

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
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002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

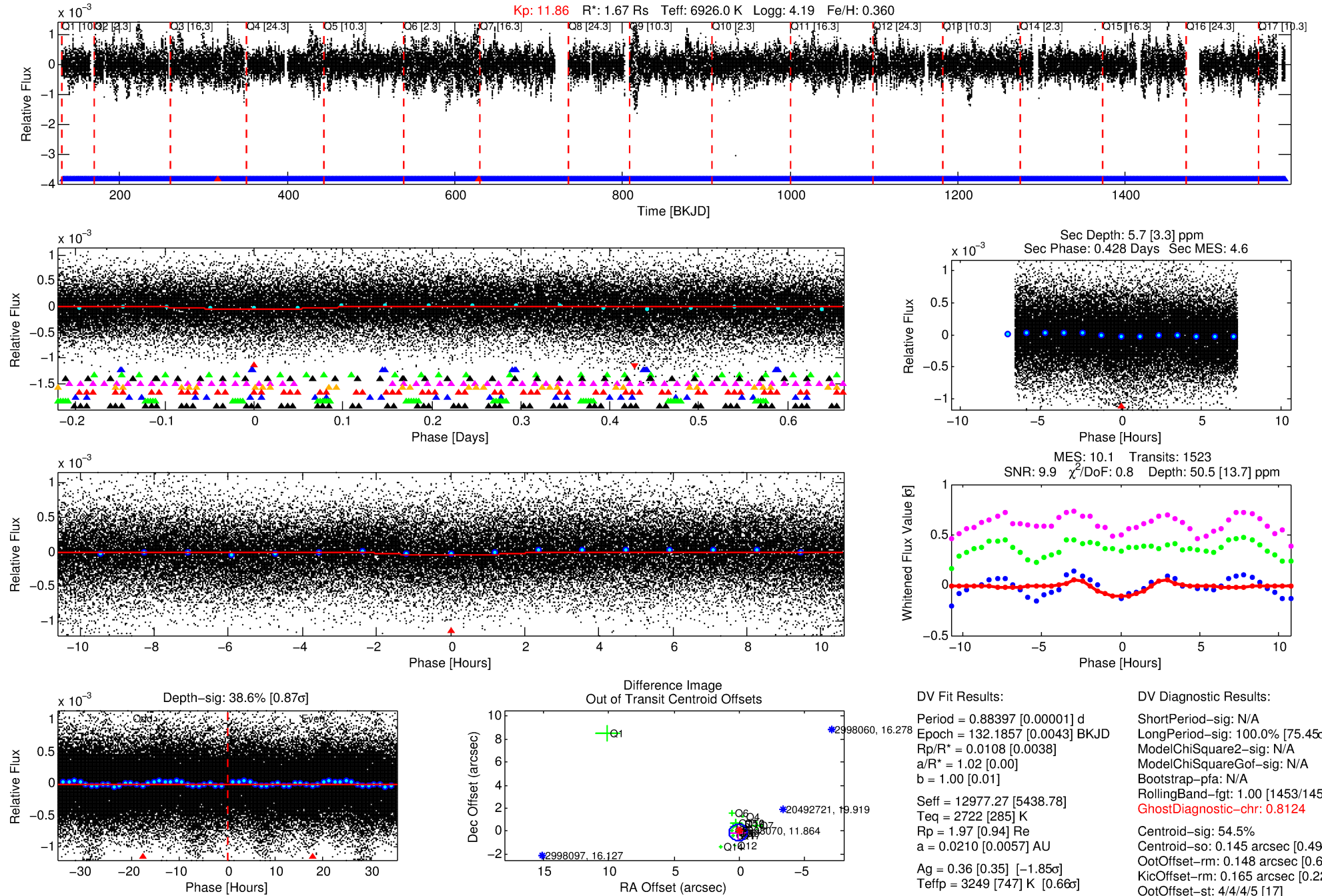
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-01

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 1 of 10 Period: 0.884 d



DV Fit Results:

Period = 0.88397 [0.00001] d
 Epoch = 132.1857 [0.0043] BKJD
 Rp/R* = 0.0108 [0.0038]
 a/R* = 1.02 [0.00]
 b = 1.00 [0.01]
 Seff = 12977.27 [5438.78]
 Teq = 2722 [285] K
 Rp = 1.97 [0.94] Re
 a = 0.0210 [0.0057] AU
 Ag = 0.36 [0.35] [-1.85 σ]
 Tefp = 3249 [747] K [0.66 σ]

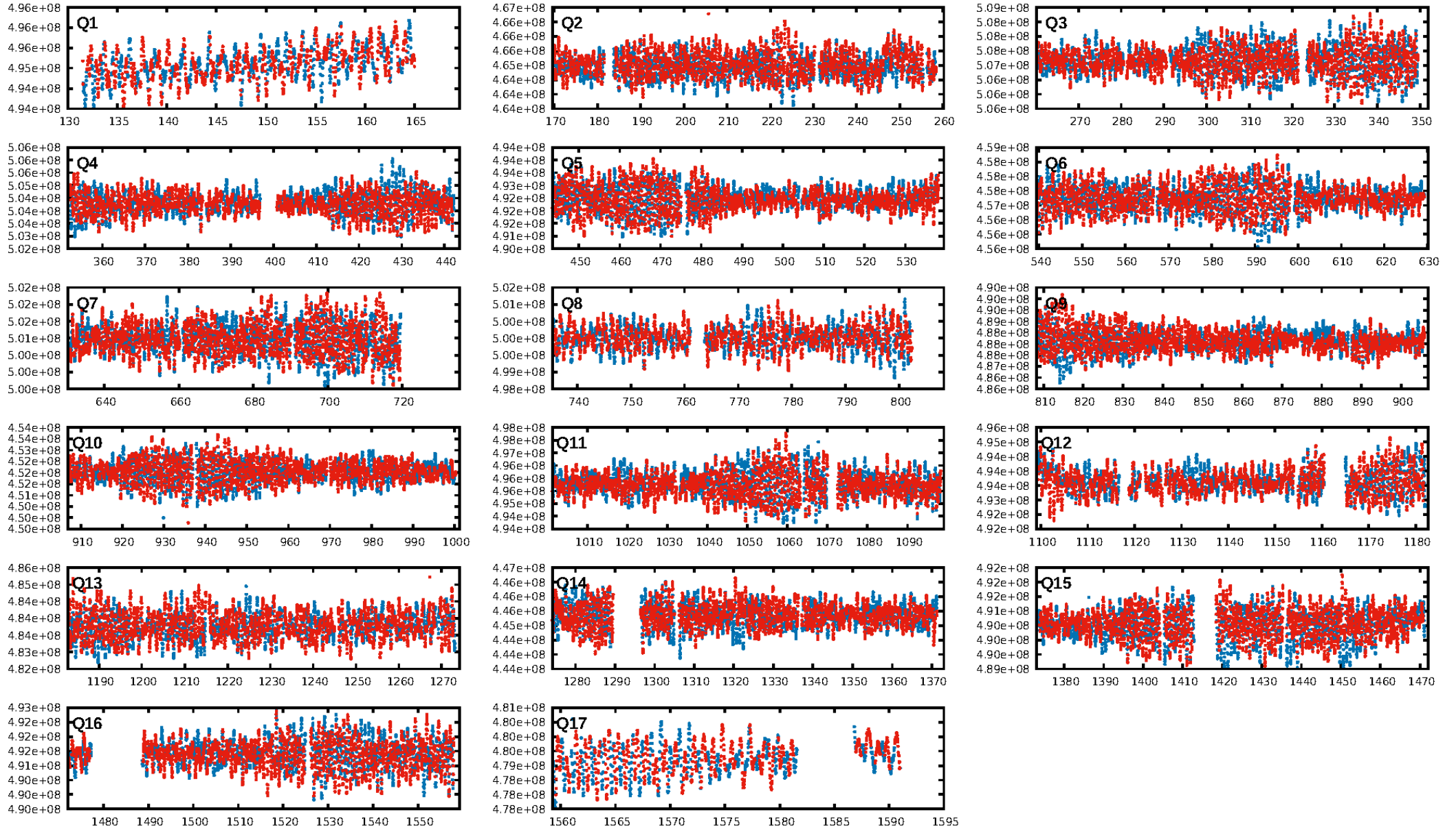
DV Diagnostic Results:

ShortPeriod-sig: N/A
 LongPeriod-sig: 100.0% [75.45 σ]
 ModelChiSquare2-sig: N/A
 ModelChiSquareGof-sig: N/A
 Bootstrap-pfa: N/A
 RollingBand-fgt: 1.00 [1453/1455]
 GhostDiagnostic-chr: 0.8124
 Centroid-sig: 54.5%
 Centroid-so: 0.145 arcsec [0.49 σ]
 OotOffset-rm: 0.148 arcsec [0.63 σ]
 KicOffset-rm: 0.165 arcsec [0.22 σ]
 OotOffset-st: 4/4/4/5 [17]
 KicOffset-st: 4/4/4/5 [17]
 DiffImageQuality-fgm: 0.59 [10/17]
 DiffImageOverlap-fno: 1.00 [17/17]

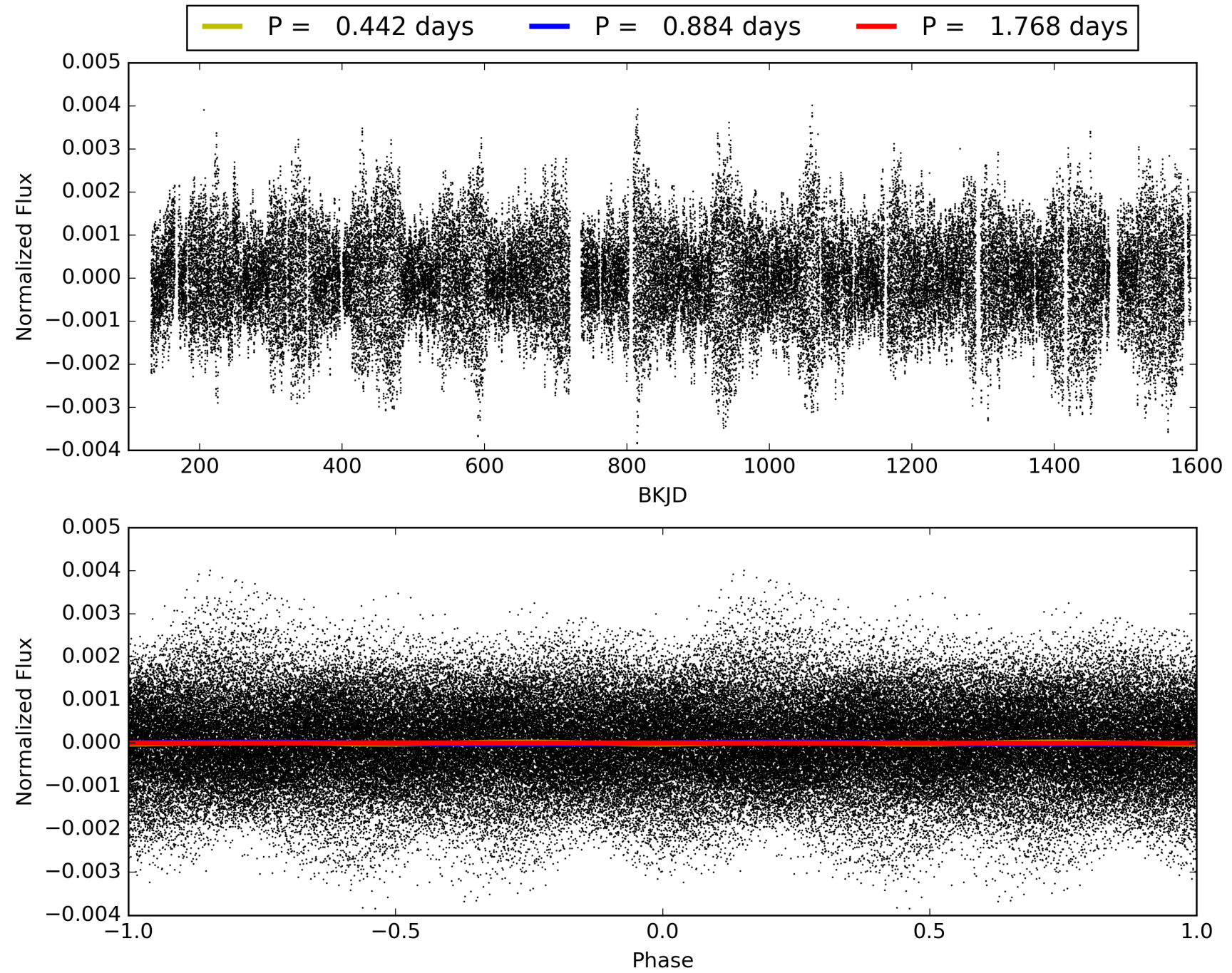
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:20 Z

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

TCE 002998070-01, PDC Light Curves

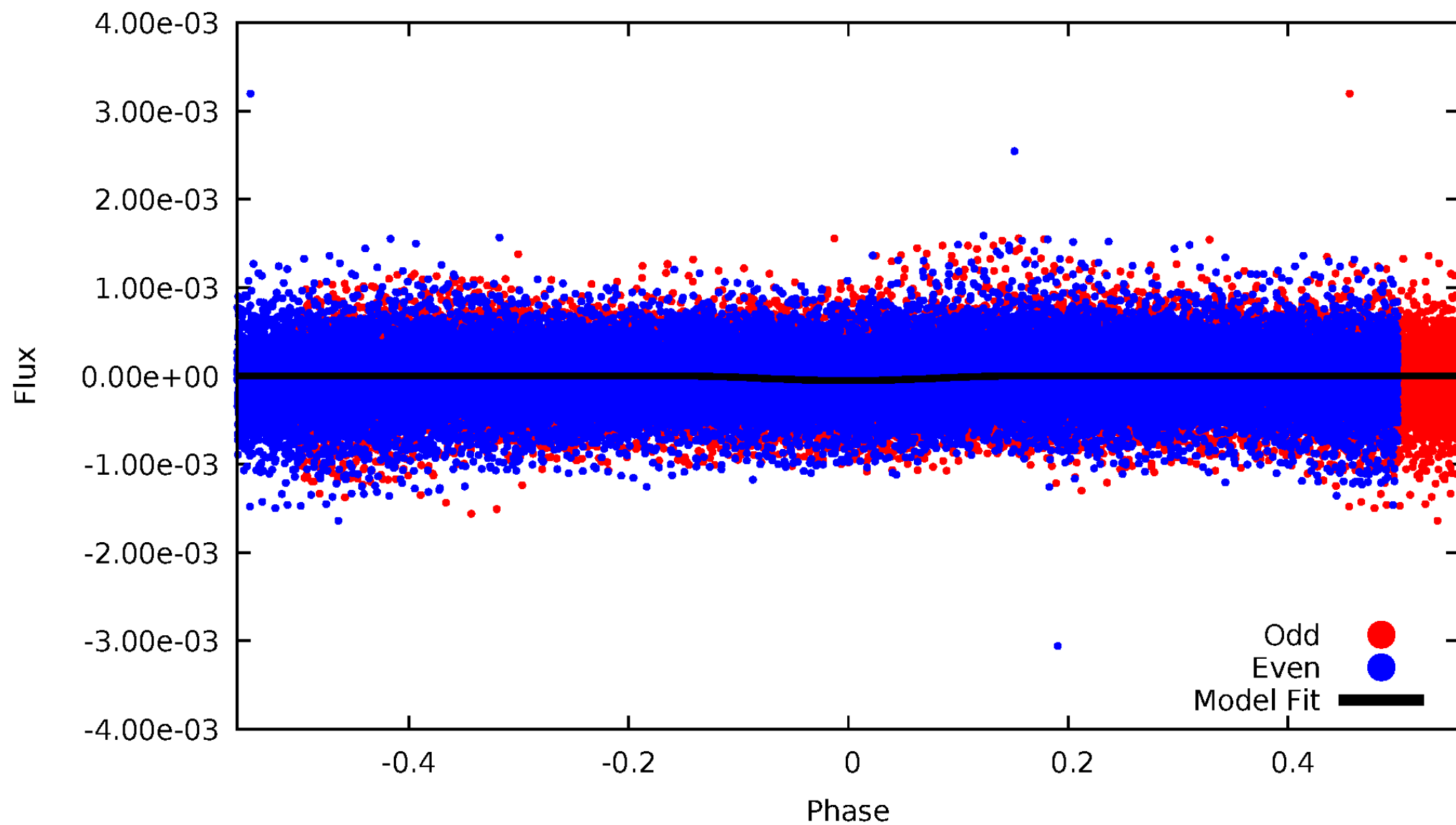


TCE 002998070-01



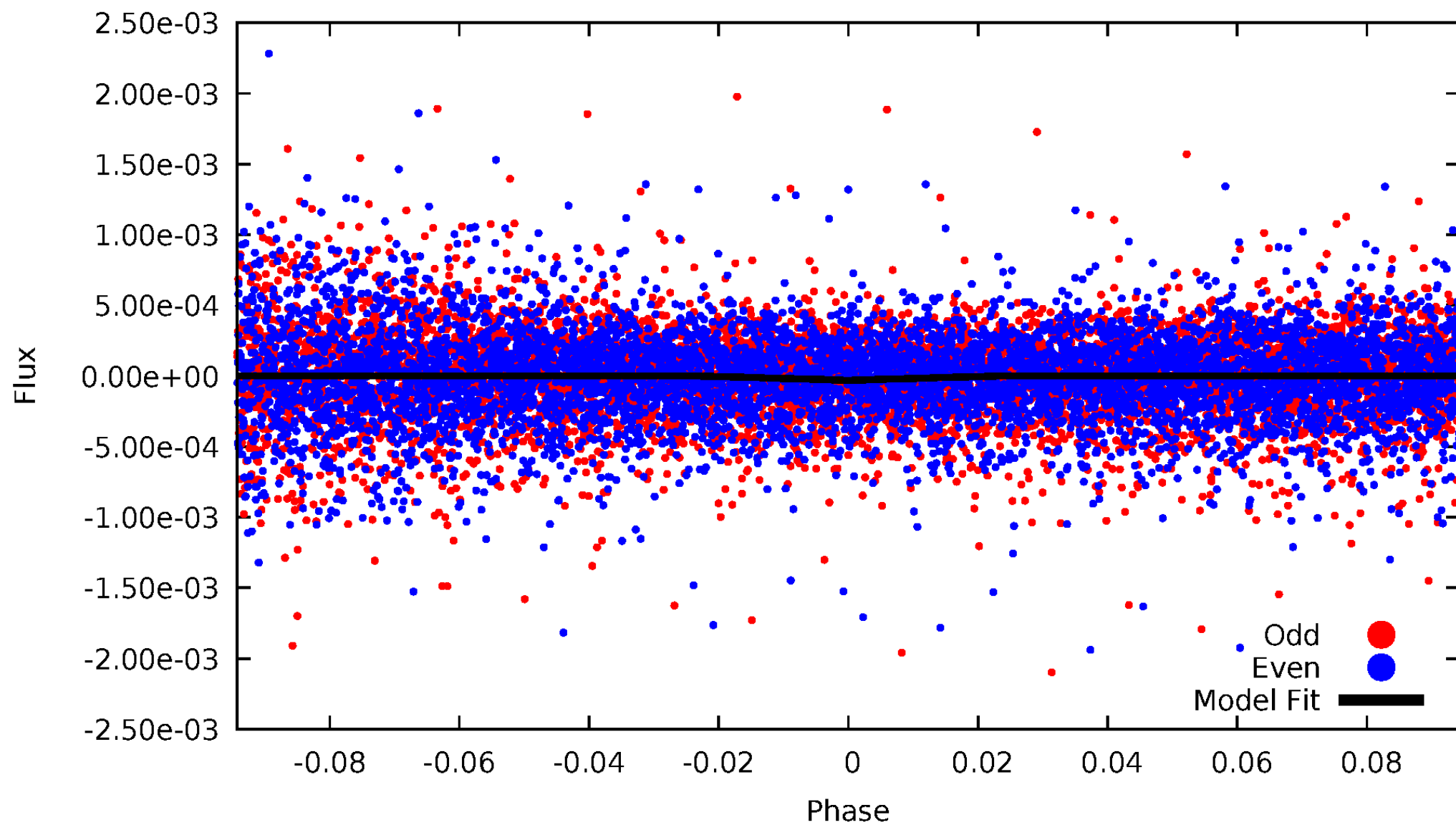
DV Odd/Even

TCE 002998070-01

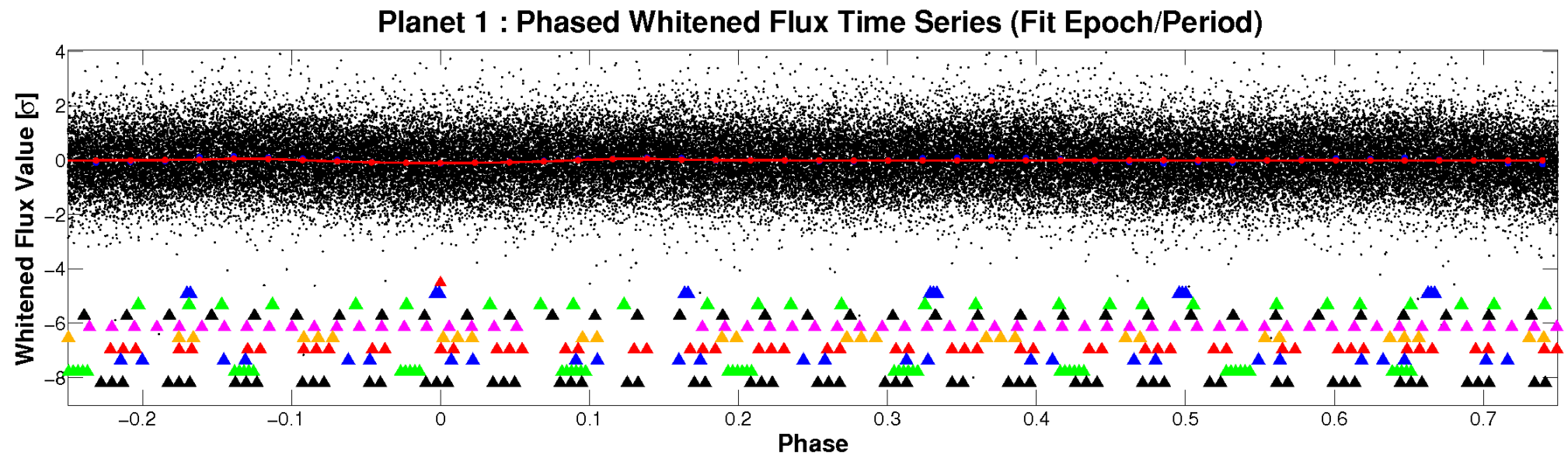
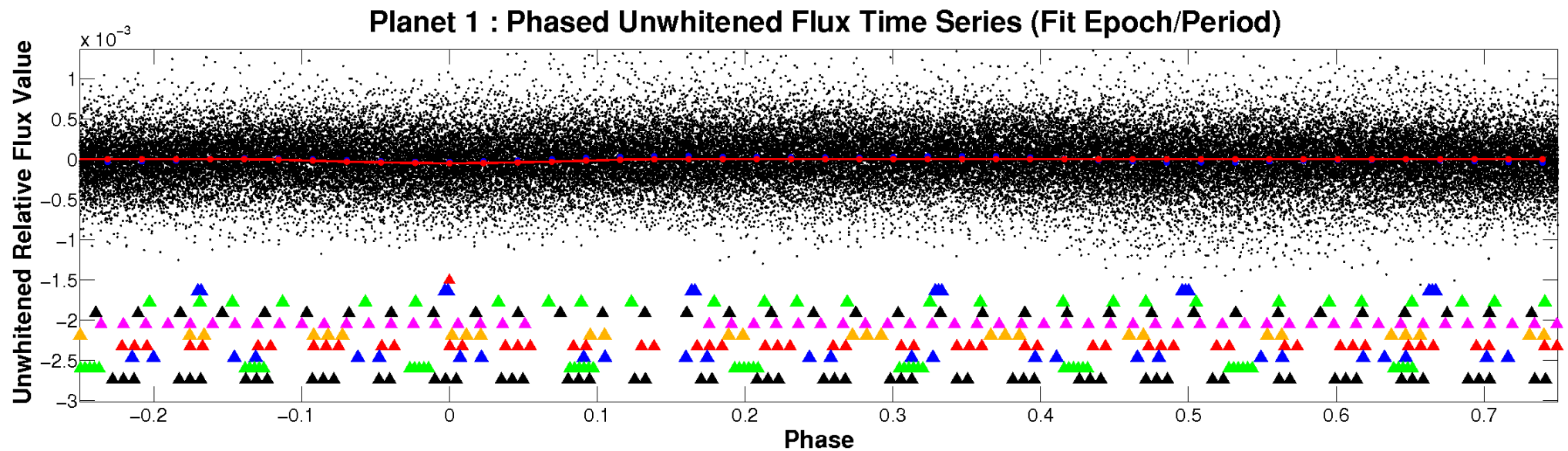


ALT Odd/Even

TCE 002998070-01

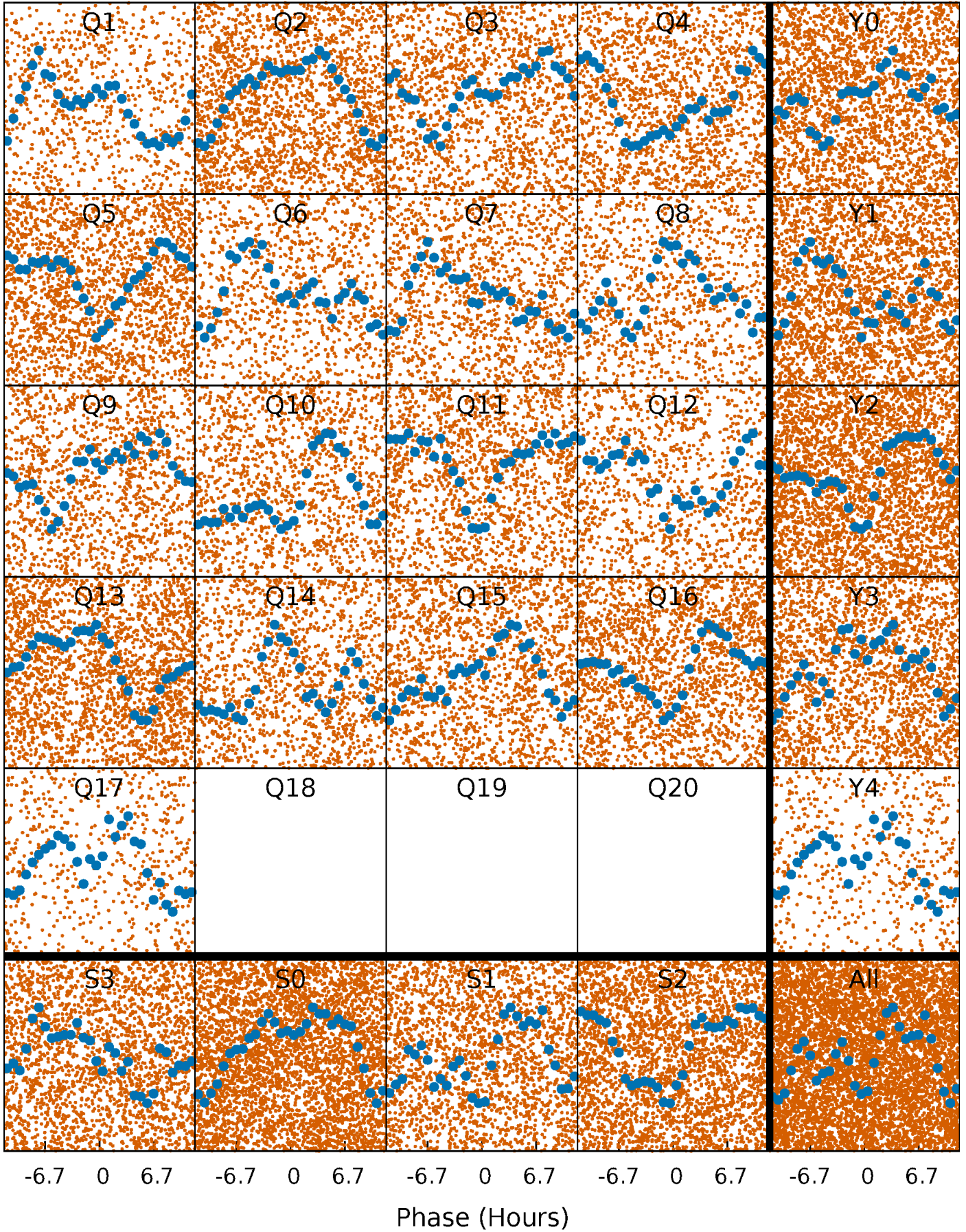


Non-Whitened Vs. Whitened Light Curve



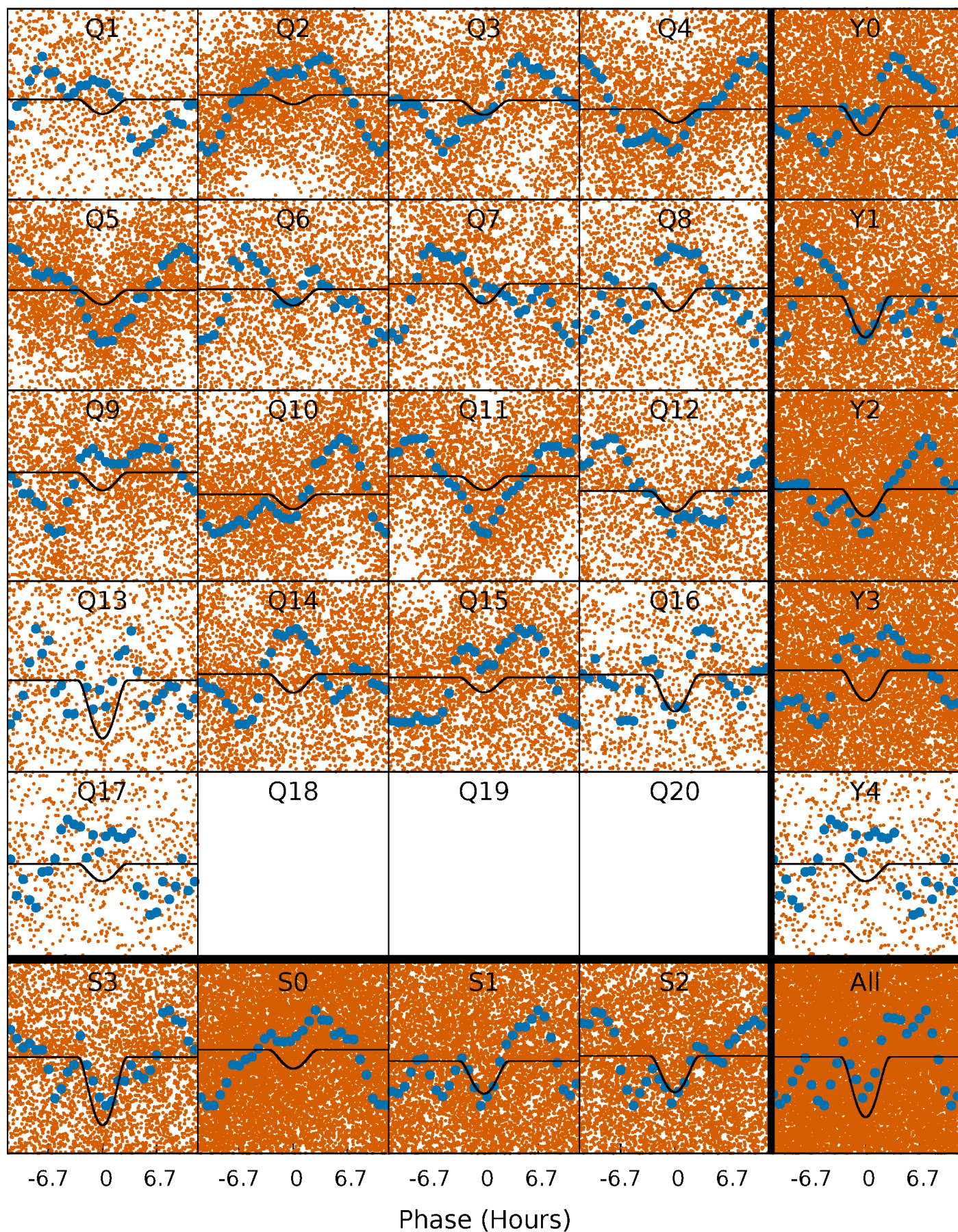
PDC Quarter-Phased Transit Curves

TCE 002998070-01 P= 0.883970 Days $T_0=132.185673$ (BKJD)



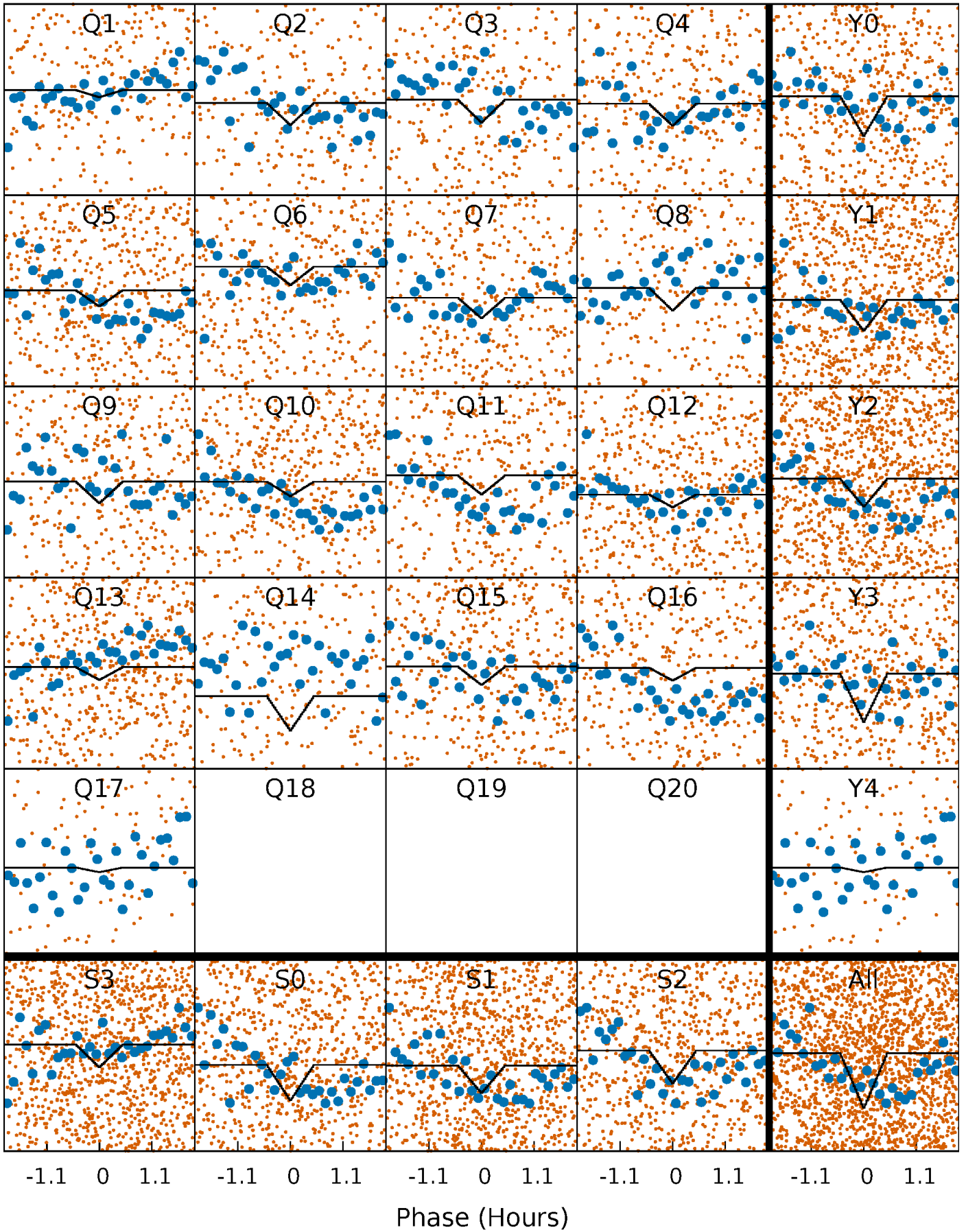
DV Quarter-Phased Transit Curves

TCE 002998070-01 P= 0.883970 Days $T_0=132.185673$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

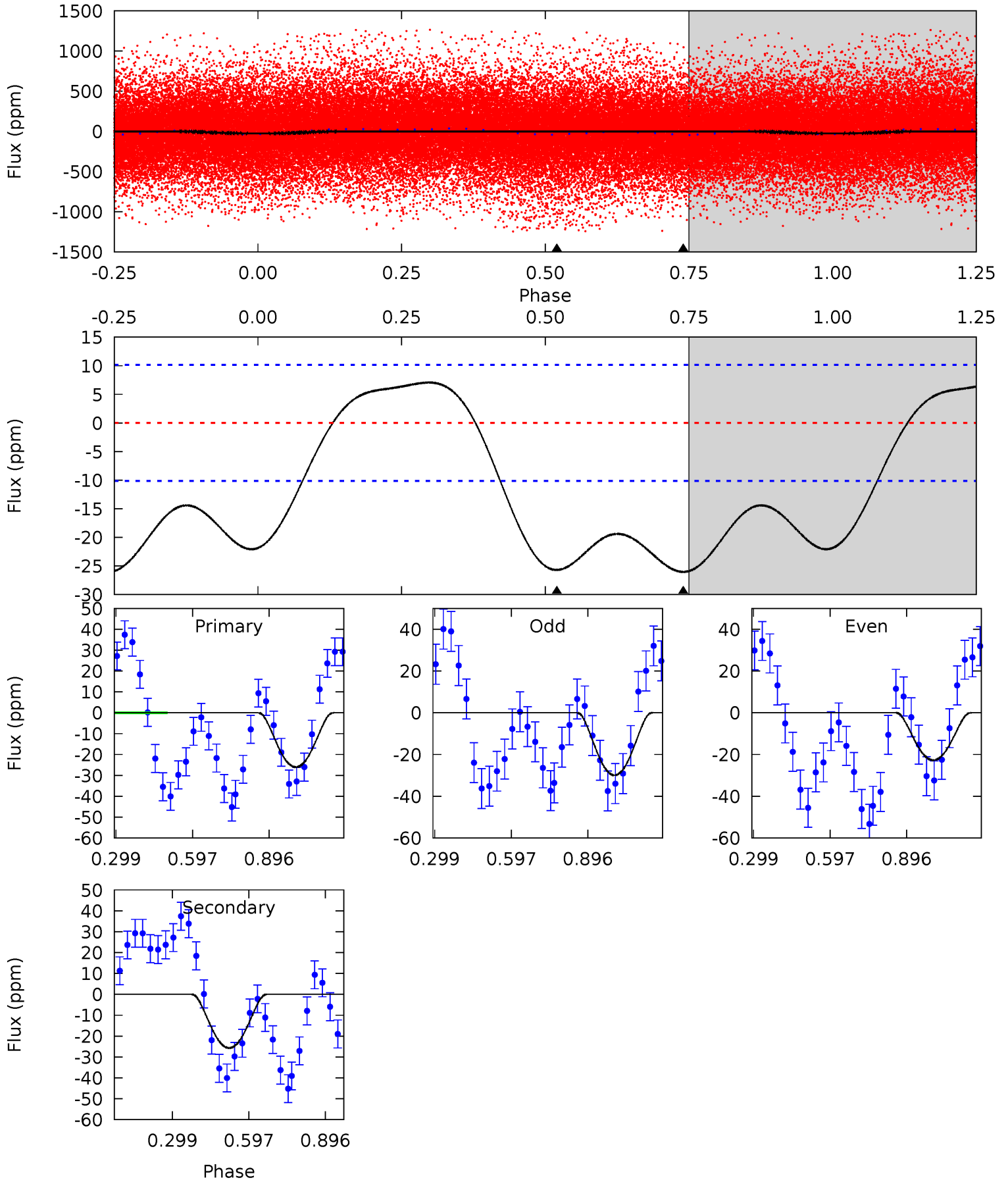
TCE 002998070-01 P= 0.883959 Days $T_0=132.169979$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-01, P = 0.883970 Days, E = 131.301703 Days

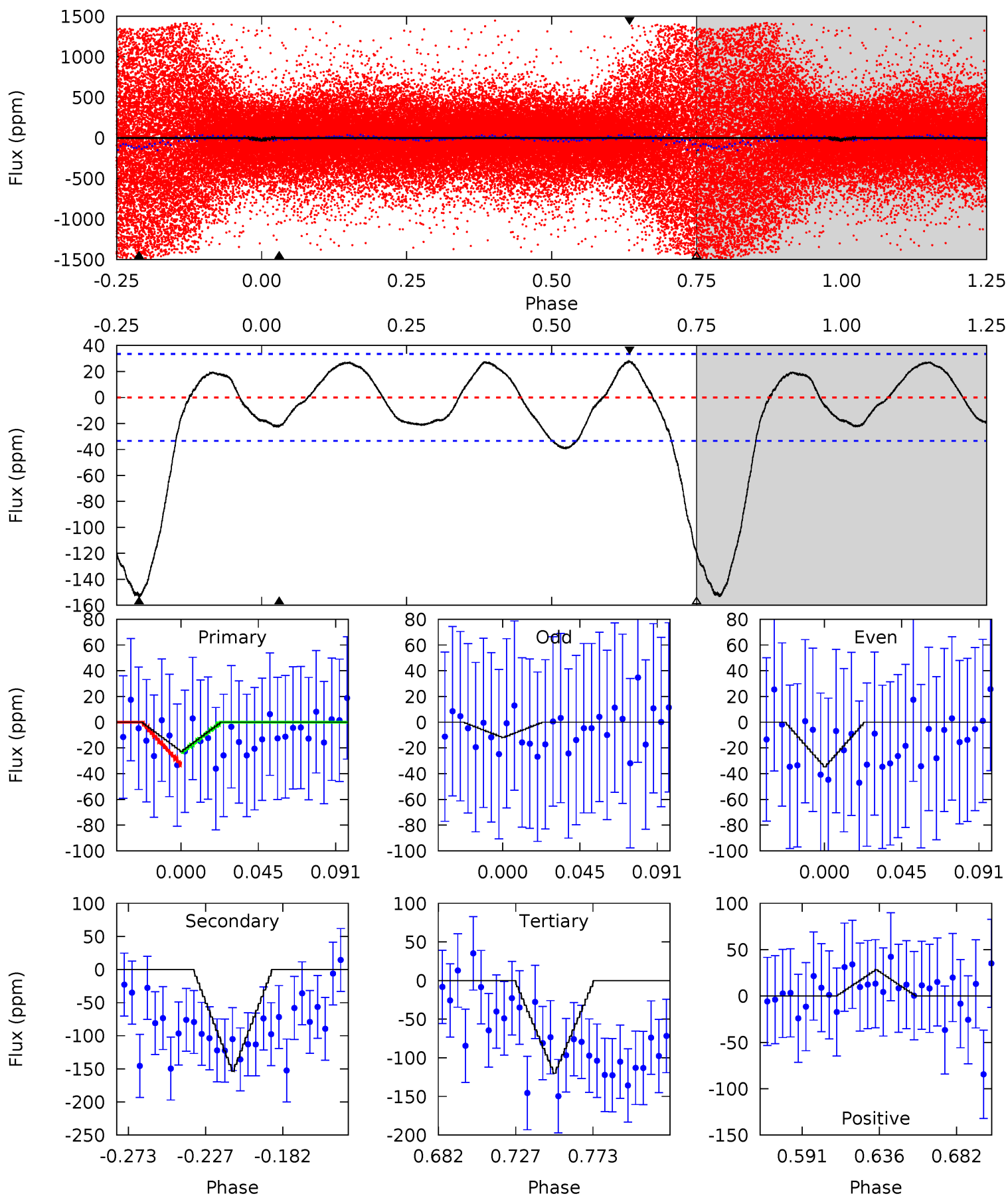
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	11.0	0	0	4.33	1.04	3.22	11.1	11.1	11.0	11.0	1.56	0.79	0.21	1.66



Alt Model-Shift Uniqueness Test

002998070-01, P = 0.883959 Days, E = 131.286020 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.20	21.7	17.0	3.99	4.73	2.00	3.69	-13.8	-0.79	4.74	17.7	1.63	5.18	0.16	0.60



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-26 ± 2	$2.05^{+0.79}_{-0.72}$	3868^{+302}_{-228}	4557^{+1069}_{-683}	$1.402^{+2.115}_{-0.659}$
Alt.	-154 ± 7	$1.09^{+0.71}_{-0.61}$	3861^{+275}_{-229}	11452^{+13138}_{-3450}	32^{+117}_{-21}

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

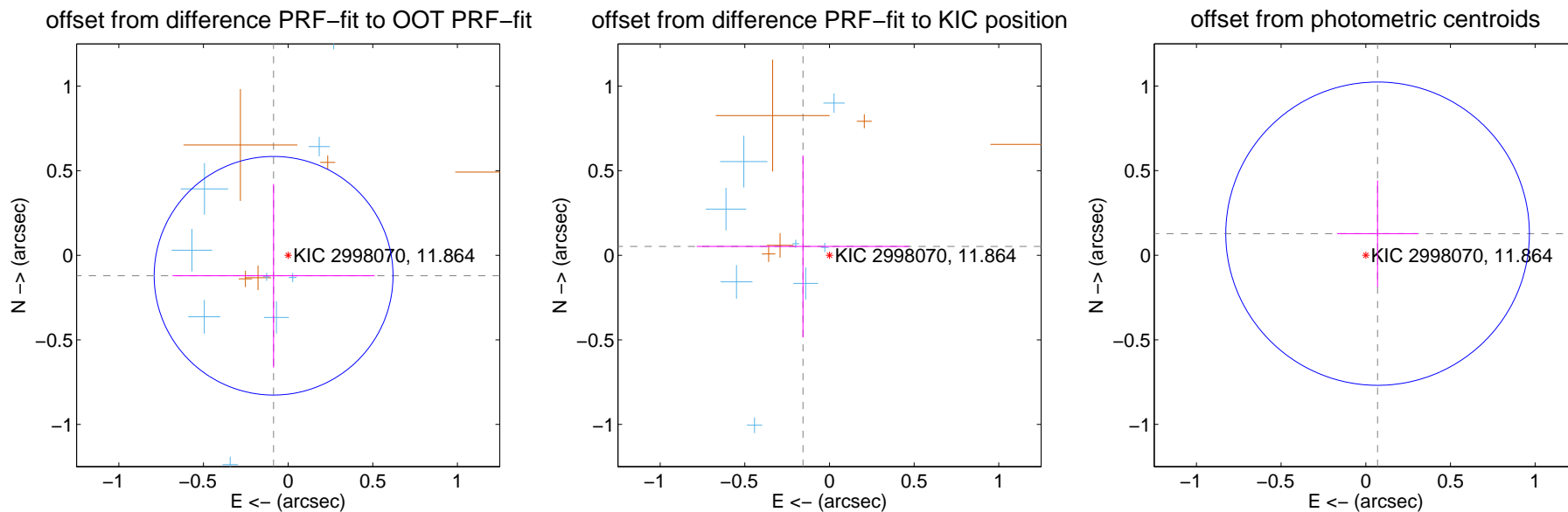
DV Centroid Data

Supplemental centroid analysis for 002998070-01. **Kepler magnitude: 11.86.** Transit SNR 9.85

There are 10 quarters with good PRF difference image offsets

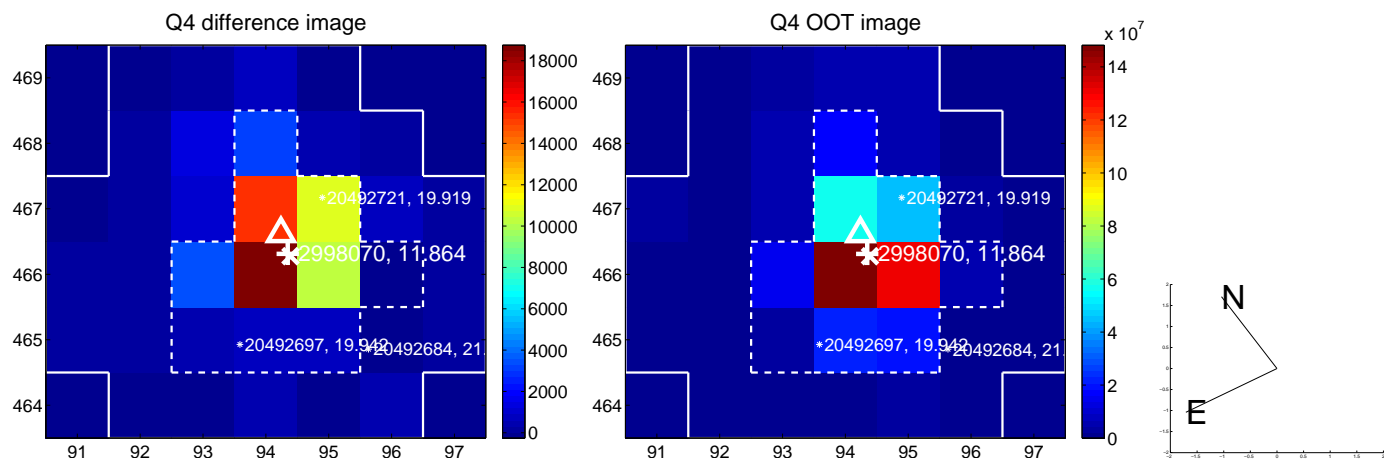
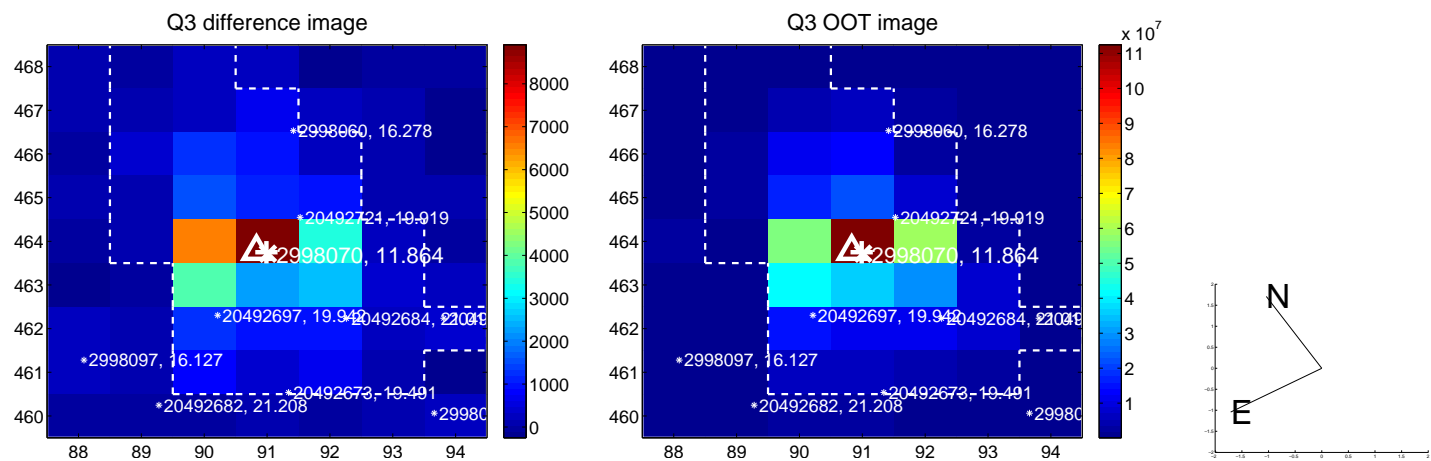
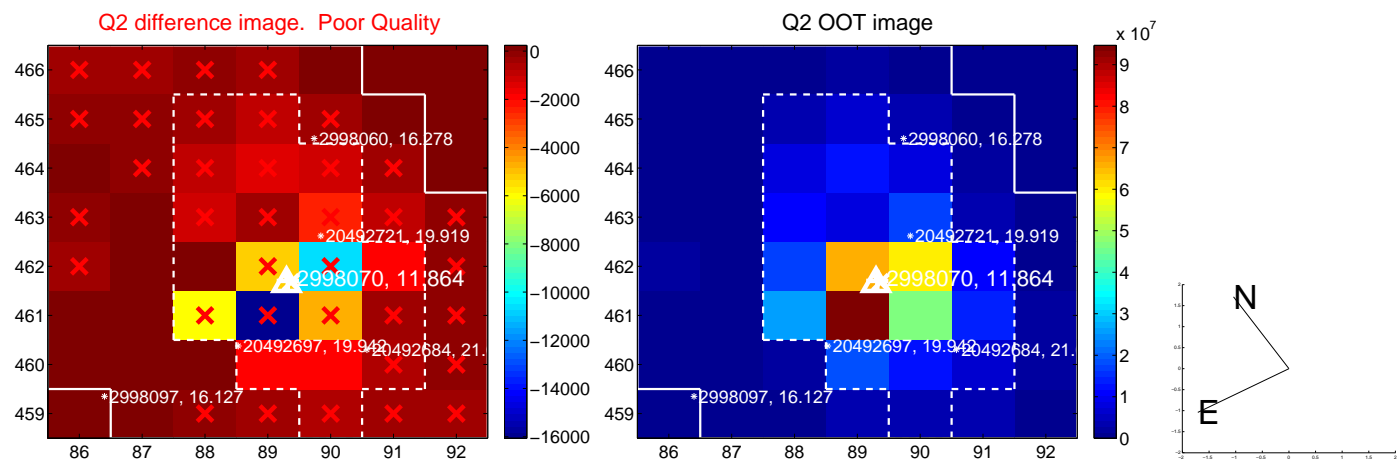
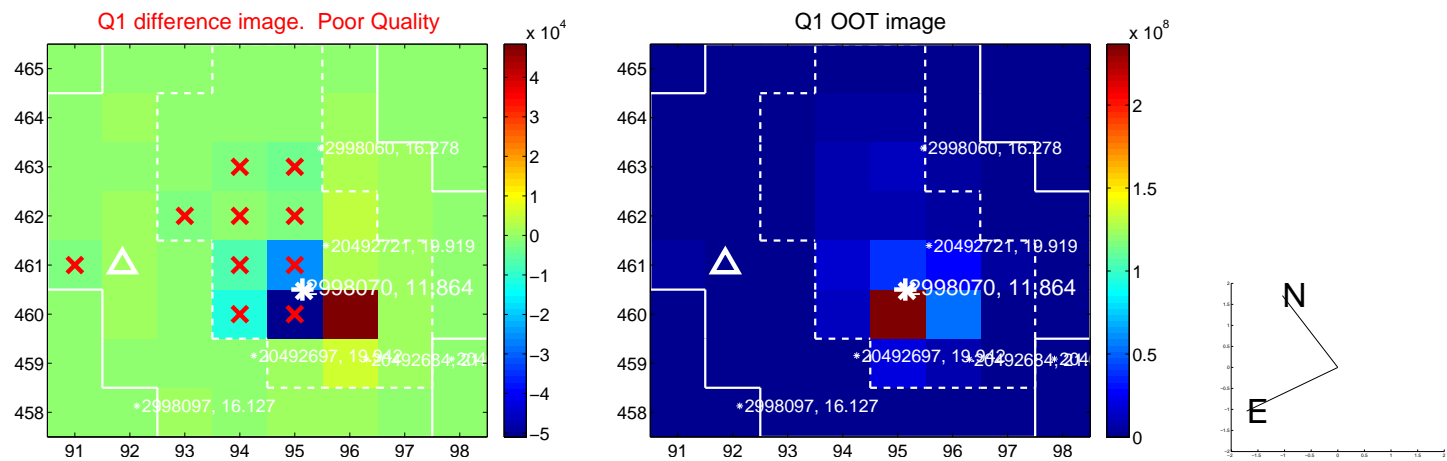
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.148 ± 0.235	0.63	0.086 ± 0.597	-0.121 ± 0.543
PRF-fit source offset from KIC position	0.165 ± 0.751	0.22	0.157 ± 0.627	0.053 ± 0.538
photometric centroid source offset	0.15 ± 0.30	0.49	-0.07 ± 0.24	0.13 ± 0.31

