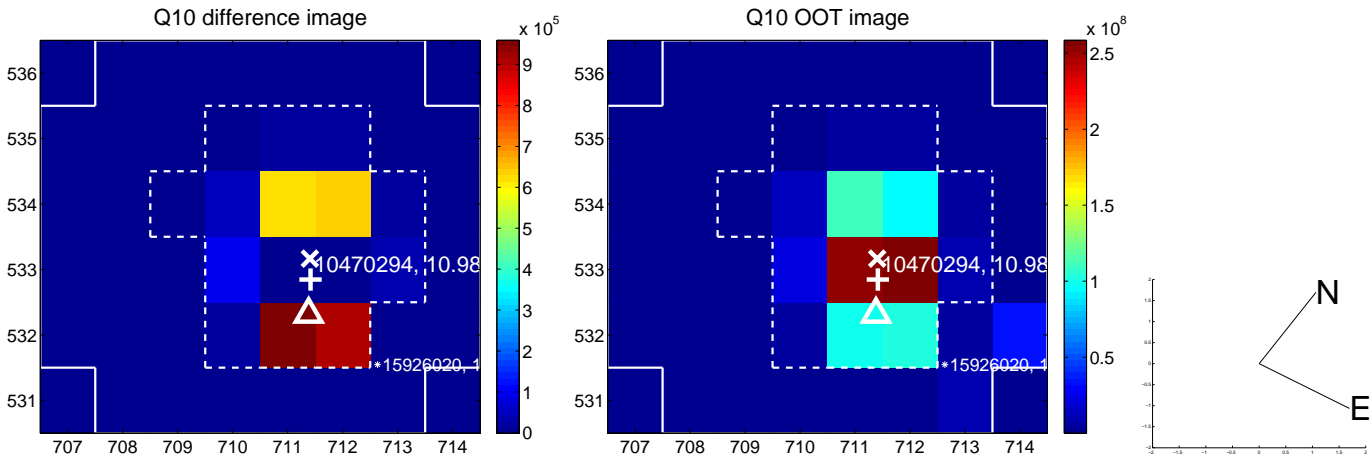
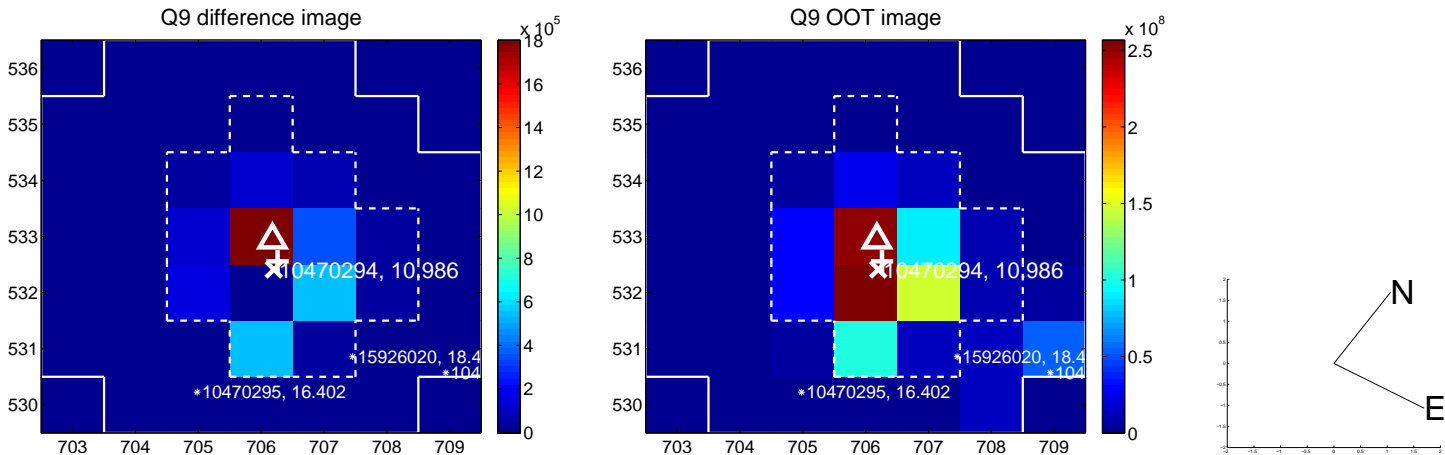
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