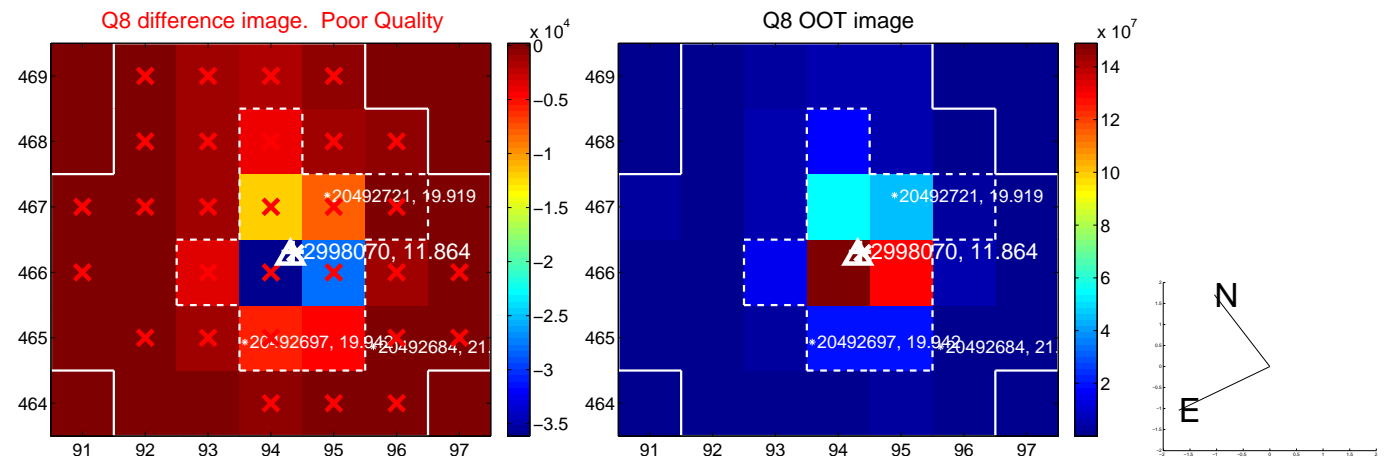
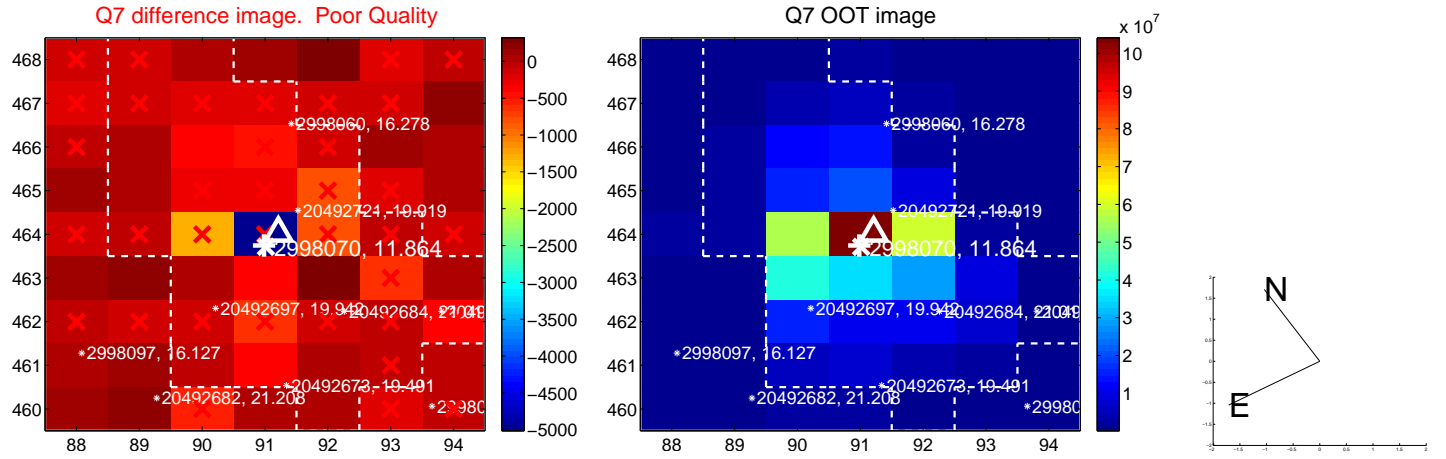
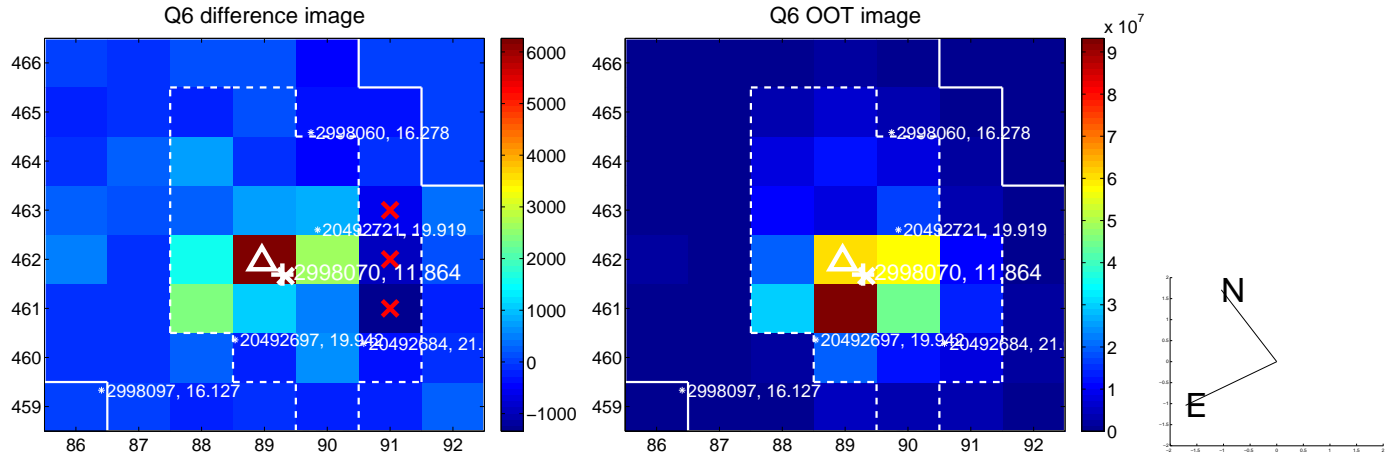
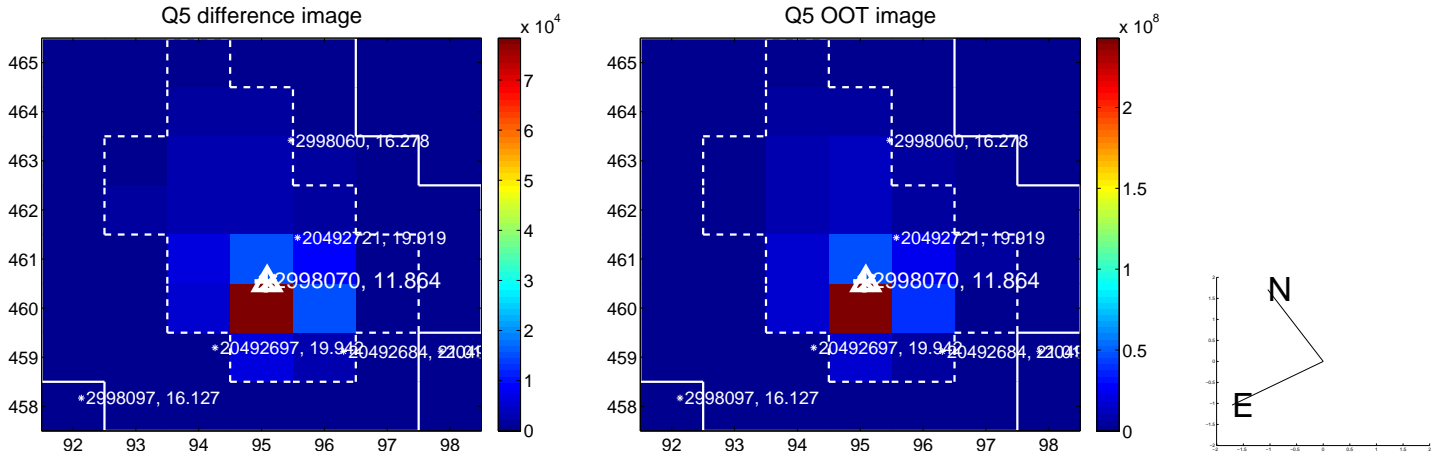


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

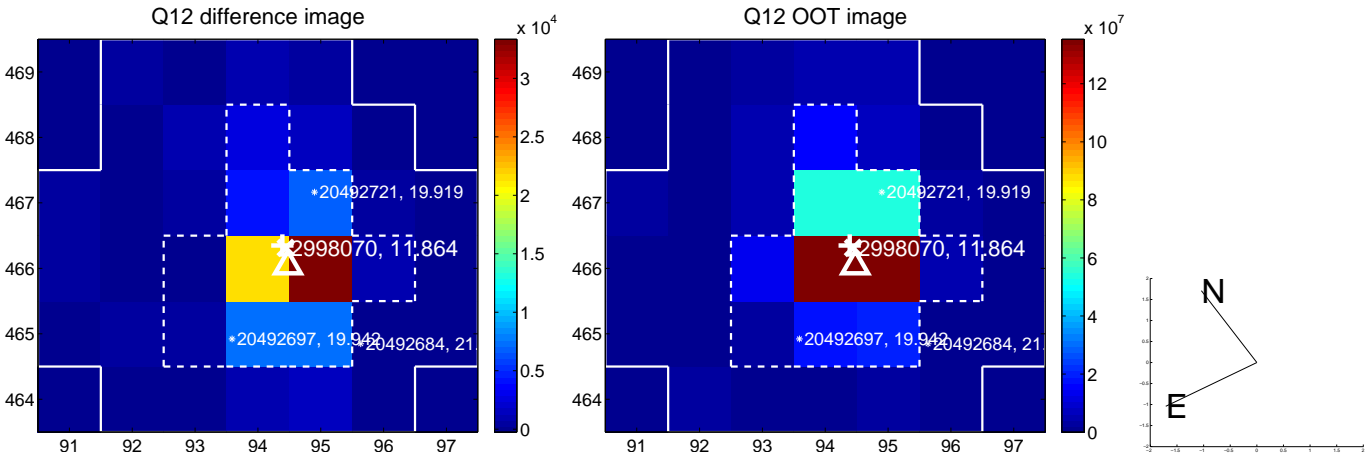
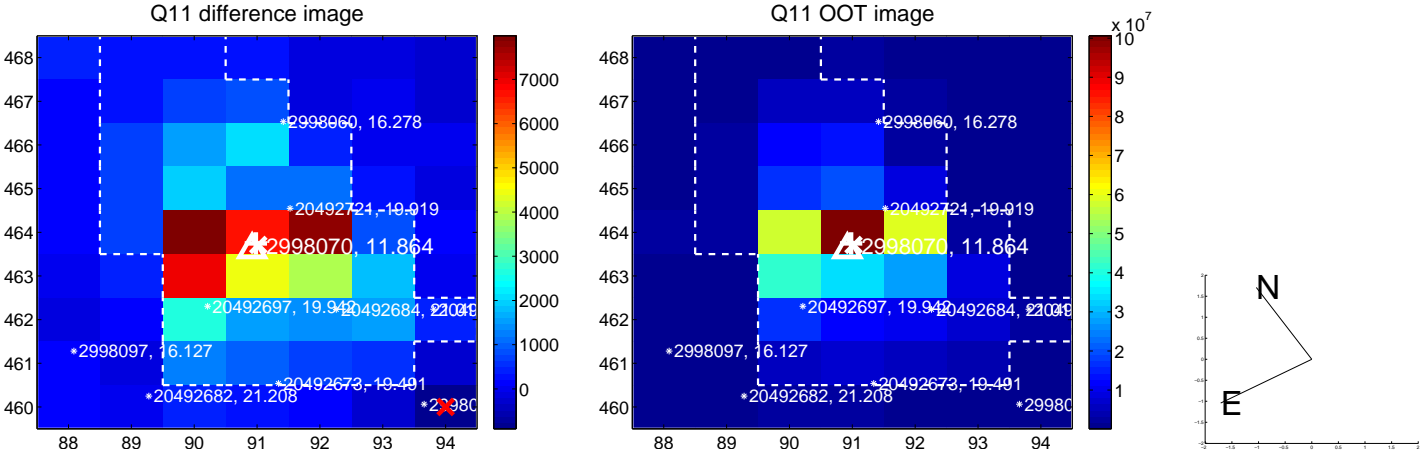
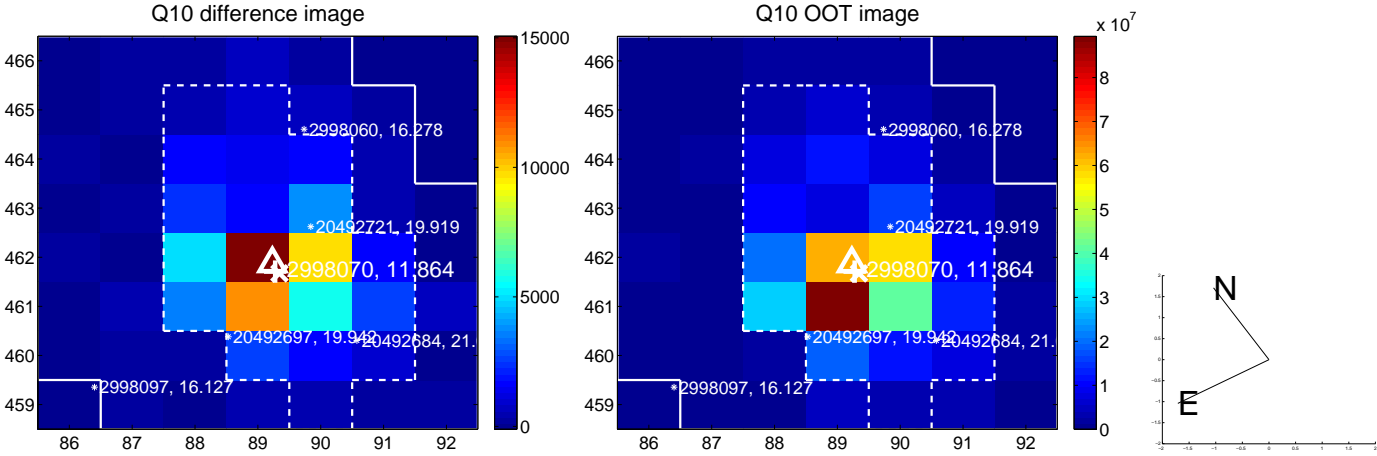
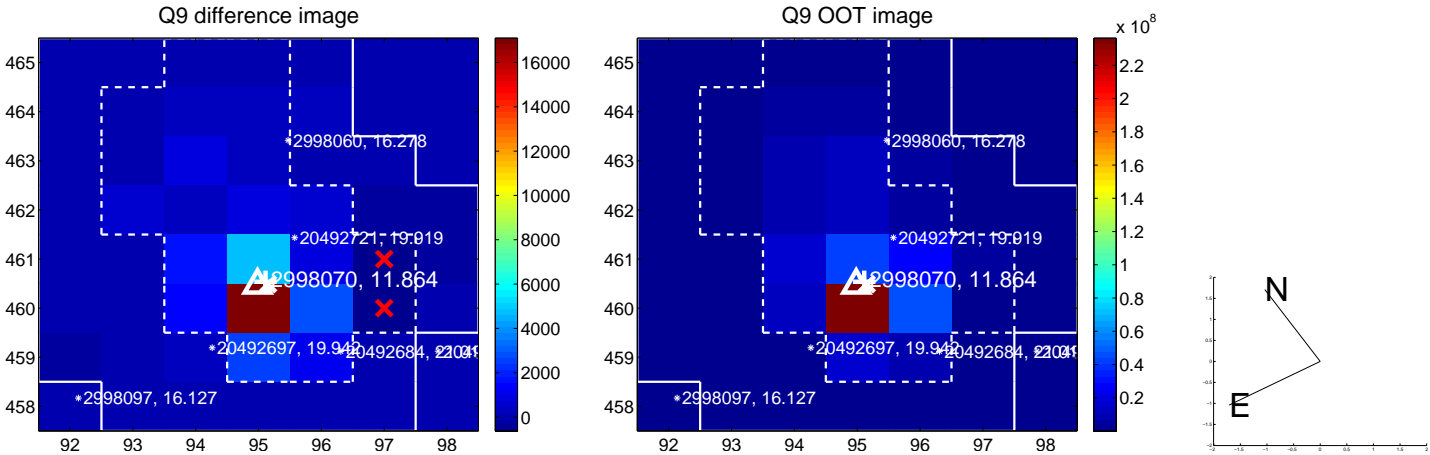
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



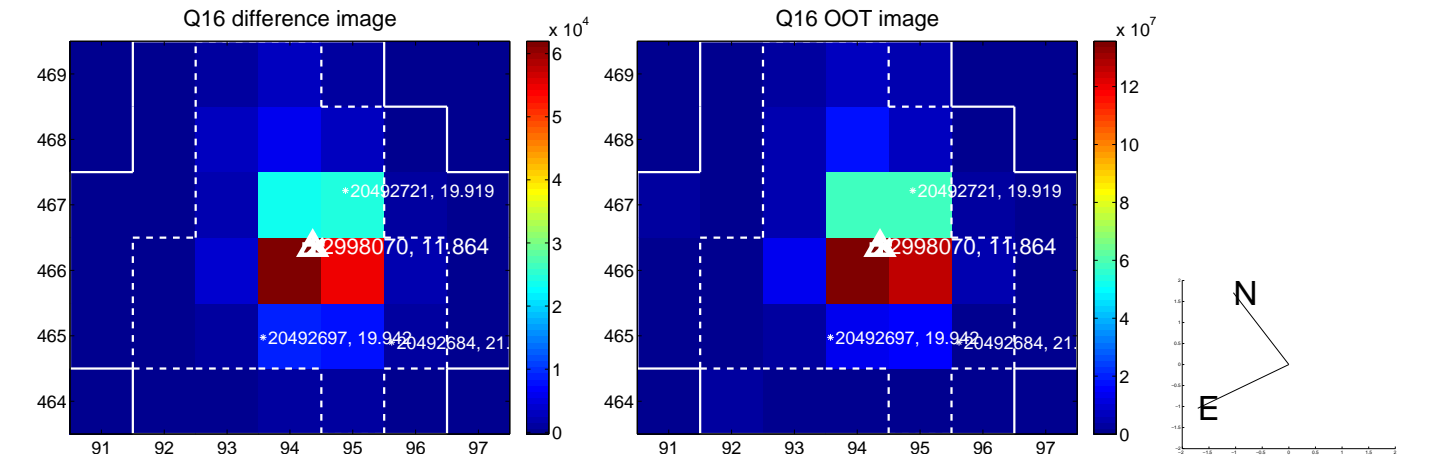
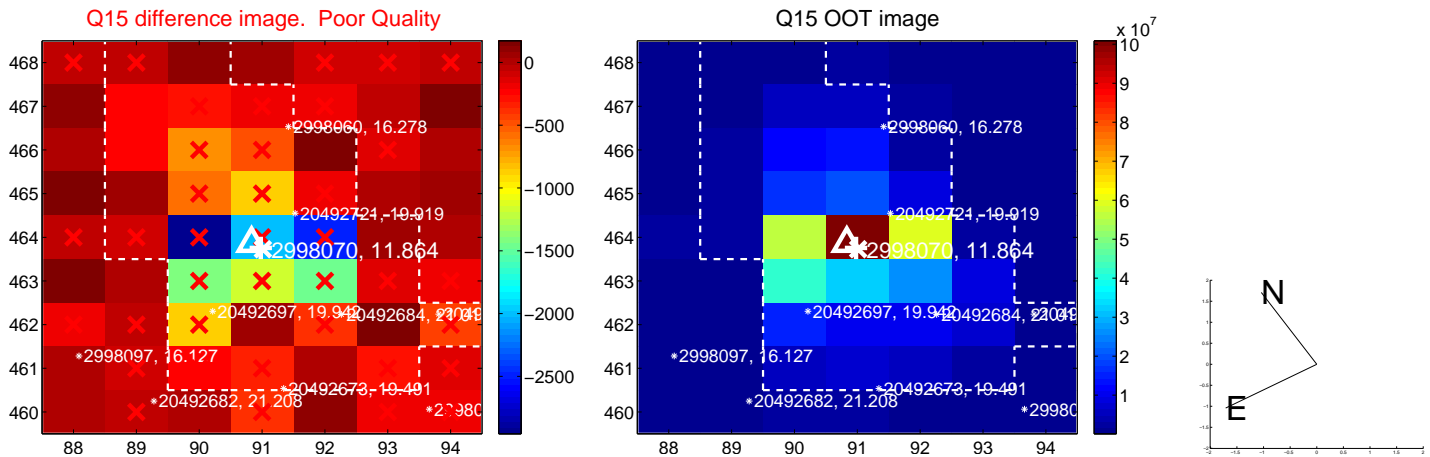
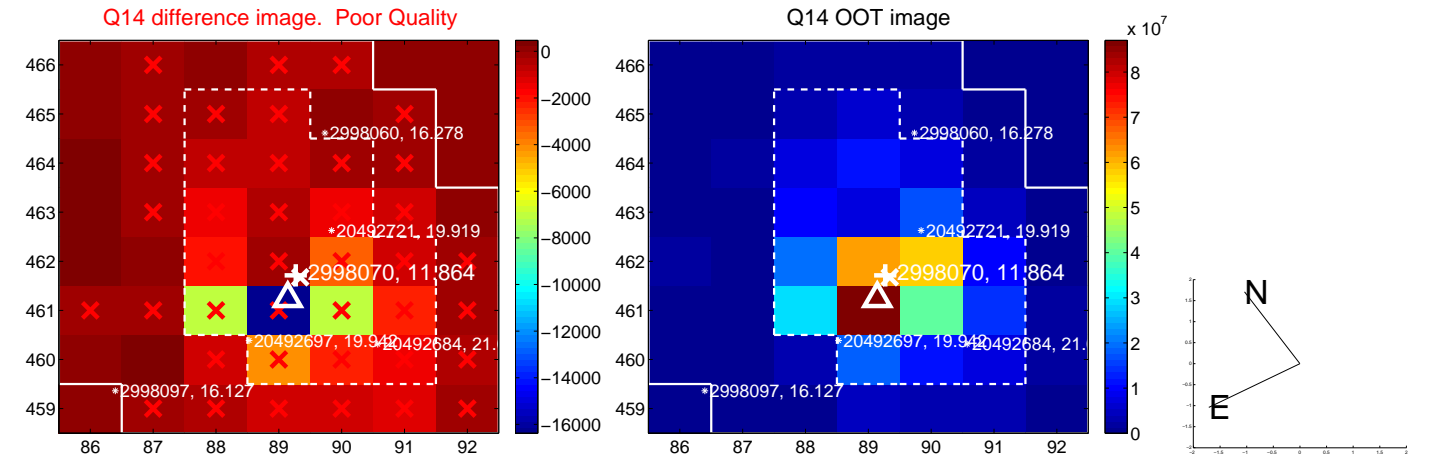
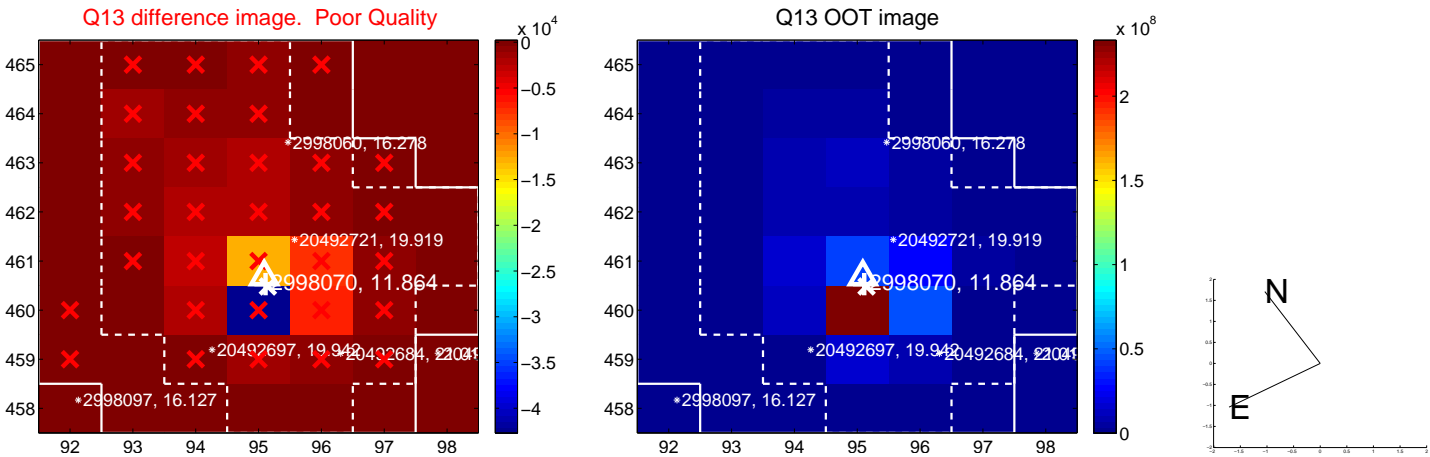
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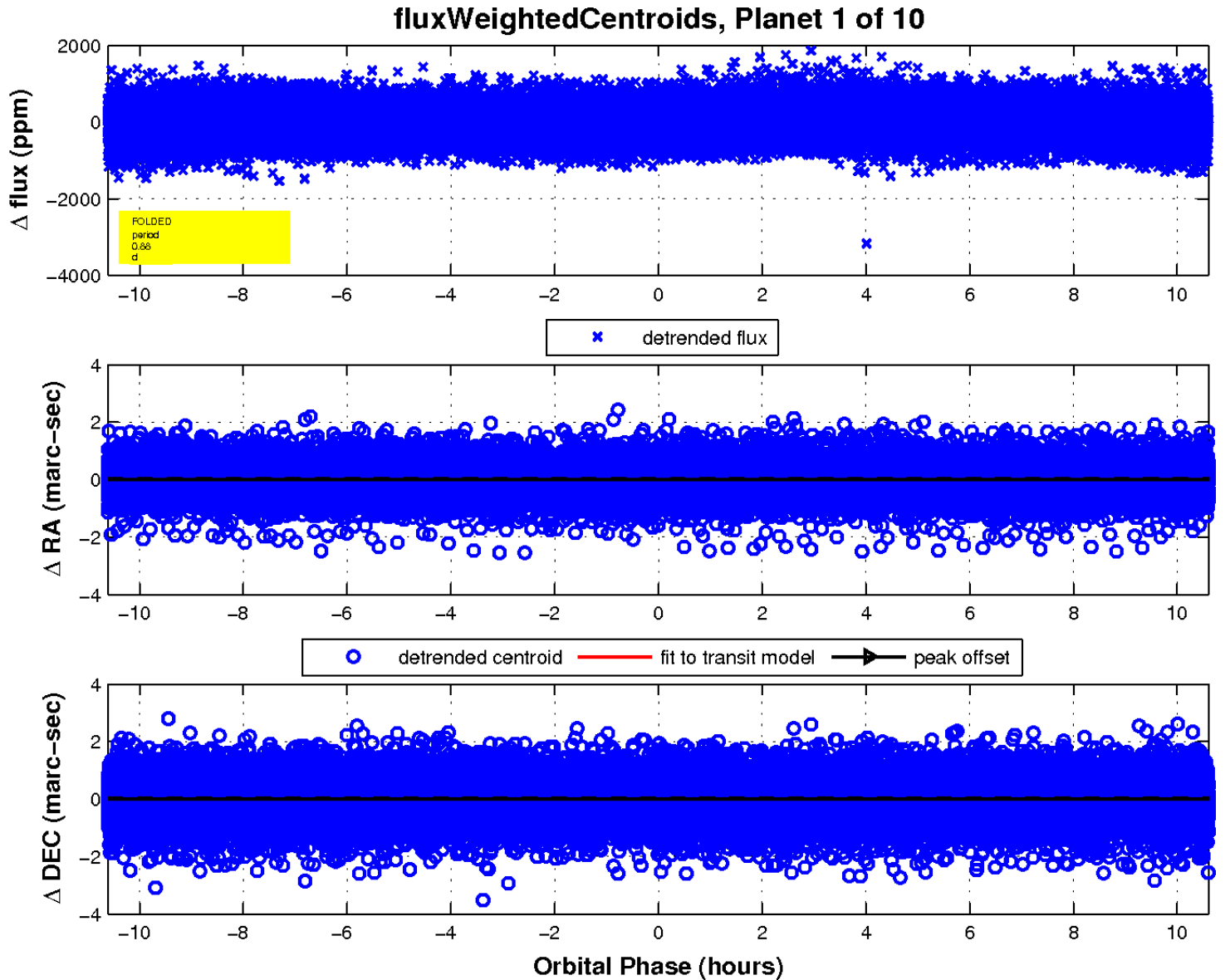
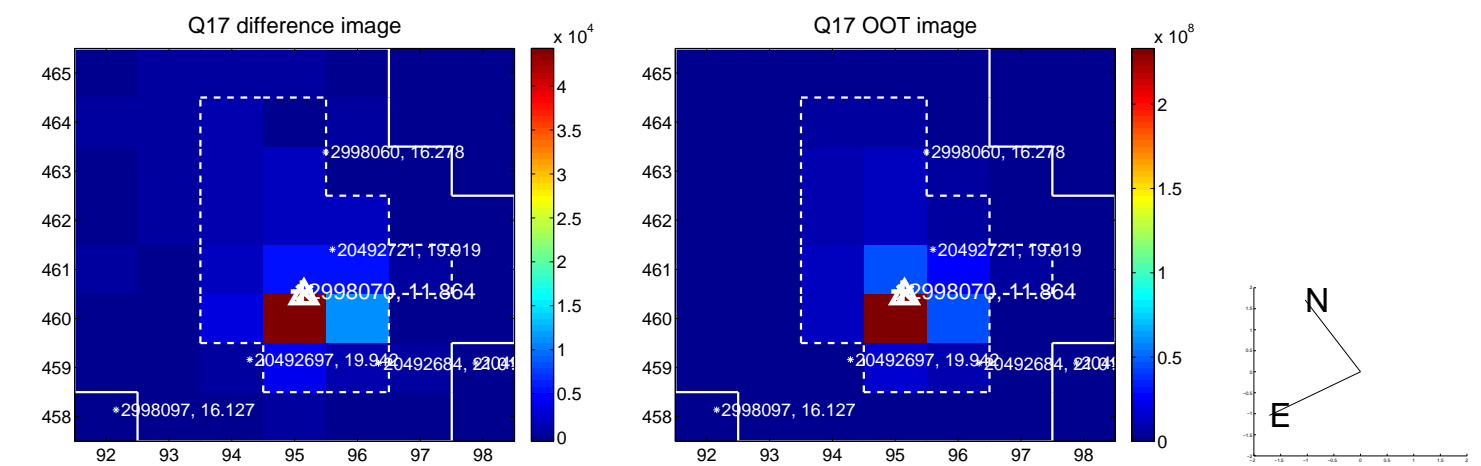
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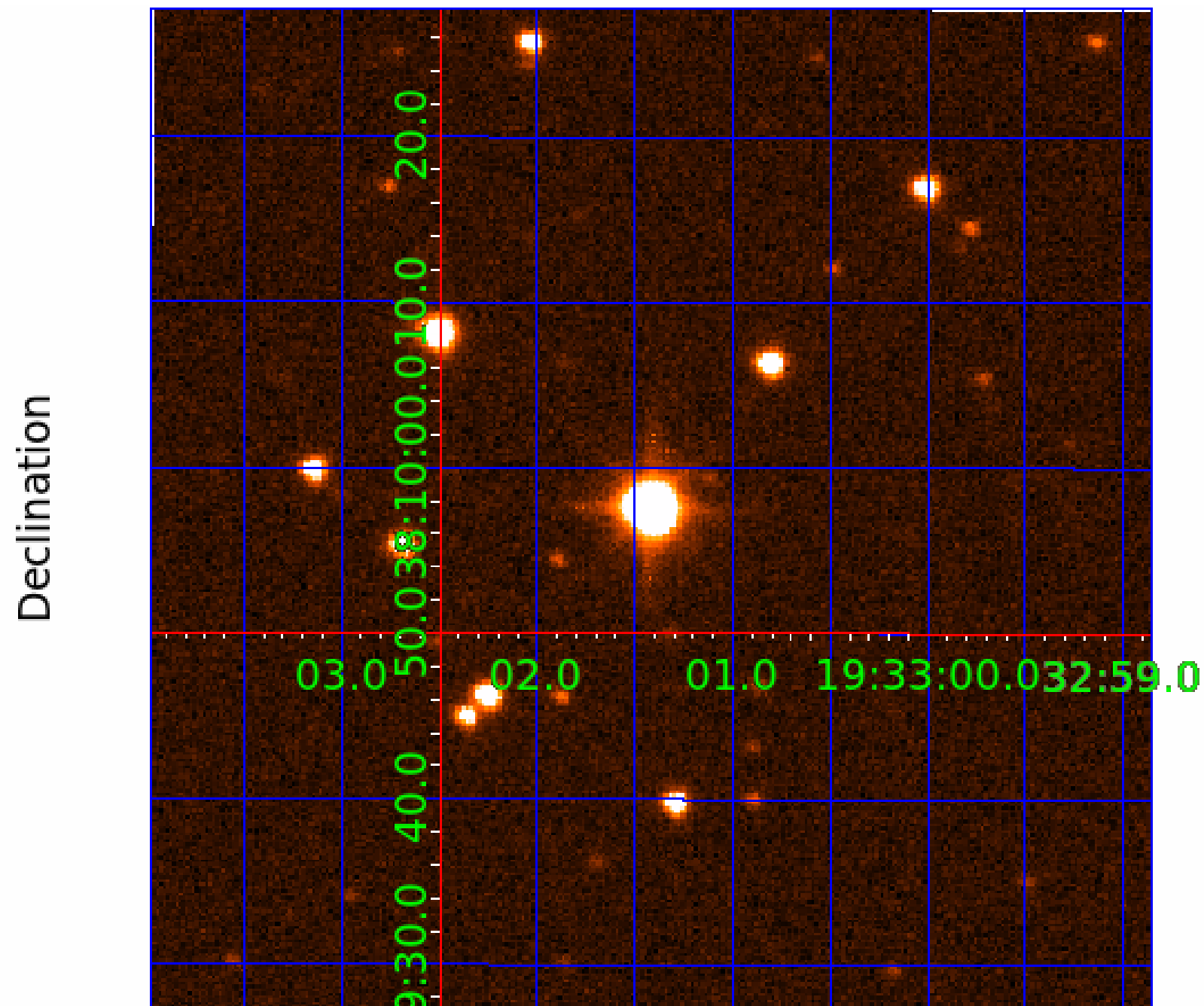
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UKIRT Image



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002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
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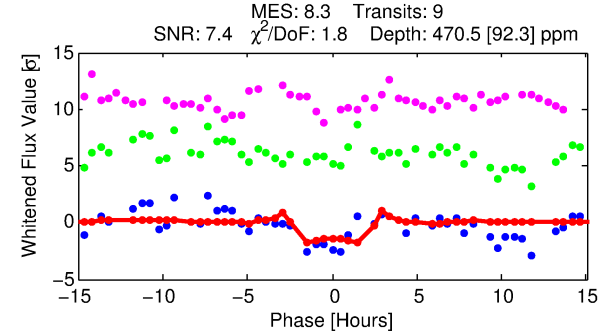
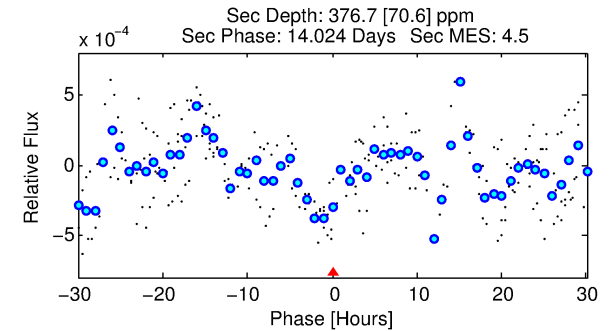
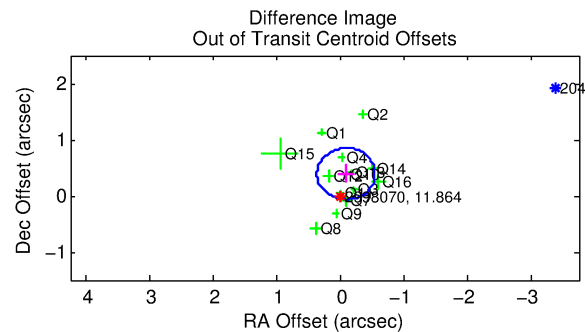
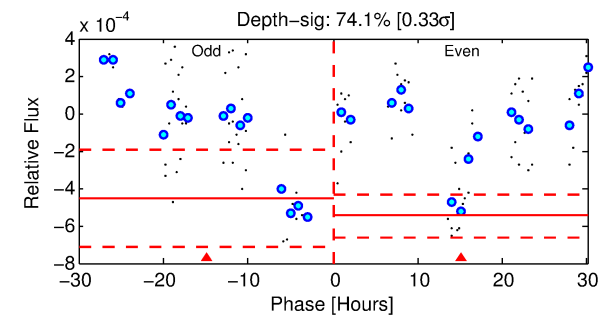
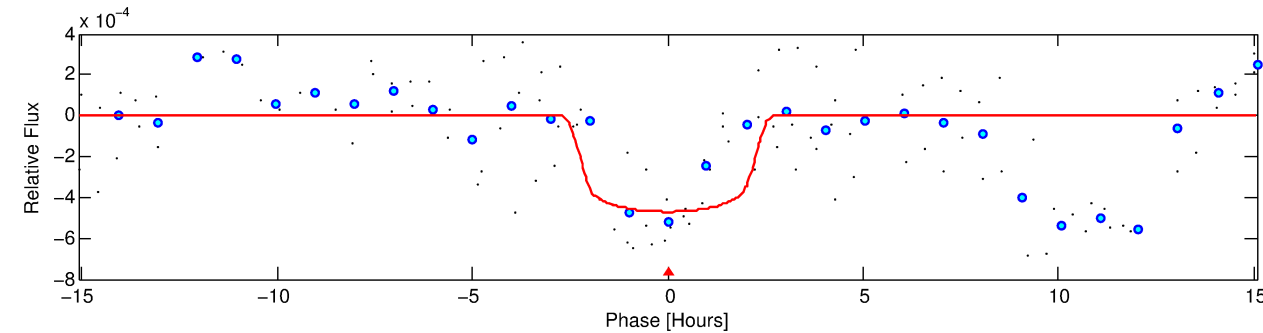
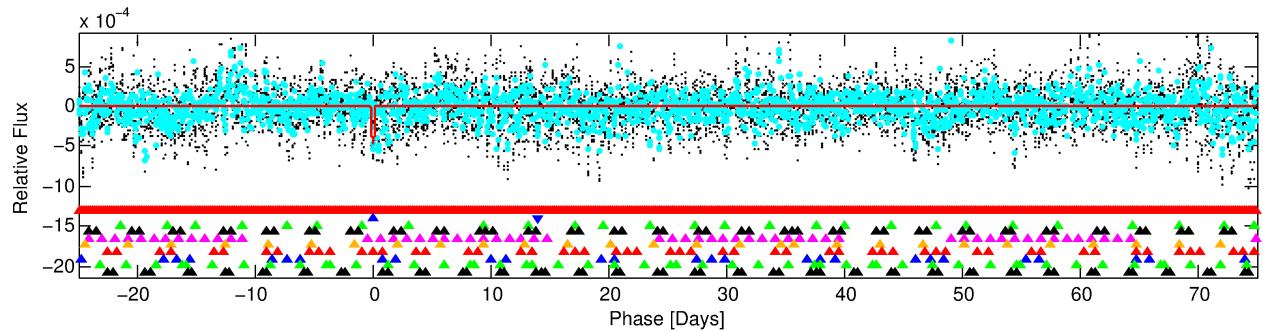
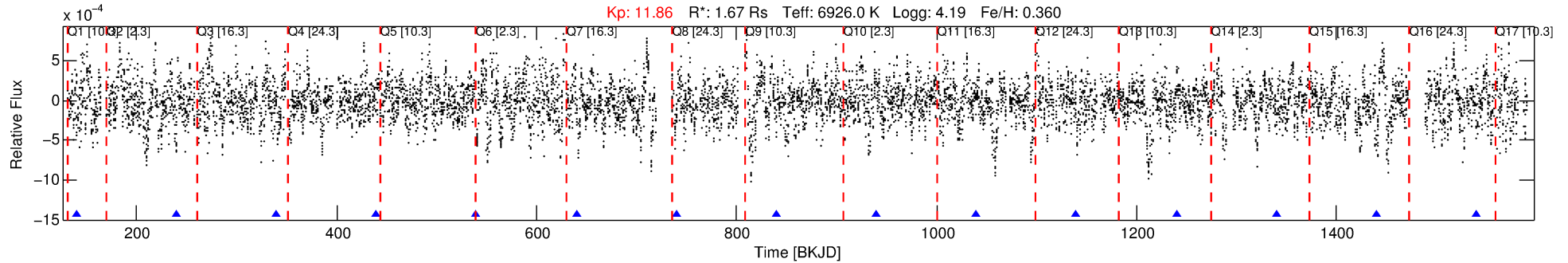
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-02

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 2 of 10 Period: 100.036 d



DV Fit Results:

Period = 100.03632 [0.00092] d
Epoch = 139.5480 [0.0067] BKJD
Rp/R* = 0.0227 [0.0103]
a/R* = 80.70 [209.62]
b = 0.87 [0.71]
Seff = 23.71 [9.94]
Teff = 563 [59] K
Rp = 4.13 [2.31] Re
a = 0.4910 [0.1323] AU
Ag = 2926.81 [2921.13] [1.00 σ]
Teffp = 6399 [1501] K [3.88 σ]

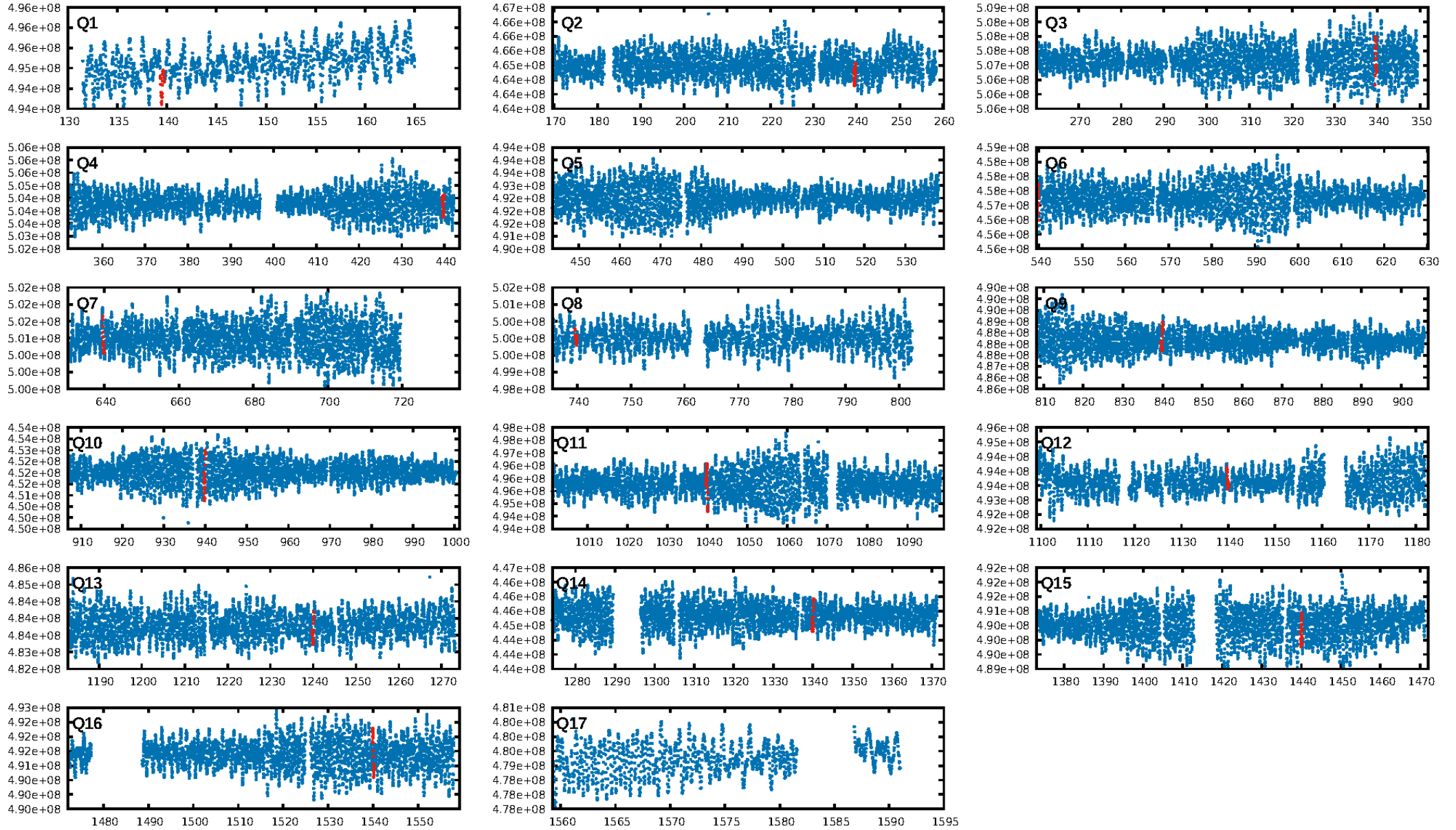
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [30.55 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 91.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [8/8]
GhostDiagnostic-chr: -7.603
Centroid-sig: 36.3%
Centroid-so: 0.067 arcsec [0.27 σ]
OotOffset-rm: 0.399 arcsec [2.62 σ]
KicOffset-rm: 0.608 arcsec [3.97 σ]
OotOffset-st: 3/4/4/3 [14]
KicOffset-st: 3/4/4/3 [14]
DiffImageQuality-fgm: 0.71 [10/14]
DiffImageOverlap-fno: 0.00 [0/14]

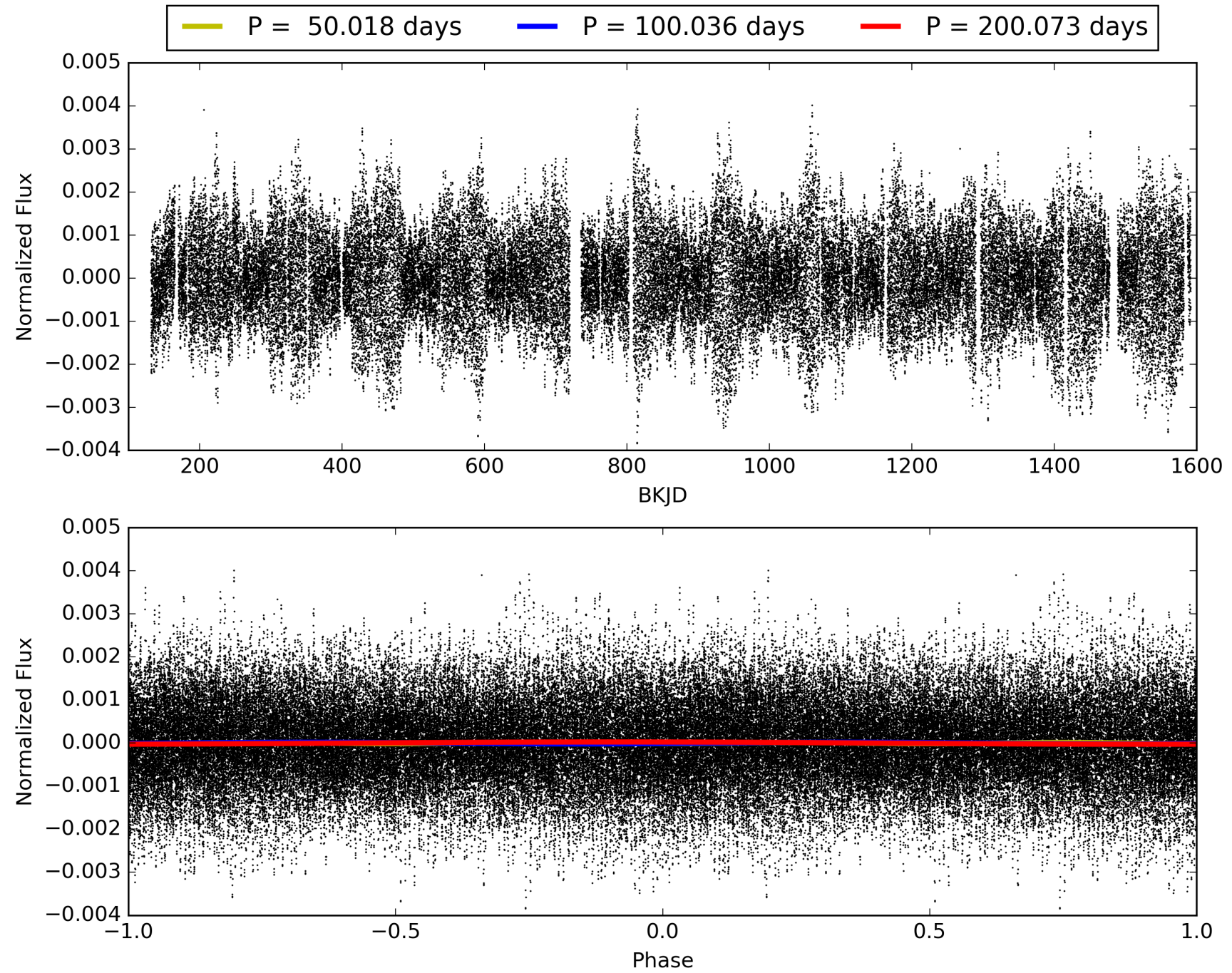
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:32 Z

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

TCE 002998070-02, PDC Light Curves

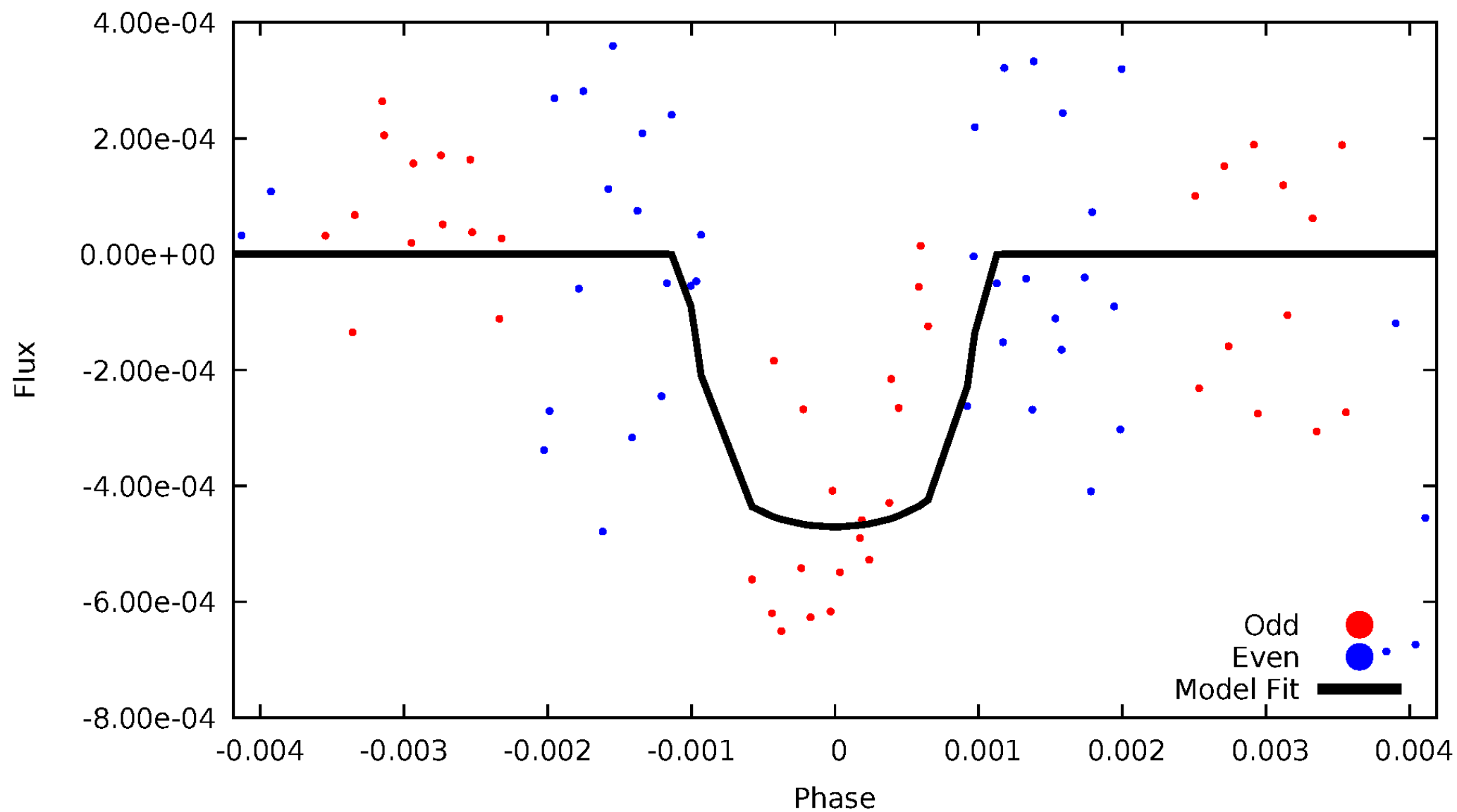


TCE 002998070-02



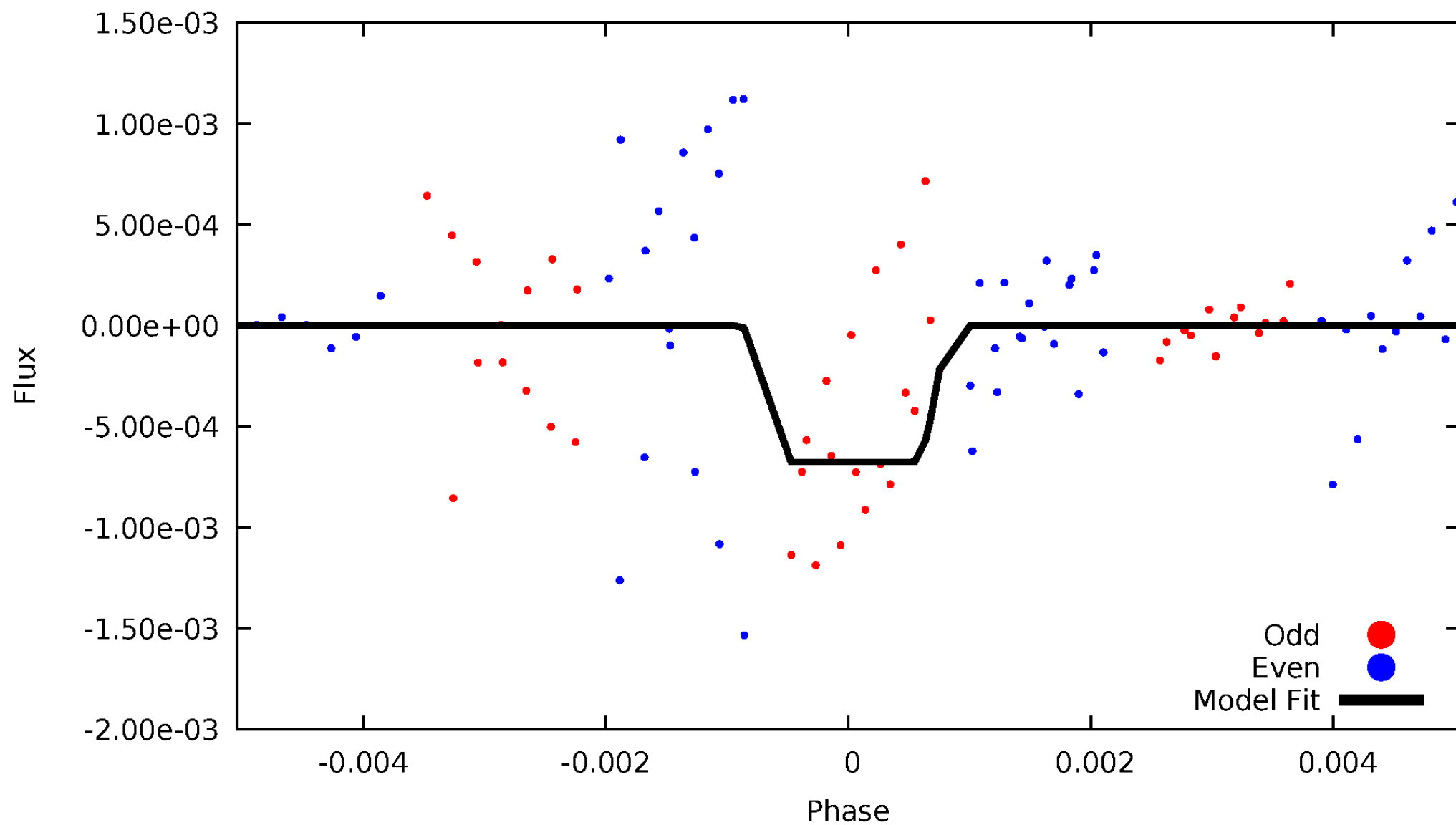
DV Odd/Even

TCE 002998070-02



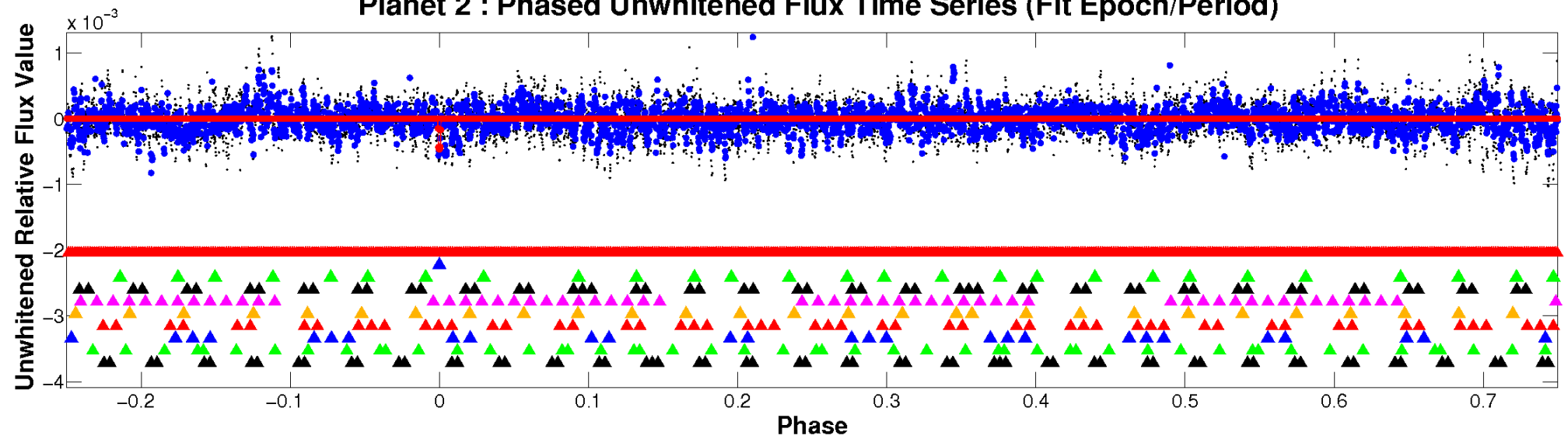
ALT Odd/Even

TCE 002998070-02

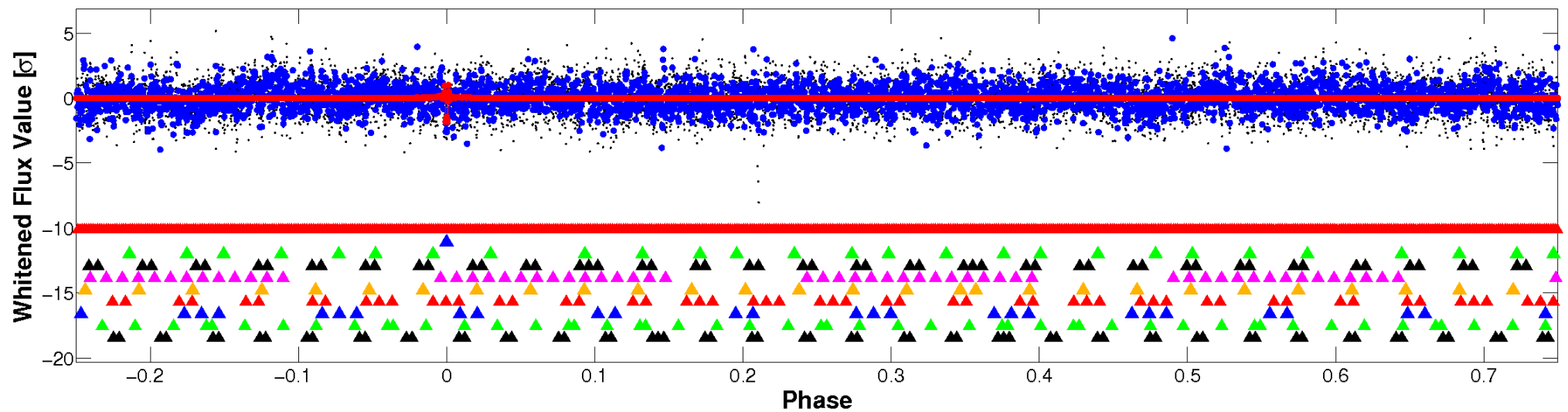


Non-Whitened Vs. Whitened Light Curve

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

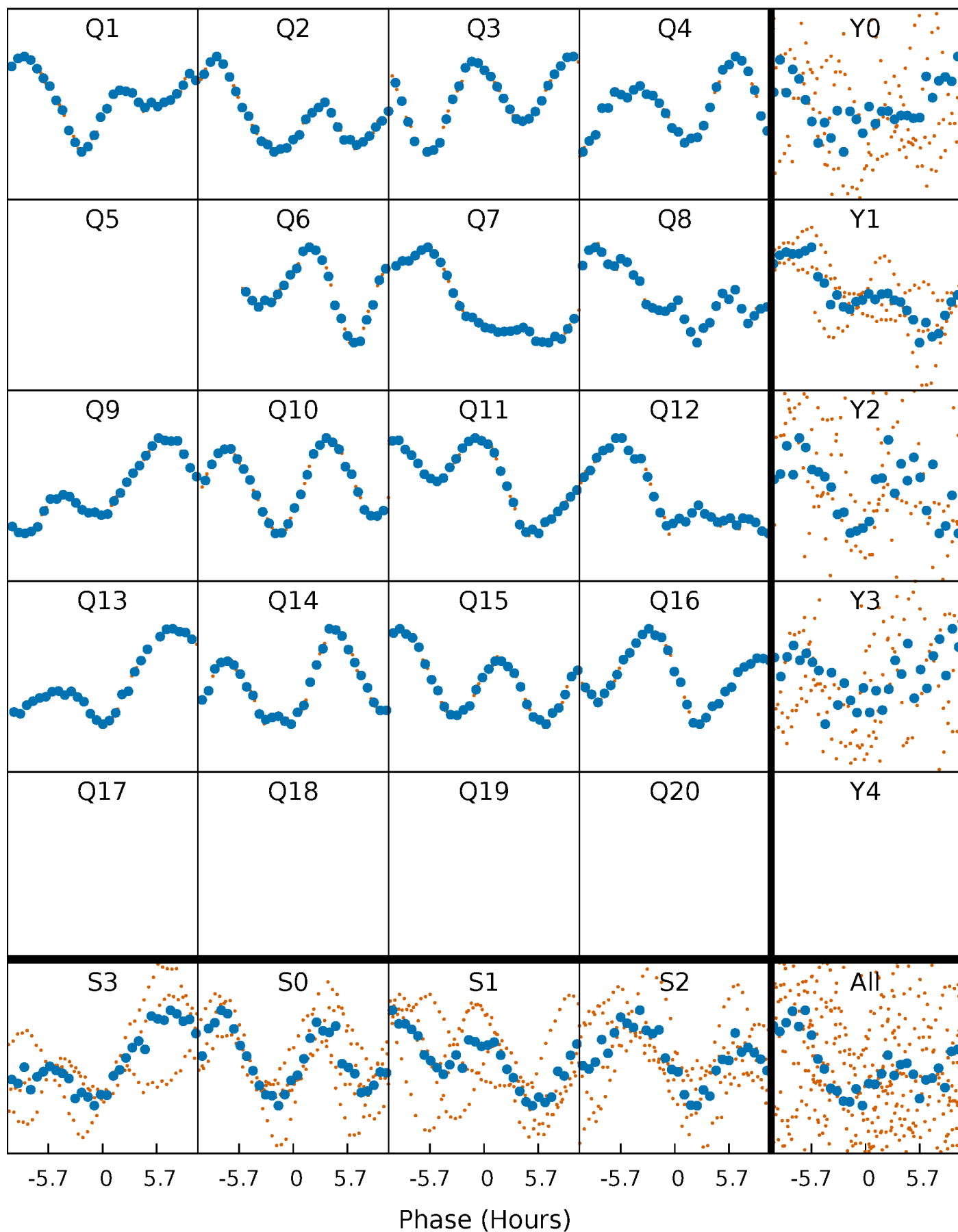


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



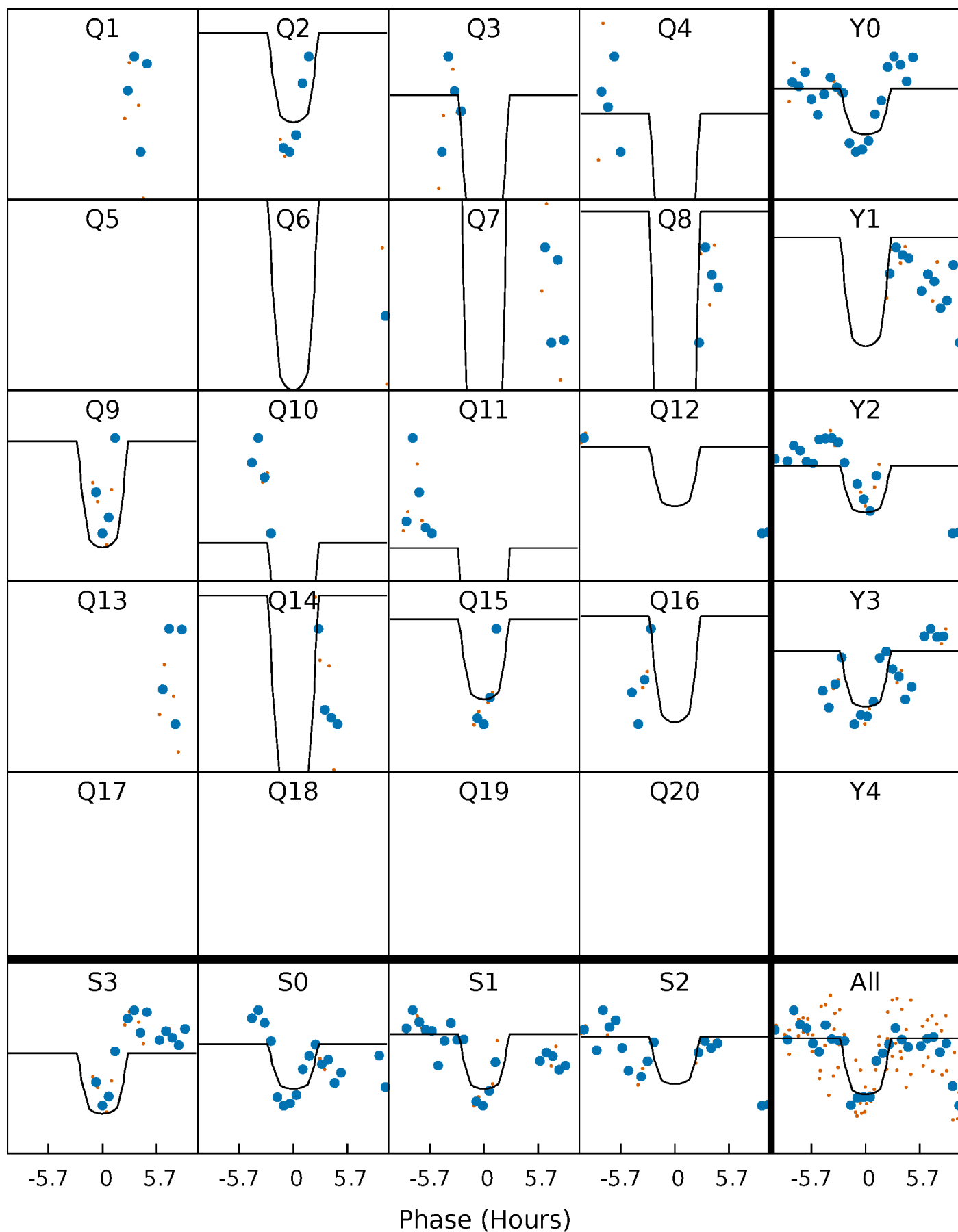
PDC Quarter-Phased Transit Curves

TCE 002998070-02 $P=100.036321$ Days $T_0=139.548042$ (BKJD)



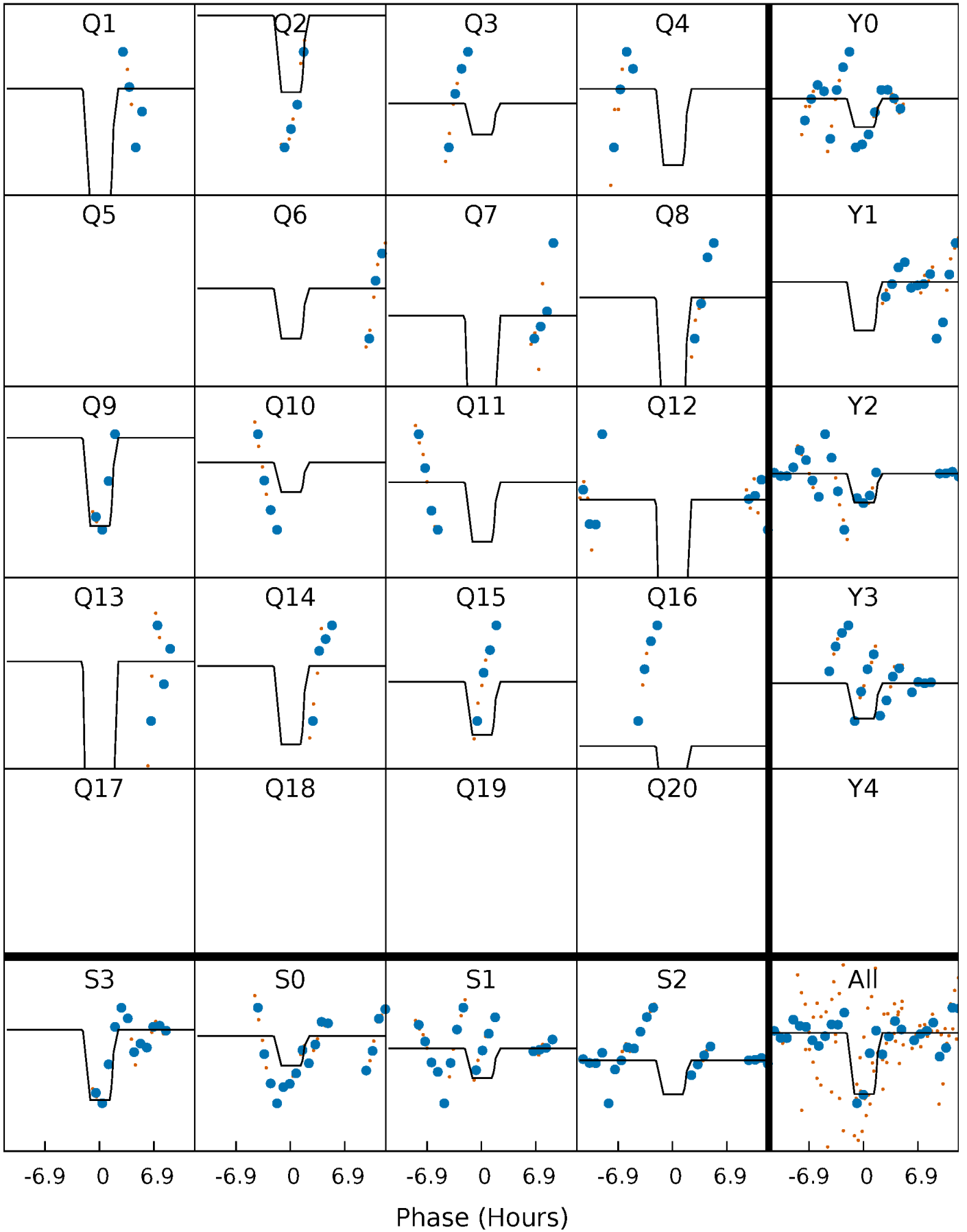
DV Quarter-Phased Transit Curves

TCE 002998070-02 P=100.036321 Days $T_0=139.548042$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

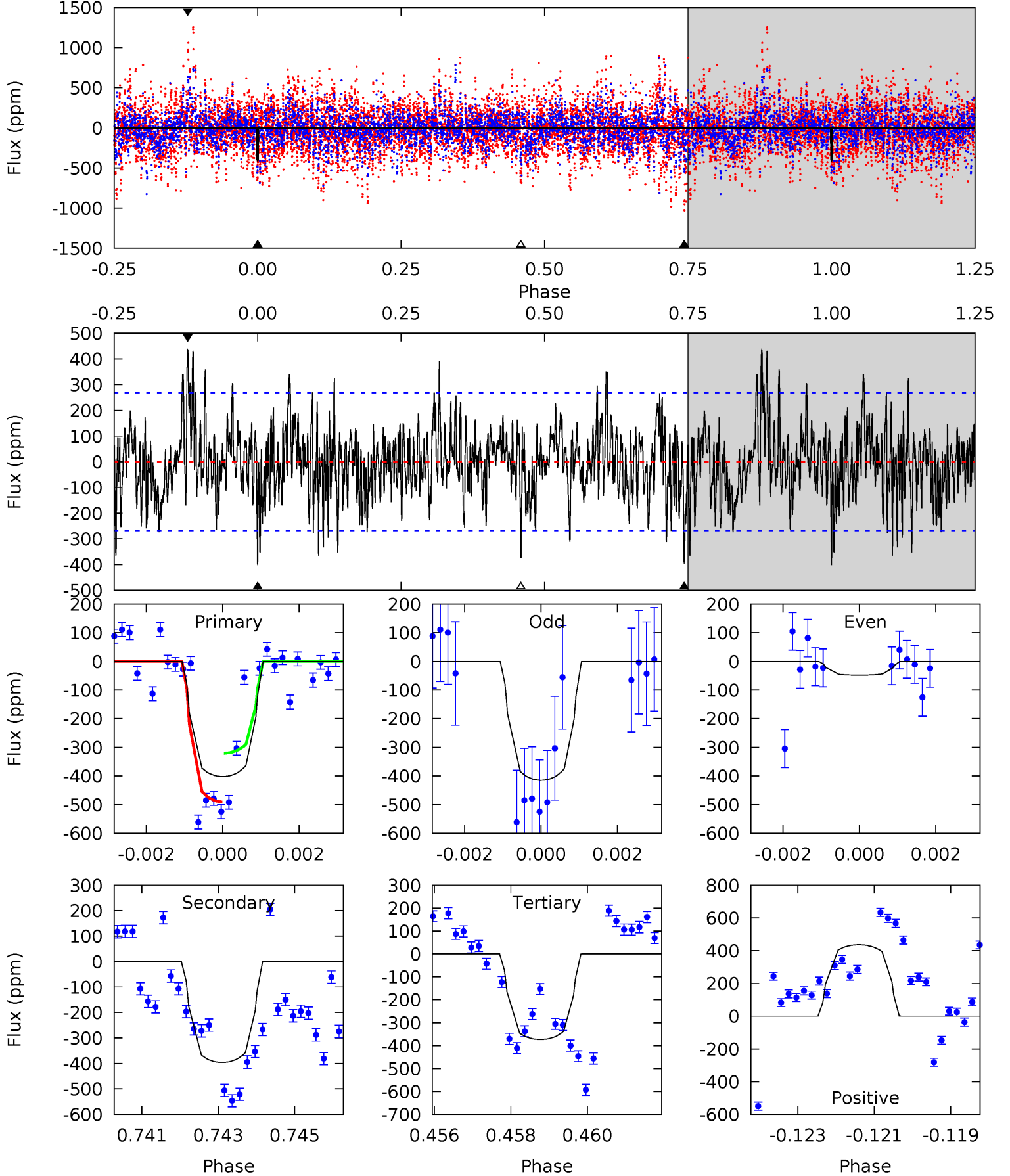
TCE 002998070-02 P=100.036744 Days $T_0=139.537078$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-02, P = 100.036321 Days, E = 39.511721 Days

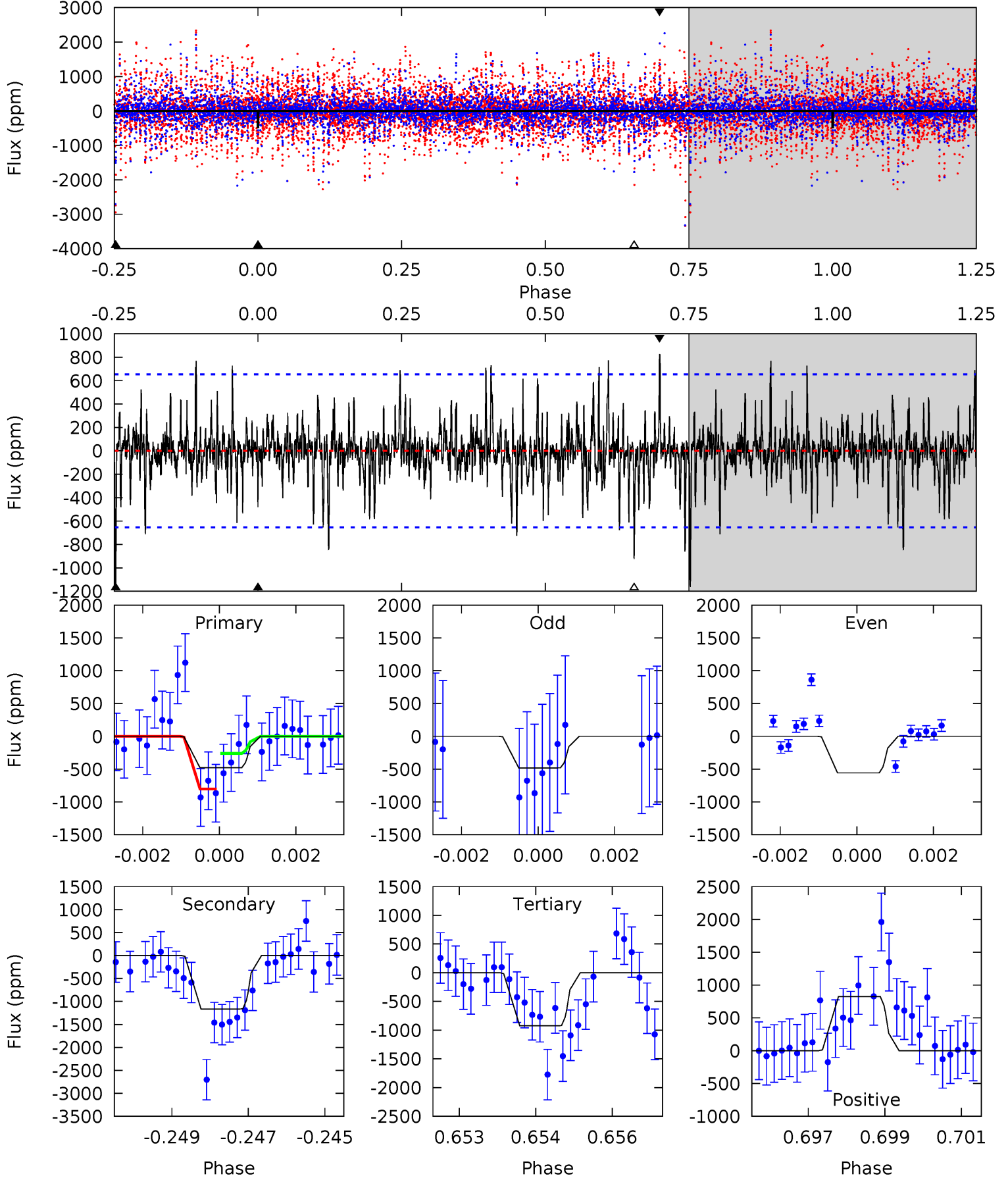
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.94	7.82	7.37	8.61	5.32	3.07	2.31	0.57	-0.67	0.45	-0.78	3.21	0.72	0.52	1.67



Alt Model-Shift Uniqueness Test

002998070-02, P = 100.036744 Days, E = 39.500334 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.92	9.50	7.53	6.74	5.34	3.11	1.62	-3.61	-2.82	1.97	2.76	0.15	0.88	0.42	2.11



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-396 ± 51	$4.29^{+2.28}_{-1.78}$	799^{+69}_{-45}	6400^{+2492}_{-1047}	2721^{+5665}_{-1508}
Alt.	-1163 ± 122	$4.87^{+2.26}_{-1.93}$	799^{+60}_{-48}	8159^{+3395}_{-1542}	6384^{+11526}_{-3322}

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

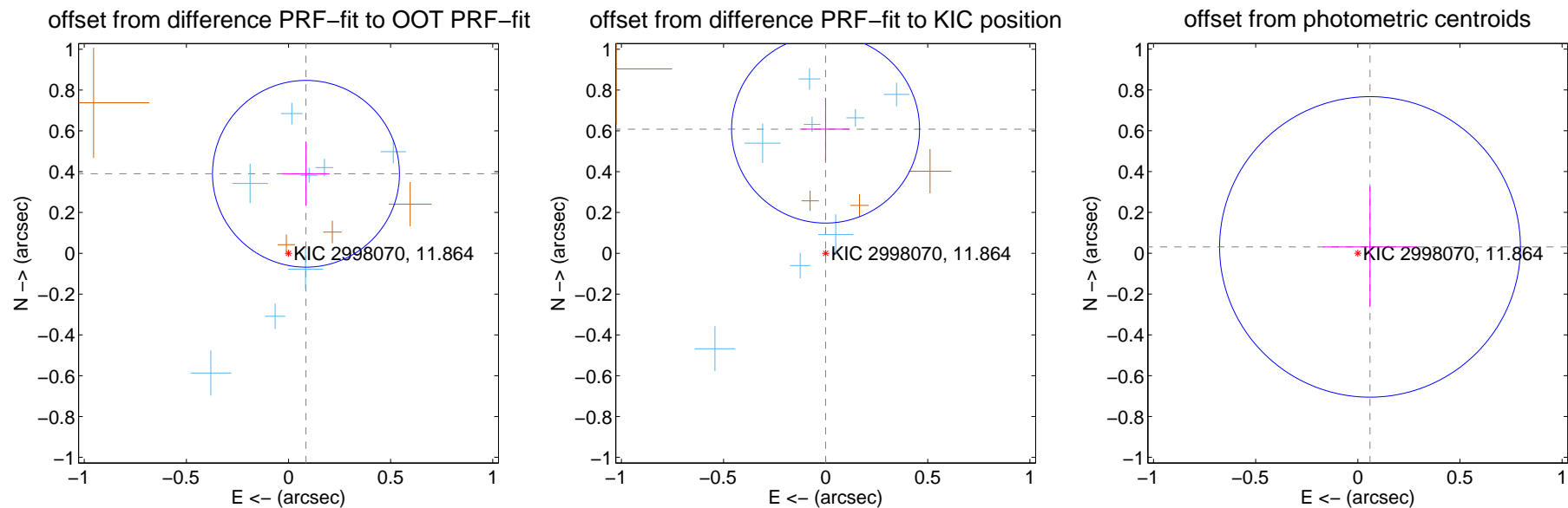
DV Centroid Data

Supplemental centroid analysis for 002998070-02. **Kepler magnitude: 11.86.** Transit SNR 7.36

There are 10 quarters with good PRF difference image offsets

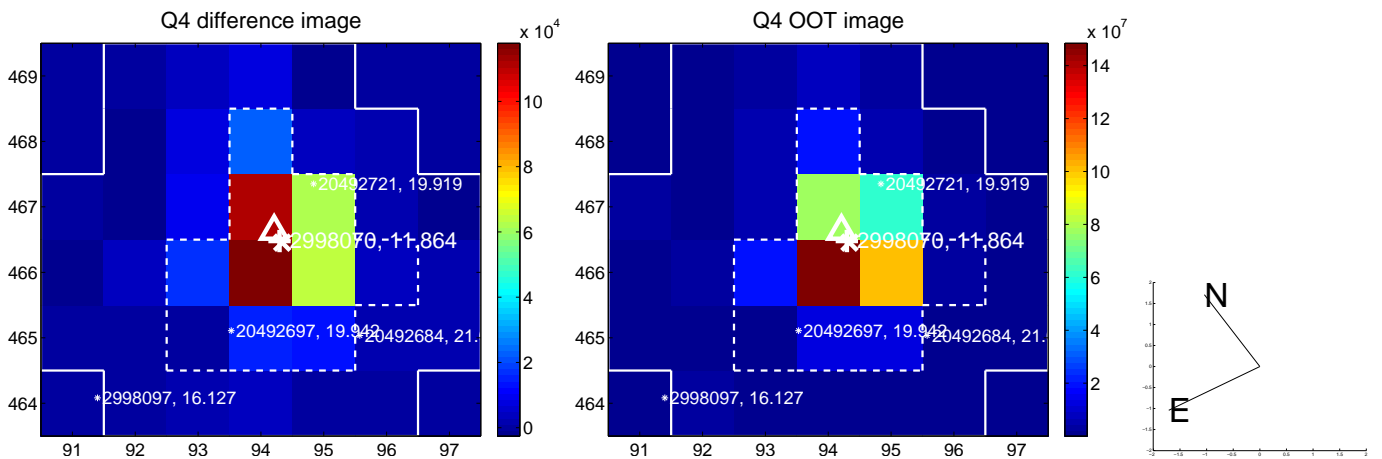
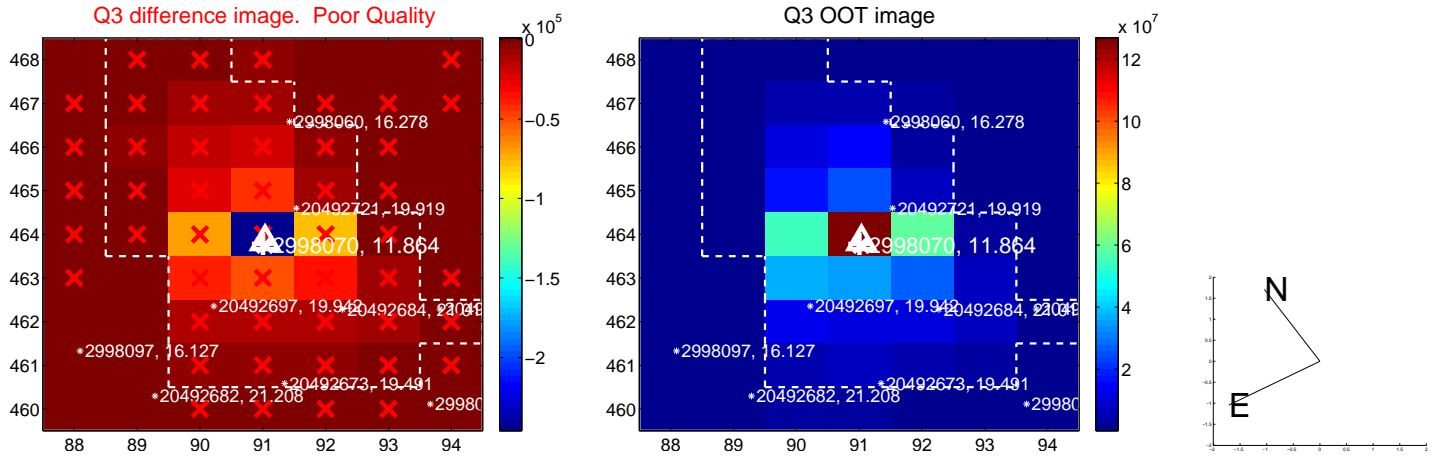
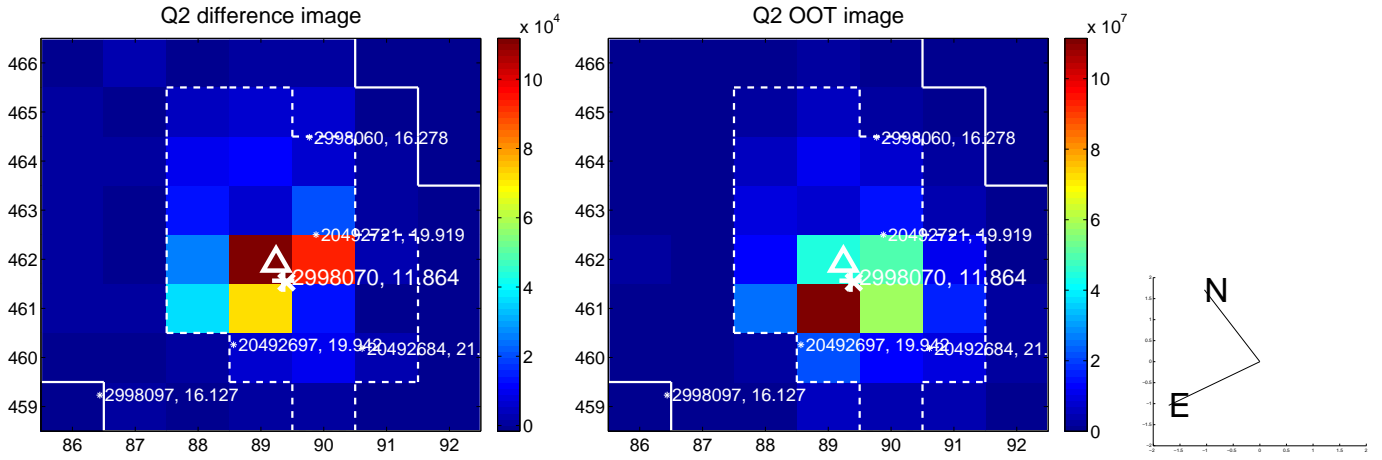
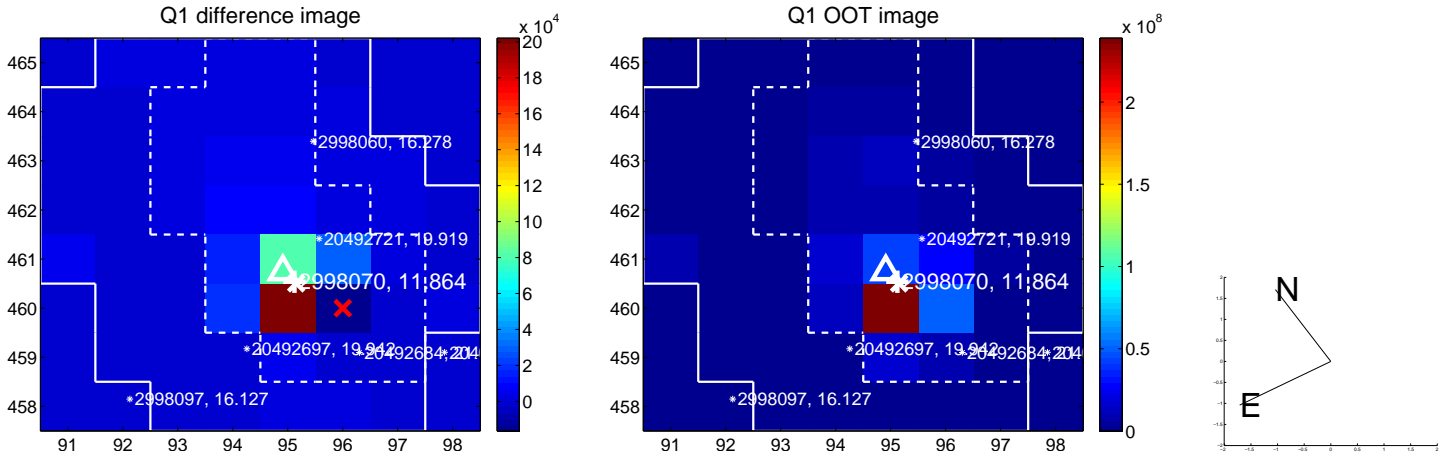
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.399 ± 0.153	2.62	-0.086 ± 0.116	0.390 ± 0.156
PRF-fit source offset from KIC position	0.608 ± 0.153	3.97	0.000 ± 0.118	0.608 ± 0.153
photometric centroid source offset	0.07 ± 0.25	0.27	-0.06 ± 0.23	0.03 ± 0.30



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.

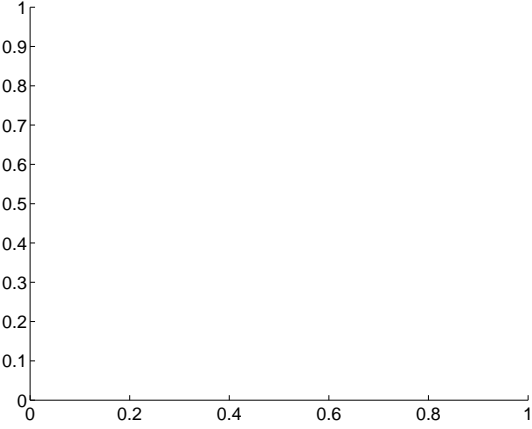
Q5 no difference image



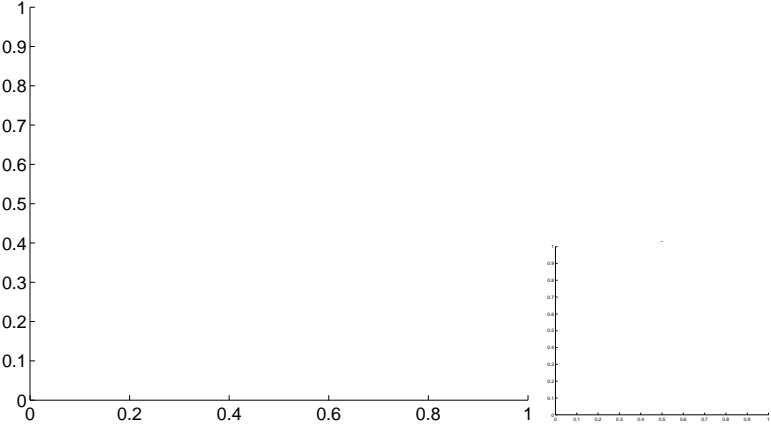
Q5 no OOT image



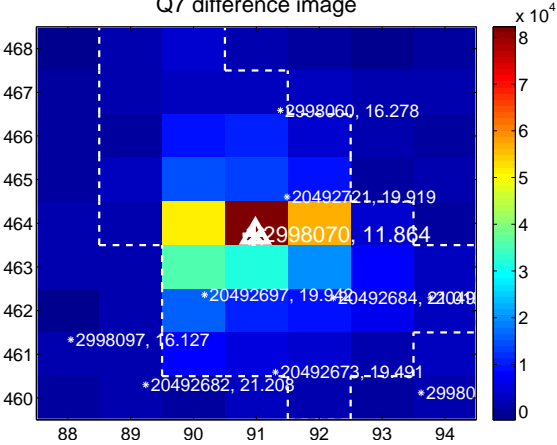
Q6 no difference image



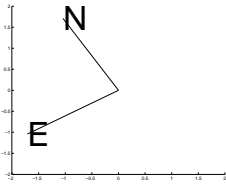
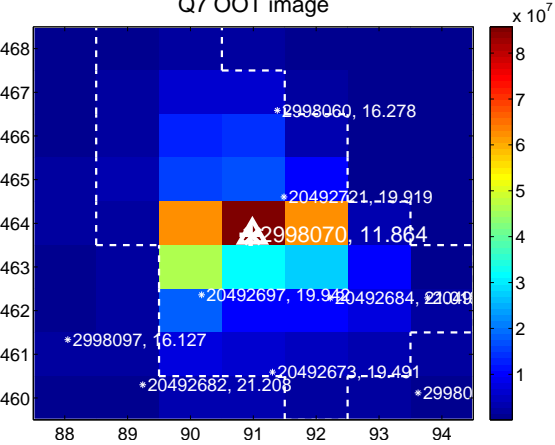
Q6 no OOT image



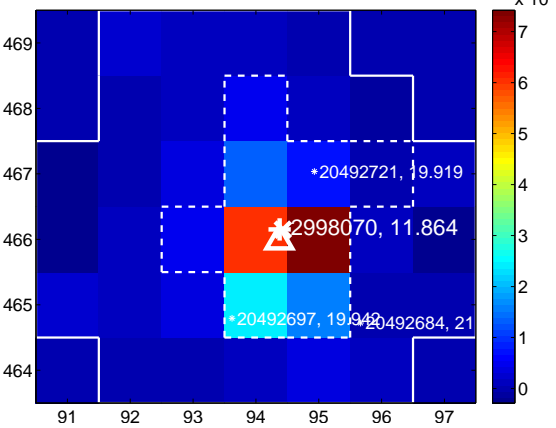
Q7 difference image



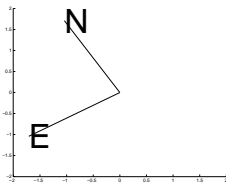
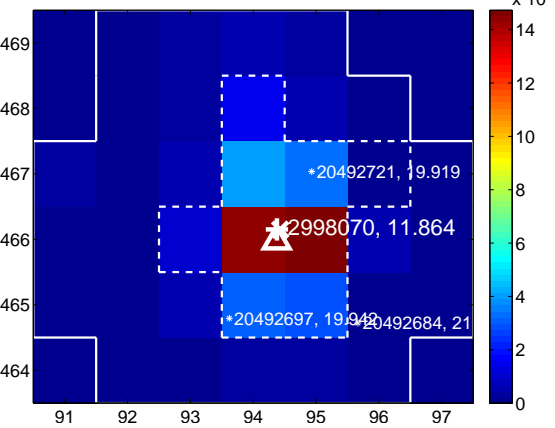
Q7 OOT image



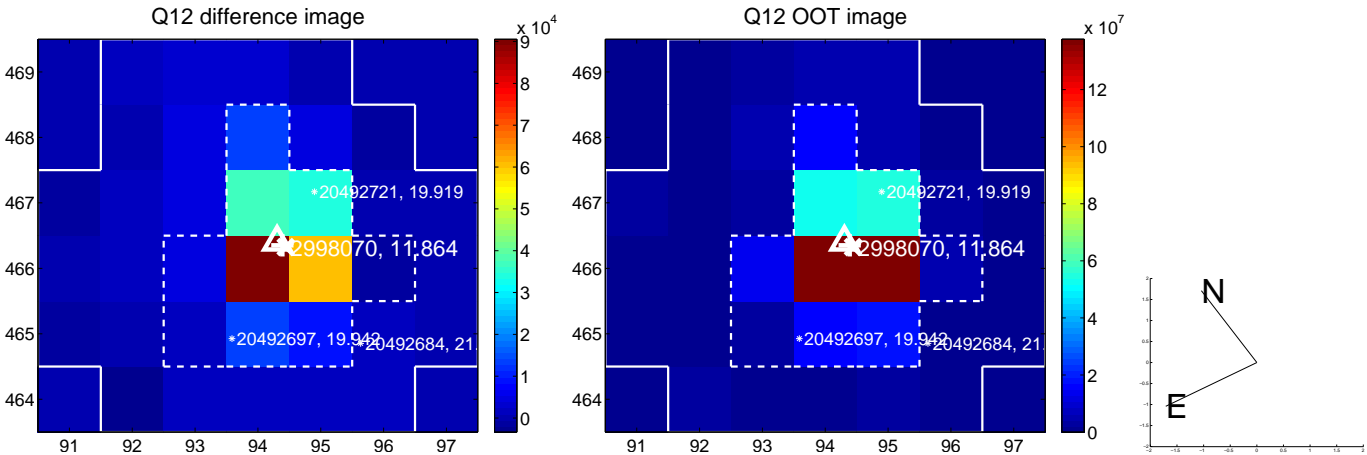
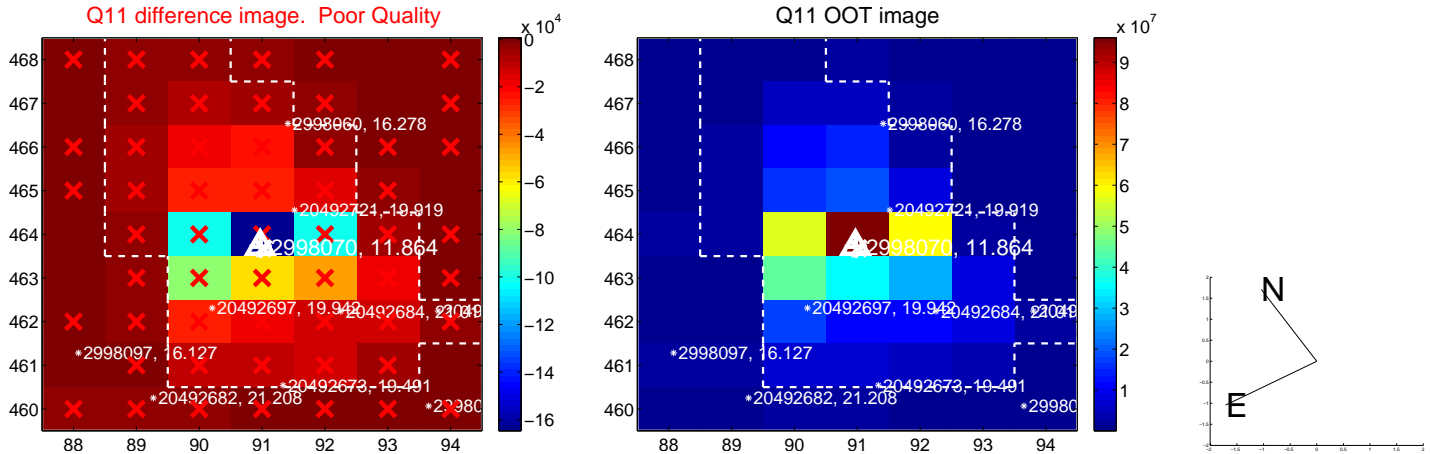
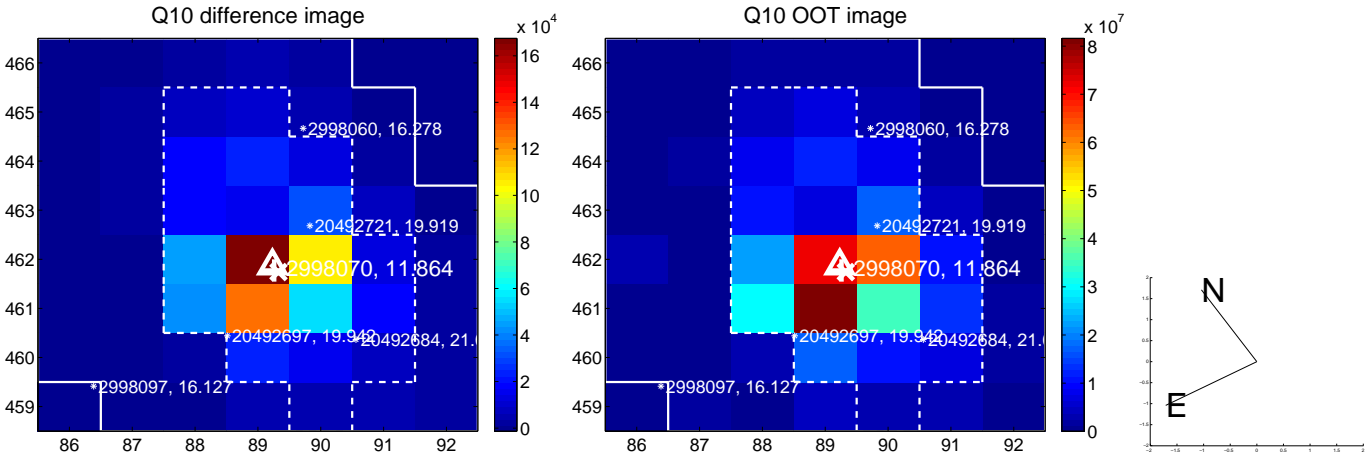
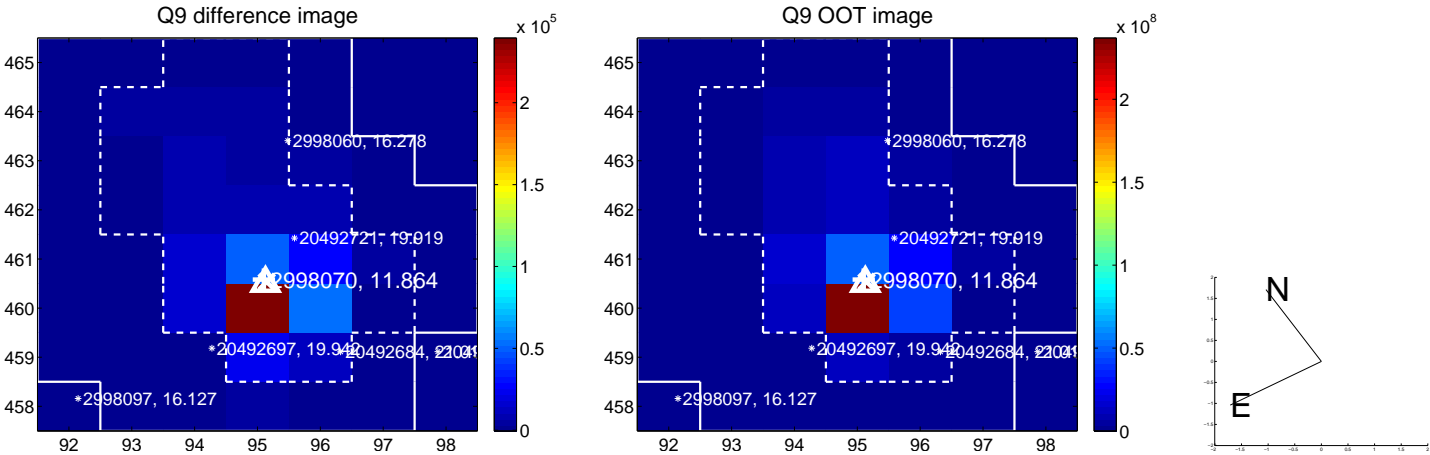
Q8 difference image