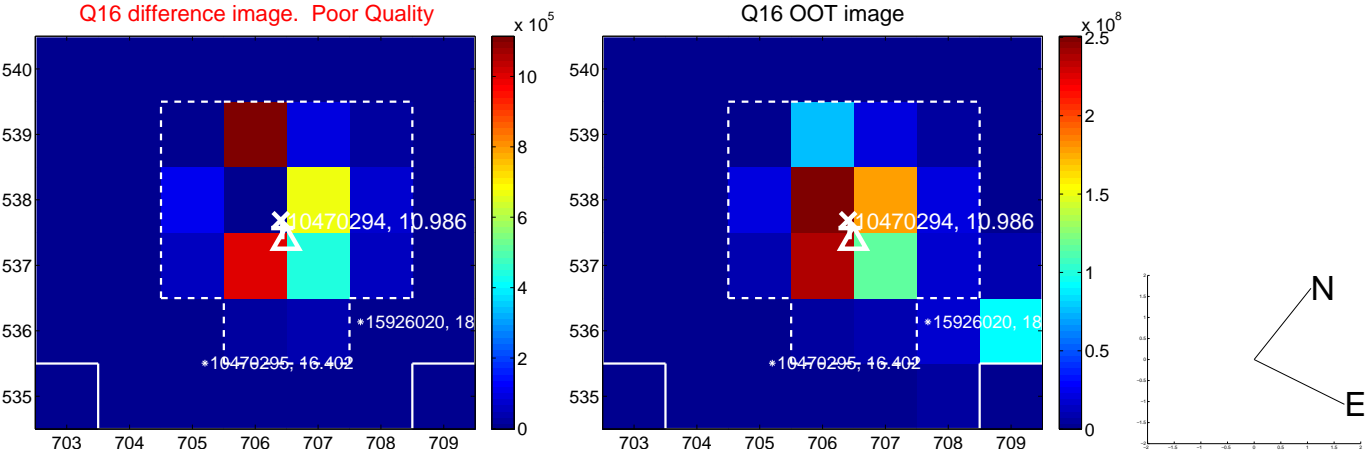
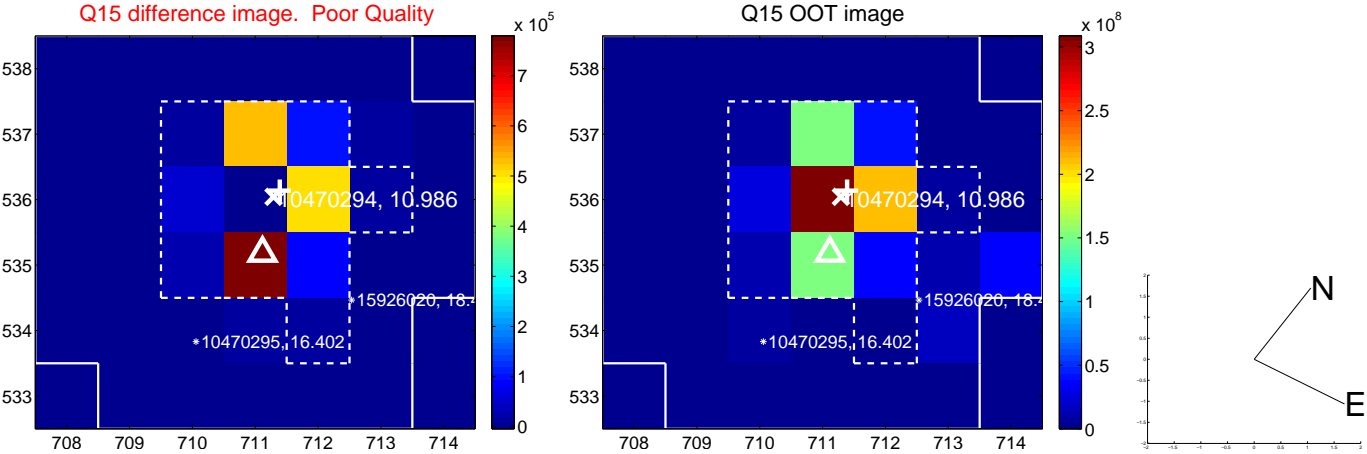