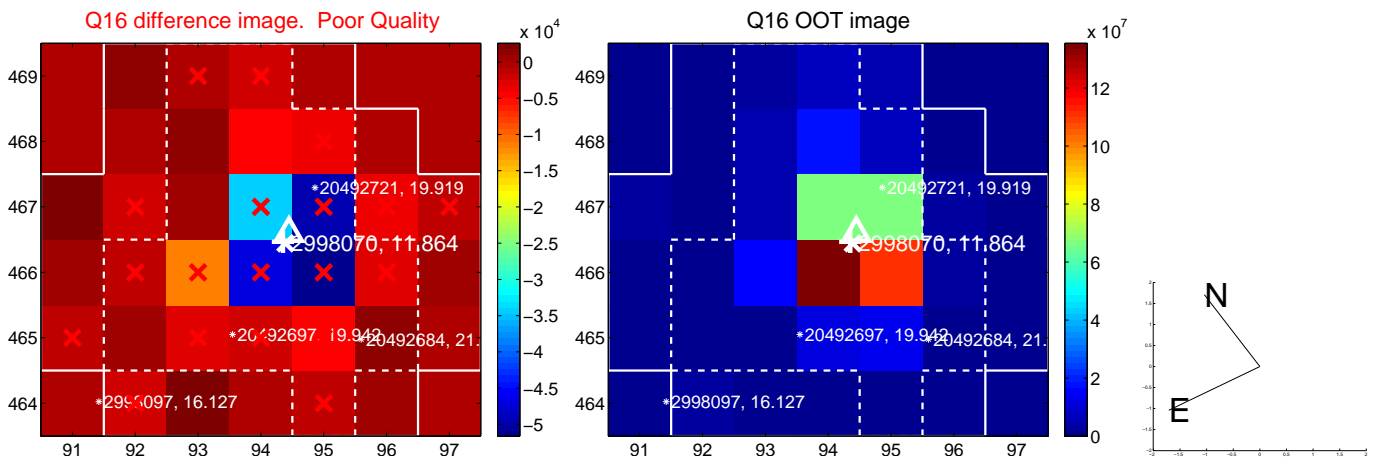
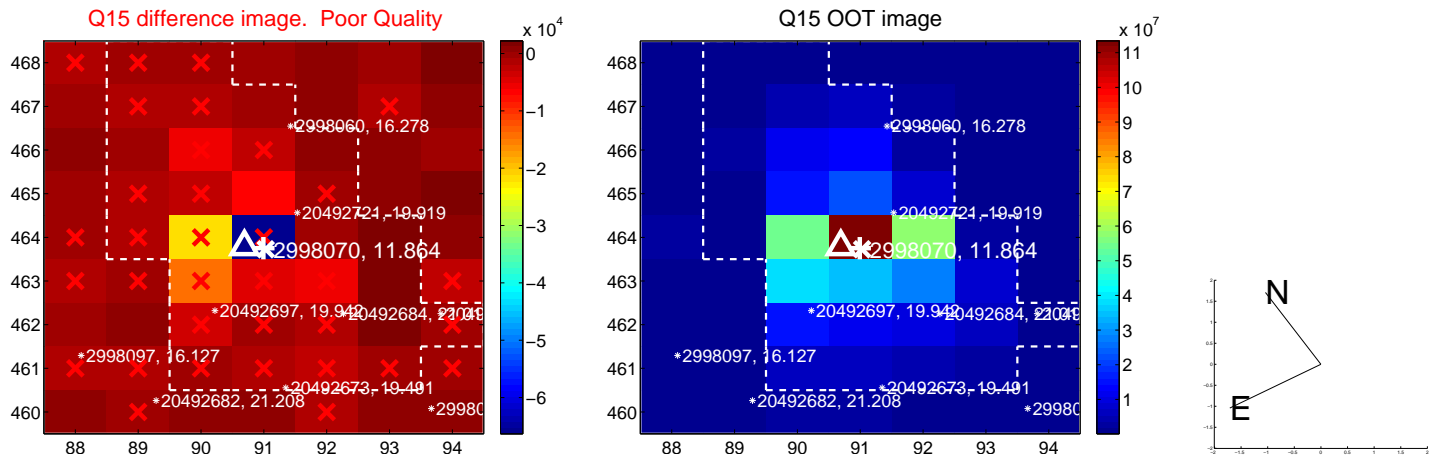
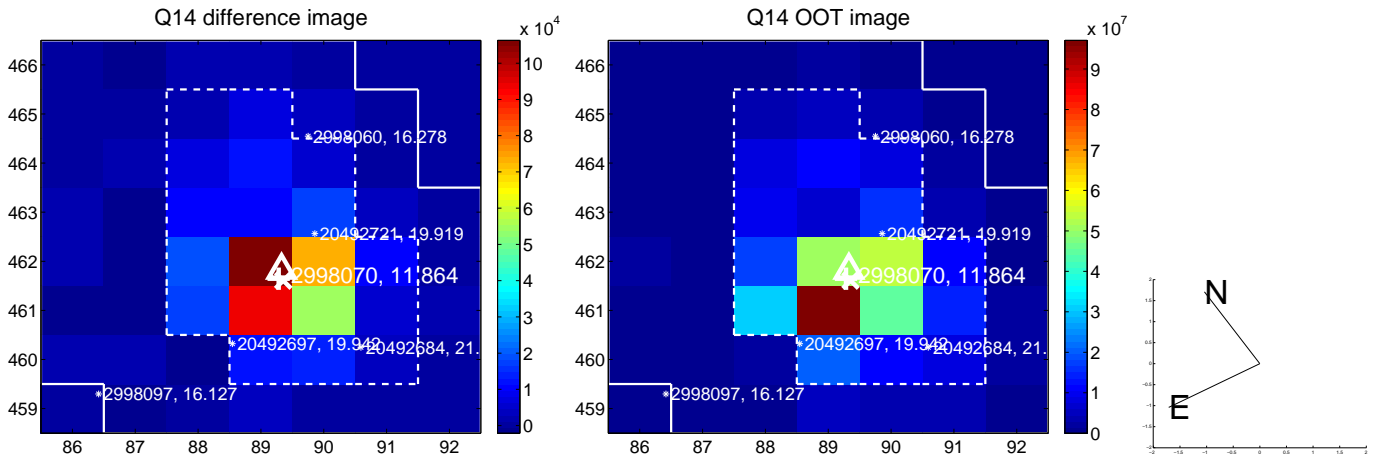
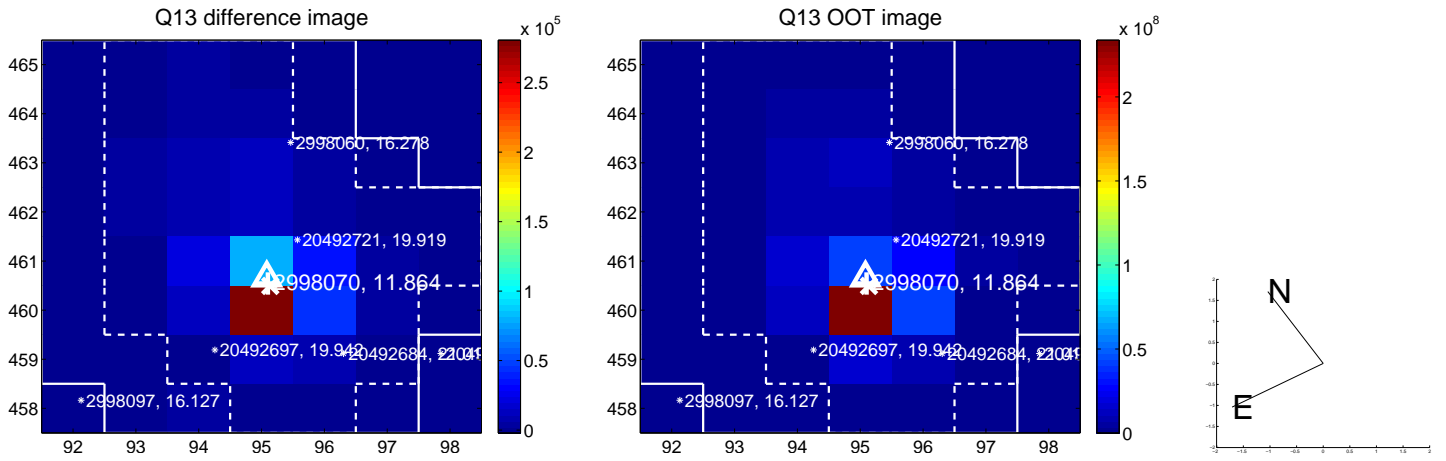
Q8 OOT image



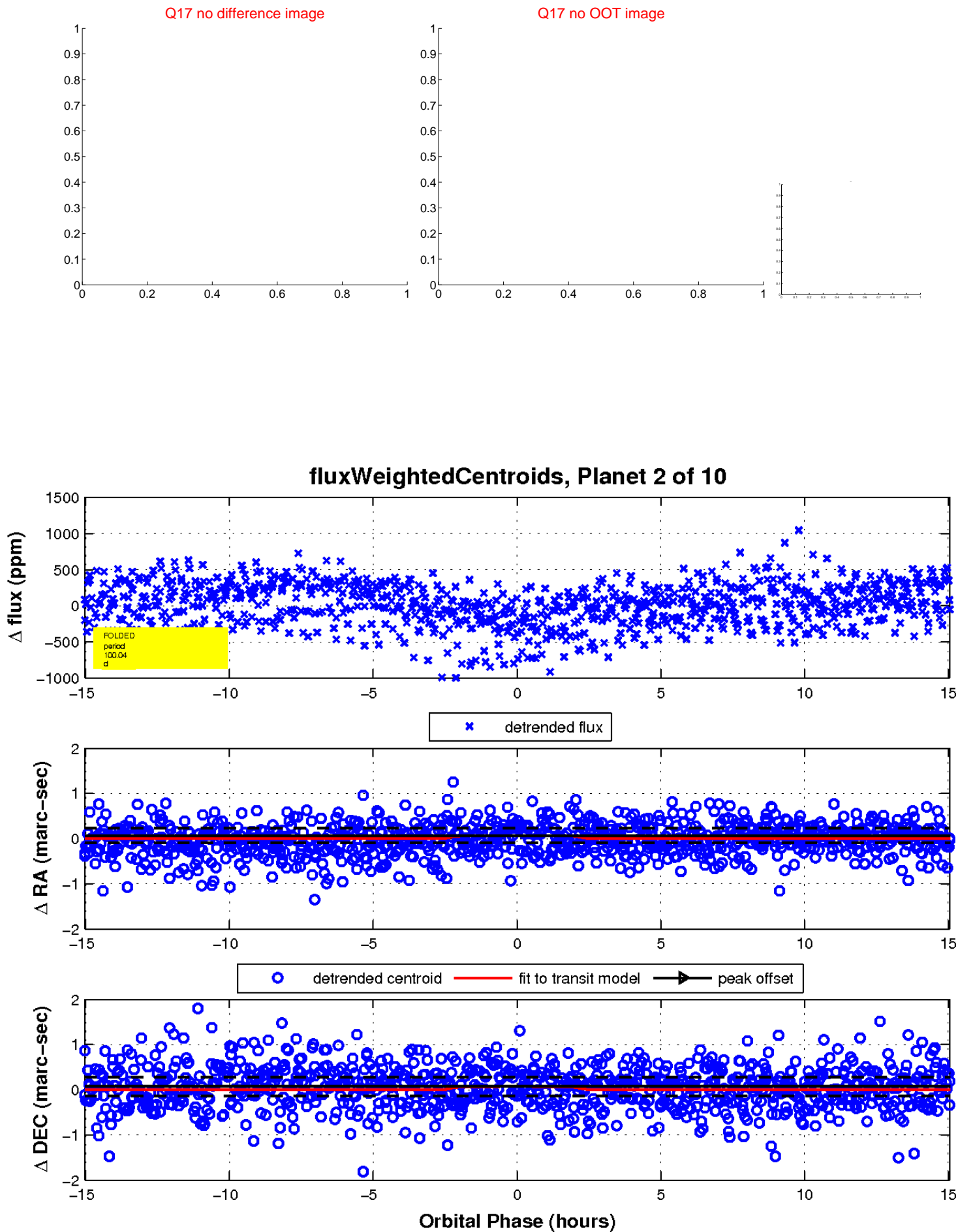
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



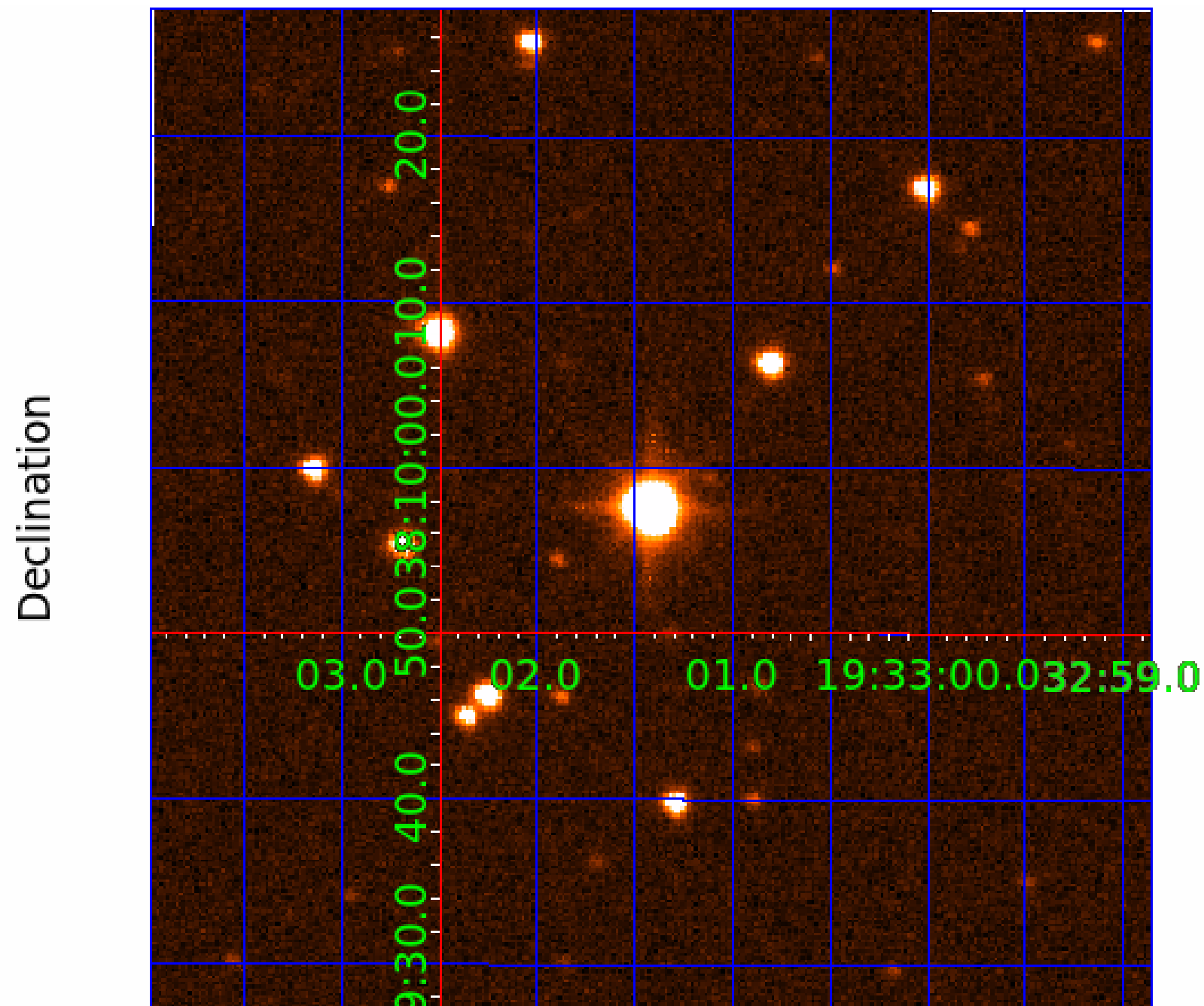
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 002998070

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

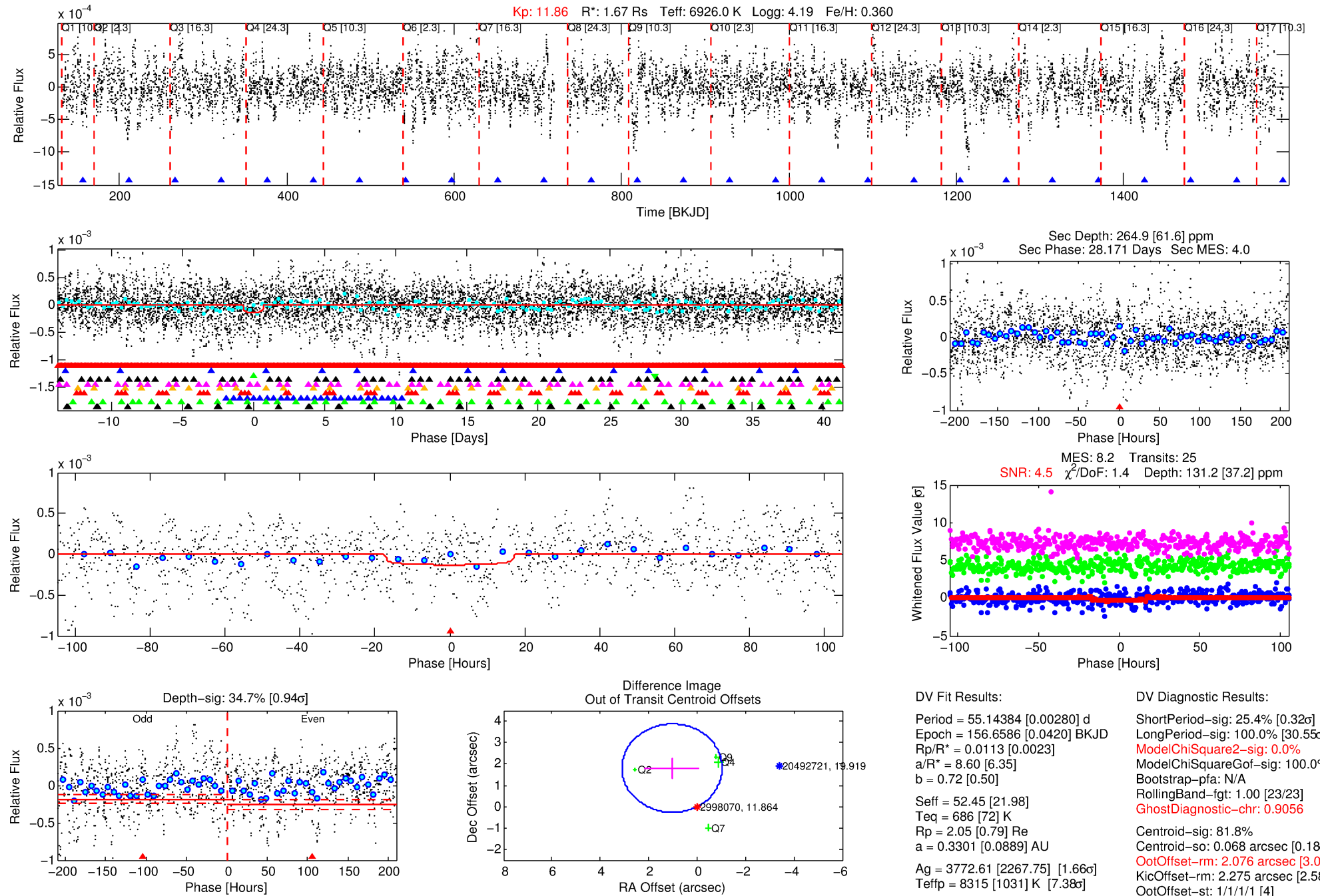
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-03

No Significant Match Found

DV One-Page Summary

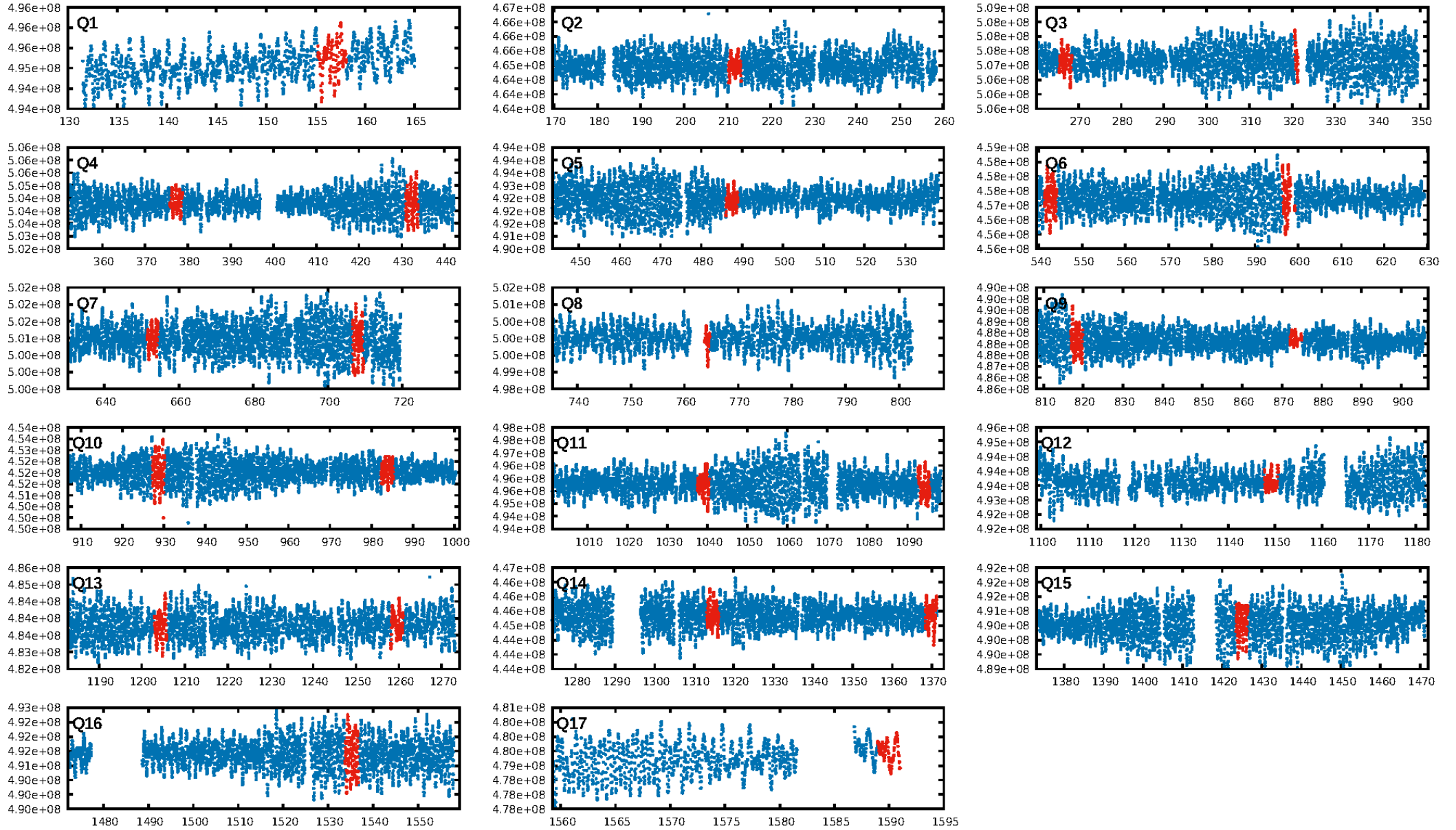
KIC: 2998070 Candidate: 3 of 10 Period: 55.144 d



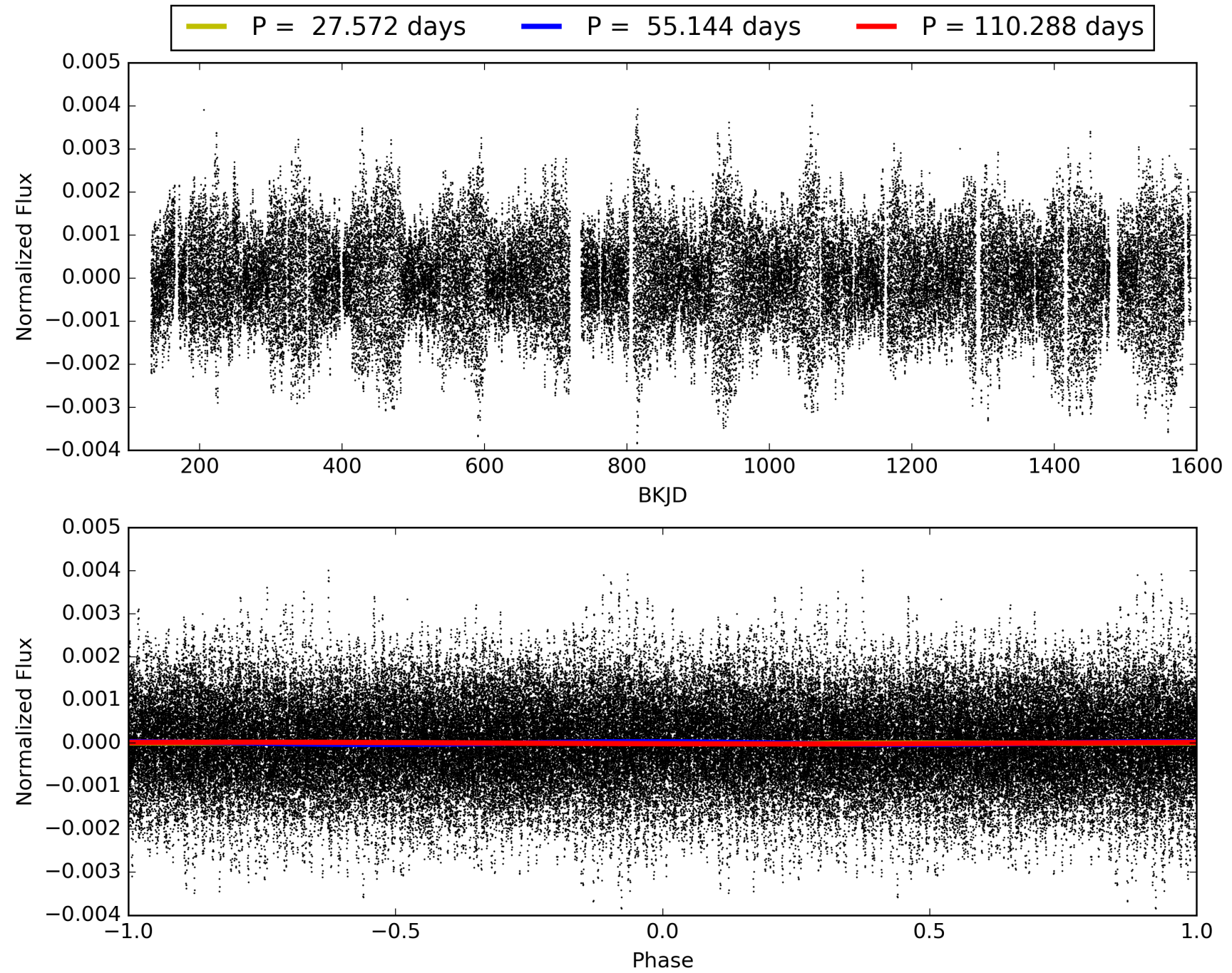
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:36 Z

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

TCE 002998070-03, PDC Light Curves

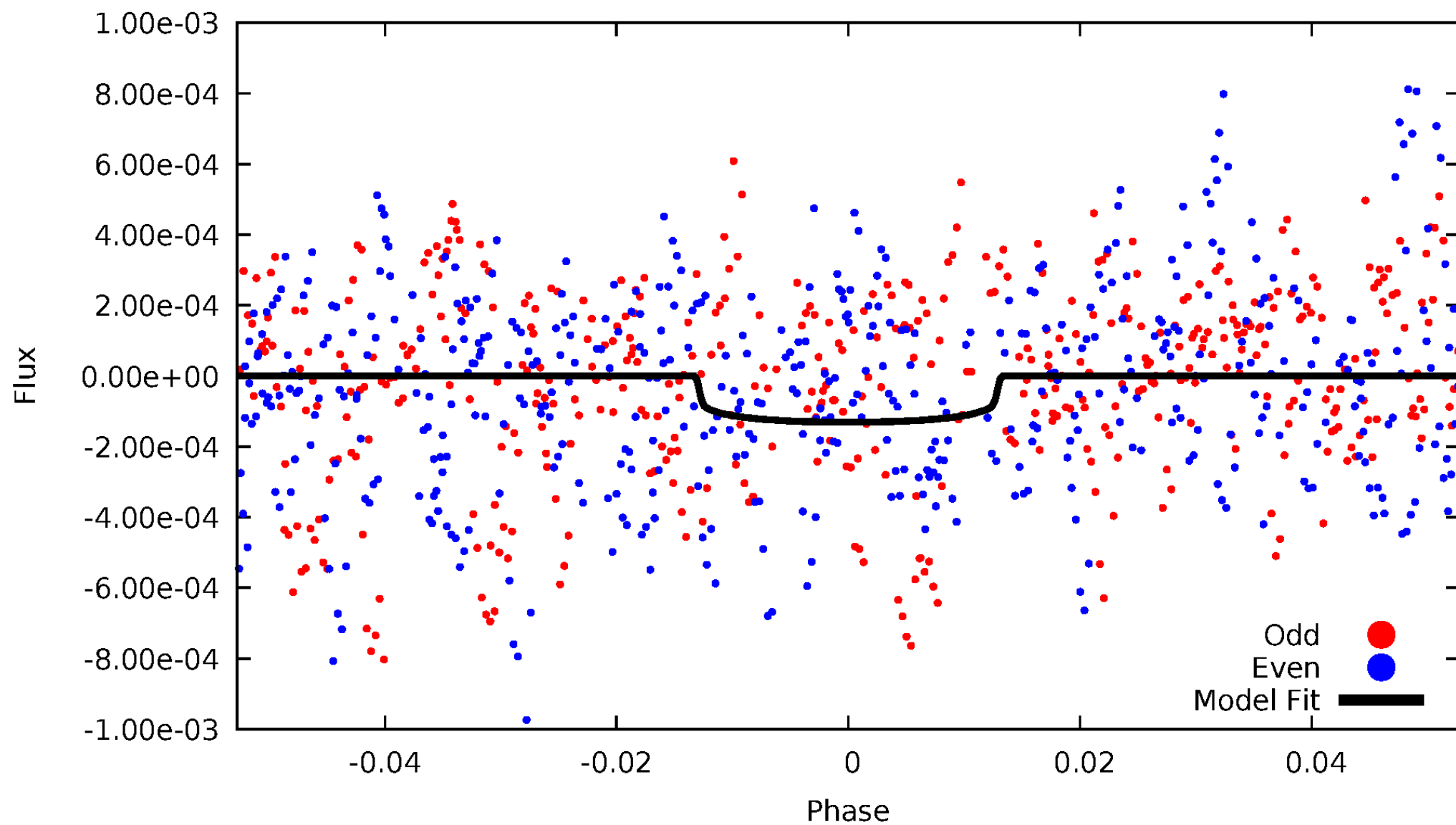


TCE 002998070-03



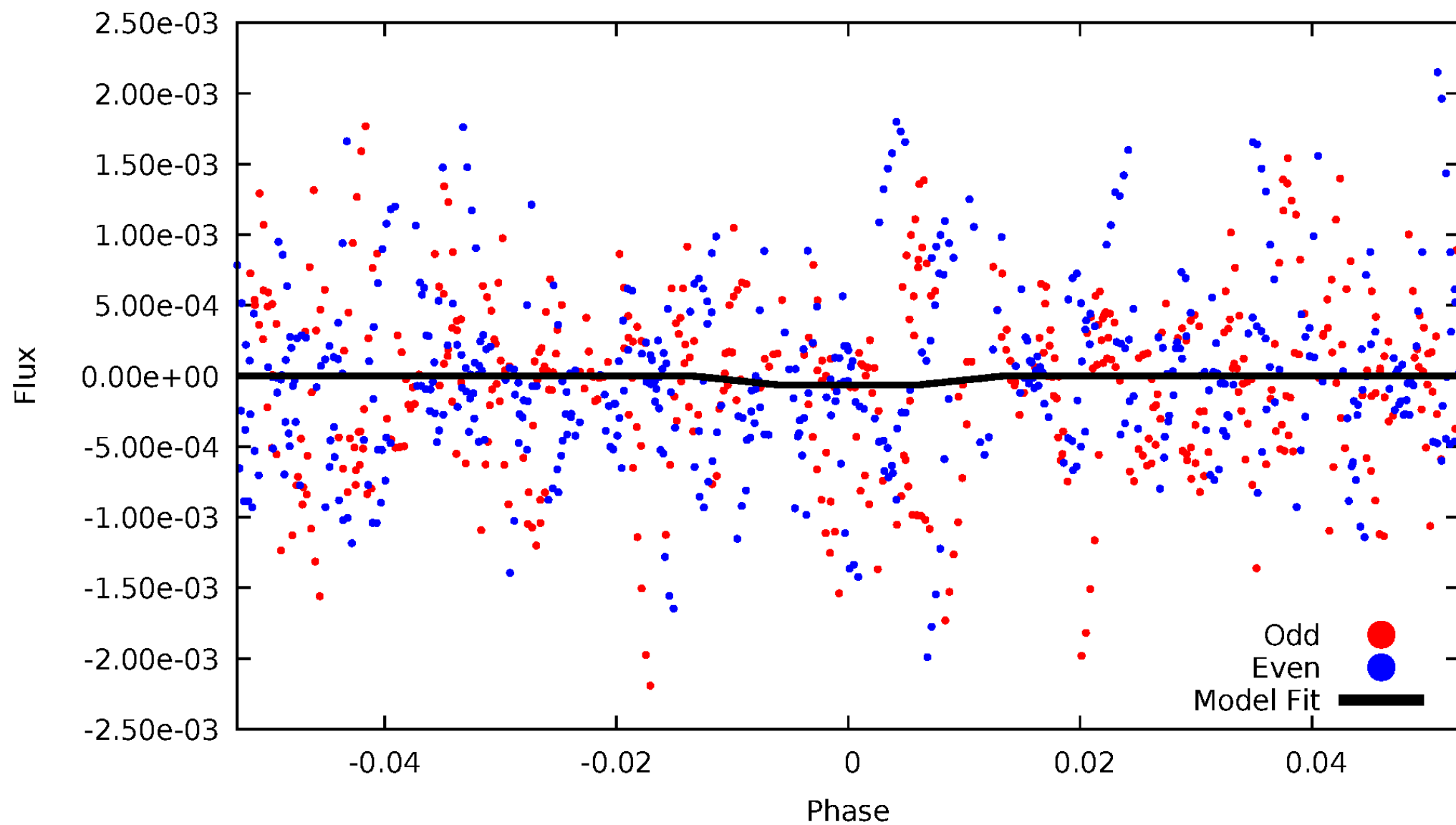
DV Odd/Even

TCE 002998070-03



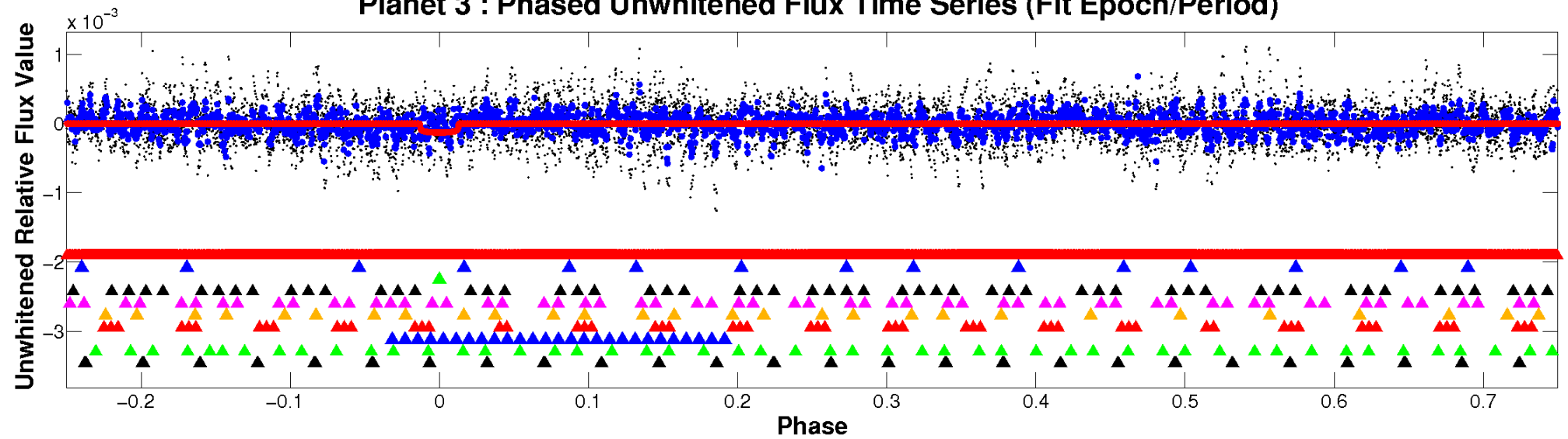
ALT Odd/Even

TCE 002998070-03

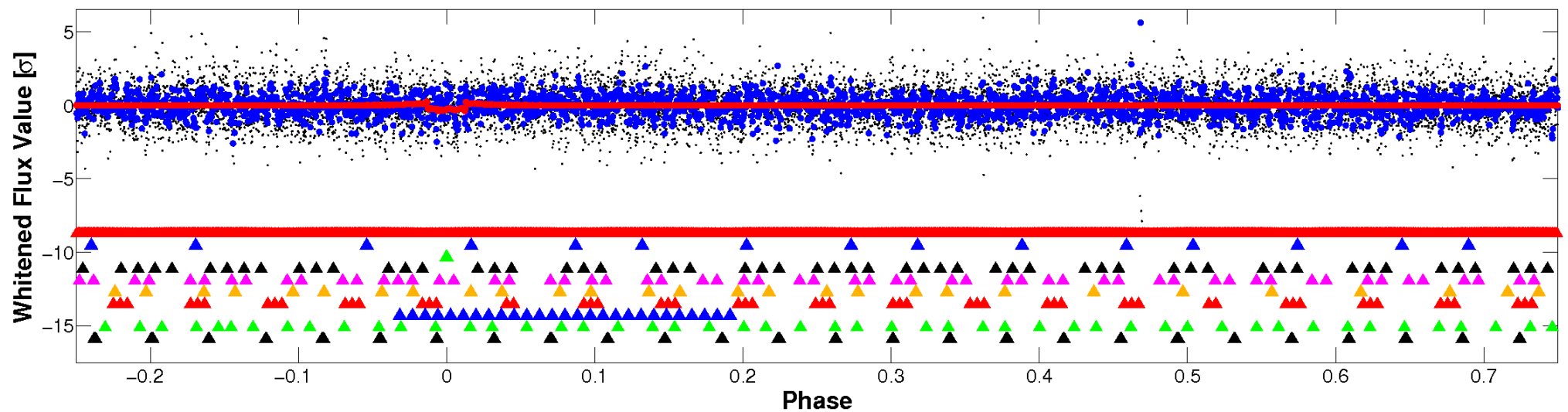


Non-Whitened Vs. Whitened Light Curve

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

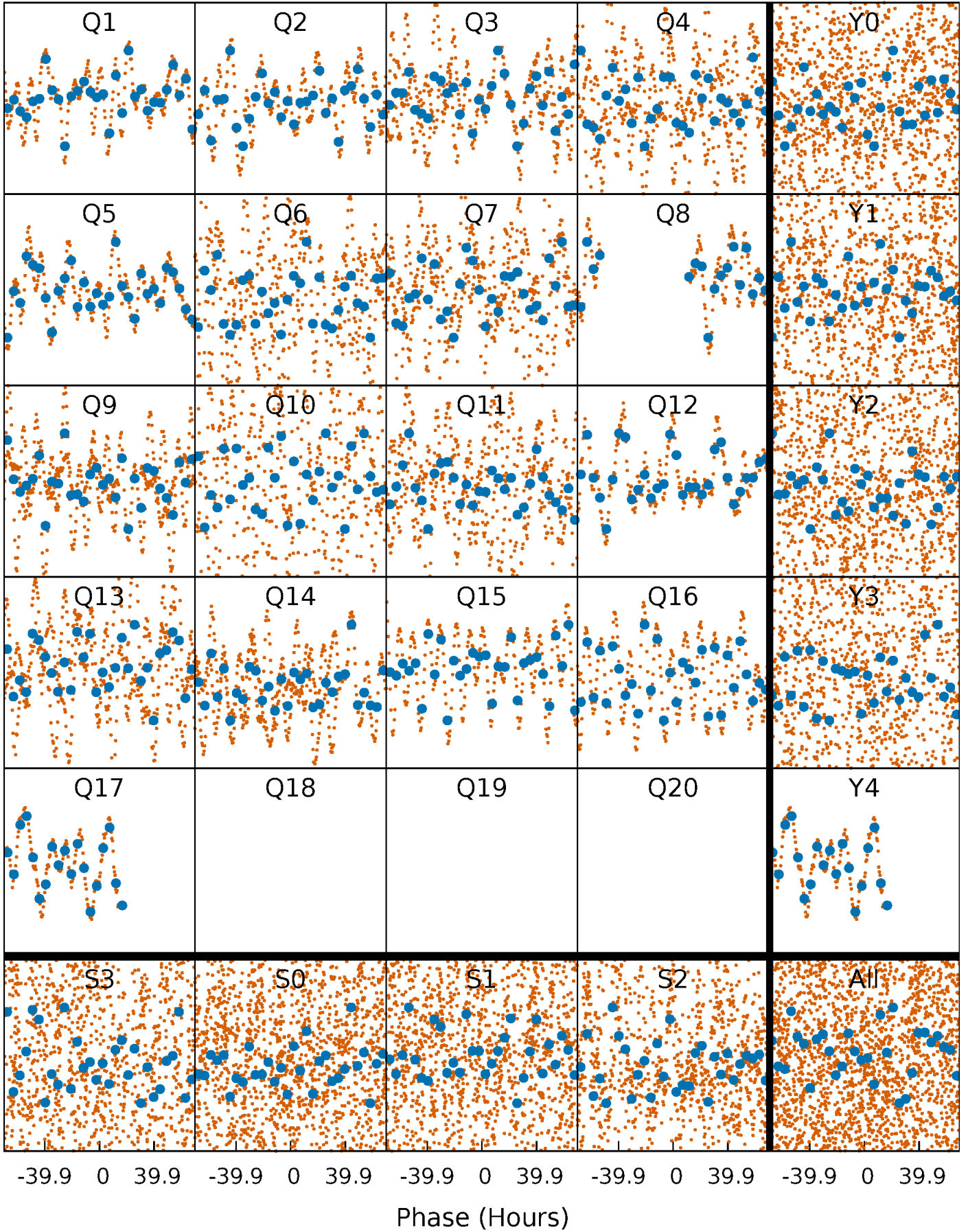


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



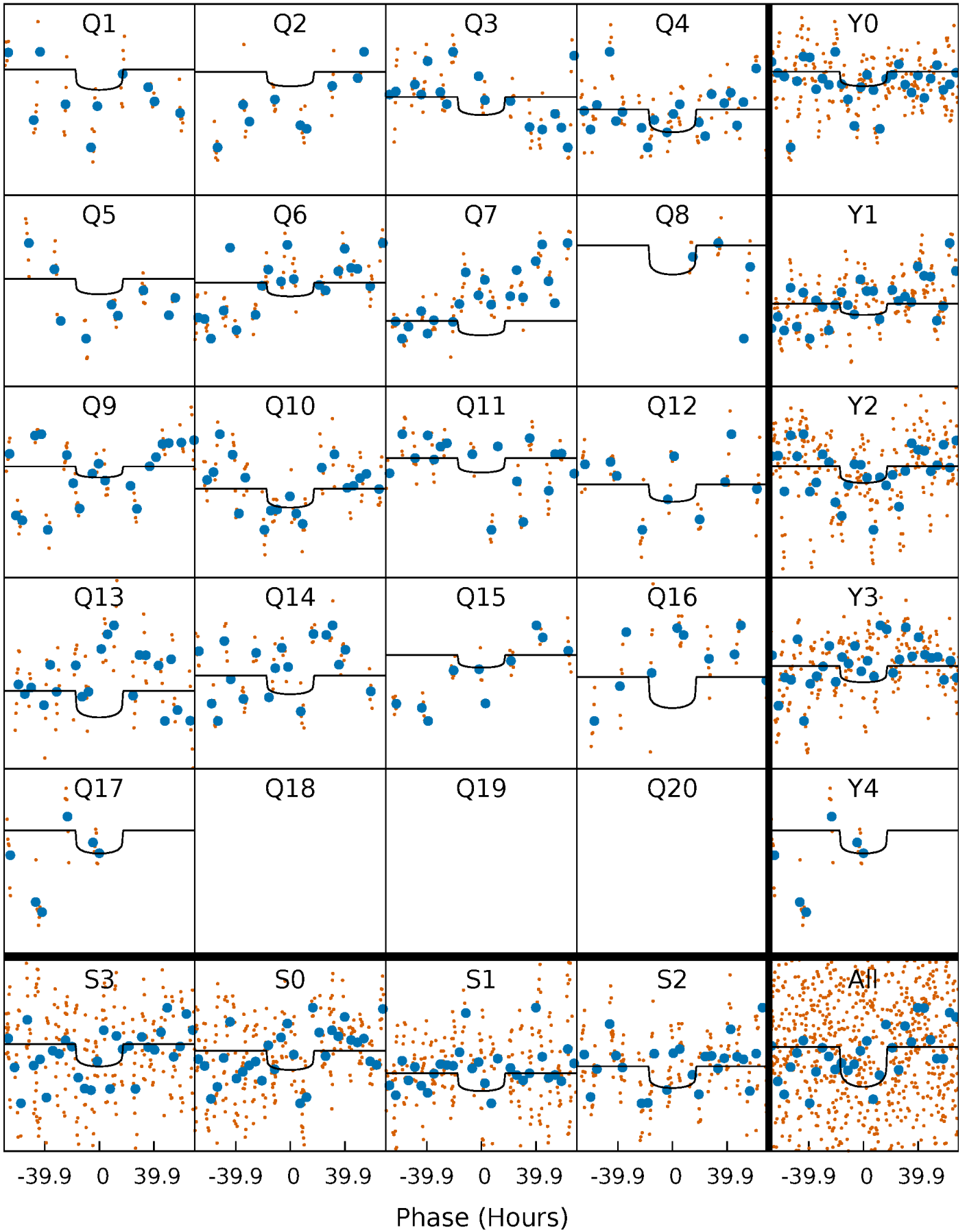
PDC Quarter-Phased Transit Curves

TCE 002998070-03 $P = 55.143844$ Days $T_0 = 156.658582$ (BKJD)



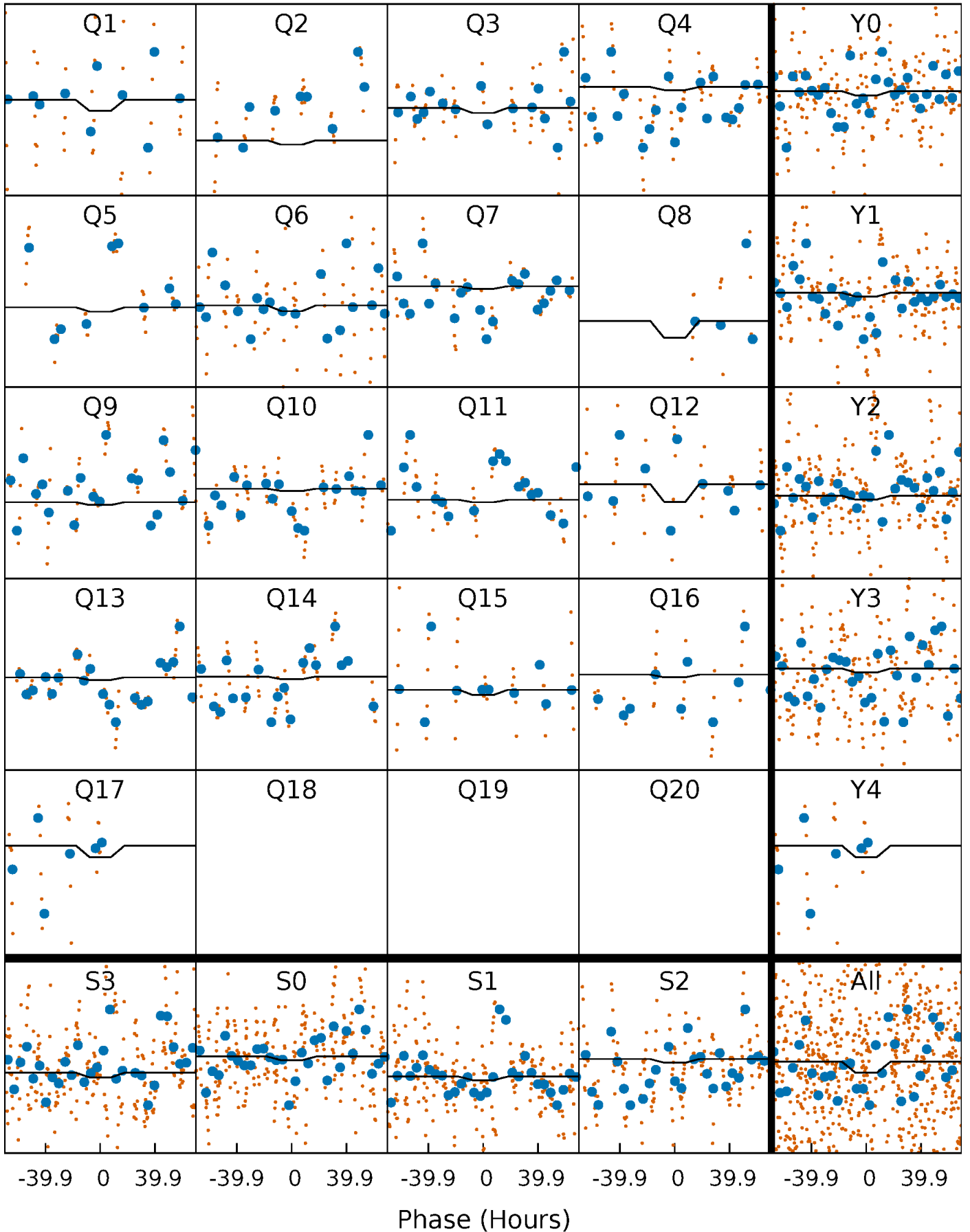
DV Quarter-Phased Transit Curves

TCE 002998070-03 P= 55.143844 Days $T_0=156.658582$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

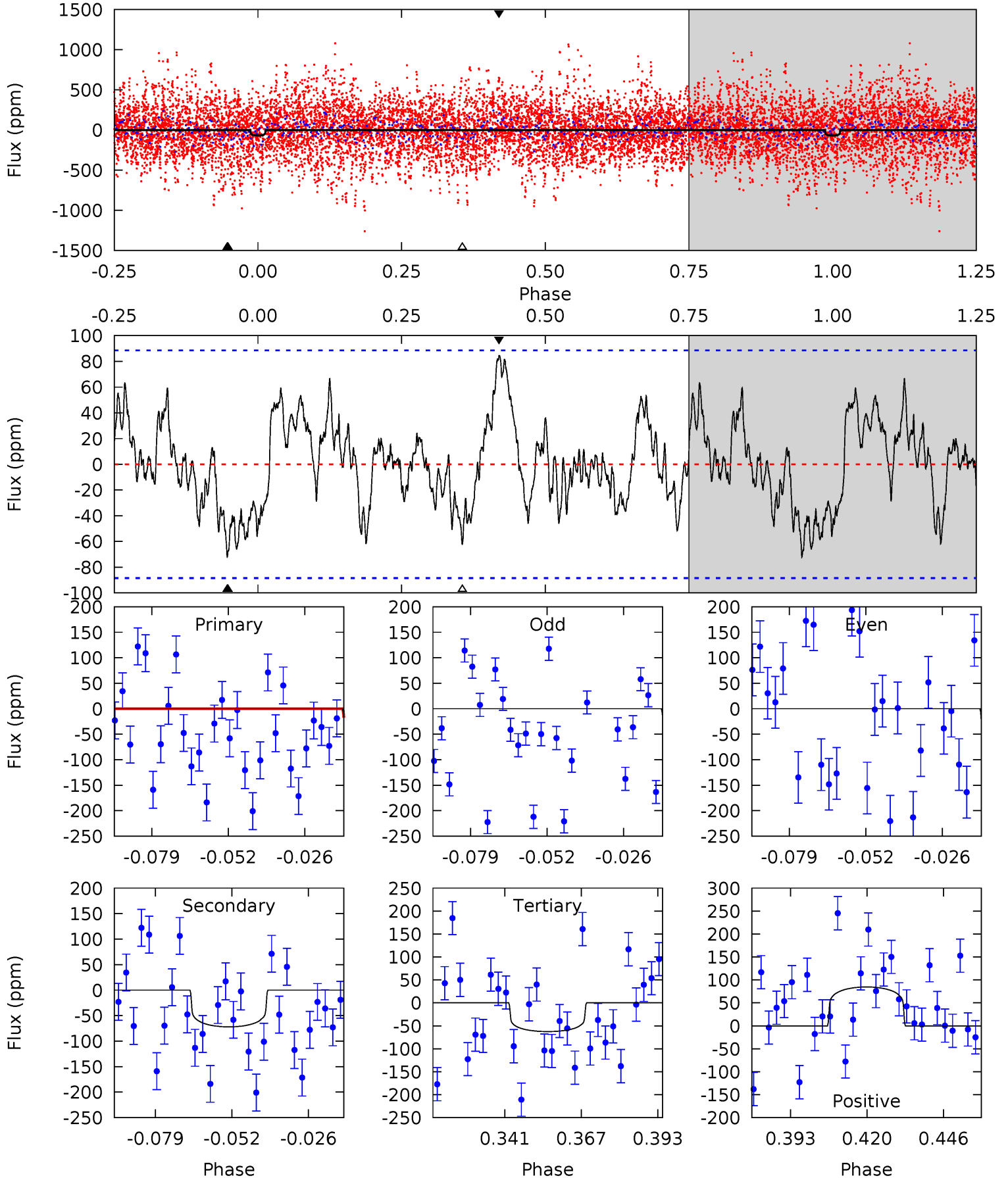
TCE 002998070-03 P= 55.140600 Days $T_0=156.693763$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-03, P = 55.143844 Days, E = 101.514738 Days

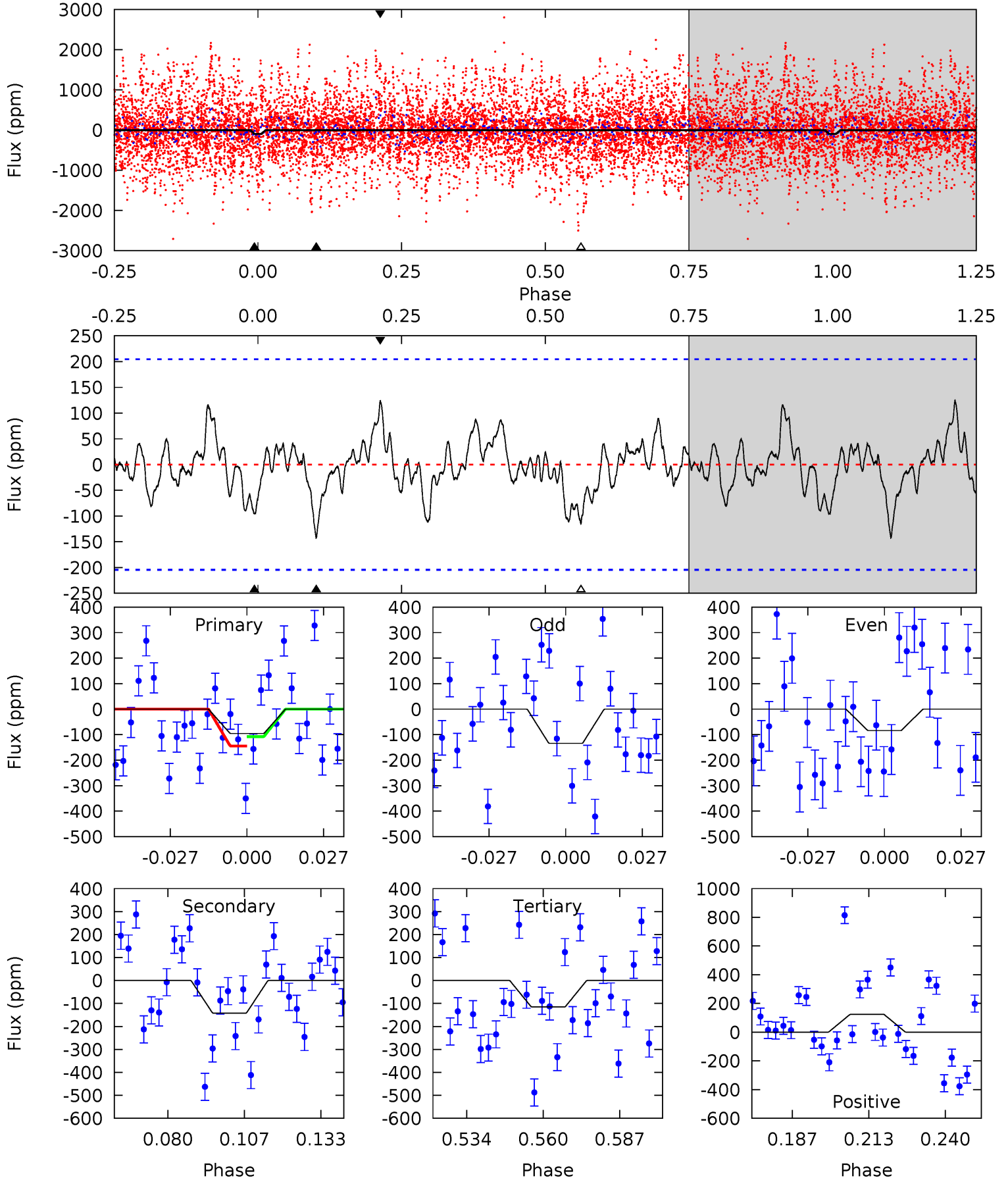
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.70	3.94	3.42	4.63	4.84	2.22	1.60	0.29	-0.92	0.52	-0.69	0.97	2.03	0.54	0.70



Alt Model-Shift Uniqueness Test

002998070-03, P = 55.140600 Days, E = 101.553163 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.26	3.37	2.73	2.95	4.83	2.22	1.01	-0.47	-0.68	0.63	0.42	0.59	1.26	0.47	0.44



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-72±18	$2.16^{+0.55}_{-0.49}$	975^{+79}_{-57}	5887^{+888}_{-625}	893^{+691}_{-378}
Alt.	-142±42	$1.50^{+0.52}_{-0.42}$	968^{+72}_{-50}	8709^{+2648}_{-1608}	3663^{+4138}_{-1813}

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

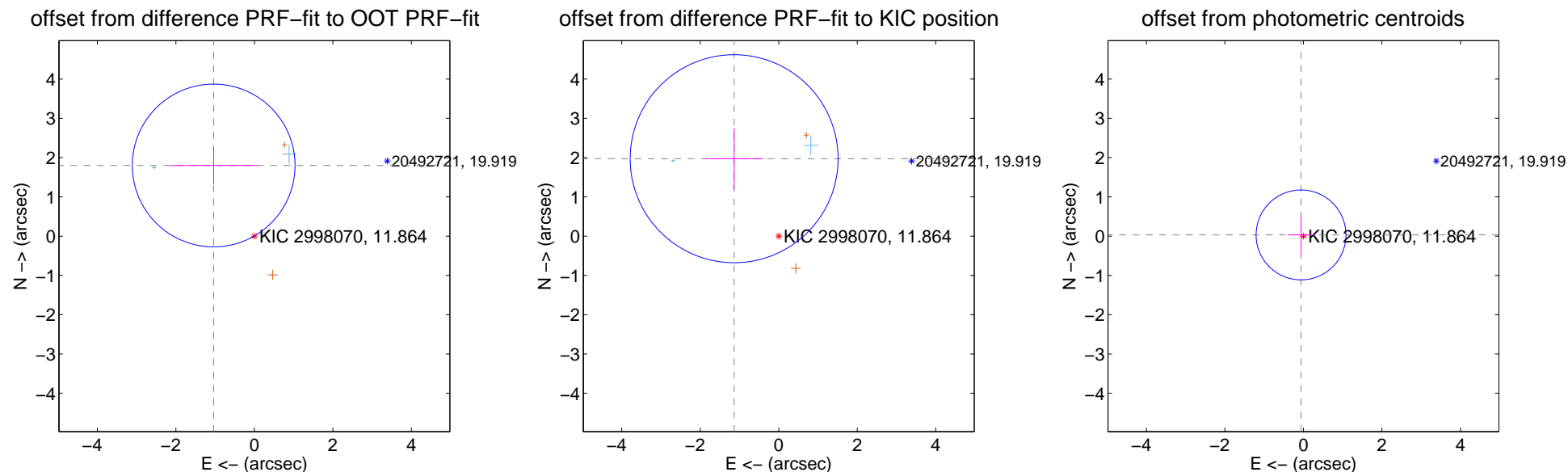
DV Centroid Data

Supplemental centroid analysis for 002998070-03. **Kepler magnitude: 11.86.** Transit SNR 4.47

There are 2 quarters with good PRF difference image offsets

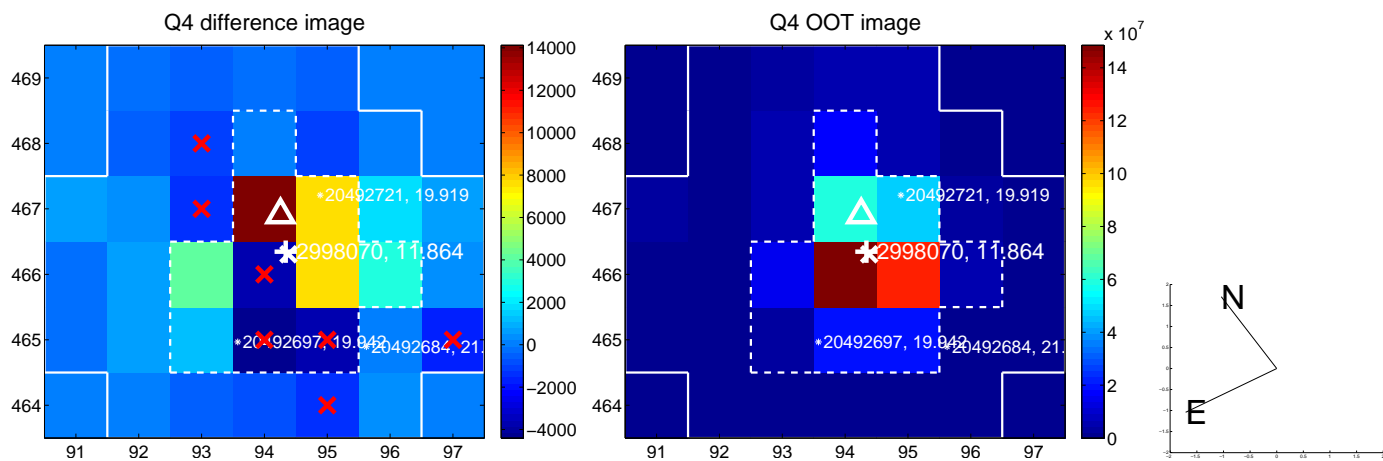
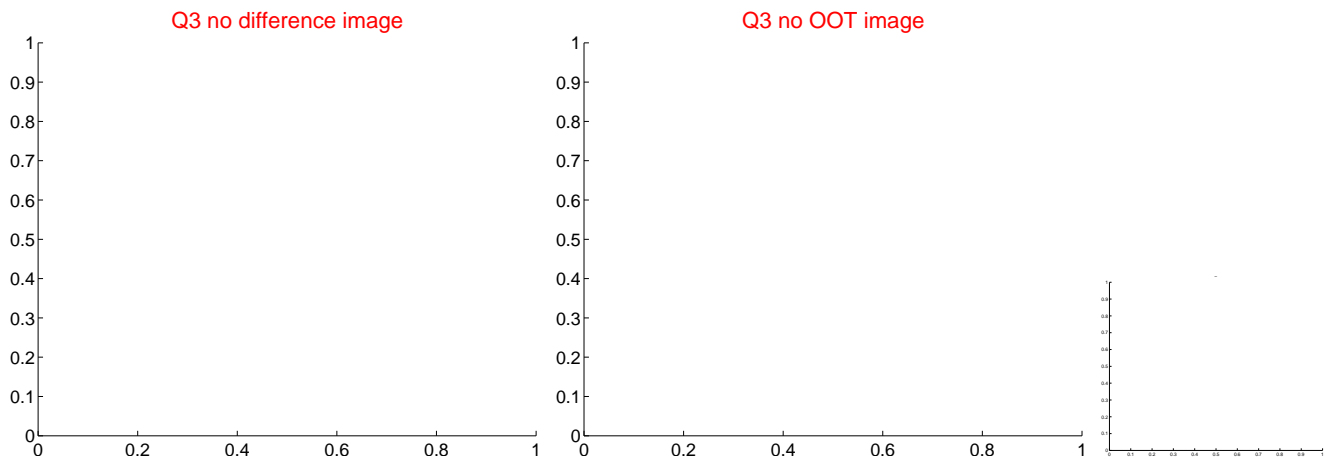
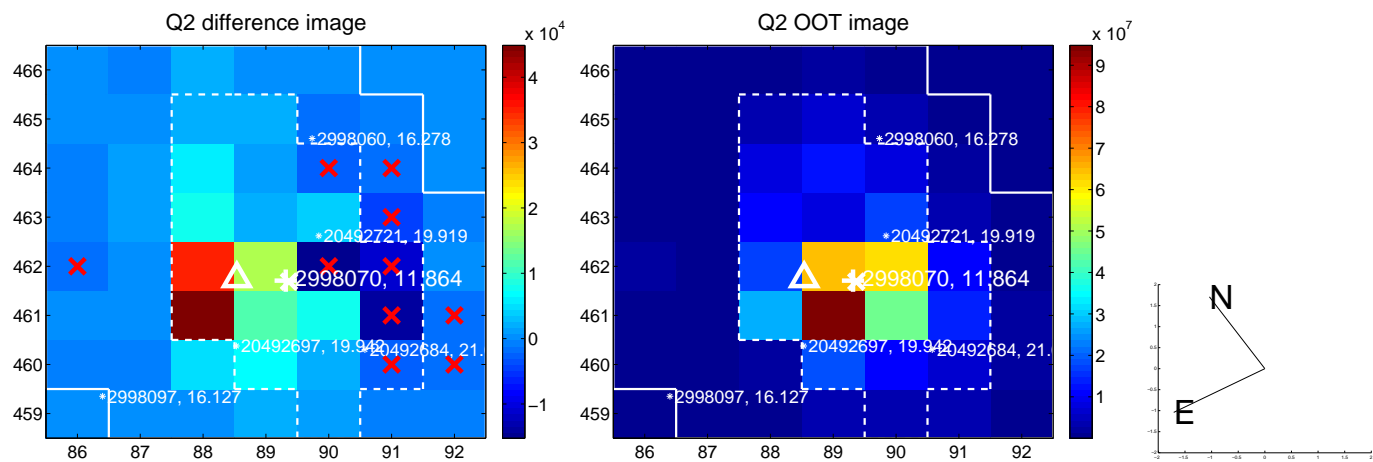
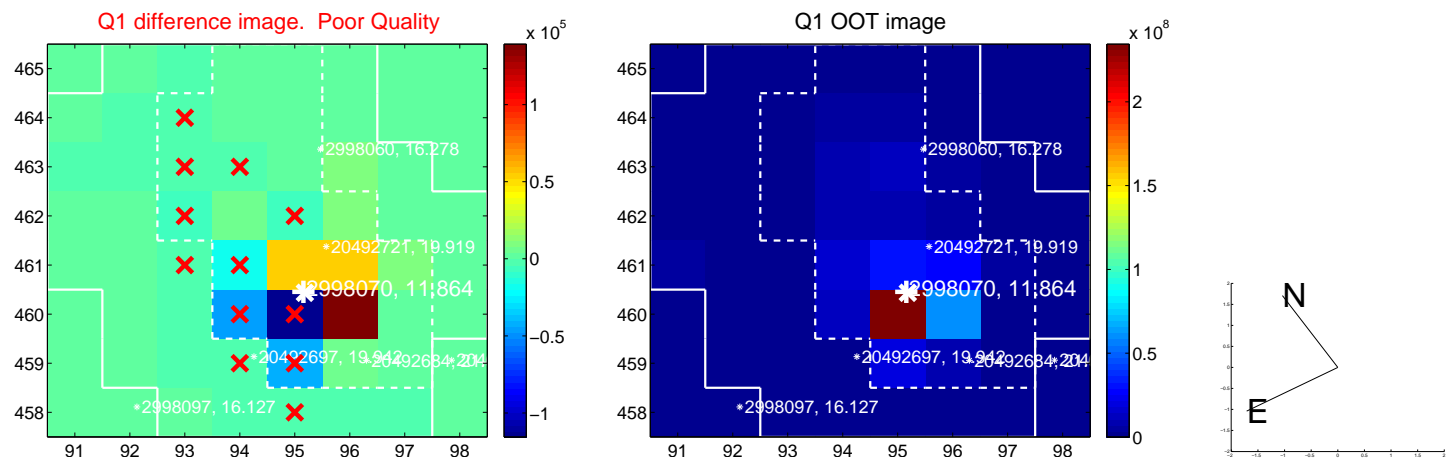
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.076 \pm 0.691	3.01	1.037 \pm 1.115	1.799 \pm 0.472
PRF-fit source offset from KIC position	2.275 \pm 0.883	2.58	1.136 \pm 0.733	1.971 \pm 0.780
photometric centroid source offset	0.07 \pm 0.38	0.18	0.06 \pm 0.34	0.03 \pm 0.51

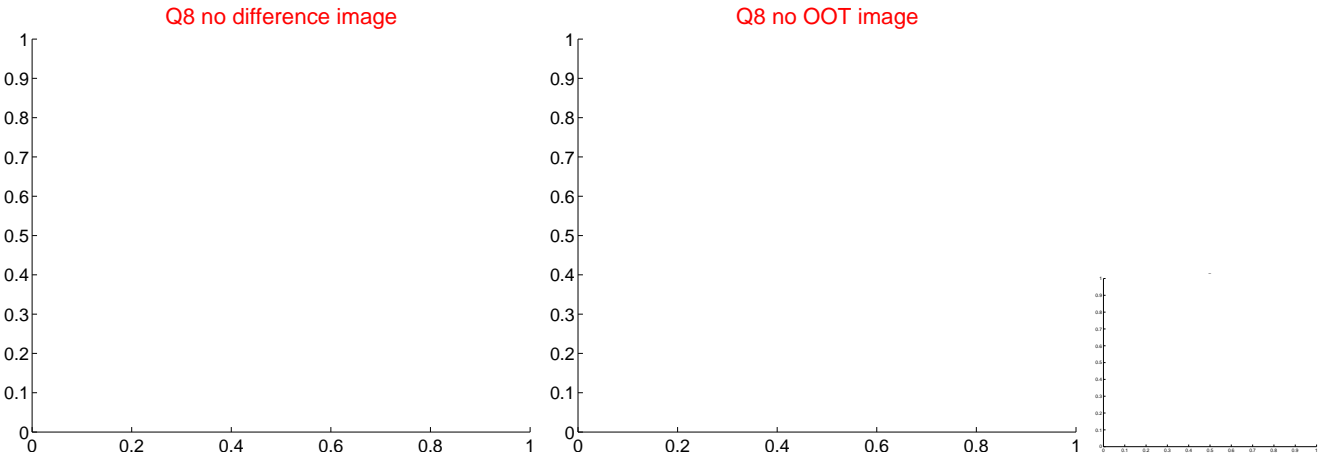
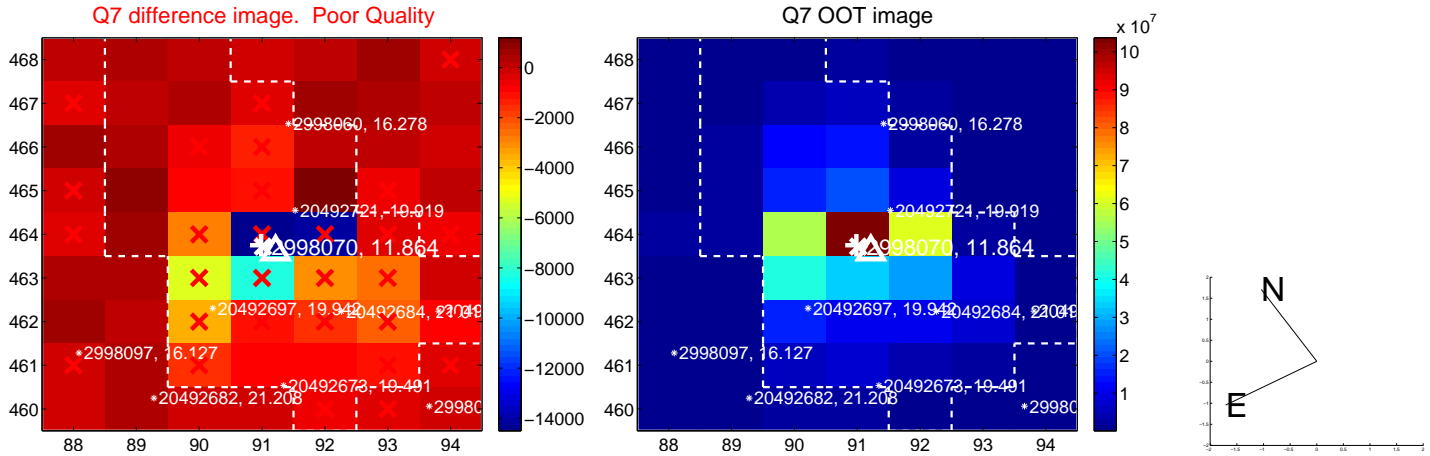
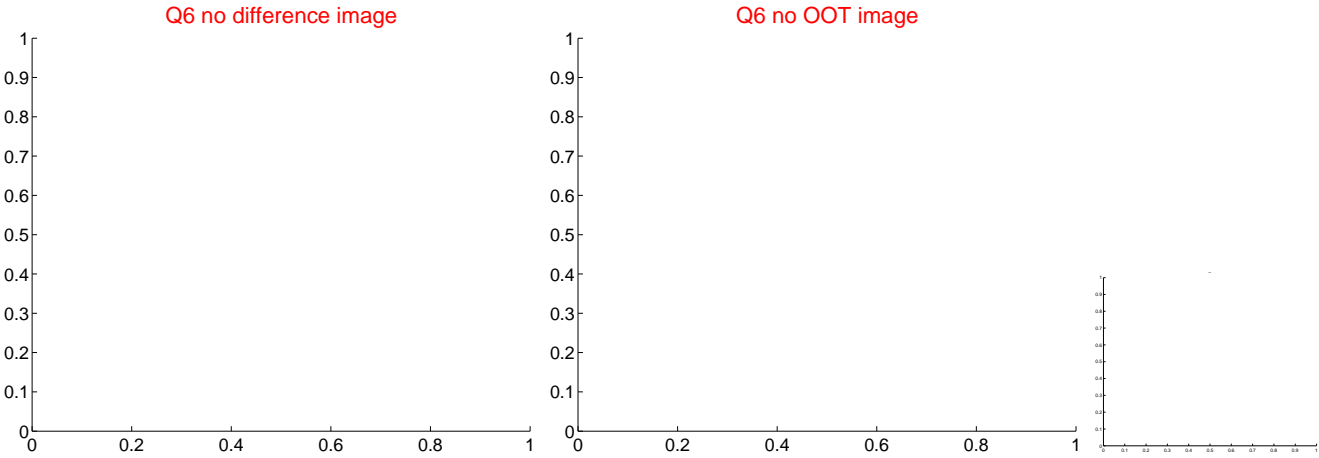
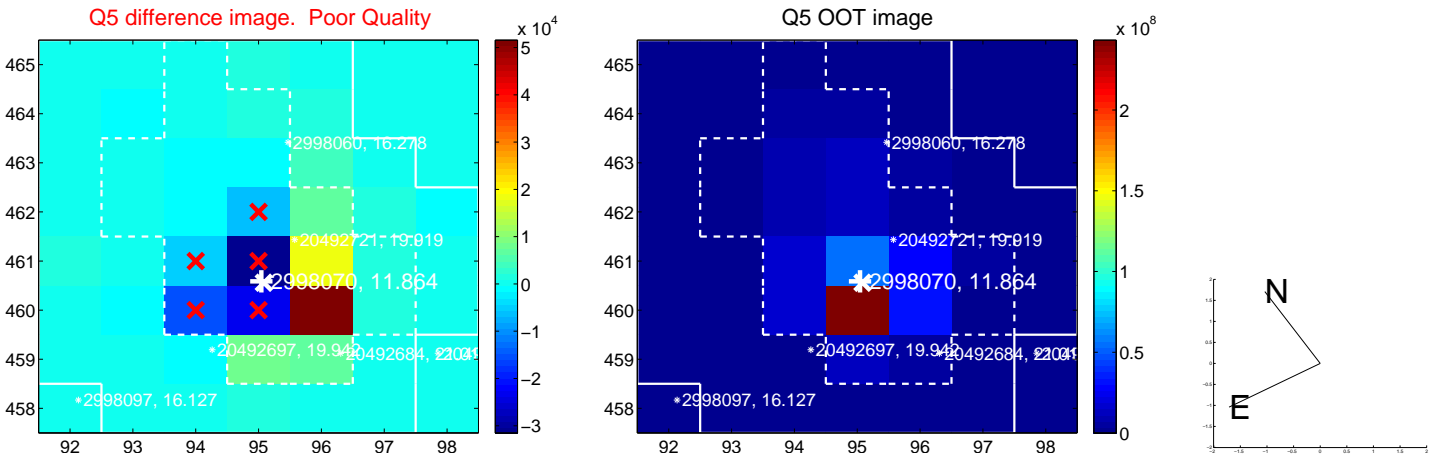


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

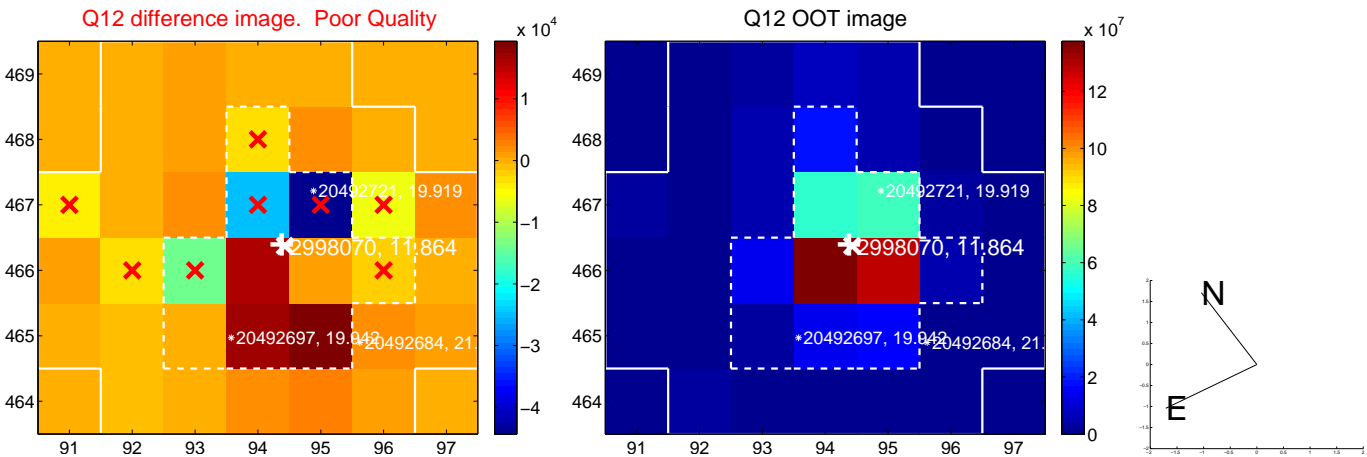
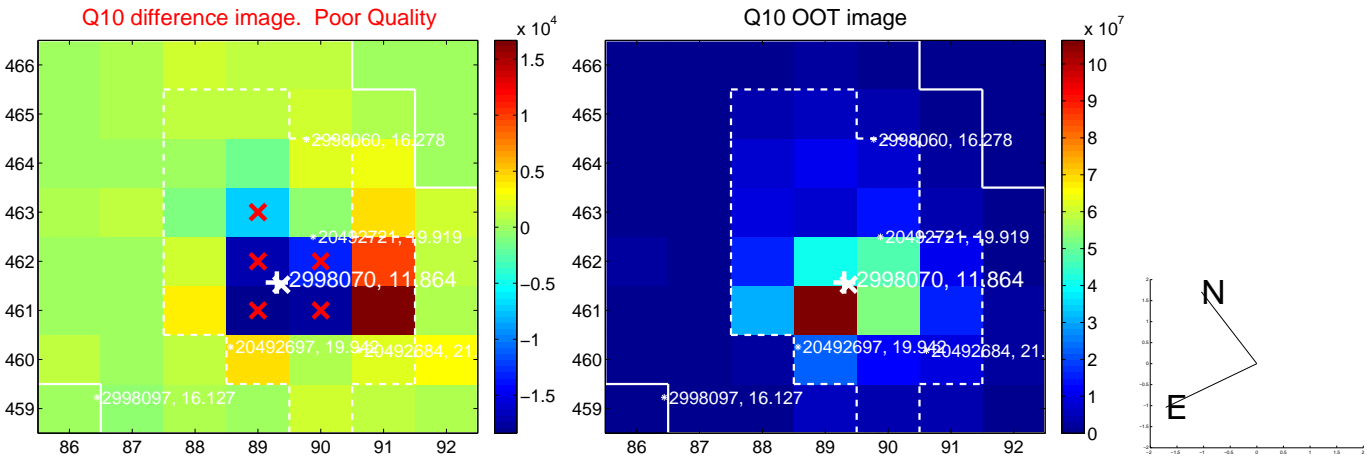
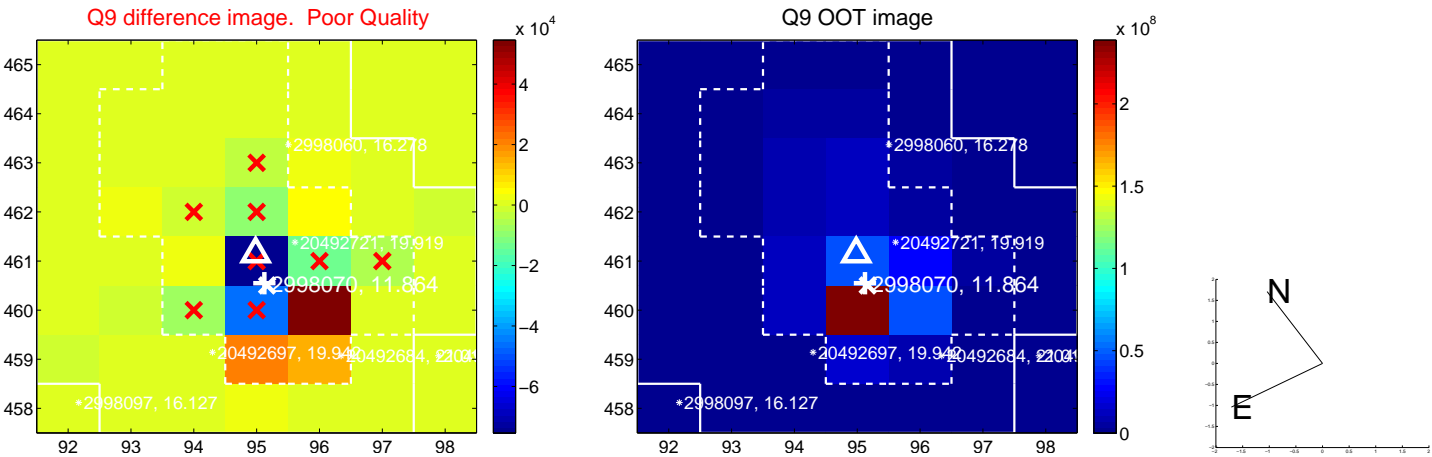
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



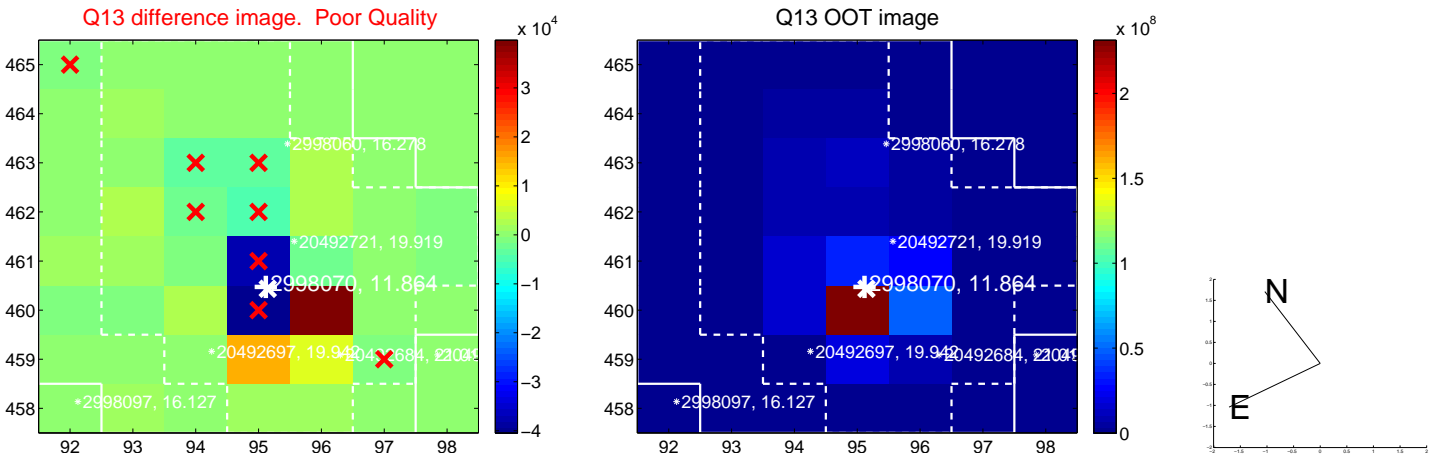
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



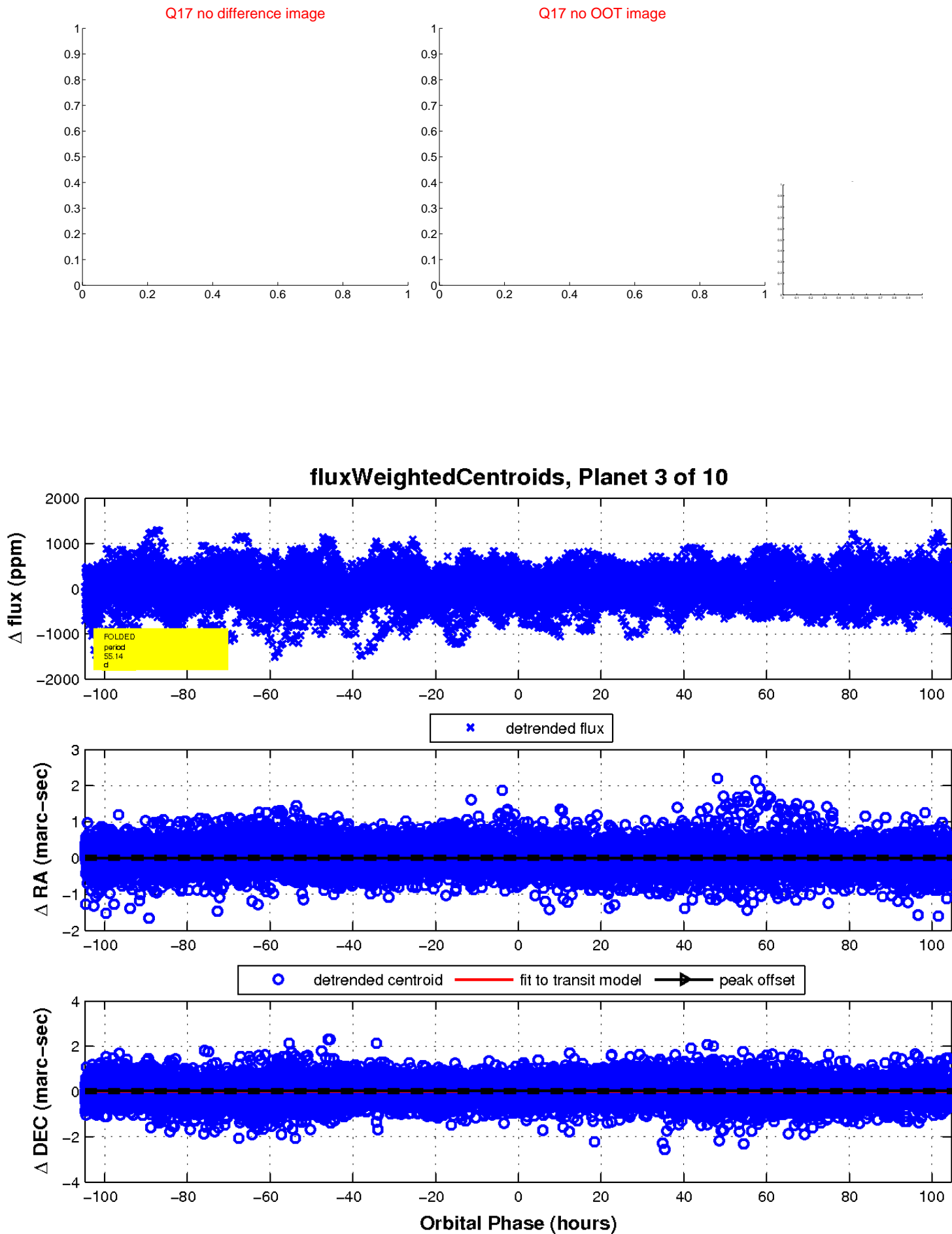
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



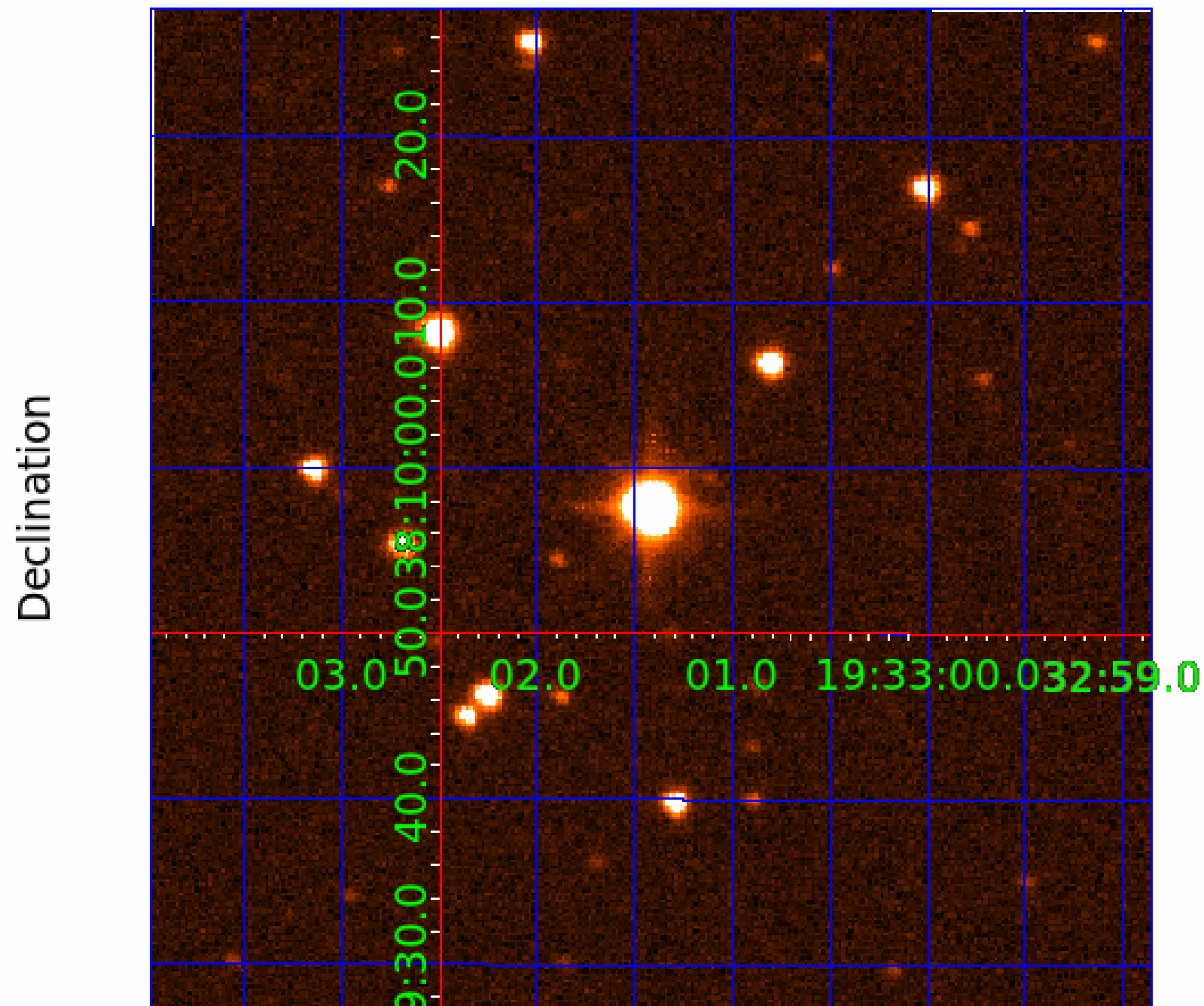
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

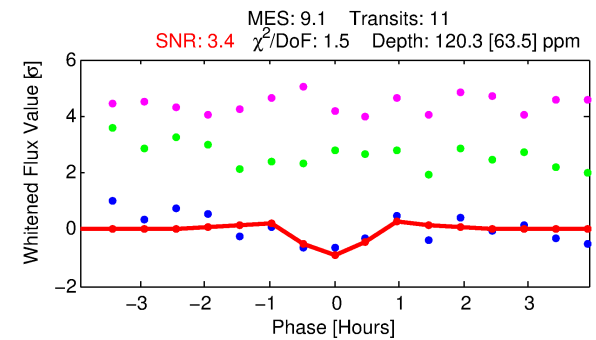
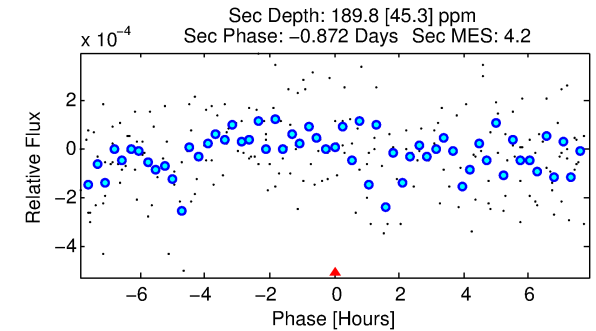
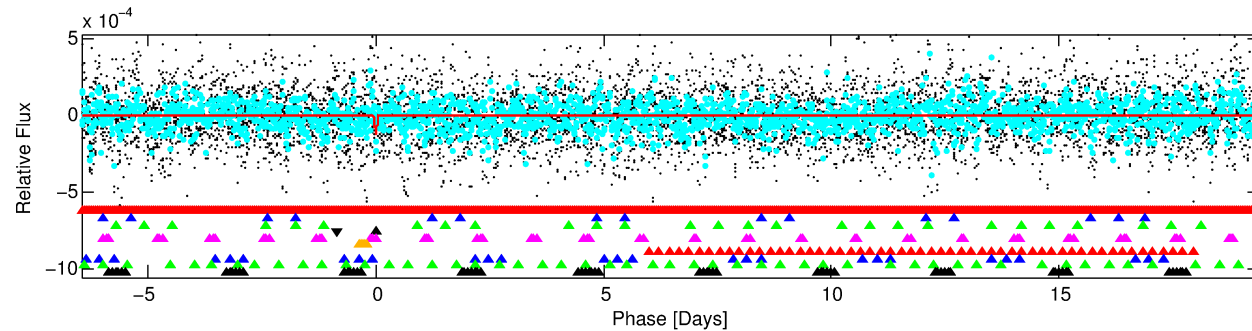
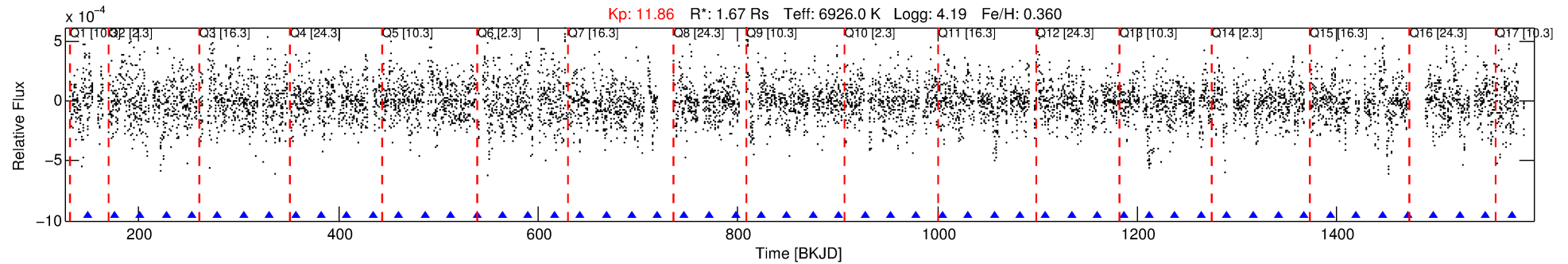
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-04

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 4 of 10 Period: 25.913 d

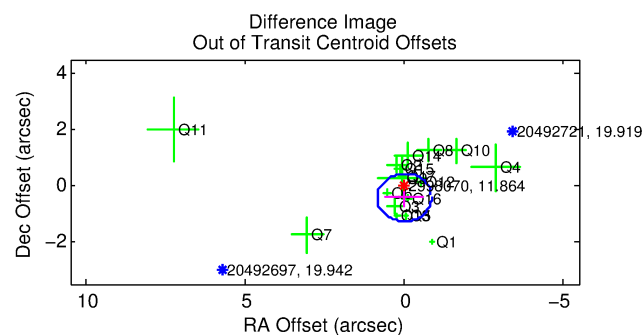
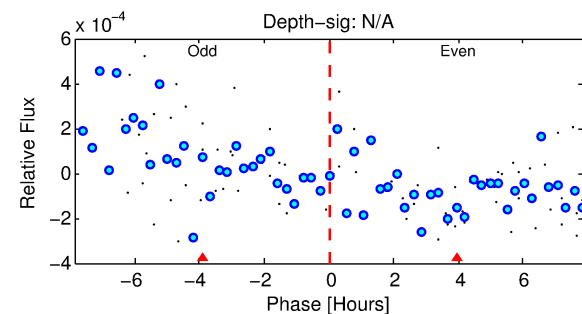
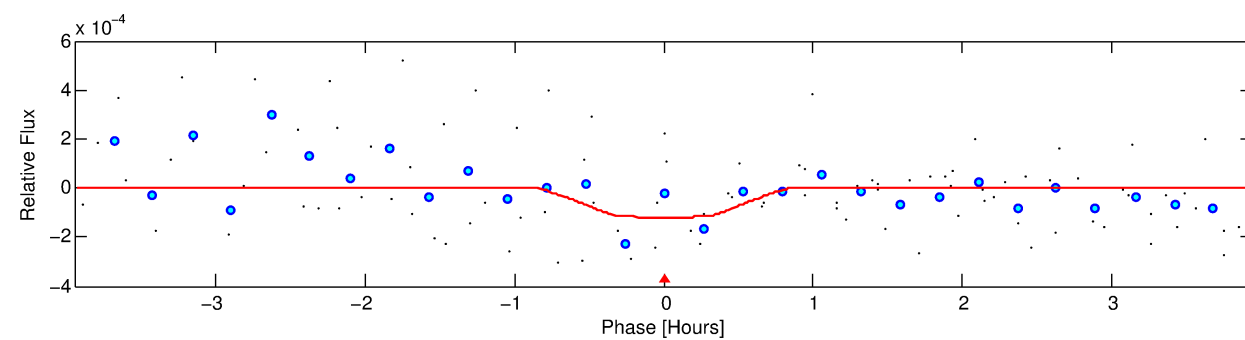


DV Fit Results:

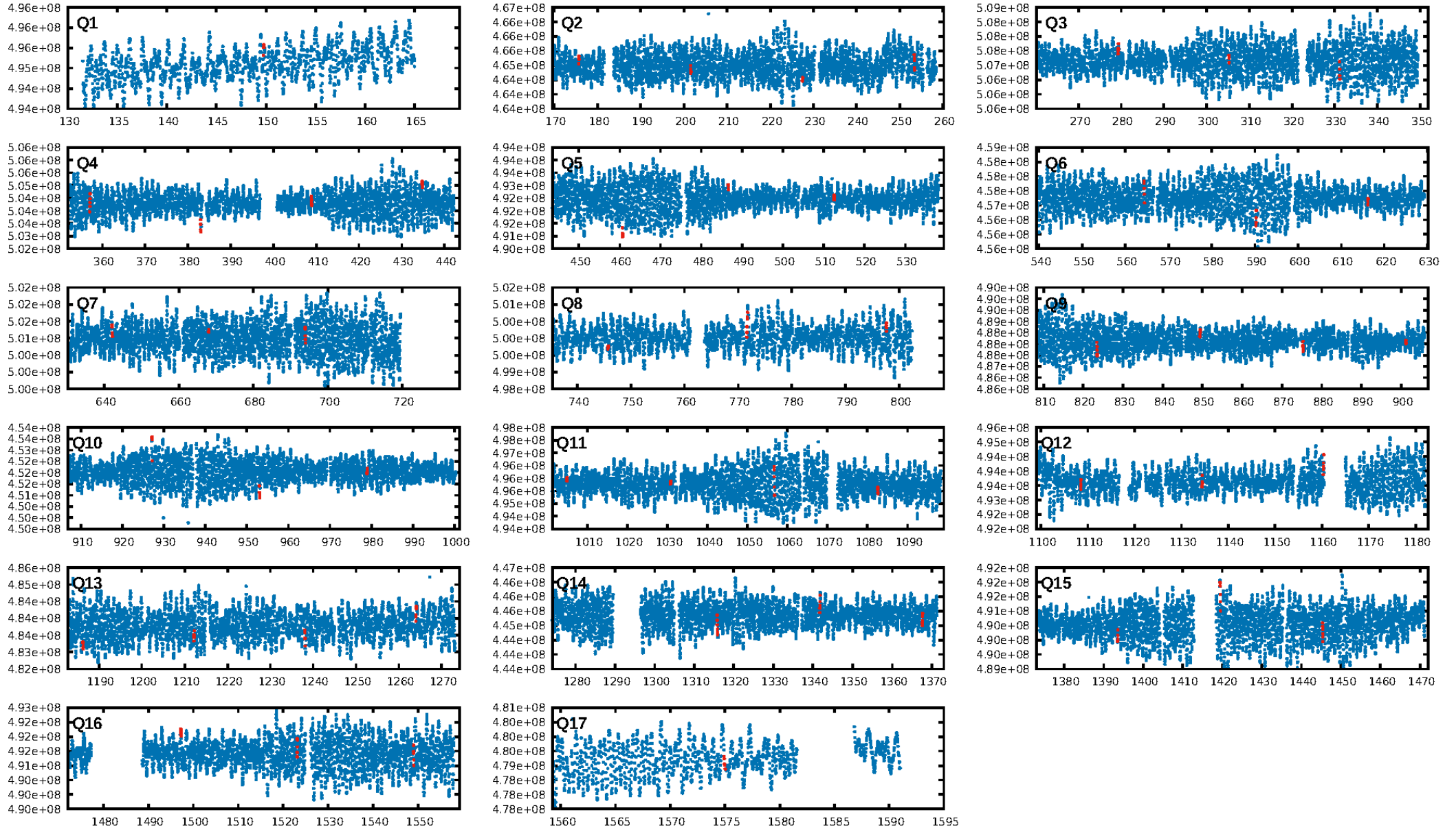
Period = 25.91295 [0.00044] d
Epoch = 149.7550 [0.0127] BKJD
Rp/R* = 0.0123 [0.0268]
a/R* = 55.00 [730.61]
b = 0.94 [1.55]
Seff = 143.57 [60.17]
Teq = 883 [92] K
Rp = 2.23 [4.92] Re
a = 0.1995 [0.0538] AU
Ag = 832.04 [3638.61] [0.23σ]
Teffp = 7329 [7989] K [0.81σ]

DV Diagnostic Results:

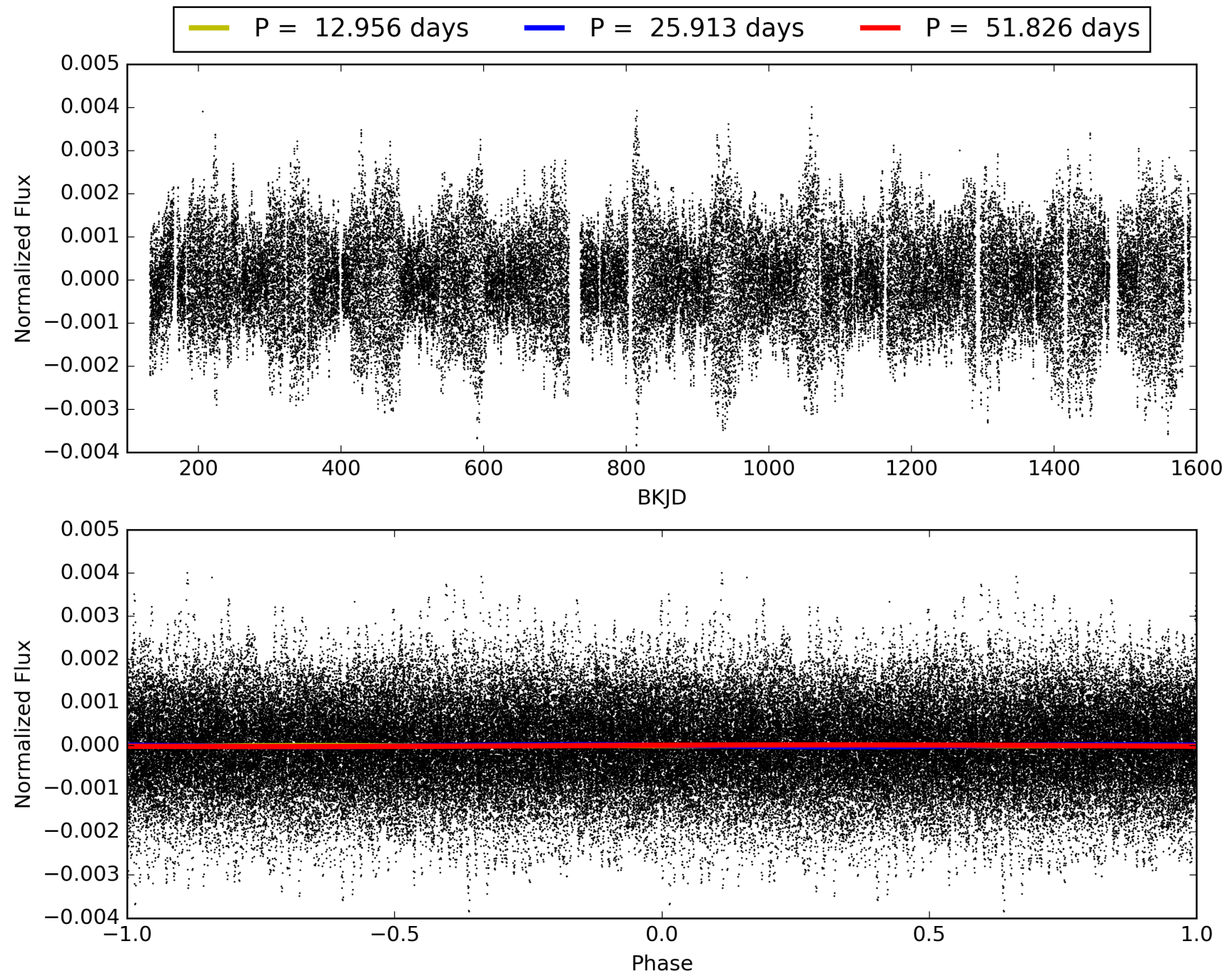
ShortPeriod-sig: 100.0% [13.38σ]
LongPeriod-sig: 98.8% [2.50σ]
ModelChiSquare2-sig: 2.1%
ModelChiSquareGof-sig: 88.3%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: 0.153
Centroid-sig: 37.1%
Centroid-so: 0.874 arcsec [0.98σ]
OotOffset-rm: 0.422 arcsec [1.49σ]
KicOffset-rm: 0.240 arcsec [0.81σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.41 [7/17]
DiffImageOverlap-fno: 0.41 [7/17]