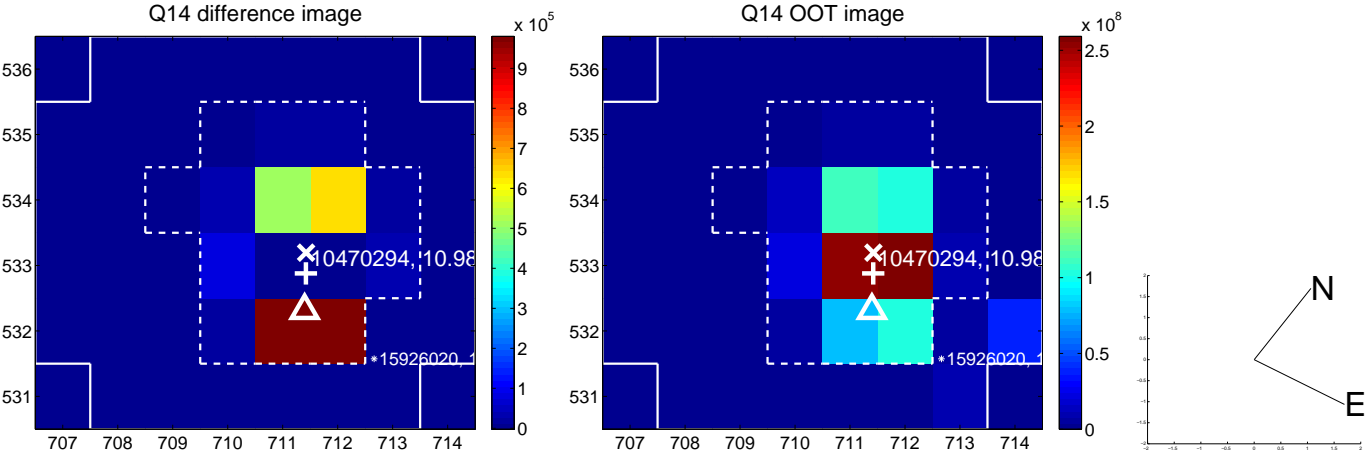
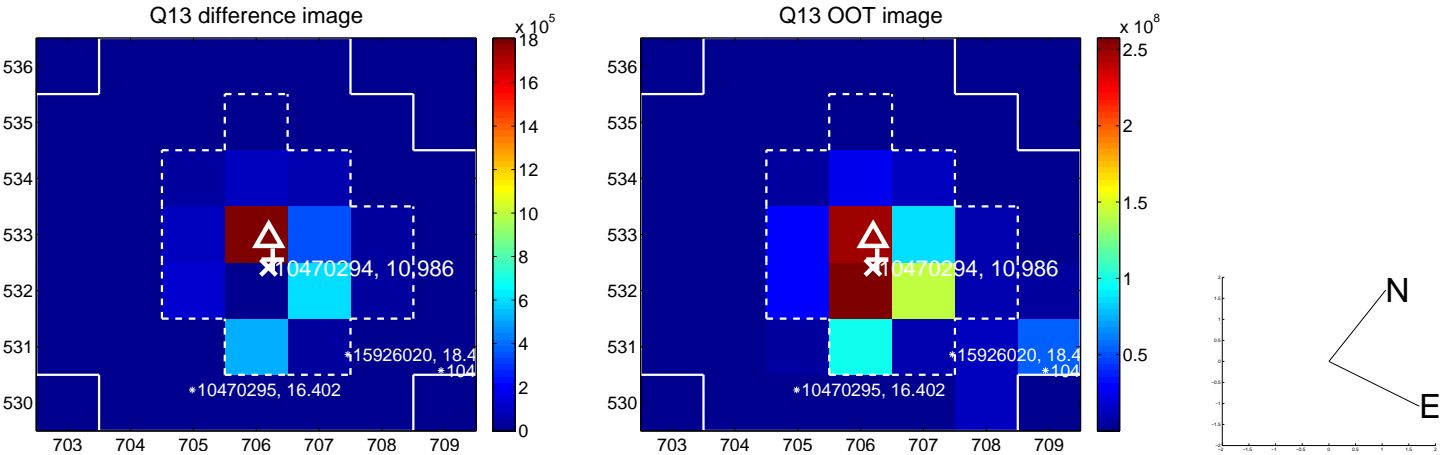
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