TCE 002998070-04, PDC Light Curves

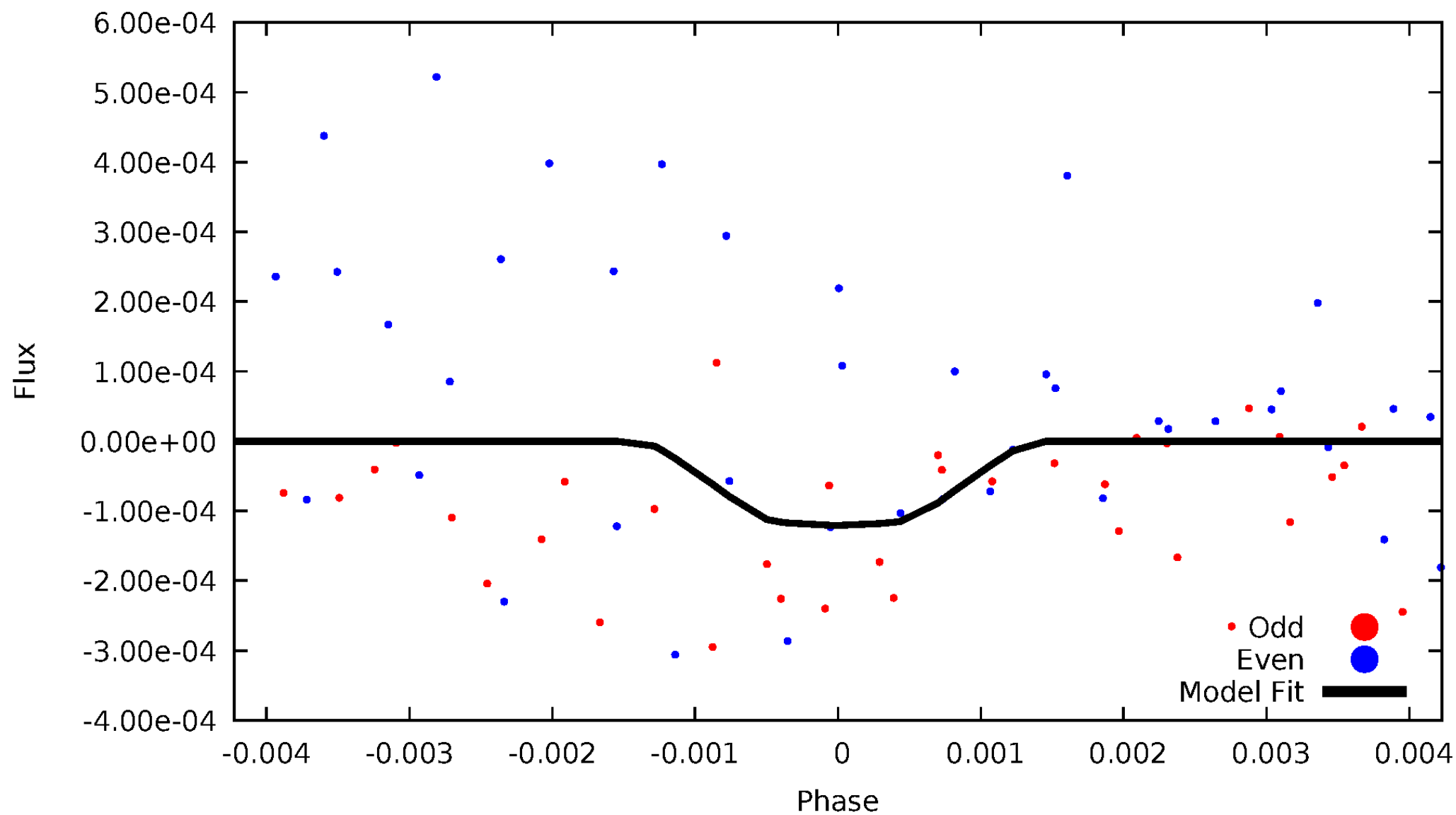


TCE 002998070-04



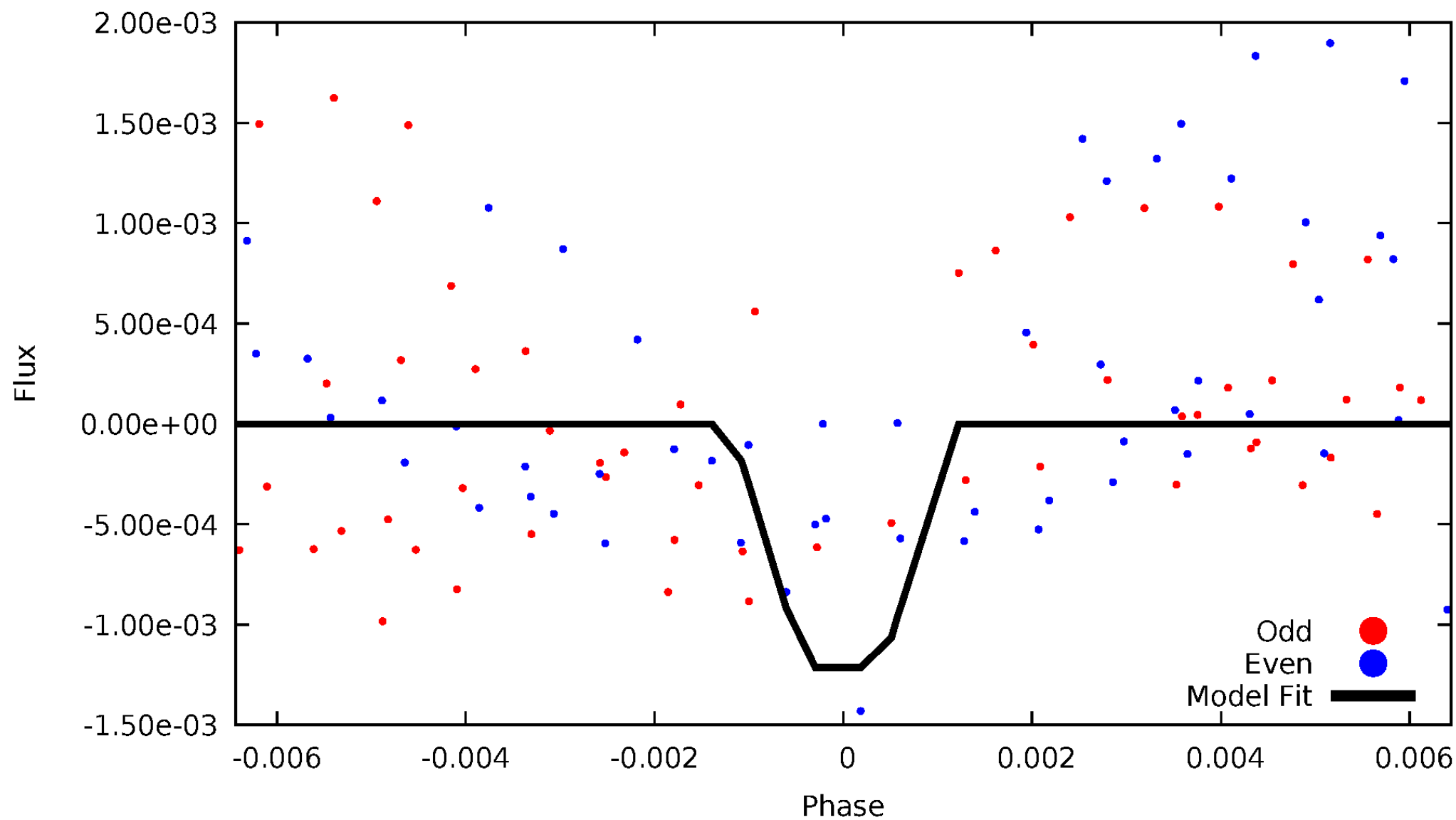
DV Odd/Even

TCE 002998070-04



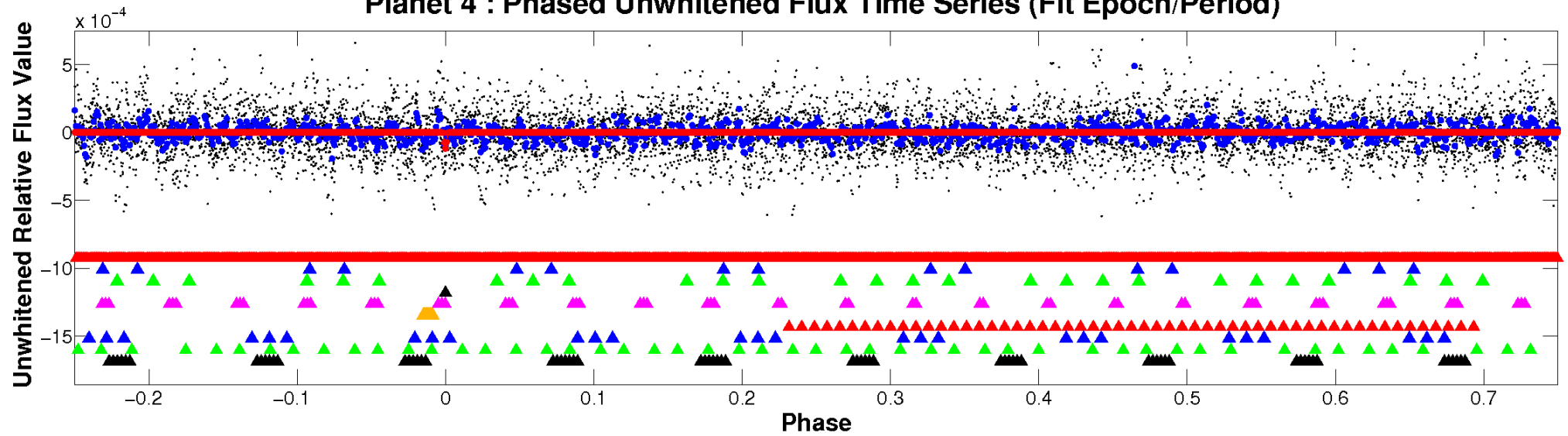
ALT Odd/Even

TCE 002998070-04

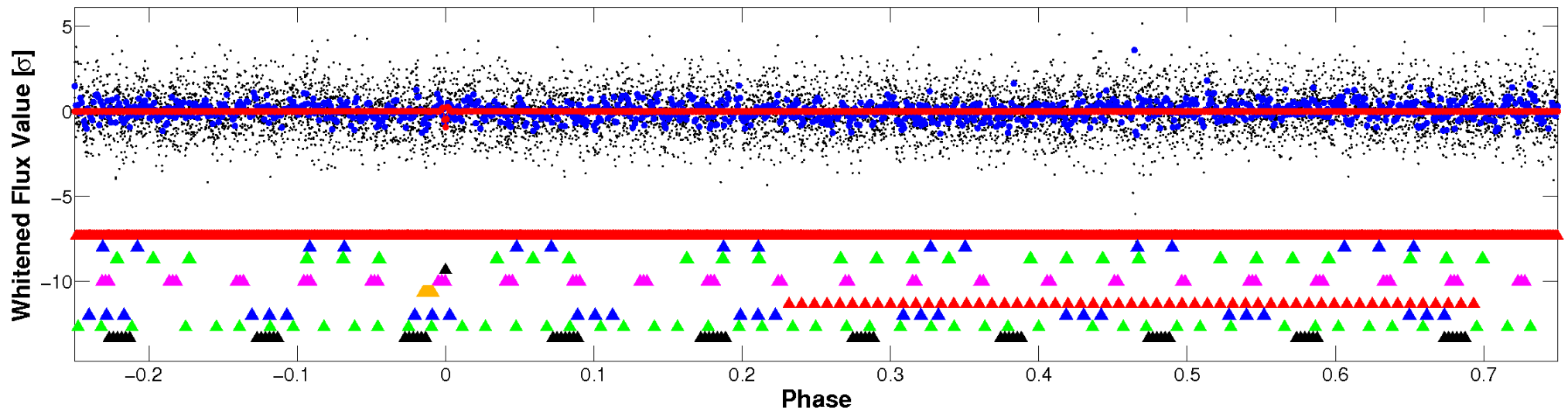


Non-Whitened Vs. Whitened Light Curve

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

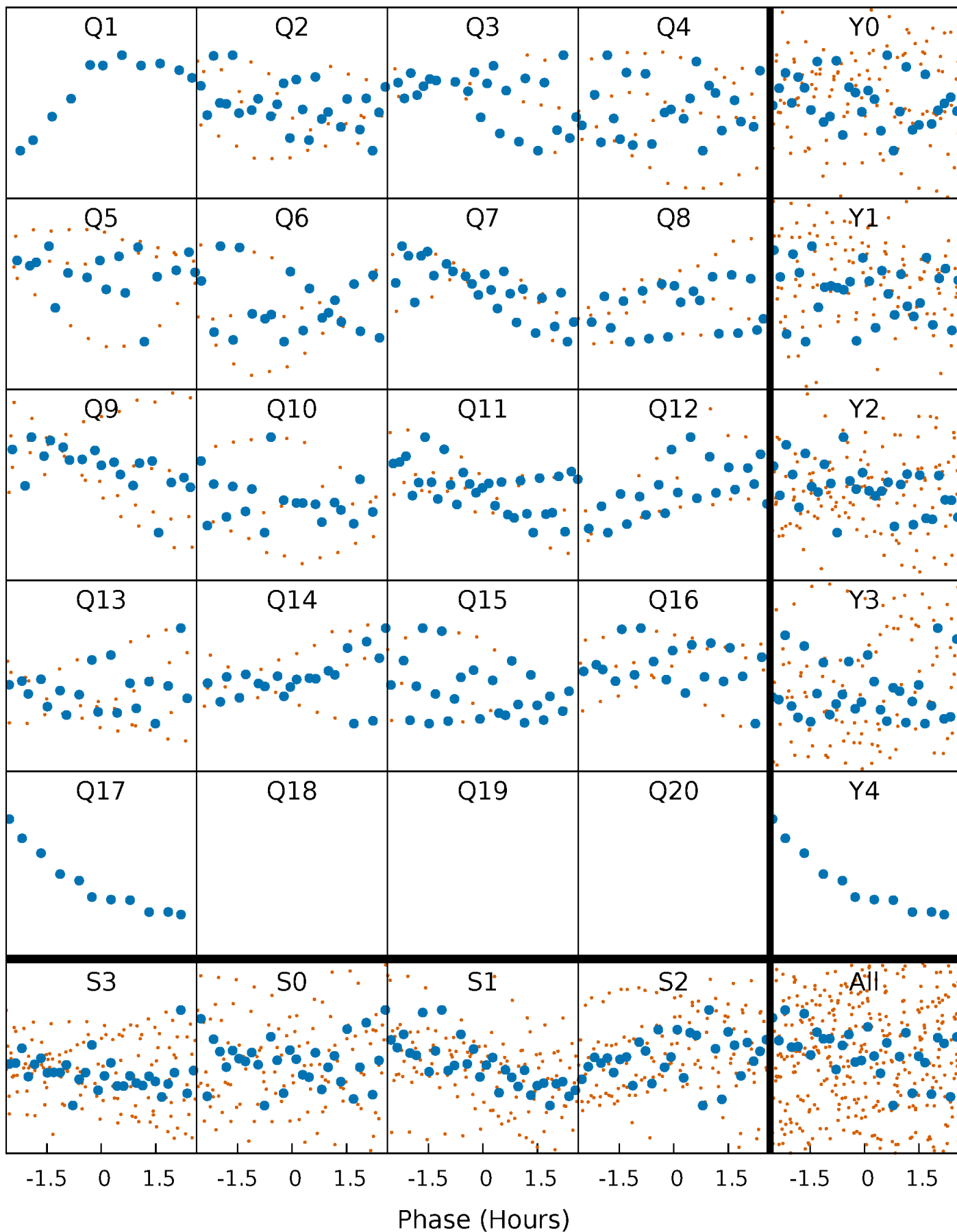


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



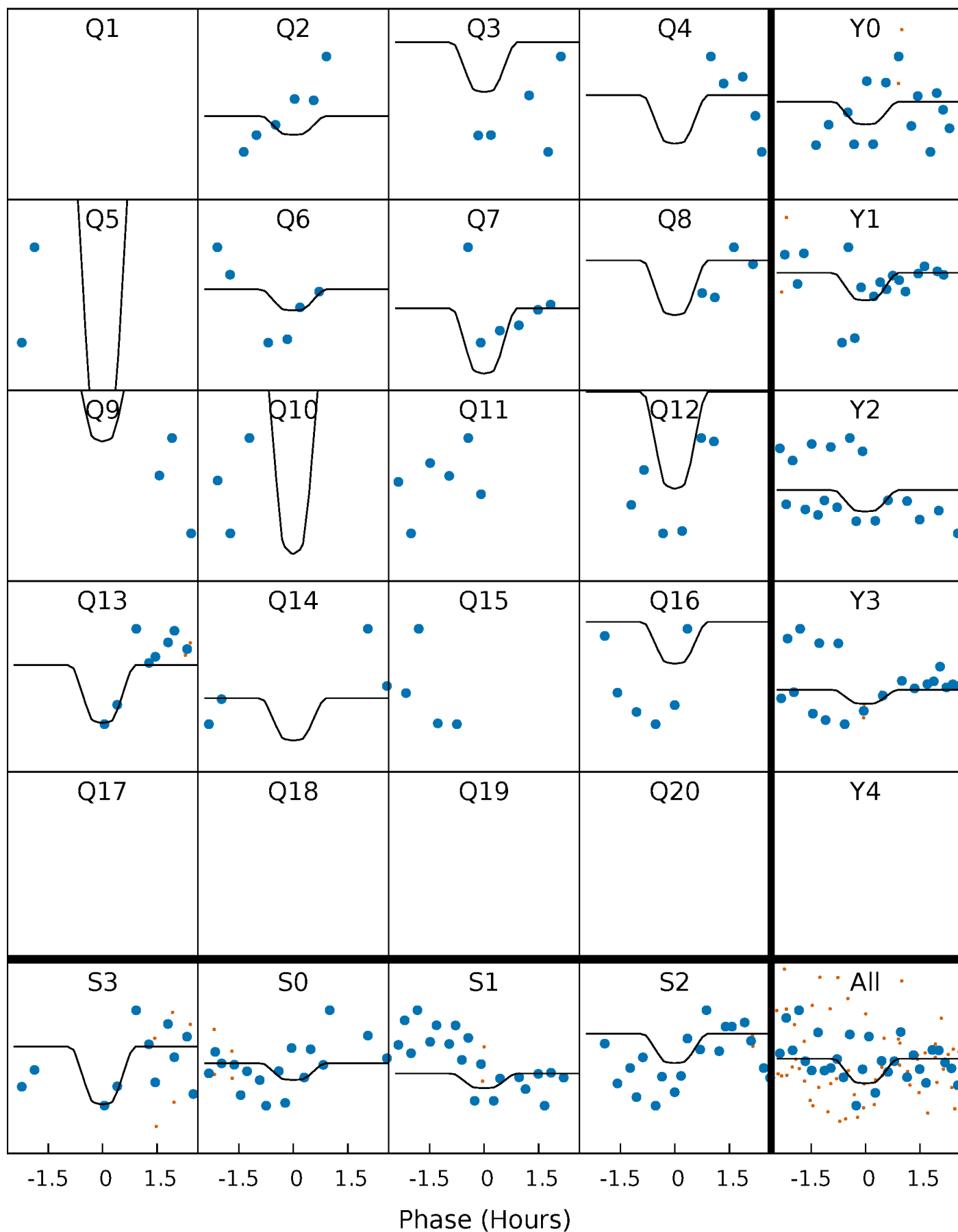
PDC Quarter-Phased Transit Curves

TCE 002998070-04 P= 25.912951 Days $T_0=149.754961$ (BKJD)



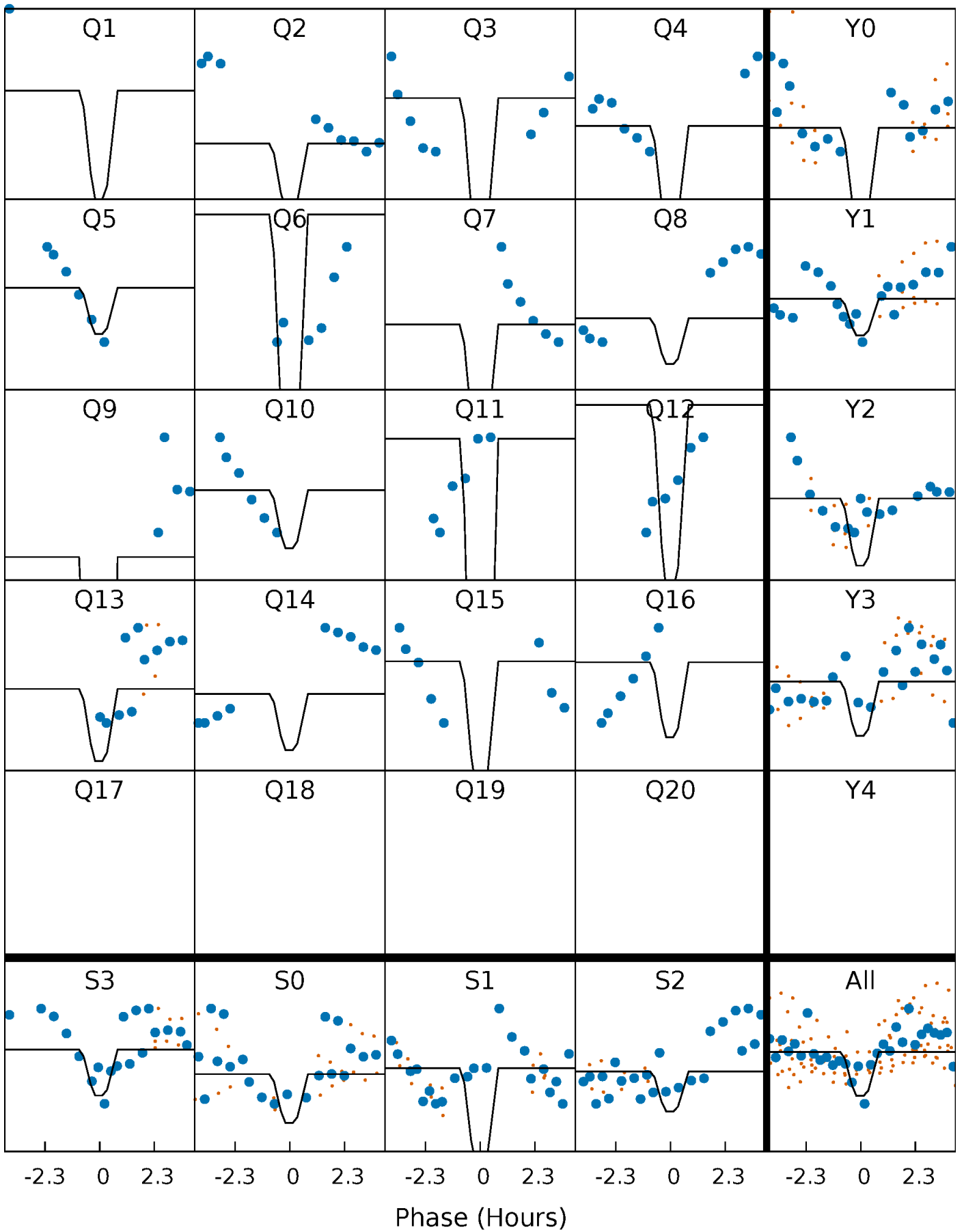
DV Quarter-Phased Transit Curves

TCE 002998070-04 P= 25.912951 Days $T_0=149.754961$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

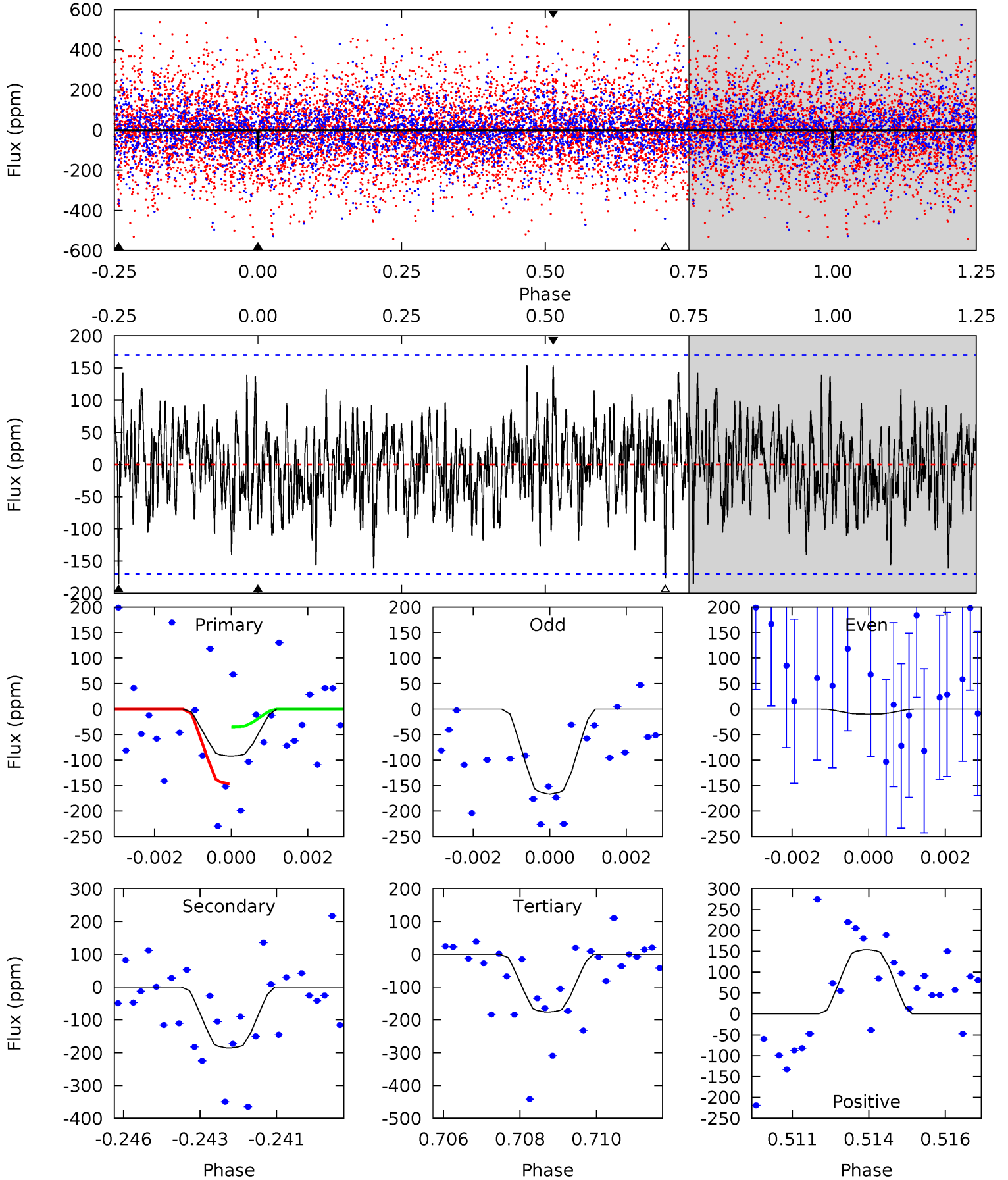
TCE 002998070-04 P= 25.915954 Days $T_0=149.638172$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-04, P = 25.912951 Days, E = 123.842010 Days

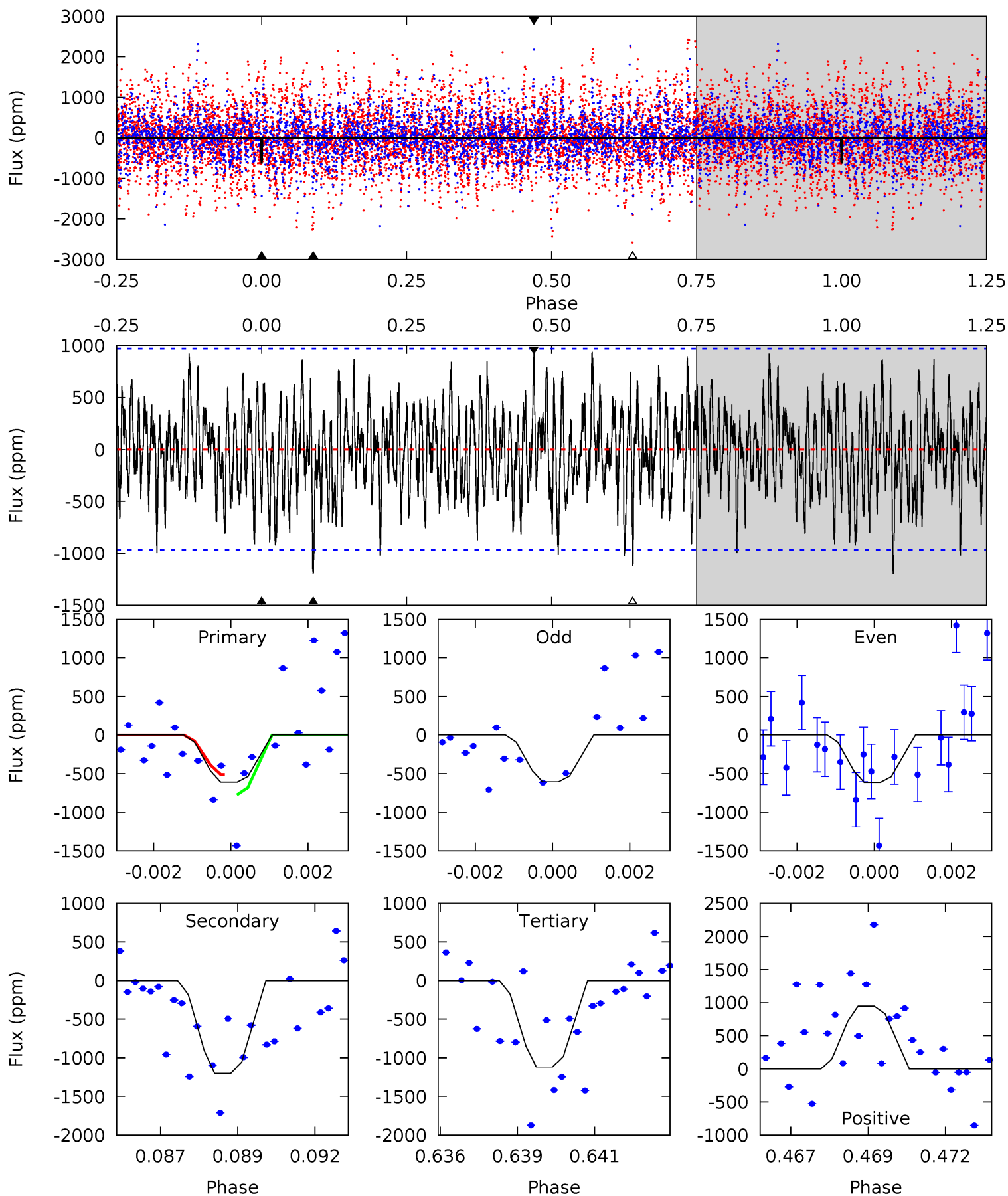
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.86	5.78	5.49	4.79	5.29	3.03	1.56	-2.62	-1.93	0.29	0.99	2.48	0.53	0.45	1.76



Alt Model-Shift Uniqueness Test

002998070-04, P = 25.915954 Days, E = 123.722218 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.34	6.56	6.12	5.17	5.30	3.05	1.92	-2.78	-1.83	0.45	1.40	0.02	1.08	0.44	0.68



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-186 ± 32	$4.60^{+4.34}_{-3.00}$	1251^{+92}_{-69}	5211^{+3991}_{-1213}	191^{+1375}_{-143}
Alt.	-1200 ± 183	$7.42^{+4.54}_{-4.61}$	1251^{+91}_{-70}	6438^{+5574}_{-1281}	457^{+2645}_{-279}

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

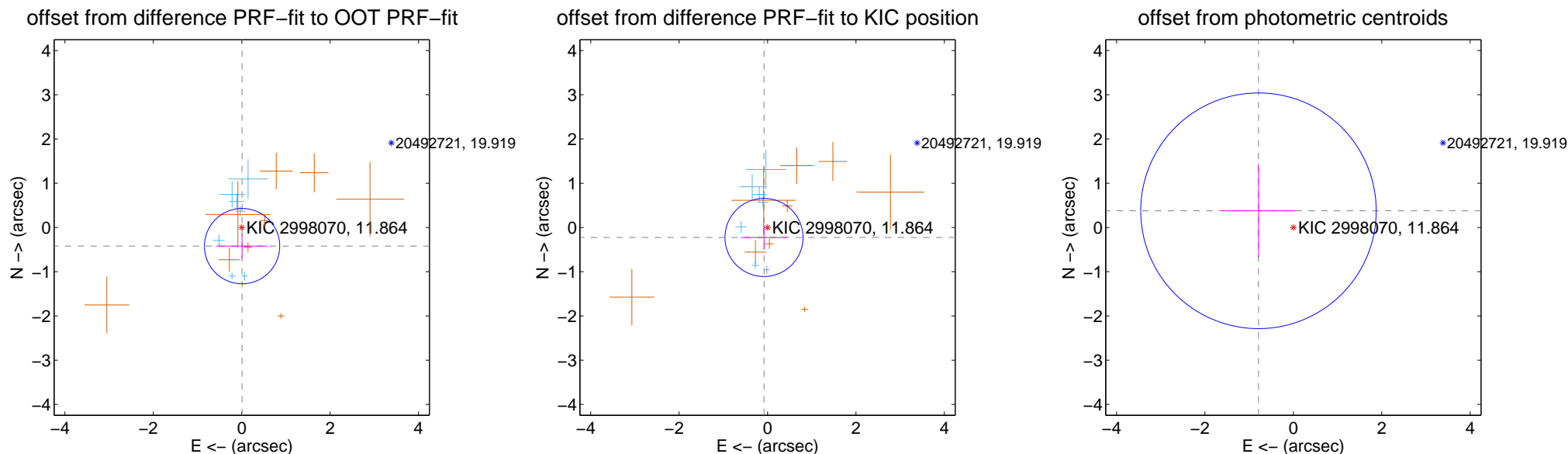
DV Centroid Data

Supplemental centroid analysis for 002998070-04. **Kepler magnitude: 11.86.** Transit SNR 3.42

There are 7 quarters with good PRF difference image offsets

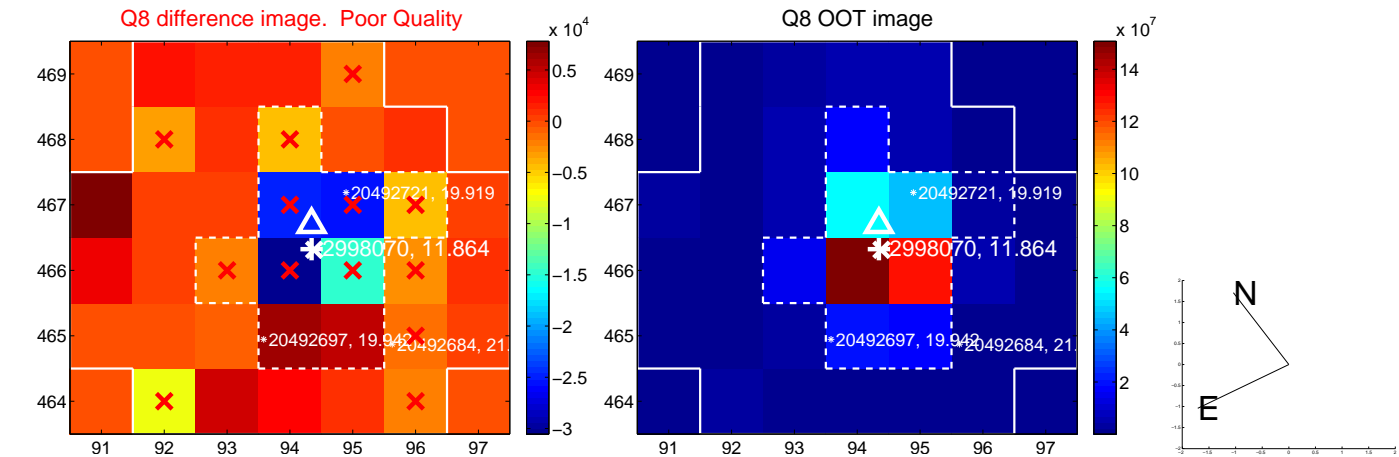
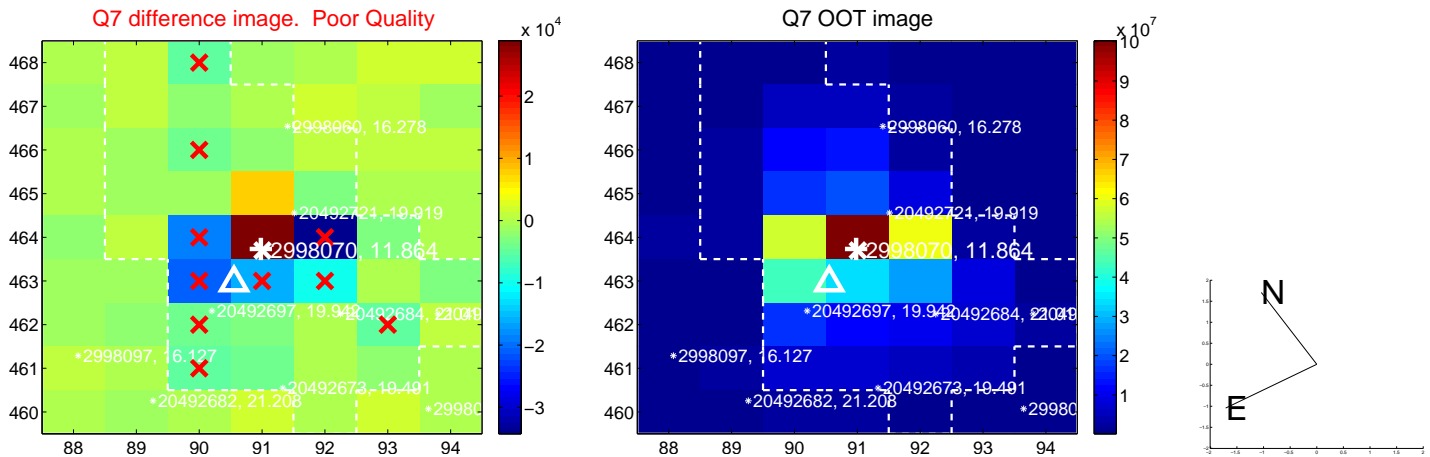
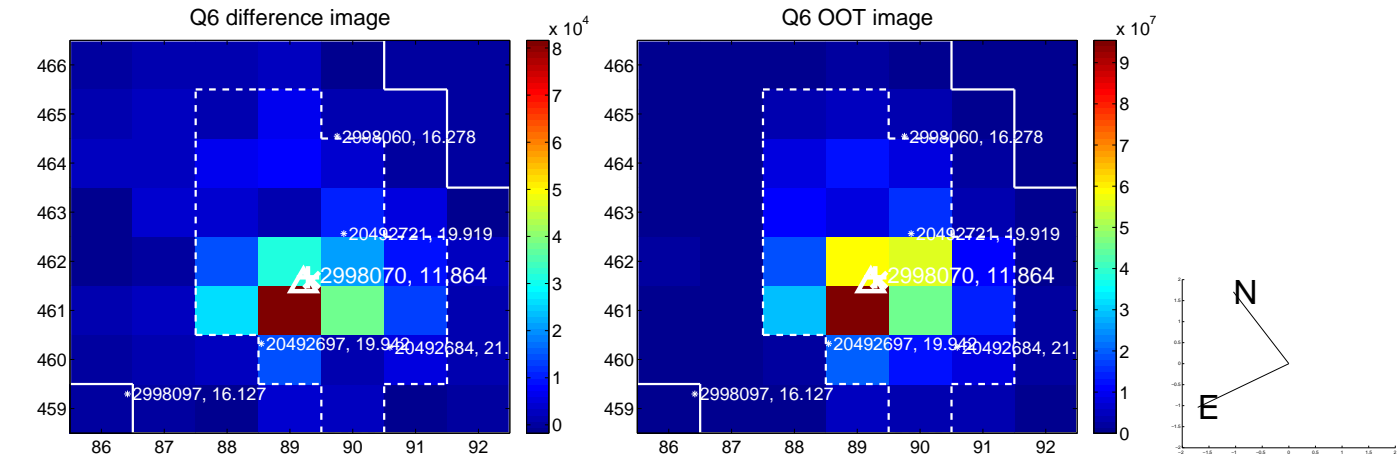
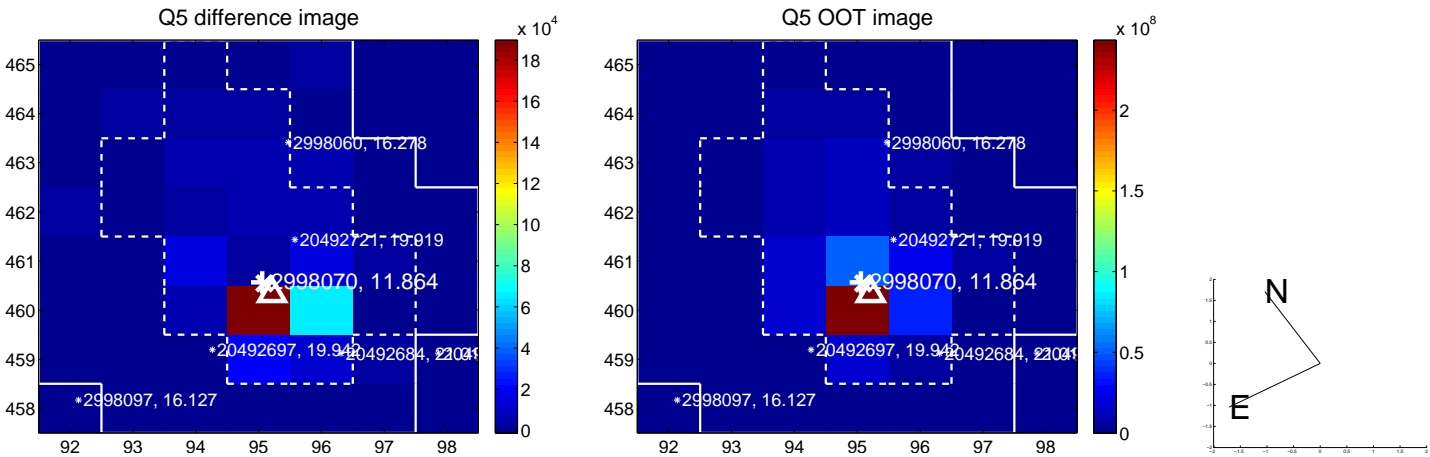
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.422 ± 0.284	1.49	-0.008 ± 0.586	-0.422 ± 0.281
PRF-fit source offset from KIC position	0.240 ± 0.294	0.81	0.080 ± 0.525	-0.226 ± 0.276
photometric centroid source offset	0.87 ± 0.89	0.98	0.79 ± 0.84	0.38 ± 1.06

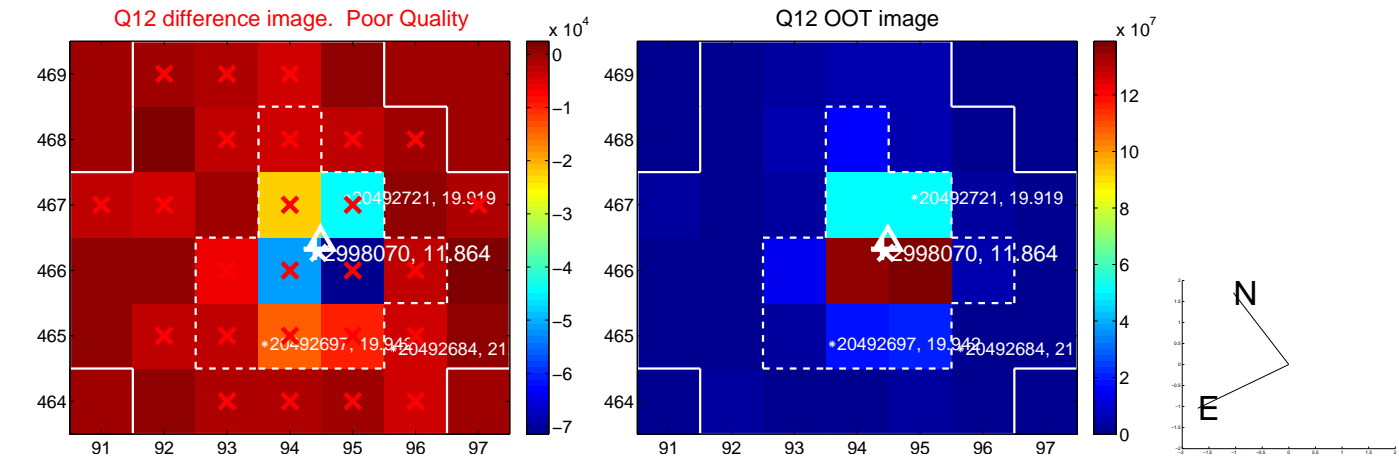
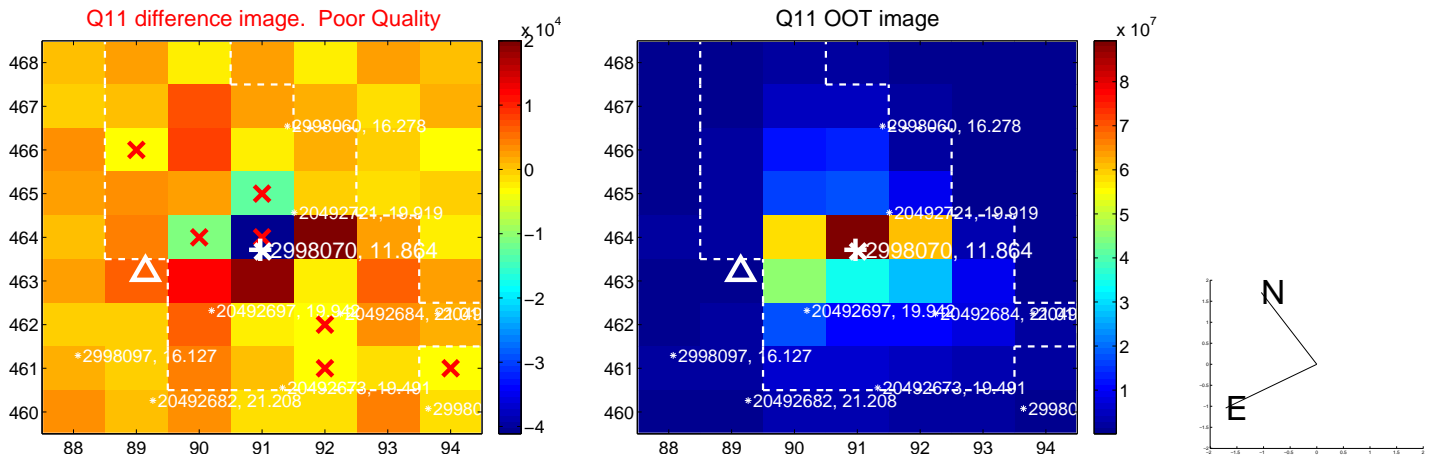
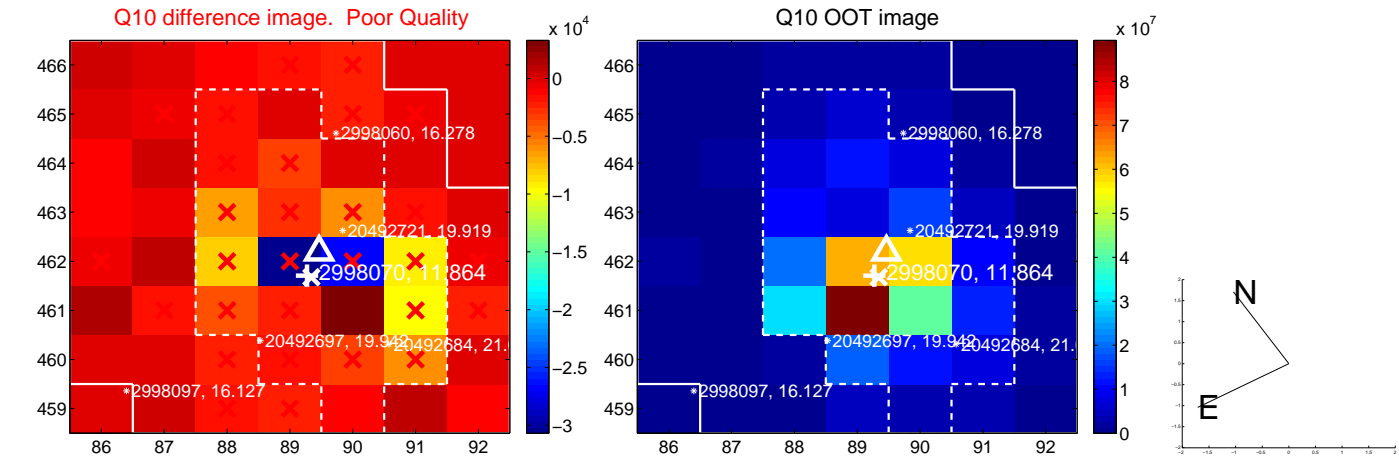
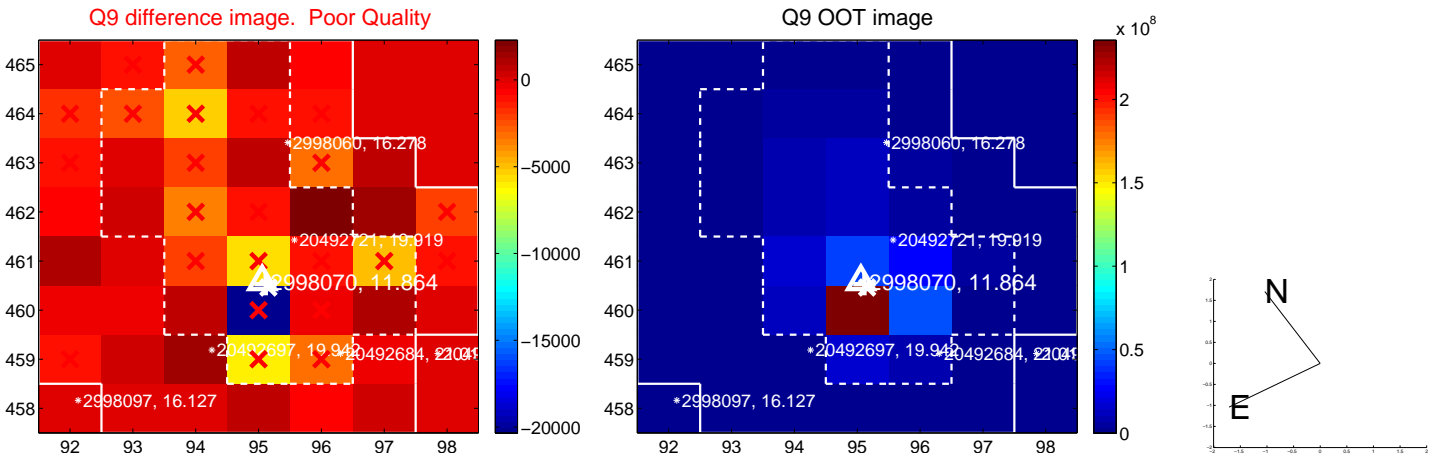


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

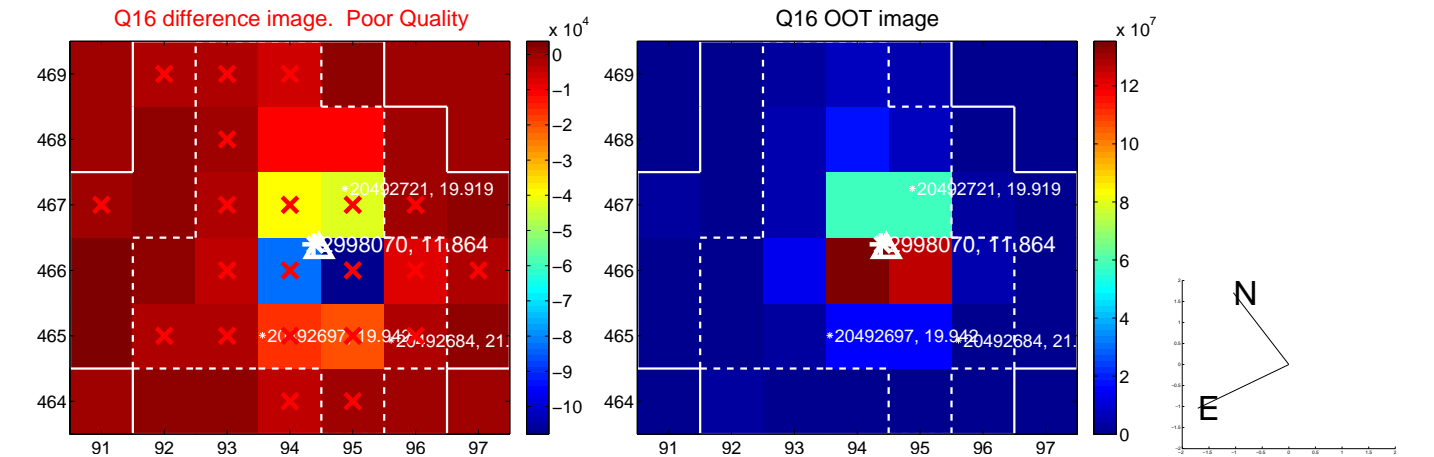
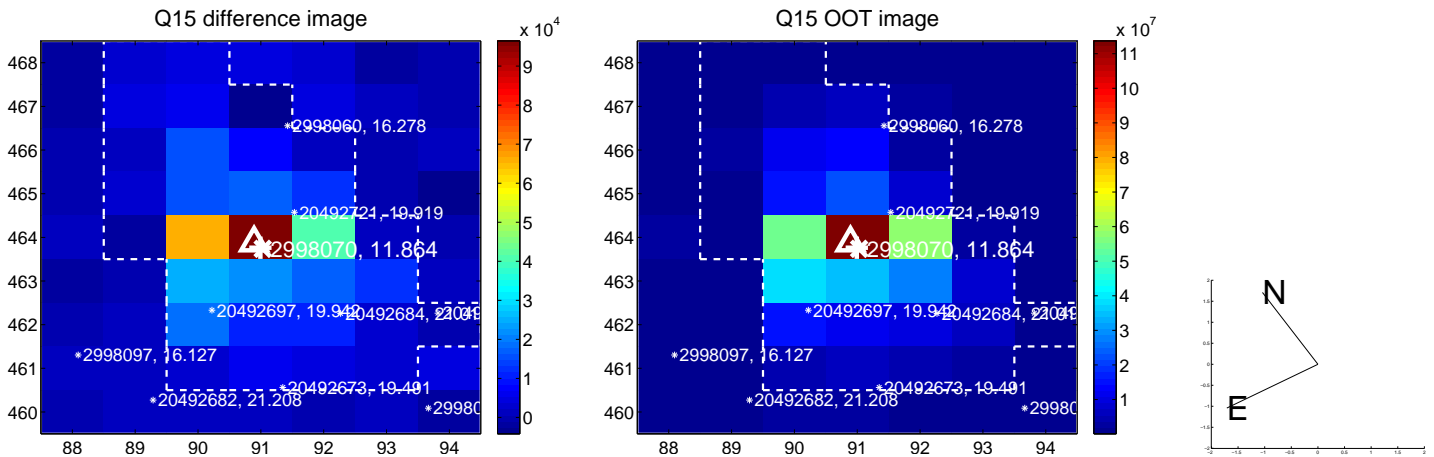
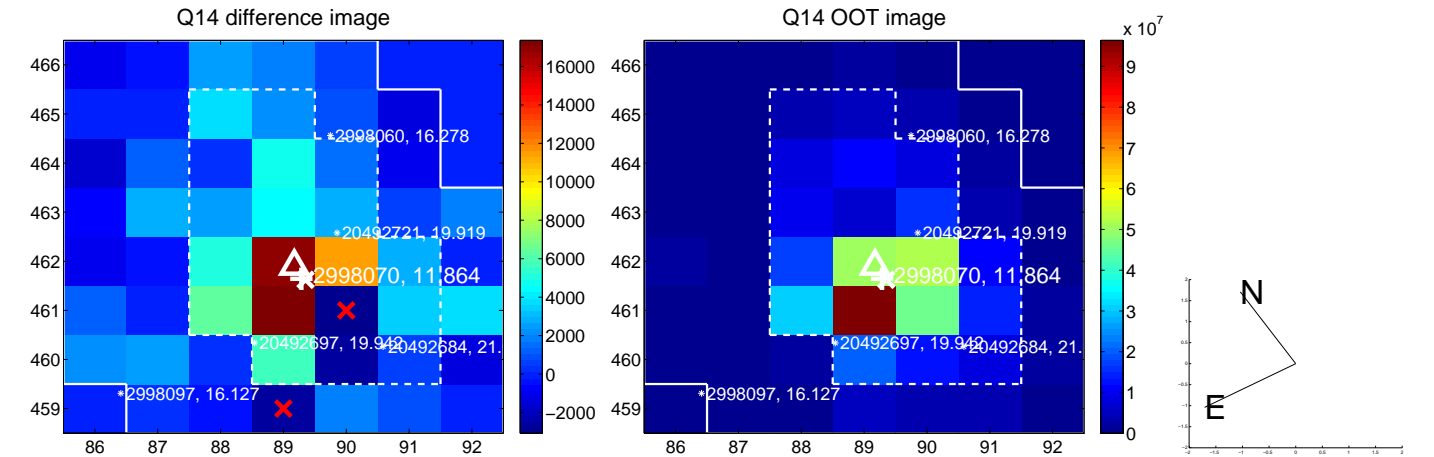
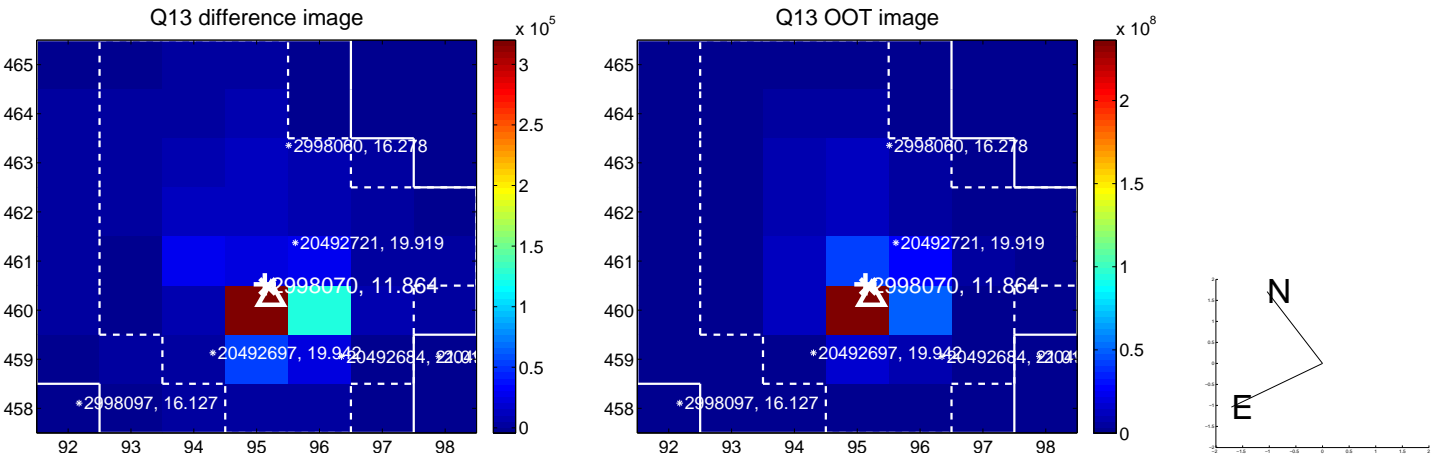
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



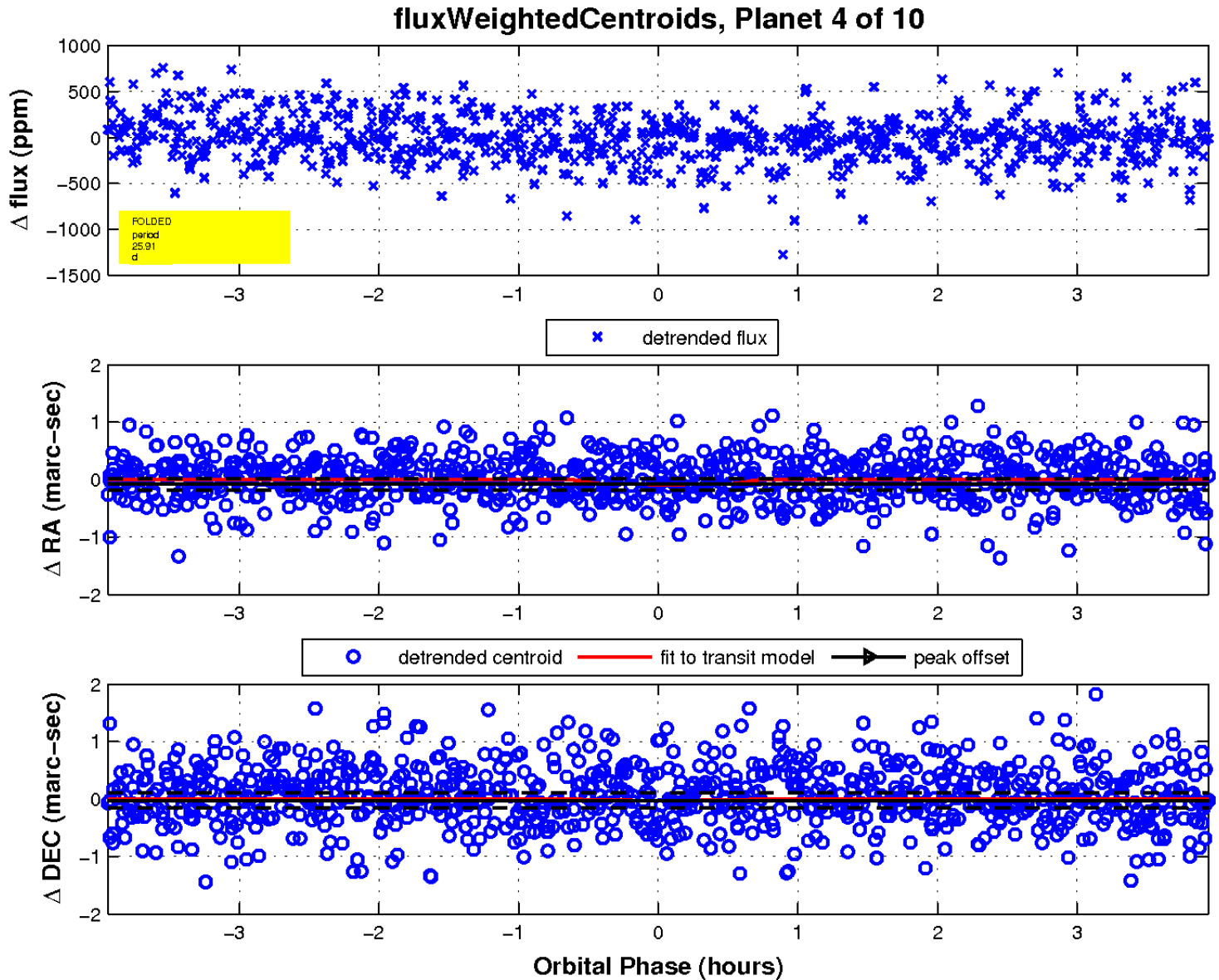
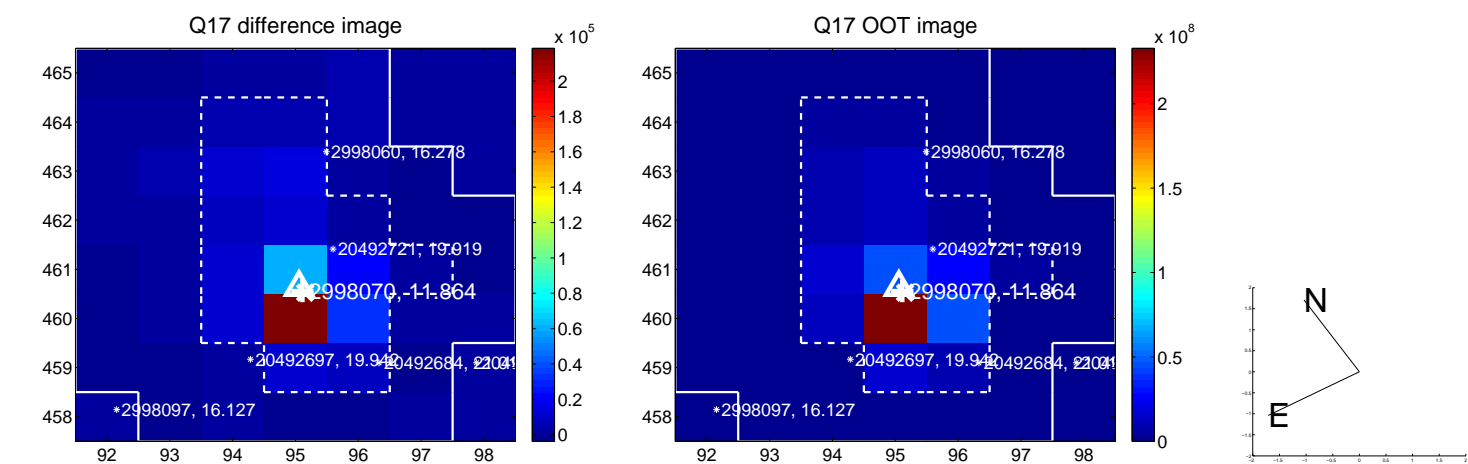
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



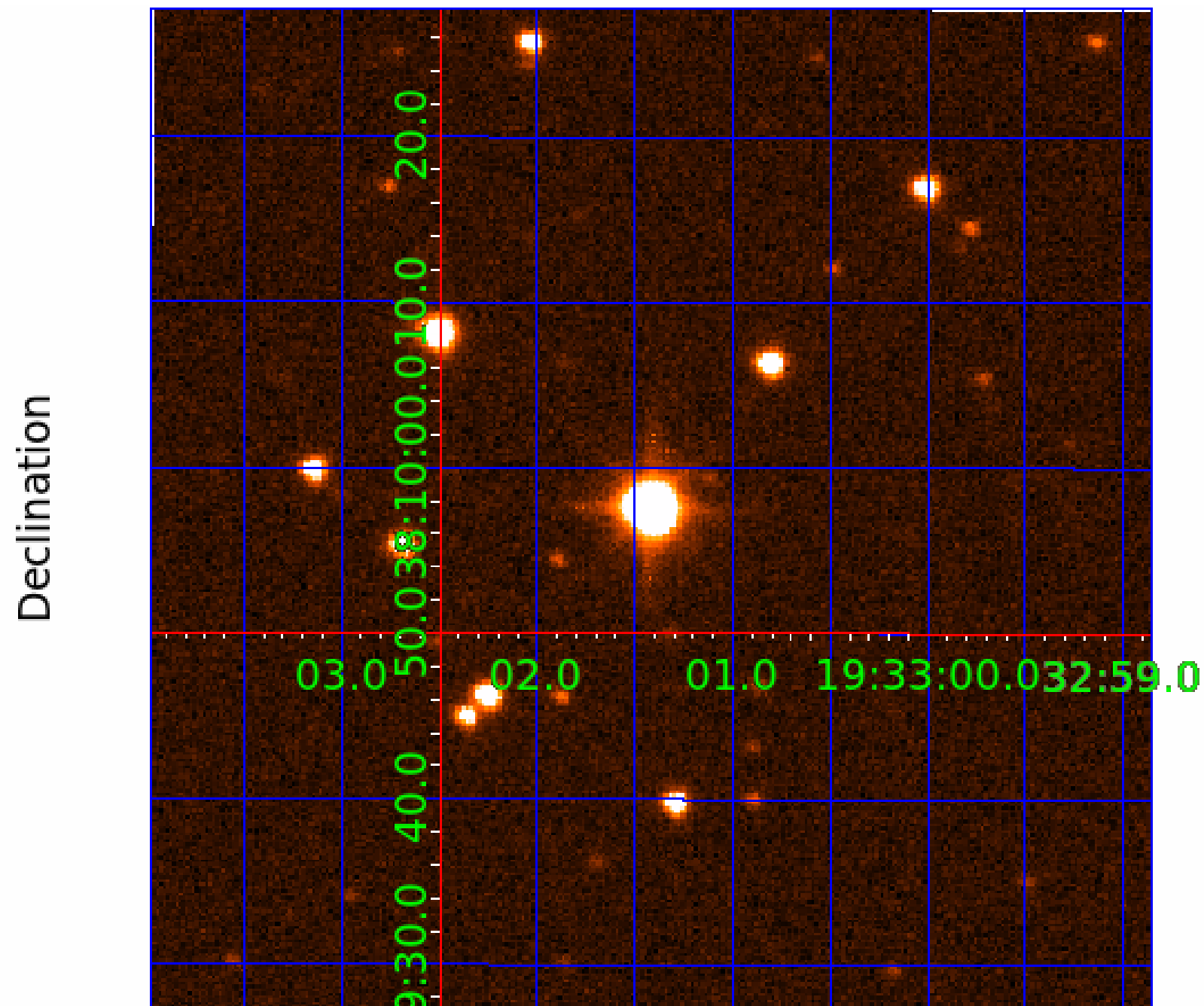
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 002998070

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

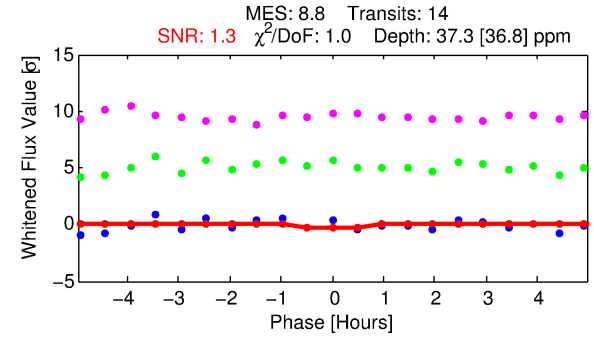
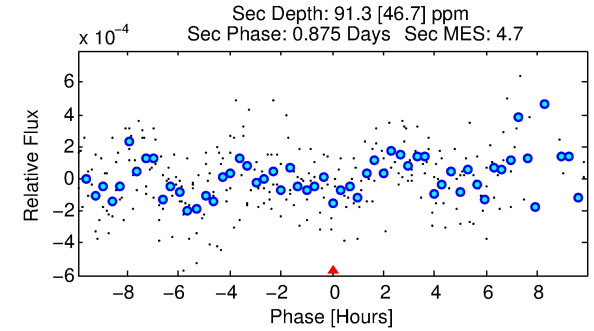
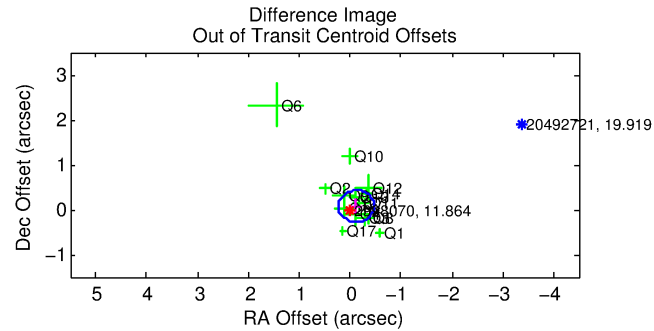
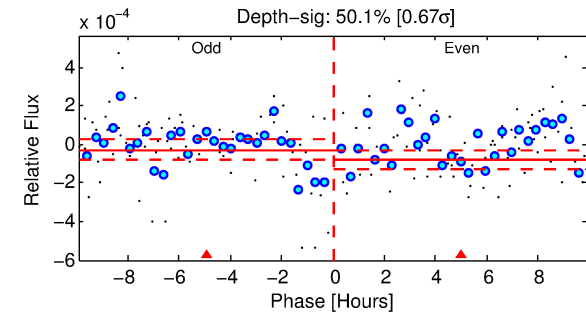
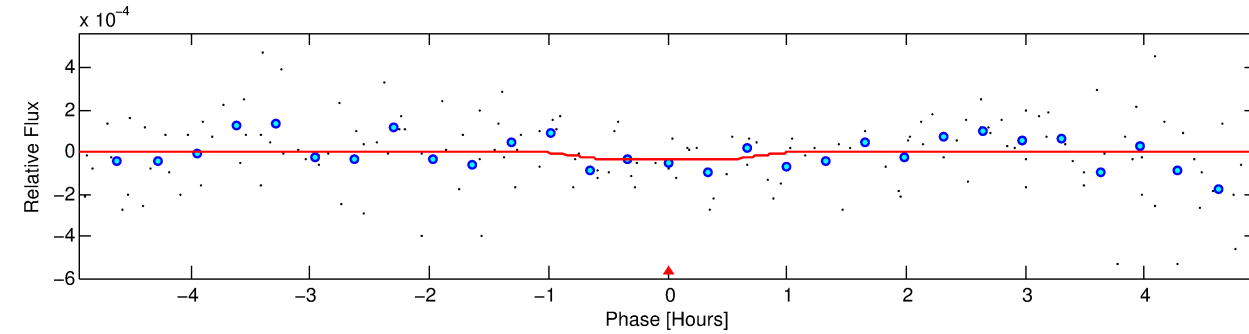
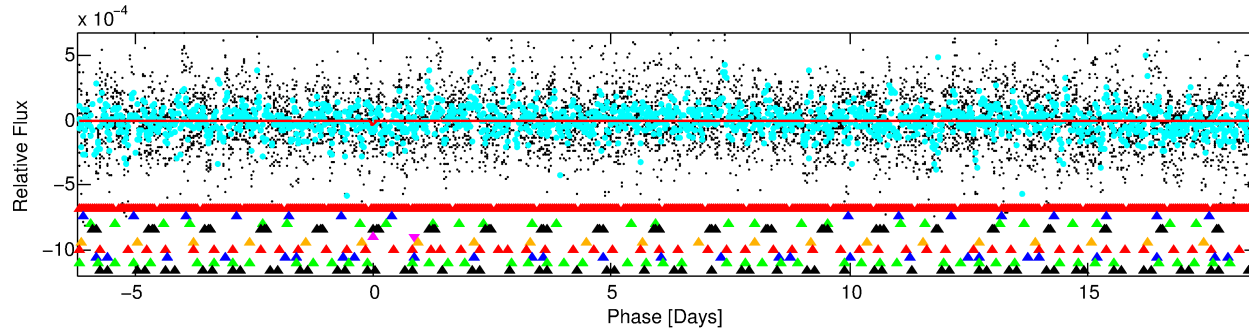
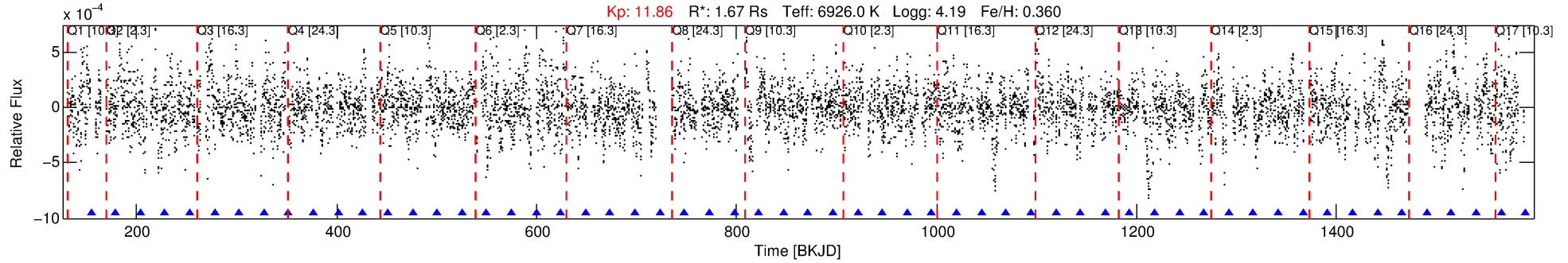
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-05

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 5 of 10 Period: 24.738 d



DV Fit Results:

Period = 24.73783 [0.00584] d
Epoch = 154.3301 [0.2162] BKJD
Rp/R* = 0.0065 [0.0208]
a/R* = 50.71 [943.10]
b = 0.90 [3.77]
Seff = 152.74 [64.01]
Teq = 896 [94] K
Rp = 1.19 [3.79] Re
a = 0.1934 [0.0521] AU
Ag = 1327.48 [8463.55] [0.16 σ]
Teffp = 8366 [13315] K [0.56 σ]

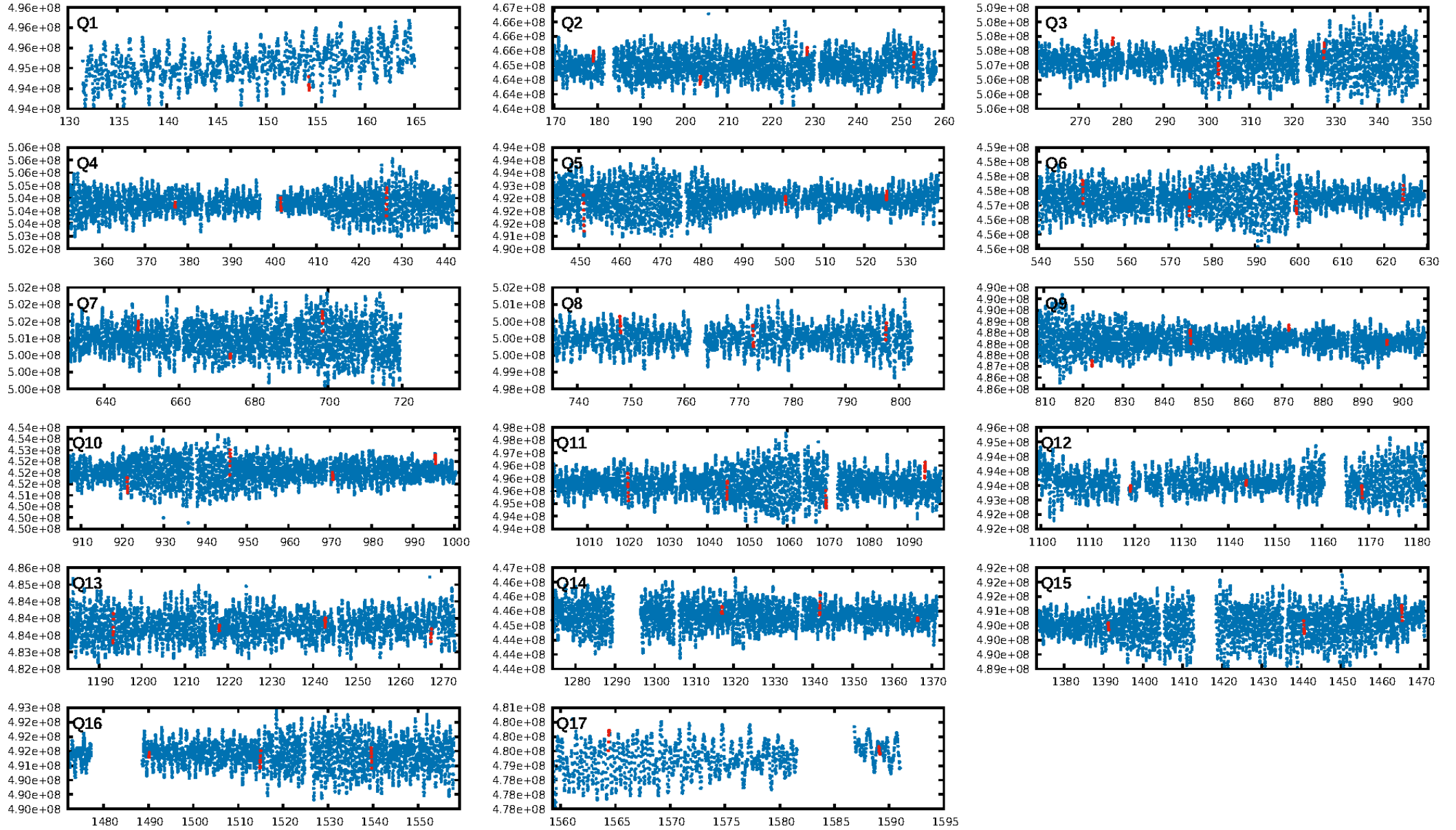
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.78 σ]
LongPeriod-sig: 100.0% [13.38 σ]
ModelChiSquare2-sig: 33.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: -0.6949
Centroid-sig: 8.4%
Centroid-so: 3.246 arcsec [1.20 σ]
OotOffset-rm: 0.140 arcsec [1.19 σ]
KicOffset-rm: 0.274 arcsec [1.48 σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 0.40 [6/15]
DiffImageOverlap-fno: 0.24 [4/17]

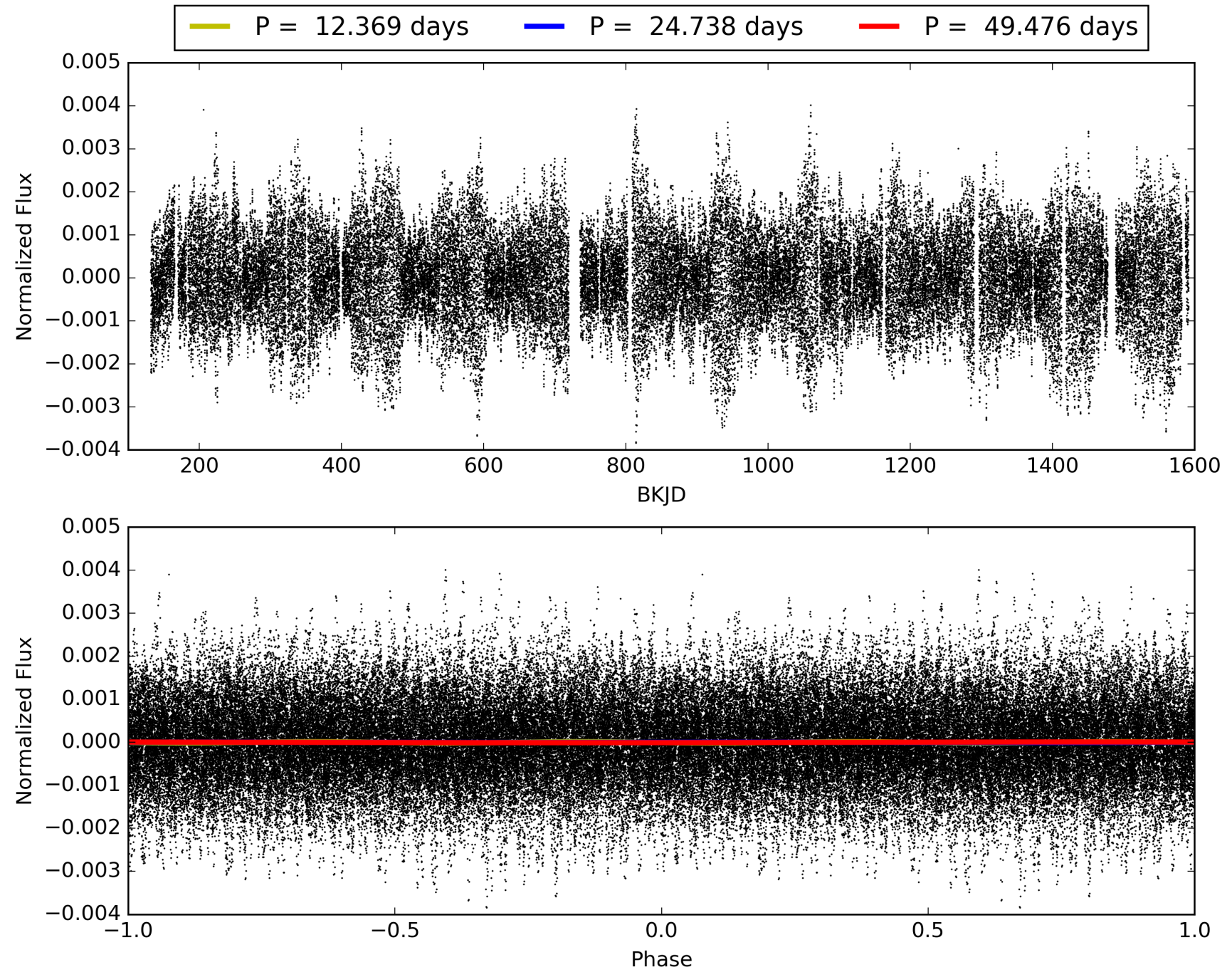
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:43 Z

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

TCE 002998070-05, PDC Light Curves

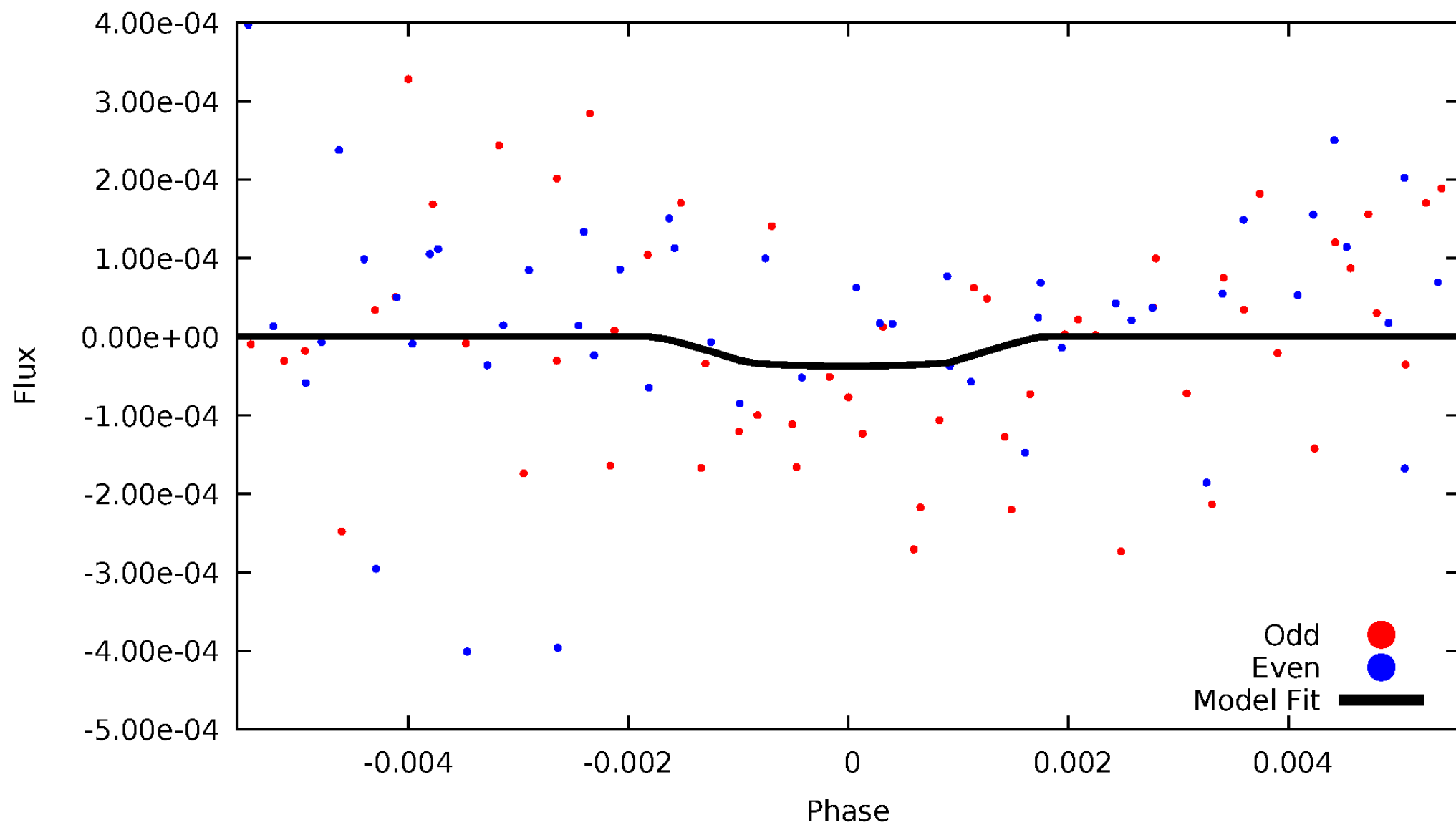


TCE 002998070-05



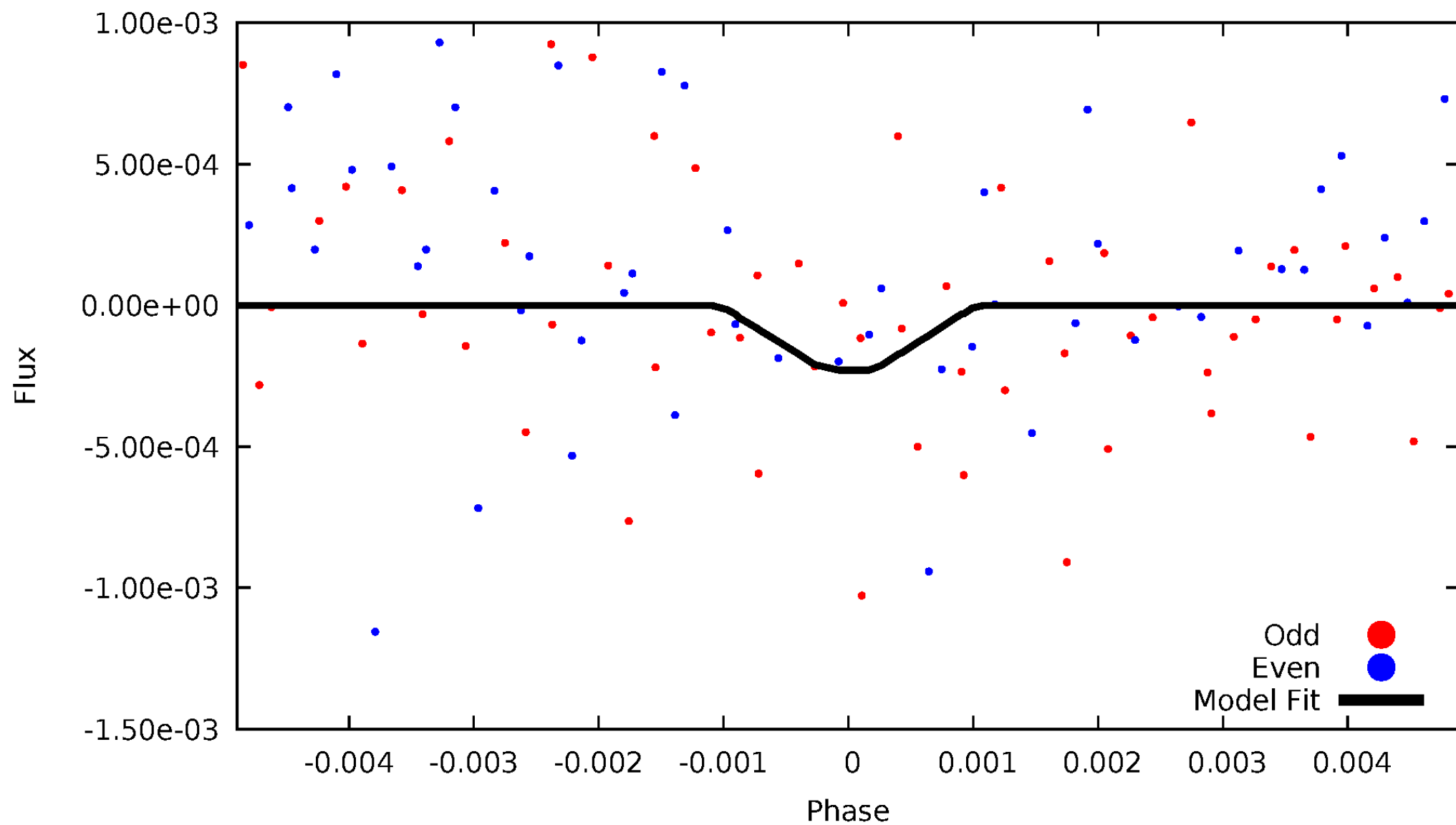
DV Odd/Even

TCE 002998070-05



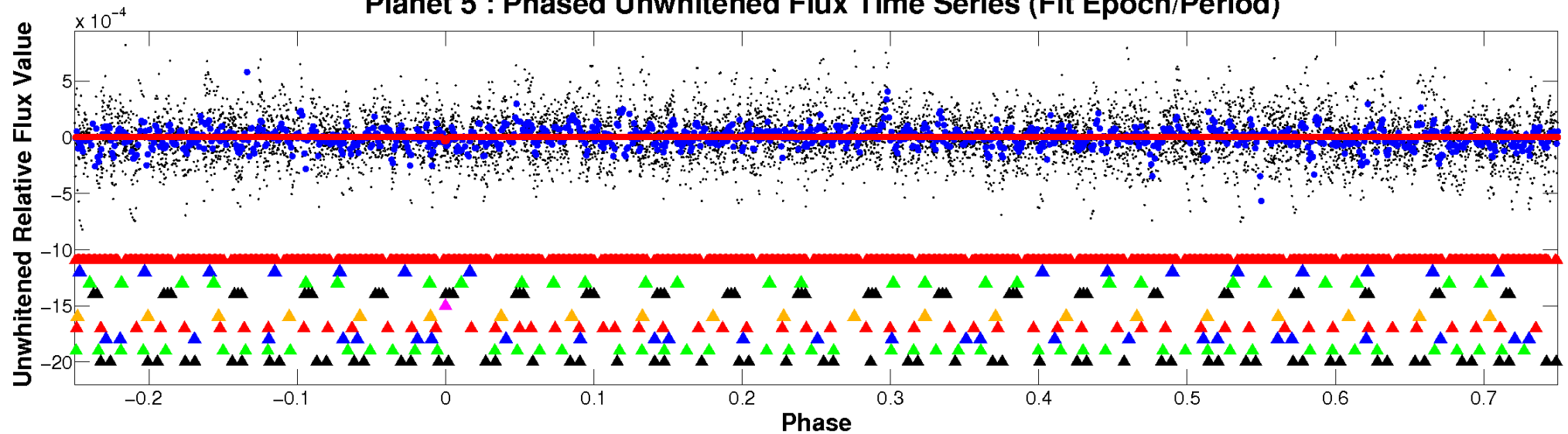
ALT Odd/Even

TCE 002998070-05

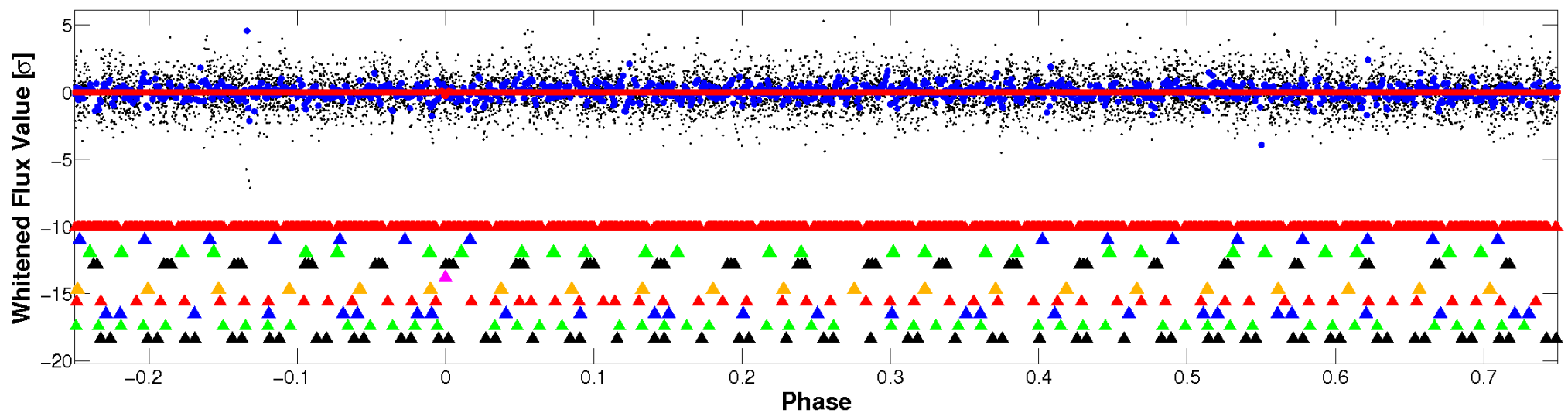


Non-Whitened Vs. Whitened Light Curve

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

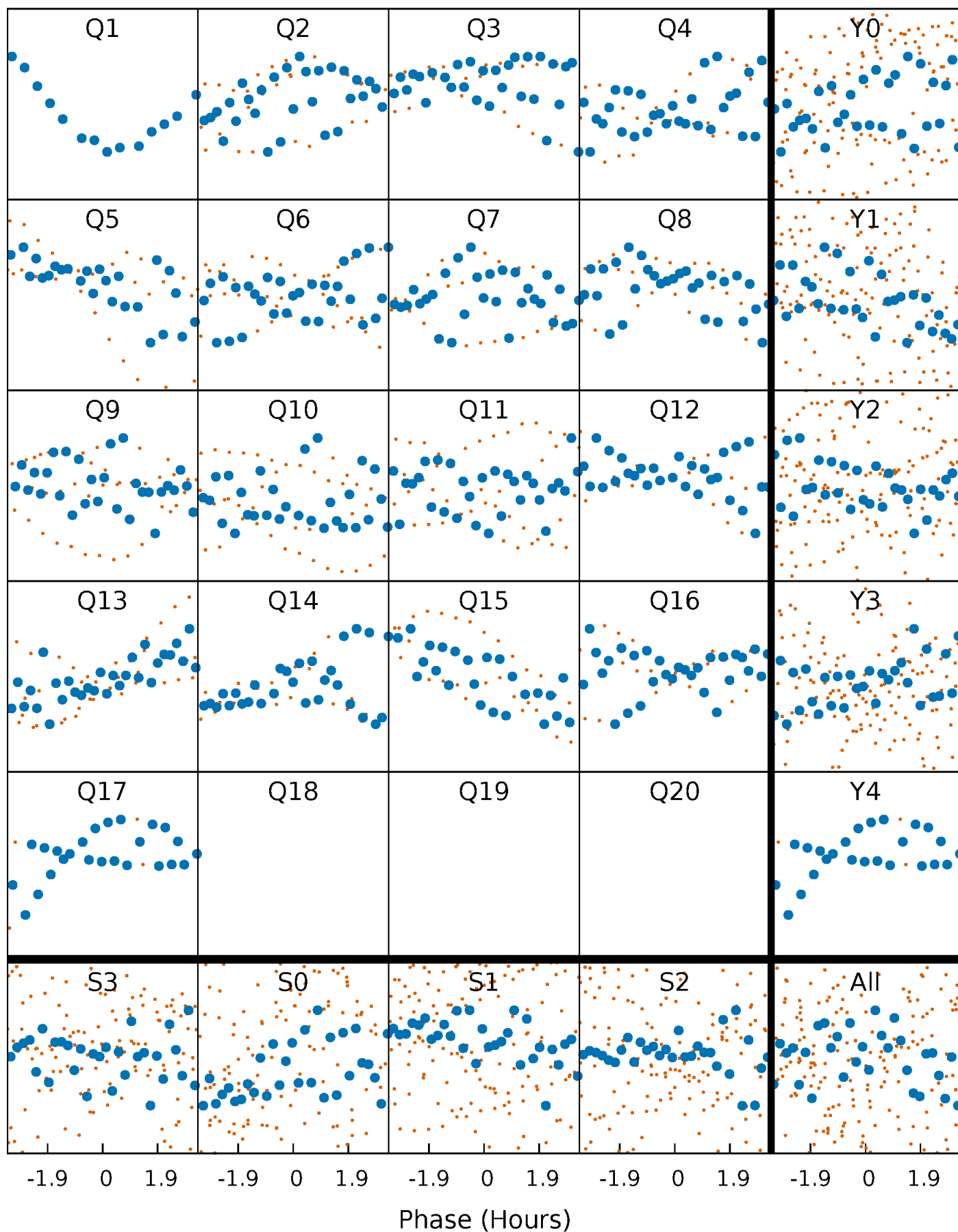


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



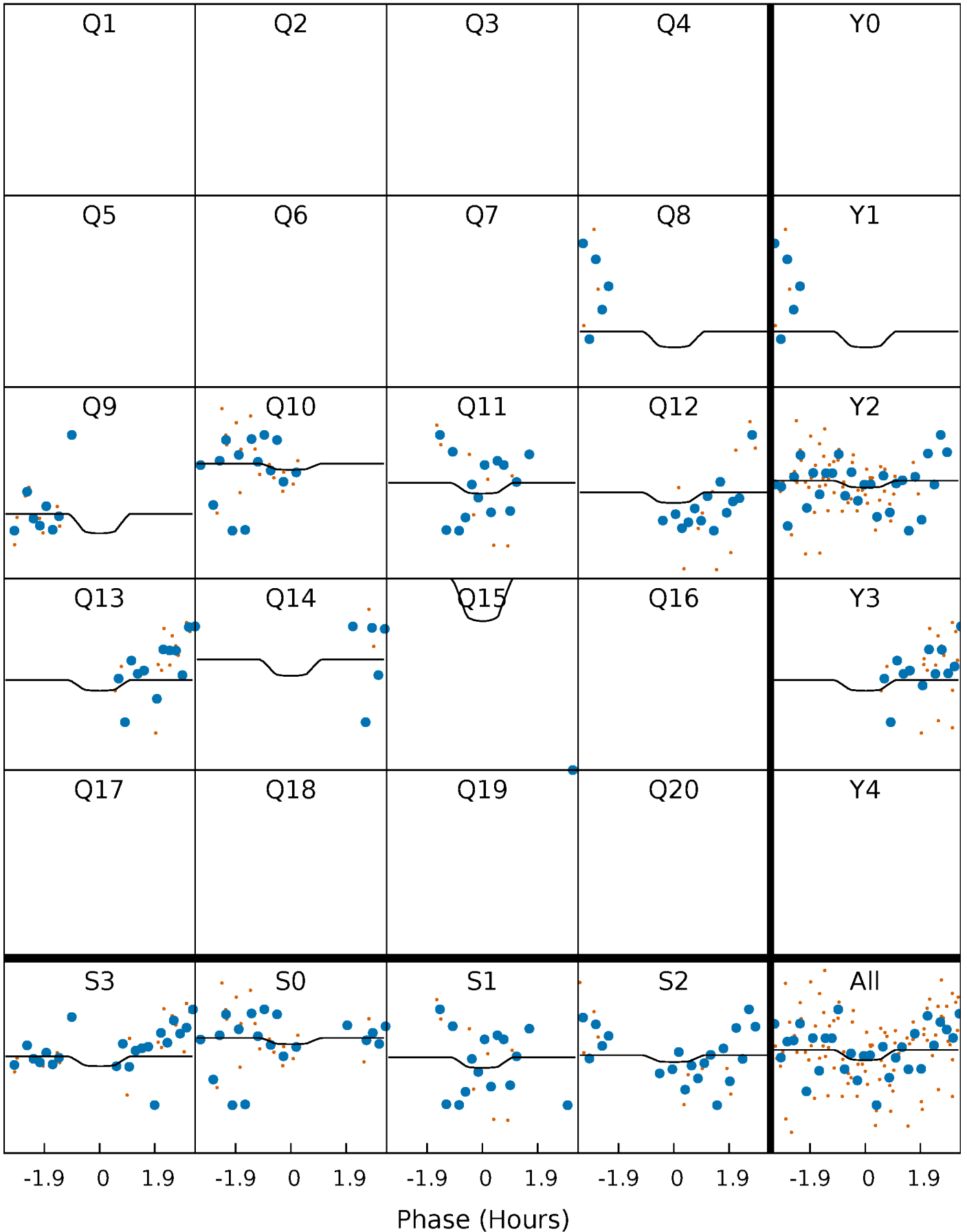
PDC Quarter-Phased Transit Curves

TCE 002998070-05 P= 24.737832 Days $T_0=154.330126$ (BKJD)



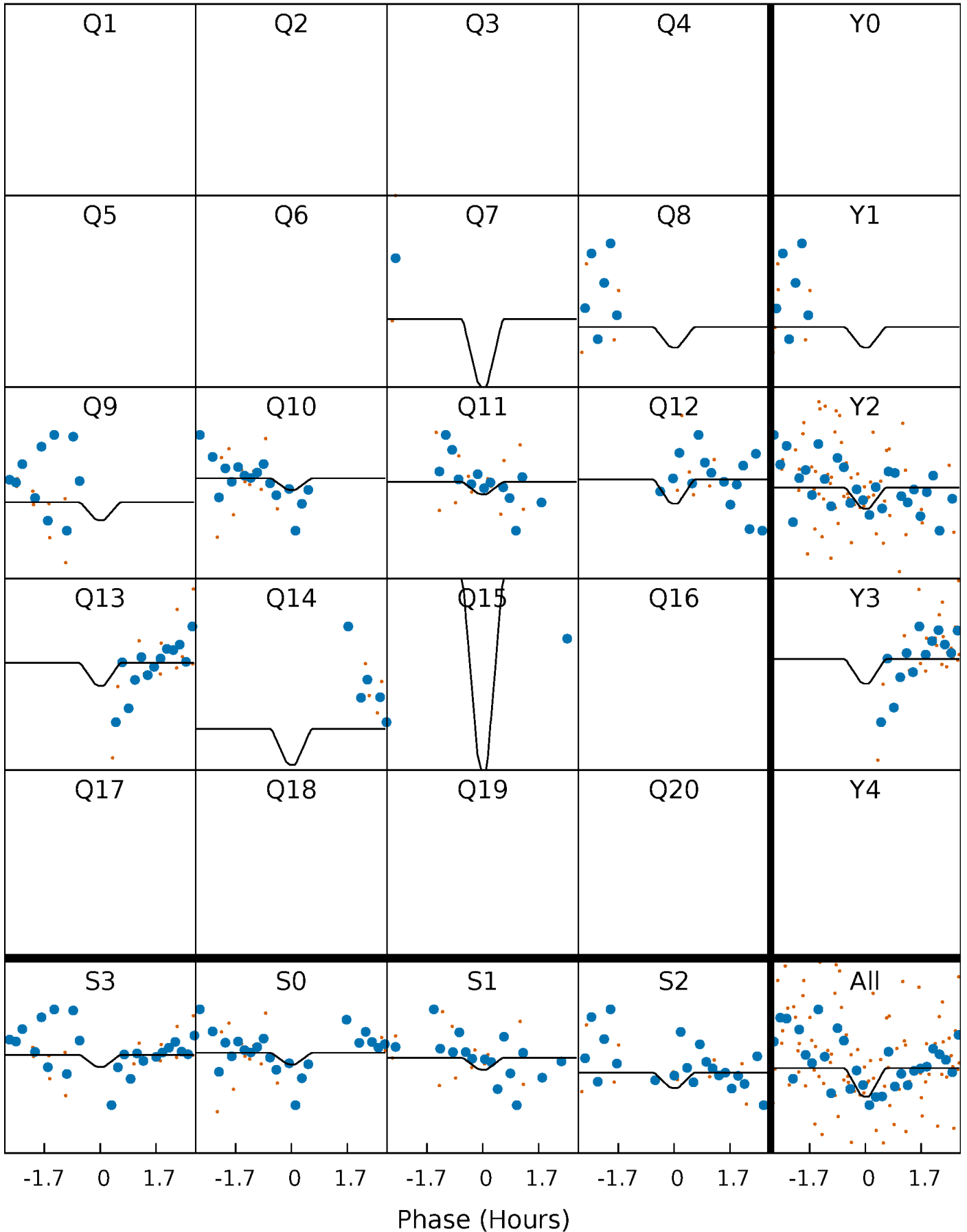
DV Quarter-Phased Transit Curves

TCE 002998070-05 $P = 24.737832$ Days $T_0 = 154.330126$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

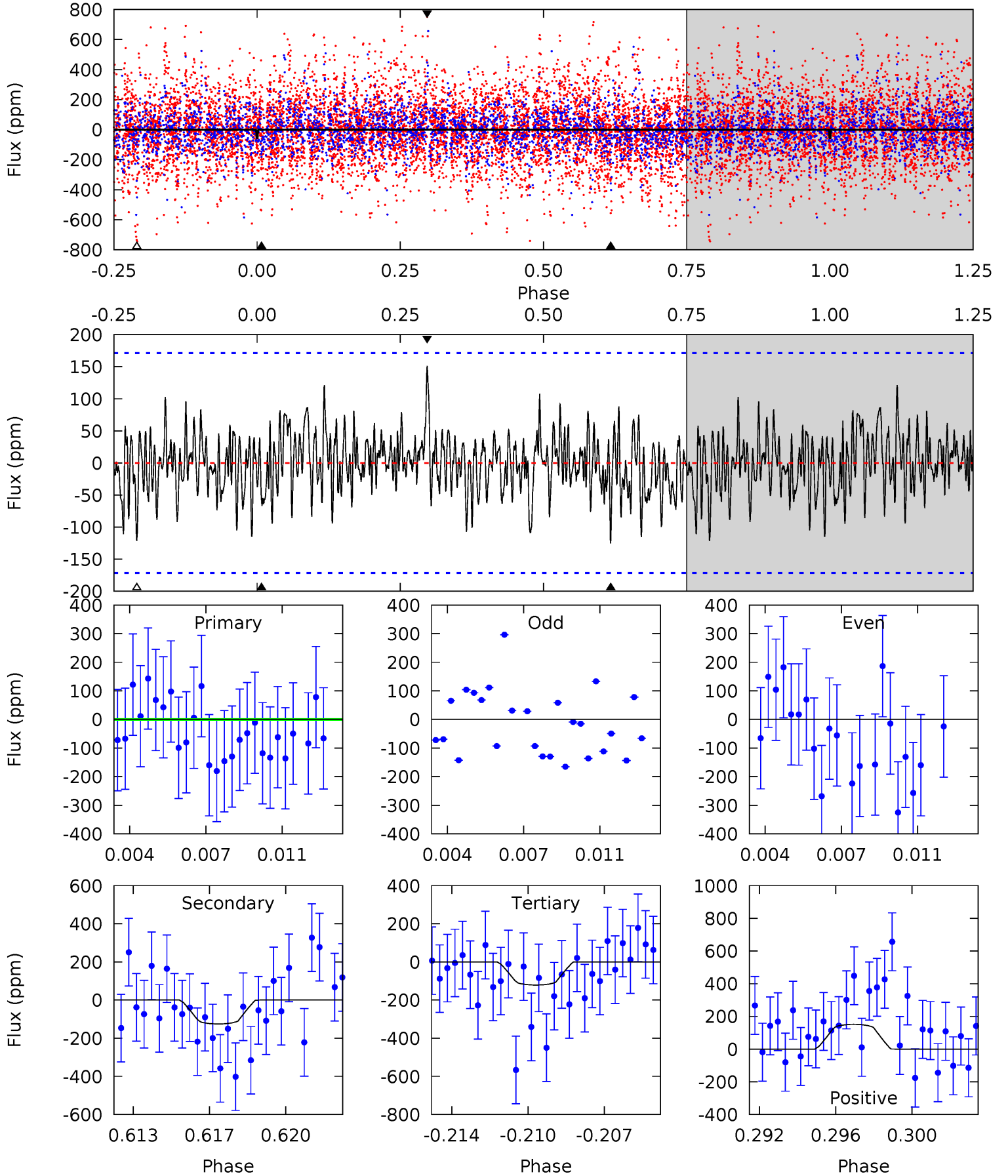
TCE 002998070-05 $P = 24.739759$ Days $T_0 = 154.256061$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-05, $P = 24.737832$ Days, $E = 129.592294$ Days

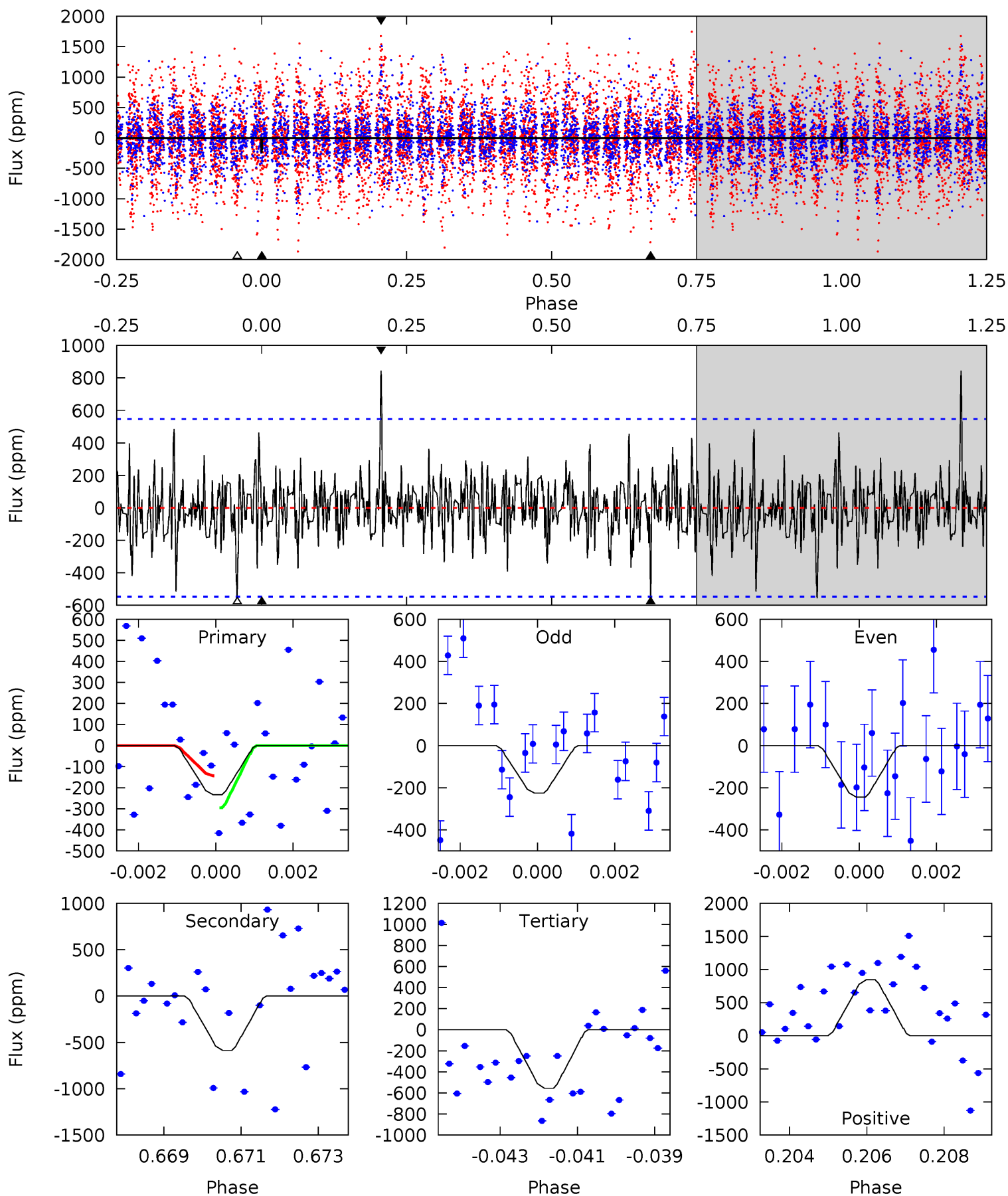
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.74	3.82	3.69	4.60	5.22	2.91	1.19	-1.95	-2.86	0.13	-0.78	1.38	1.56	0.55	0.20



Alt Model-Shift Uniqueness Test

002998070-05, P = 24.739759 Days, E = 129.516302 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.26	5.72	5.40	8.21	5.32	3.08	1.41	-3.14	-5.95	0.31	-2.50	0.09	2.02	0.59	0.73



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-125 ± 33	$3.20^{+3.10}_{-2.10}$	1266^{+98}_{-73}	5504^{+4999}_{-1290}	236^{+1895}_{-173}
Alt.	-588 ± 103	$3.98^{+3.84}_{-2.64}$	1272^{+95}_{-79}	7377^{+10187}_{-2073}	742^{+5694}_{-542}

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

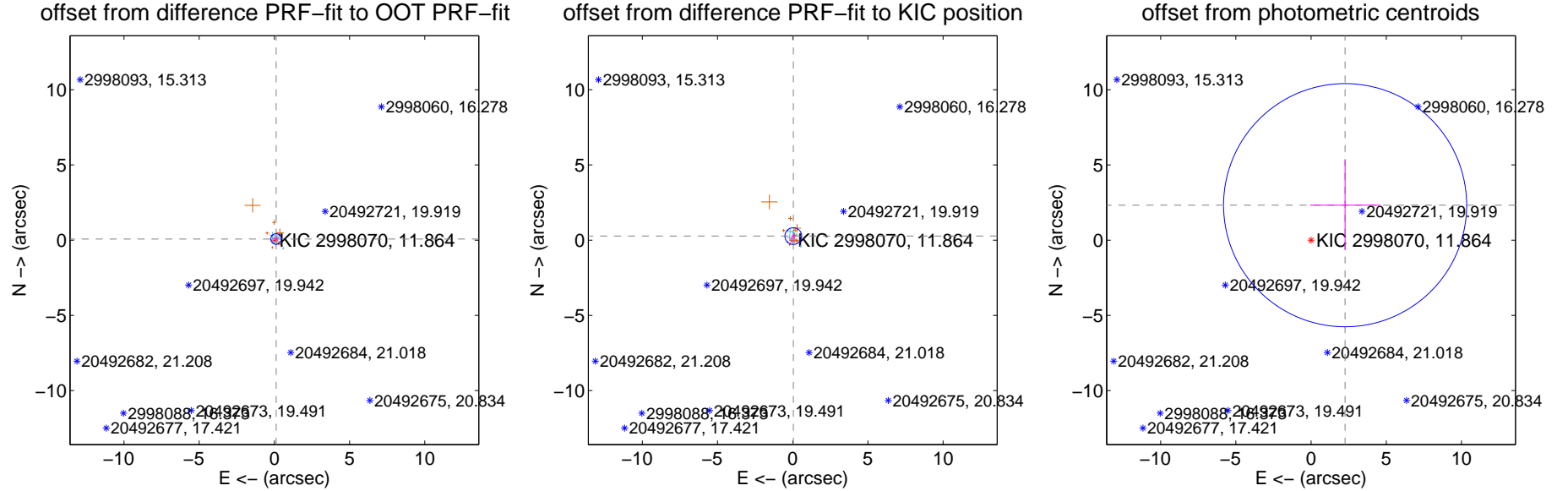
DV Centroid Data

Supplemental centroid analysis for 002998070-05. **Kepler magnitude: 11.86.** Transit SNR 1.25