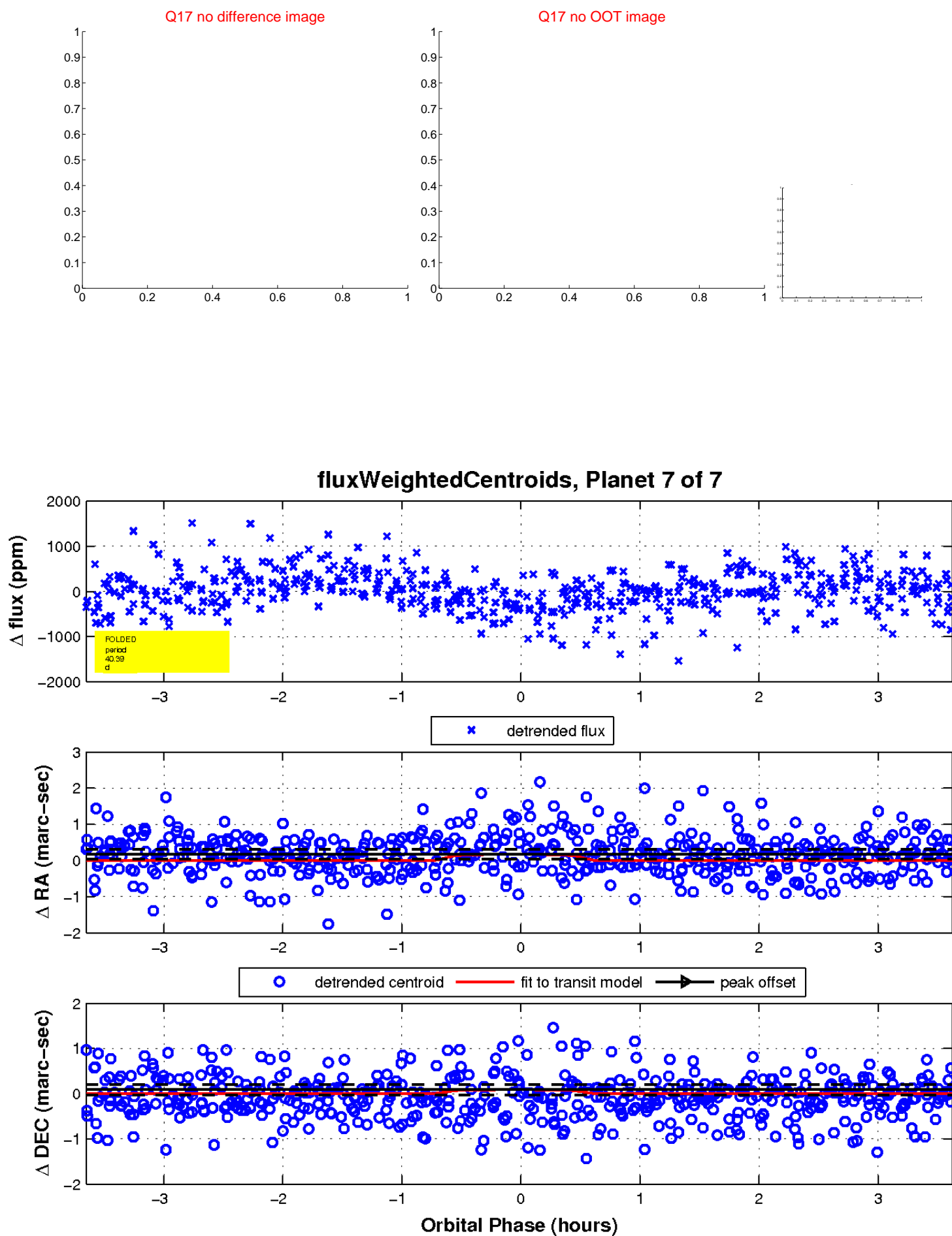
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