There are 6 quarters with good PRF difference image offsets

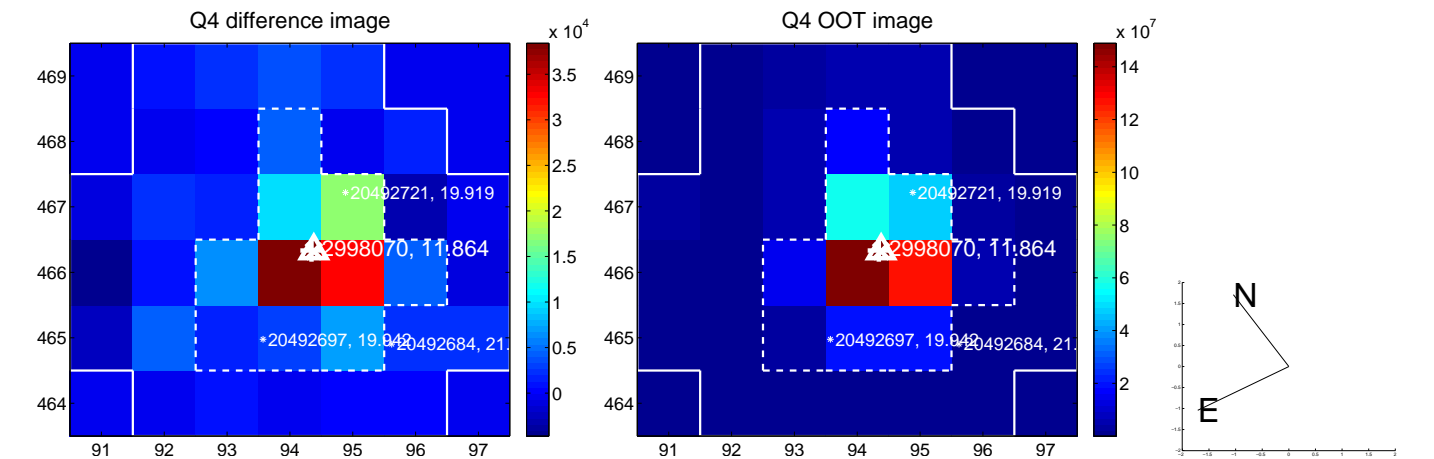
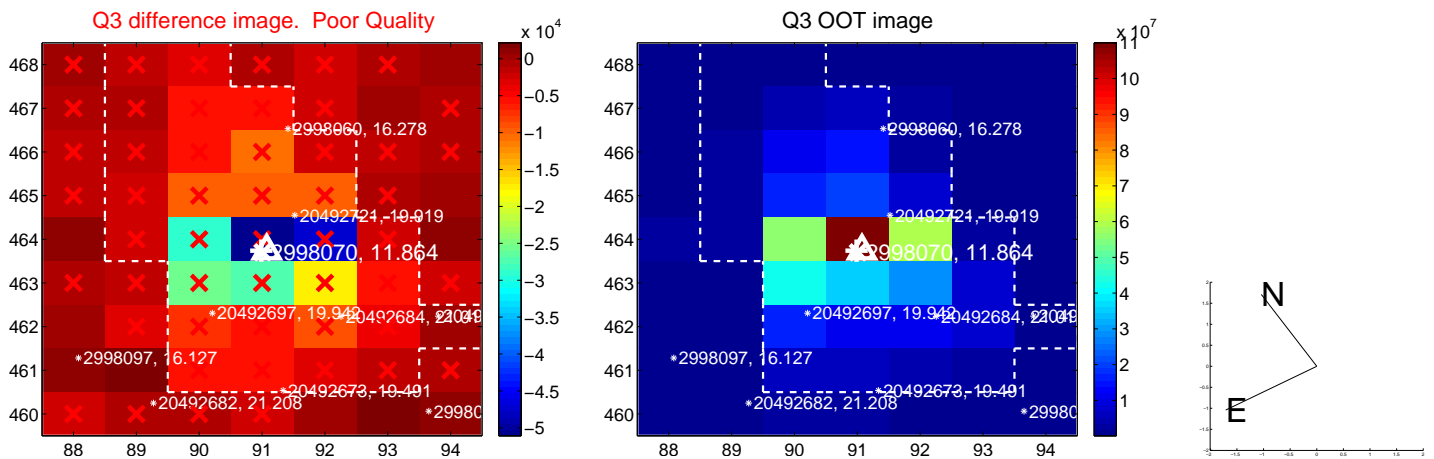
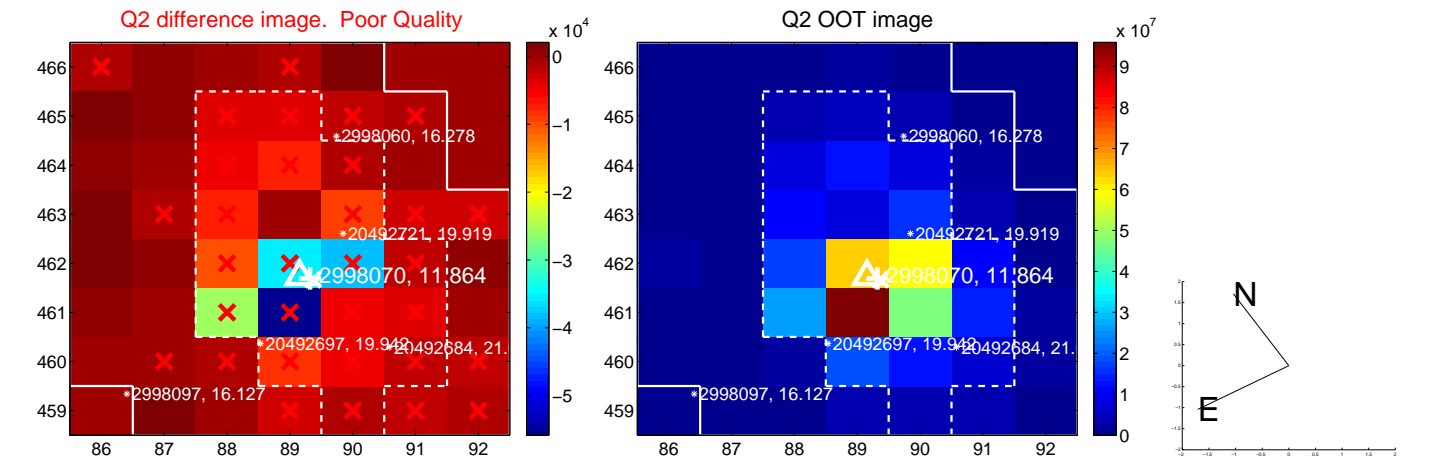
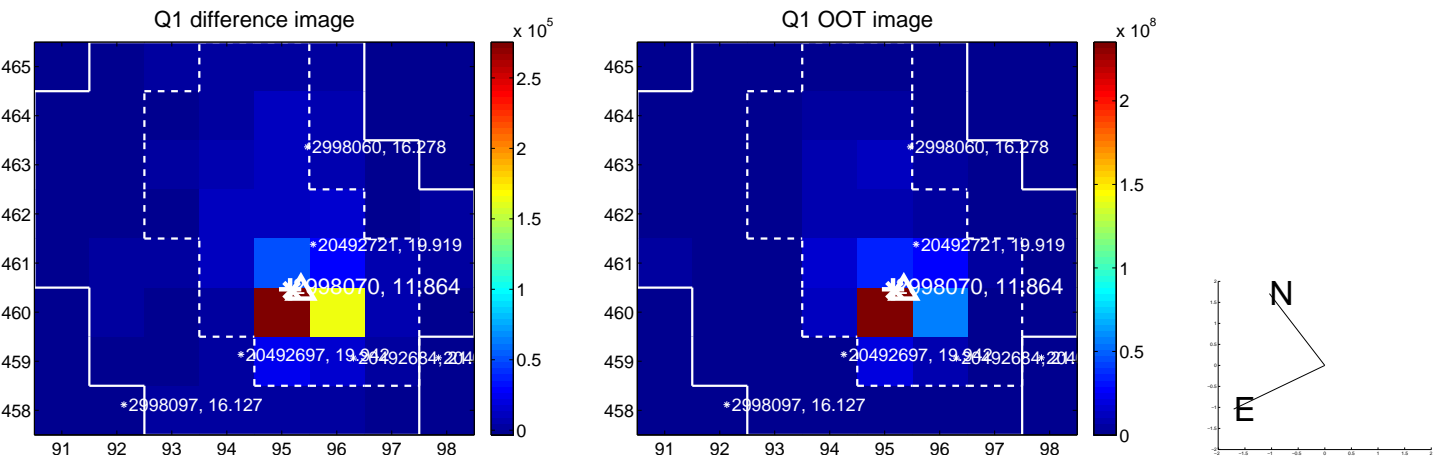
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.140 ± 0.118	1.19	-0.118 ± 0.102	0.076 ± 0.151
PRF-fit source offset from KIC position	0.274 ± 0.185	1.48	-0.039 ± 0.140	0.271 ± 0.199
photometric centroid source offset	3.25 ± 2.69	1.20	-2.26 ± 2.34	2.32 ± 2.99

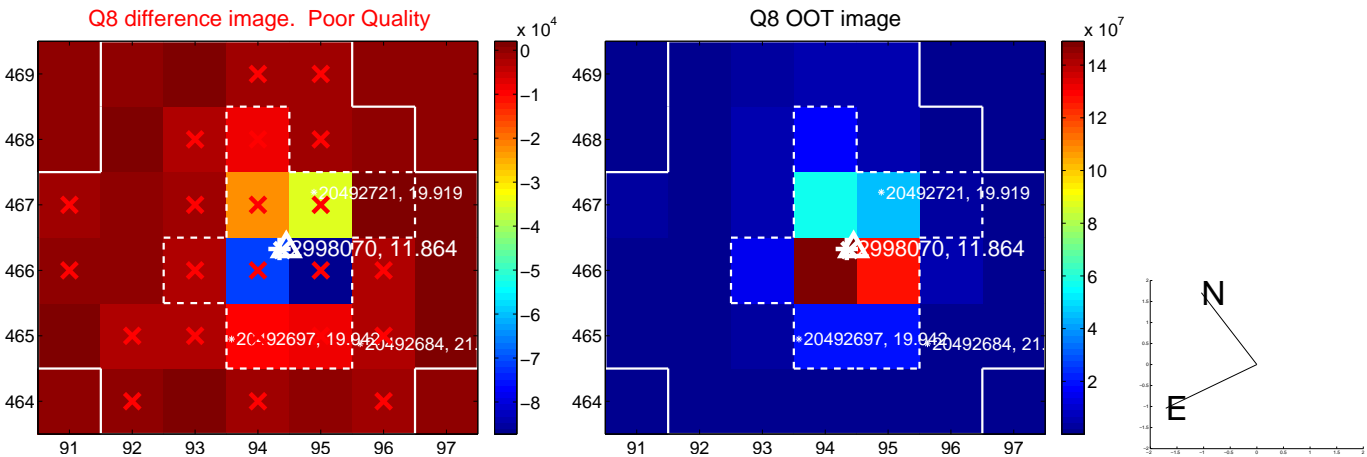
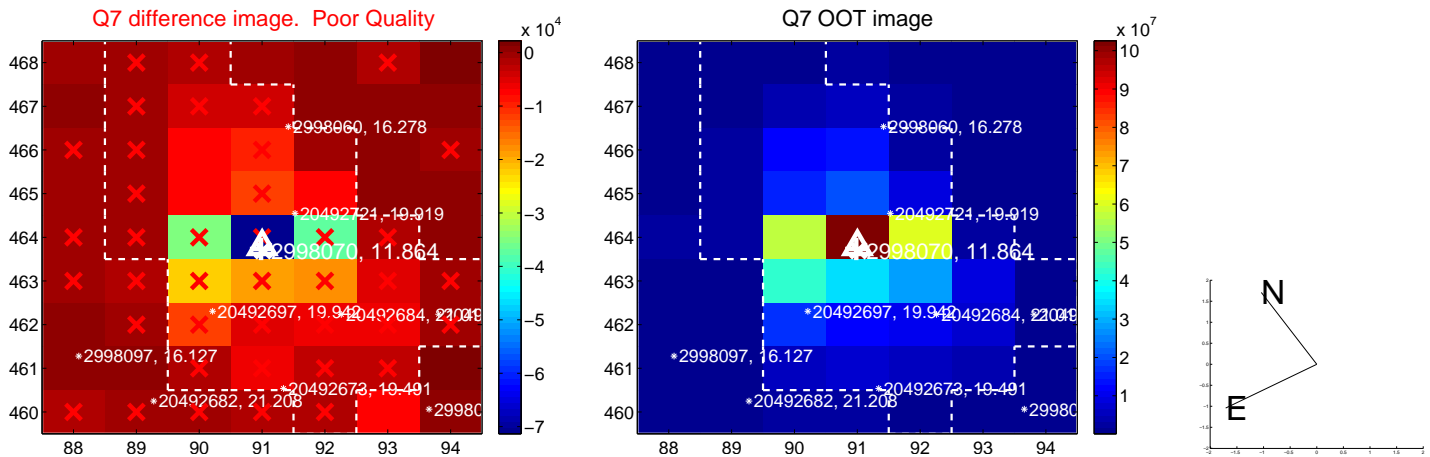
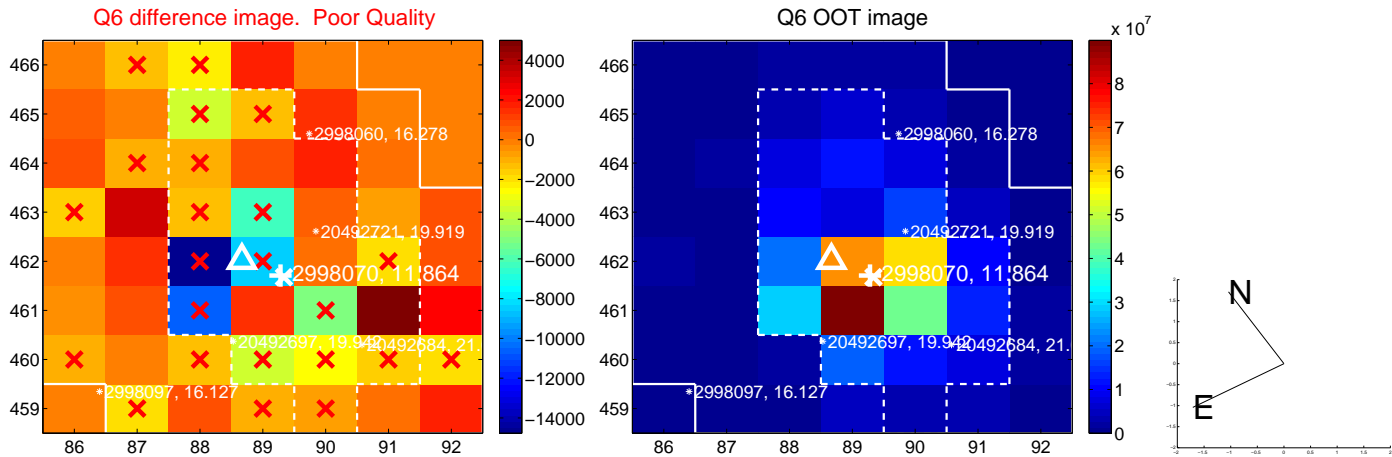
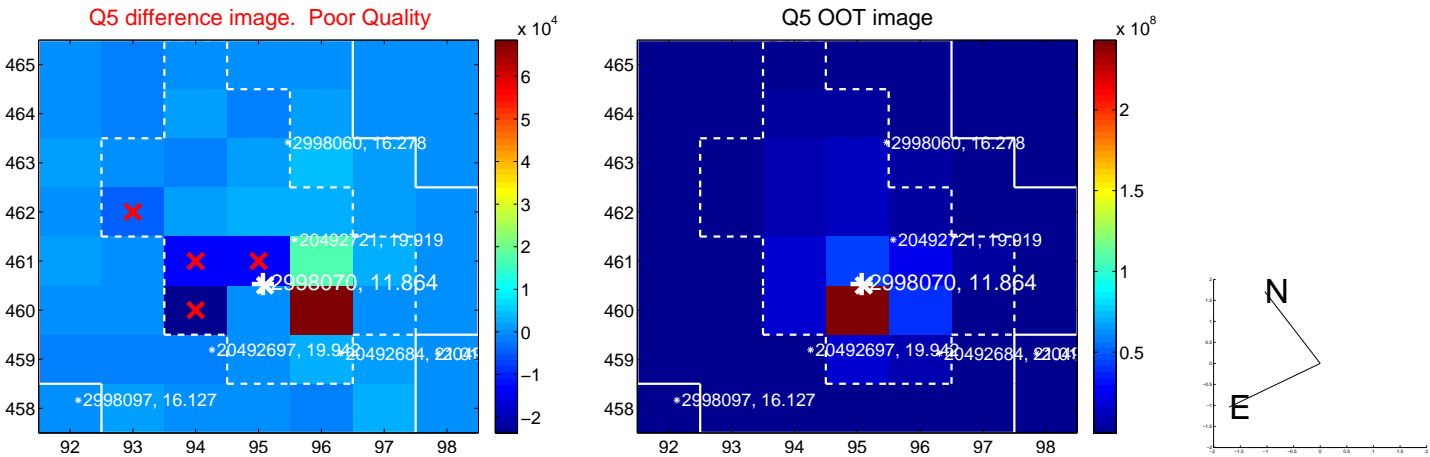


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

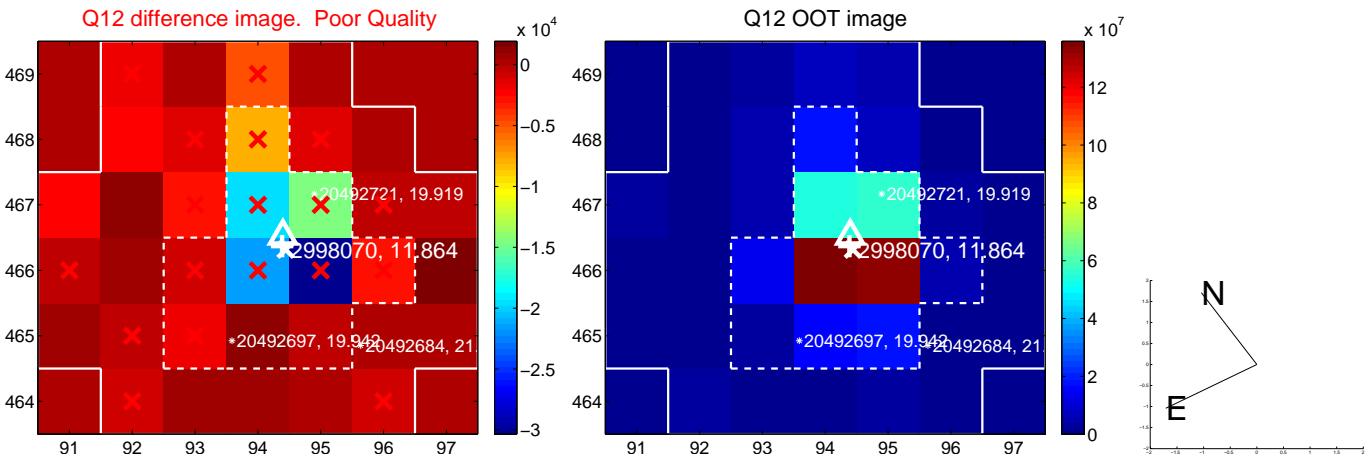
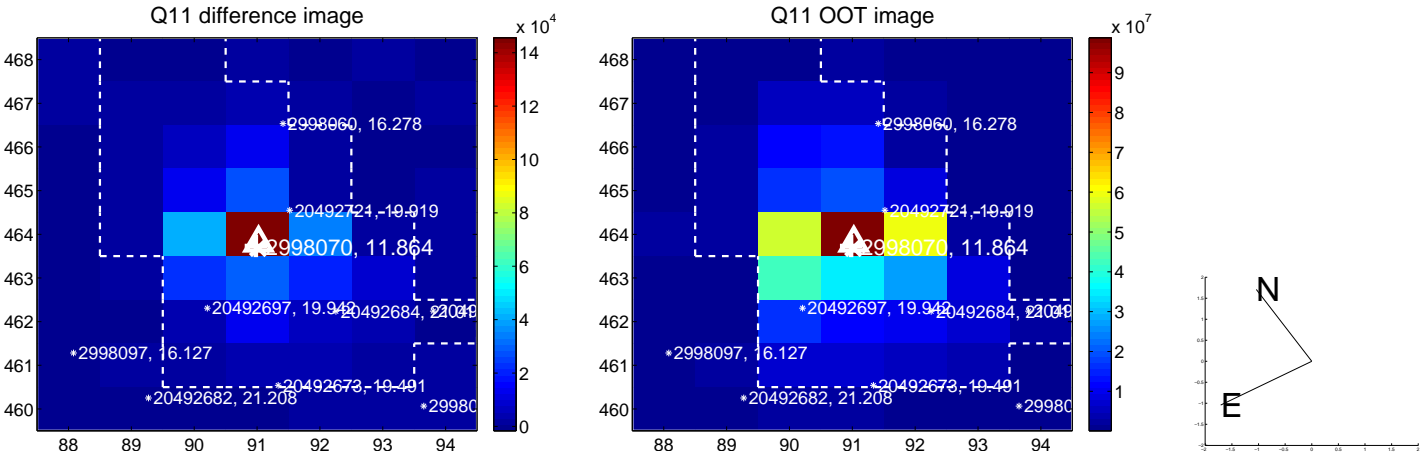
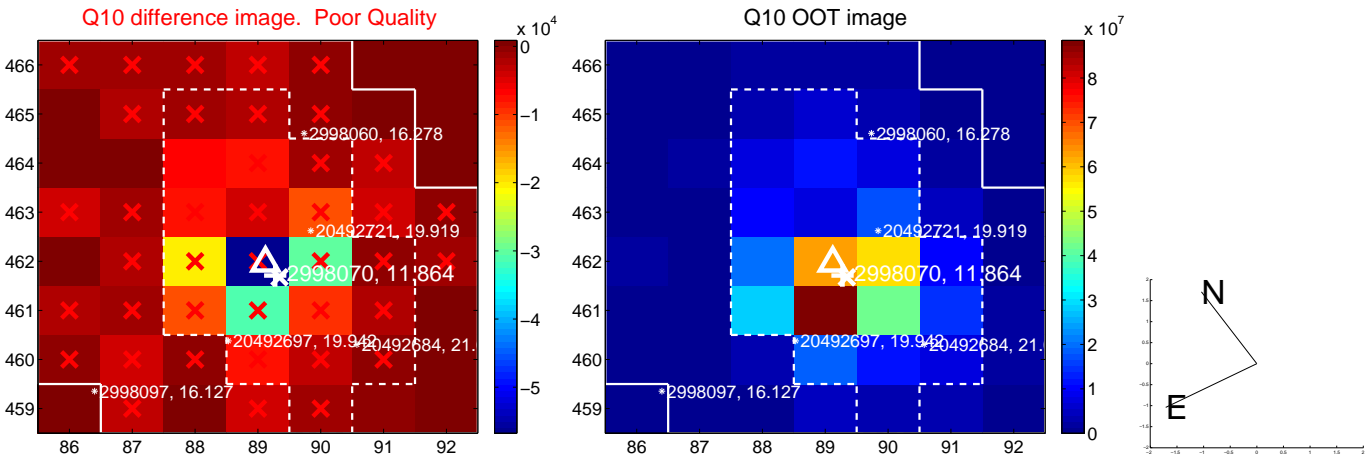
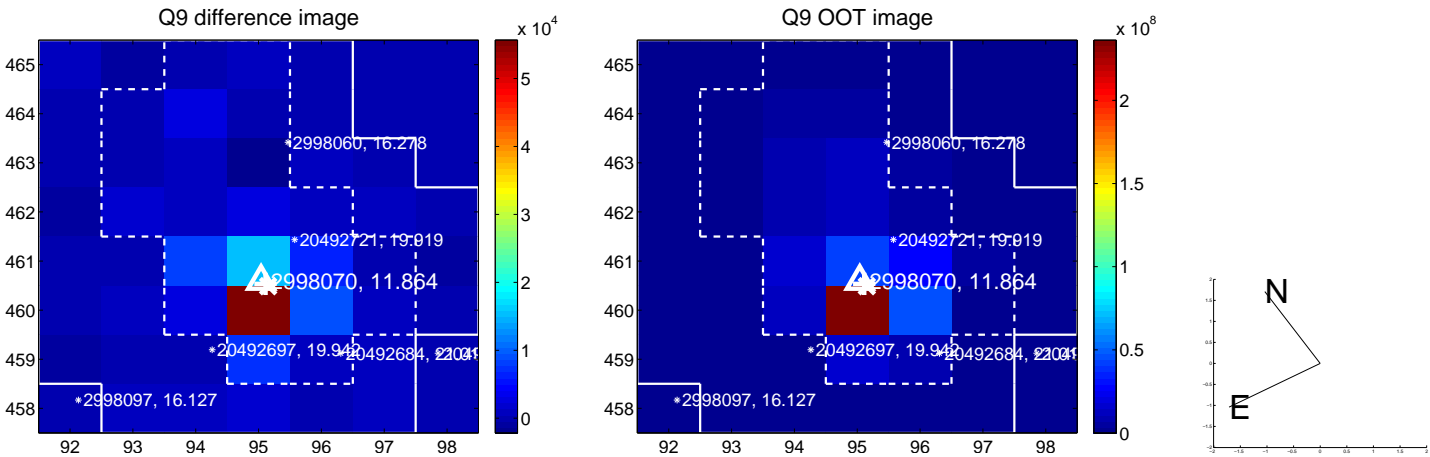
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



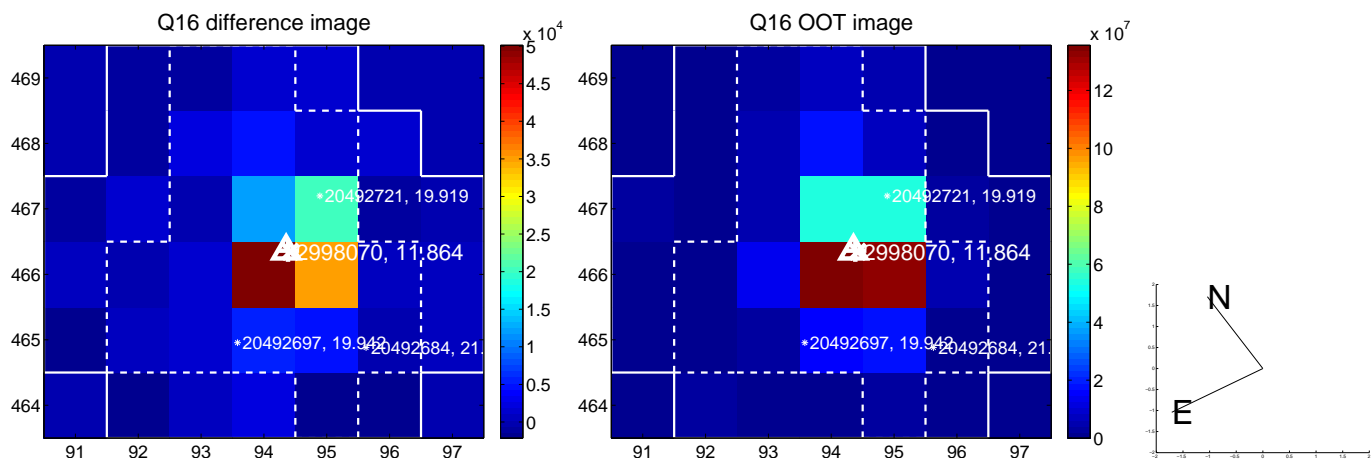
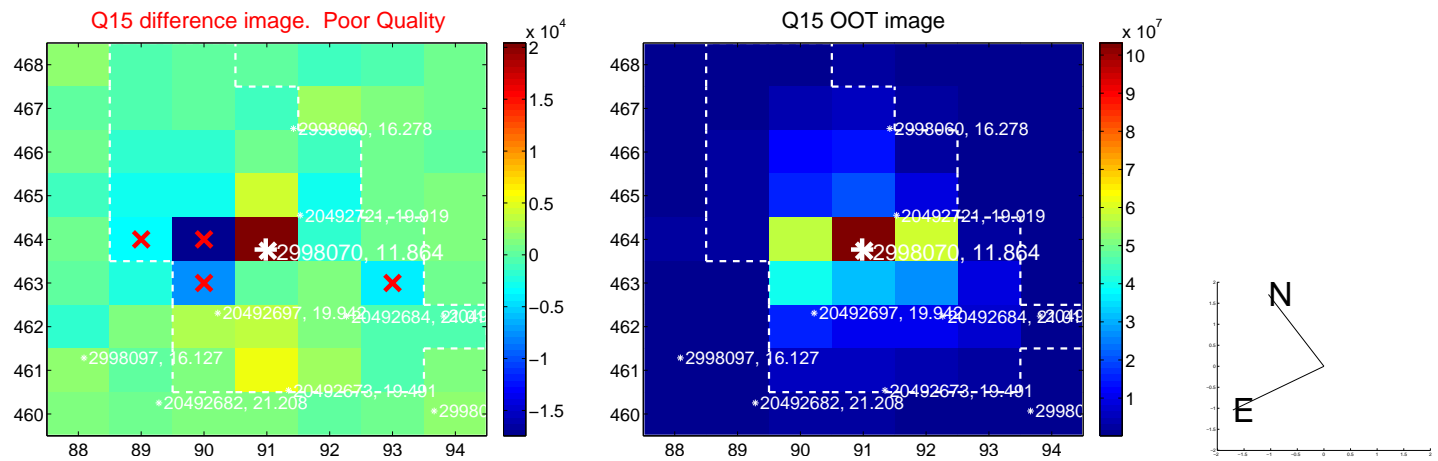
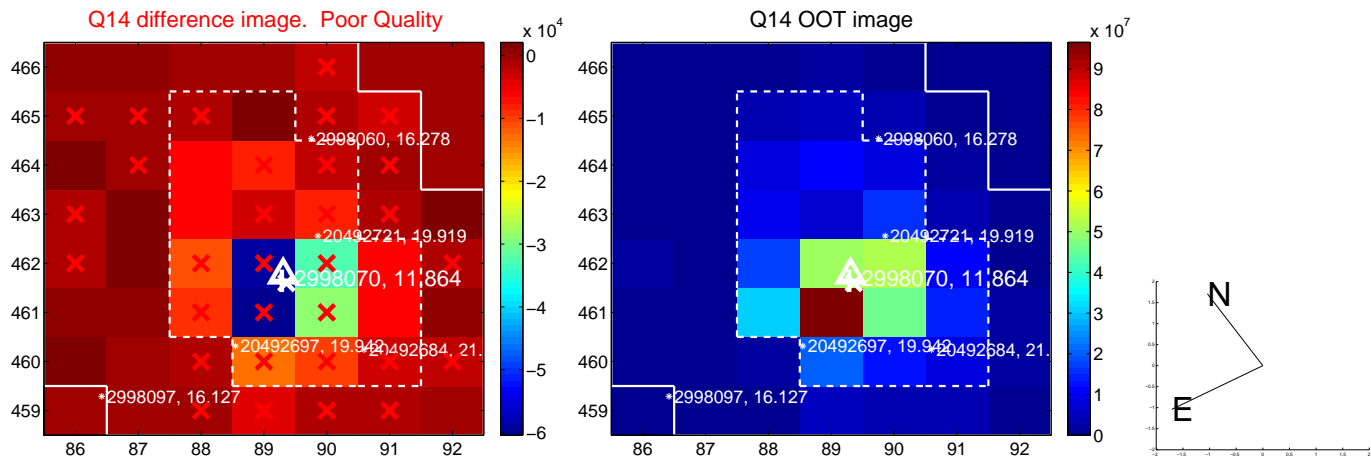
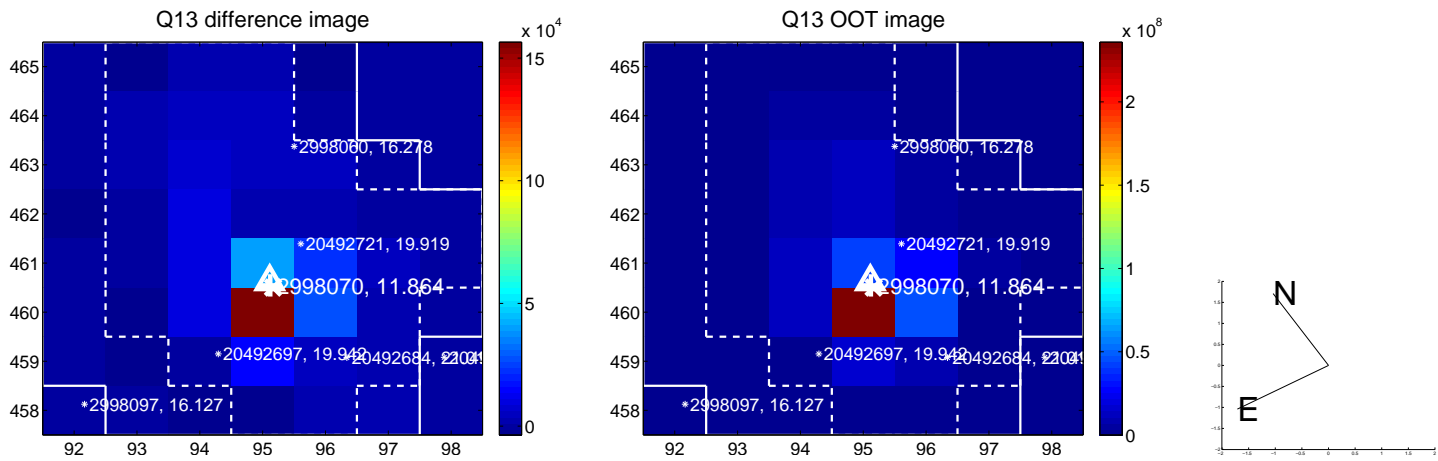
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



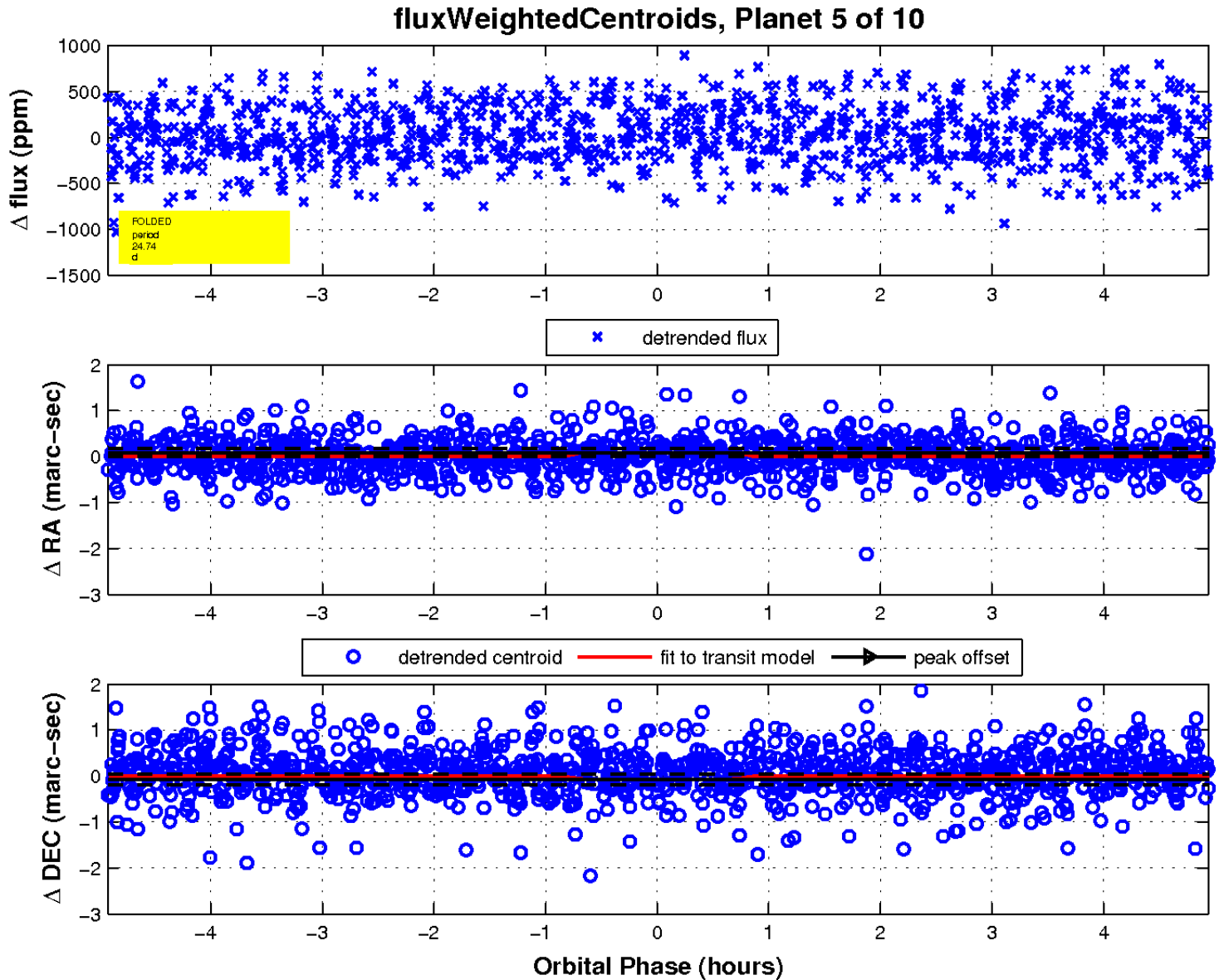
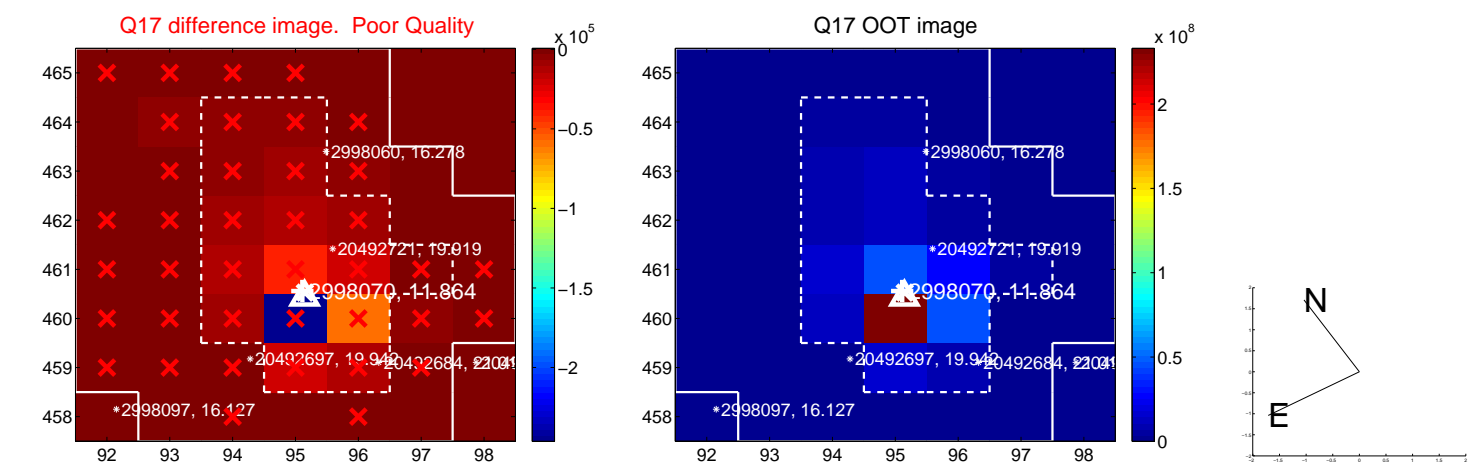
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



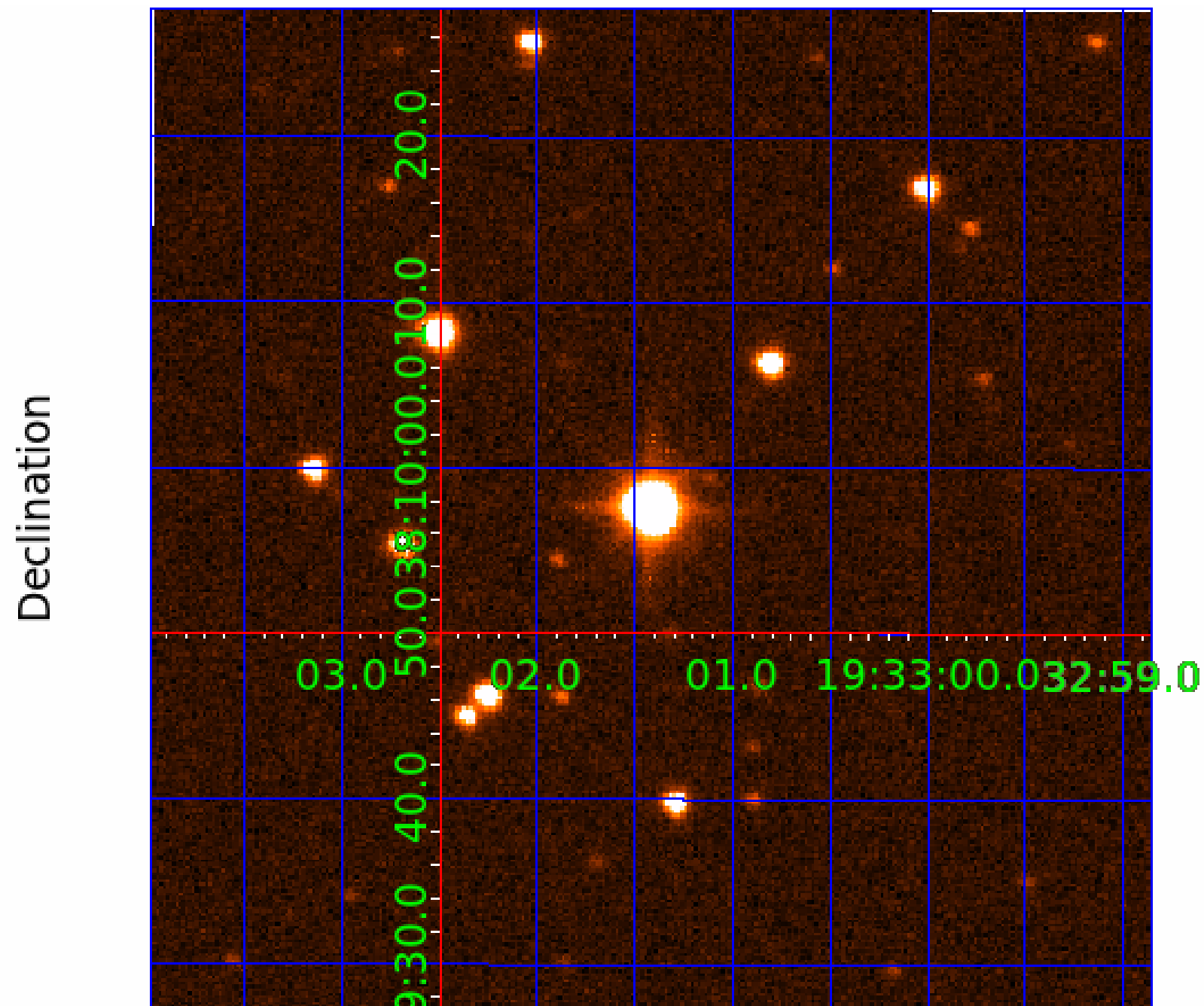
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 002998070

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

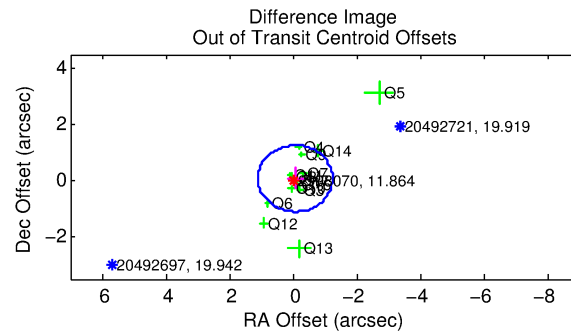
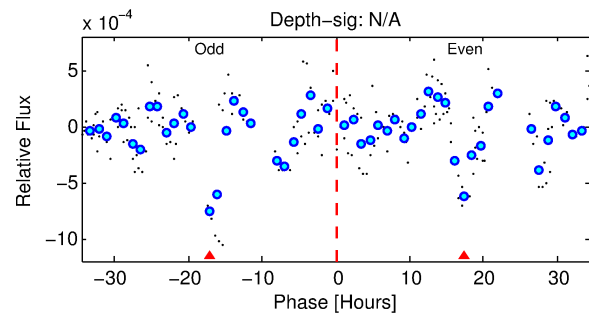
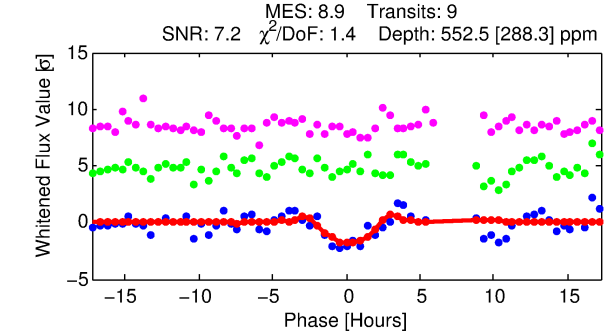
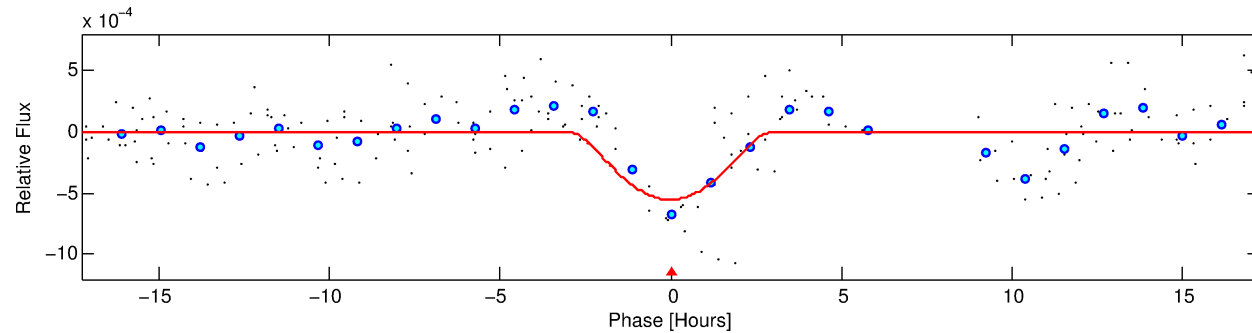
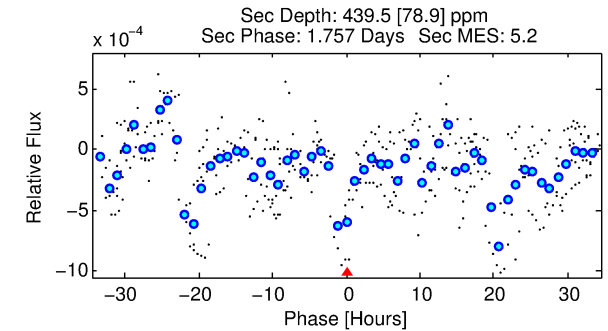
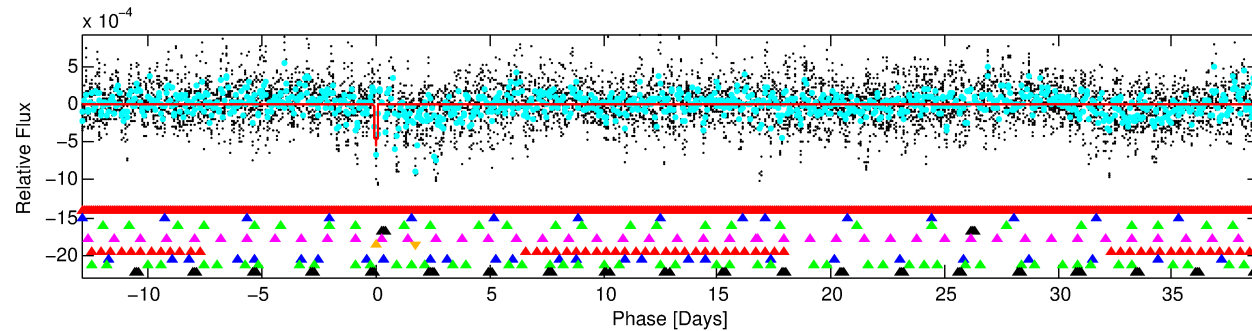
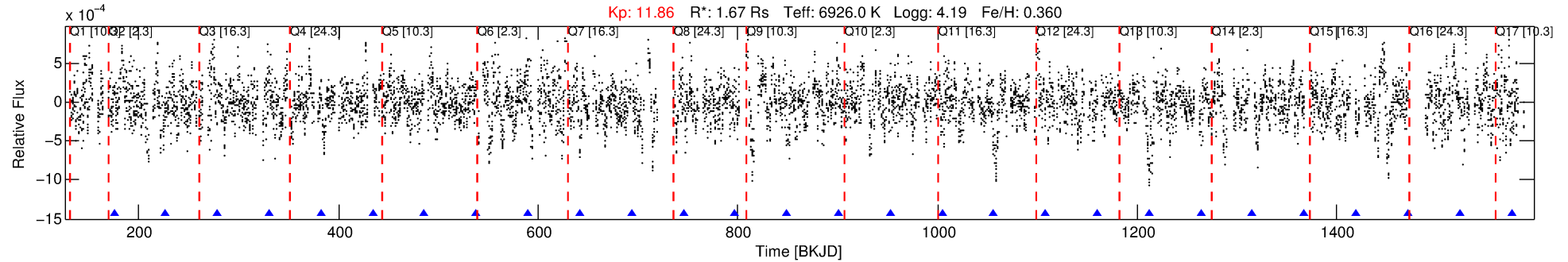
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-06

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 6 of 10 Period: 51.832 d



DV Fit Results:

Period = 51.83203 [0.00092] d
Epoch = 175.2795 [0.0142] BKJD
Rp/R* = 0.0412 [0.1003]
a/R* = 20.00 [12.09]
b = 1.00 [0.13]
Seff = 56.97 [23.88]
Teq = 701 [73] K
Rp = 7.48 [18.39] Re
a = 0.3167 [0.0853] AU
Ag = 433.11 [2117.02] [0.20σ]
Teffp = 4941 [6023] K [0.70σ]

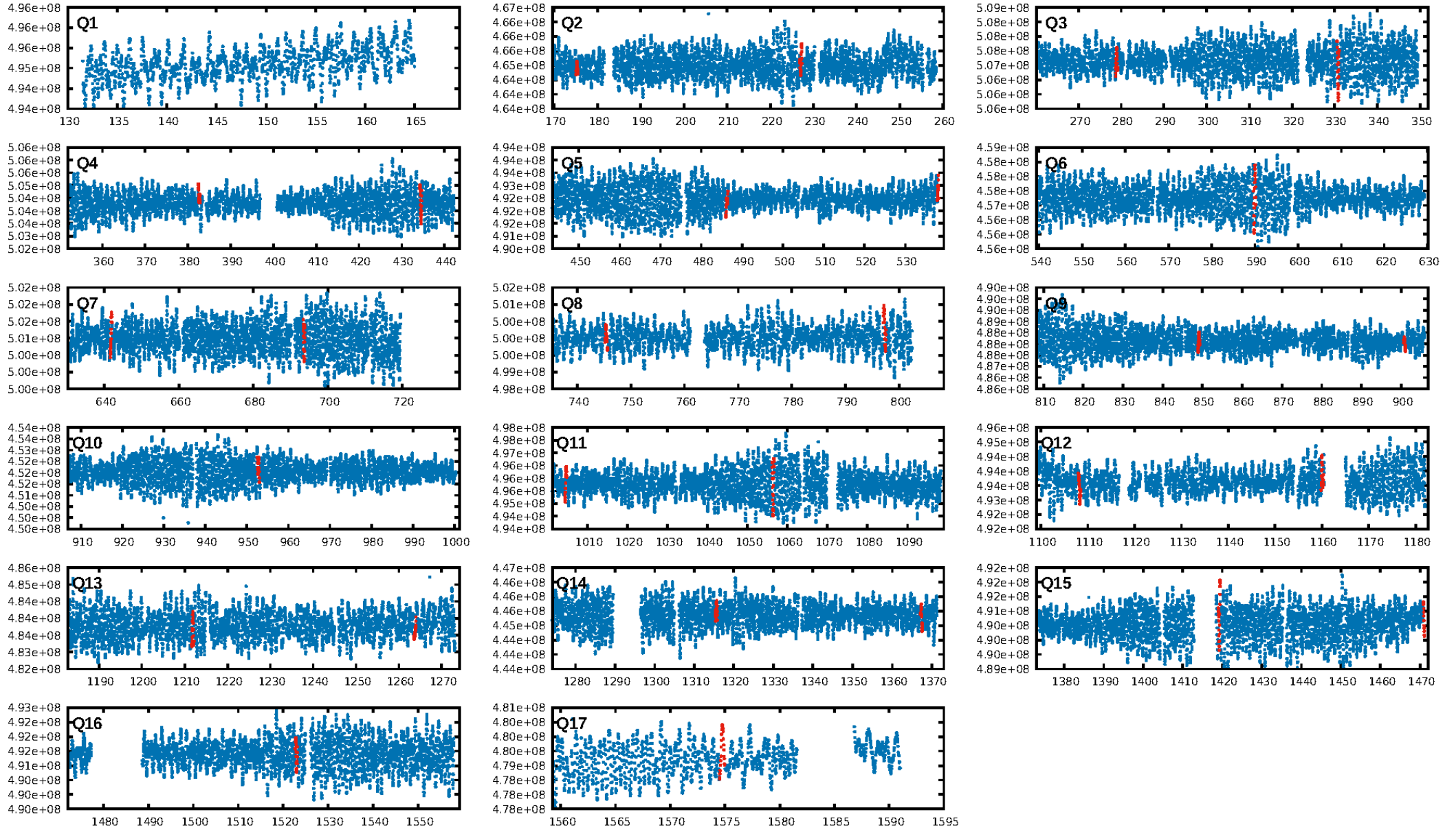
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [73.50σ]
LongPeriod-sig: 100.0% [10.51σ]
ModelChiSquare2-sig: 7.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [9/9]
GhostDiagnostic-chr: -0.9329
Centroid-sig: 37.0%
Centroid-so: 0.328 arcsec [1.52σ]
OotOffset-rm: 0.104 arcsec [0.26σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-rm: 0.284 arcsec [0.77σ]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.50 [7/14]
DiffImageOverlap-fno: 0.00 [0/15]

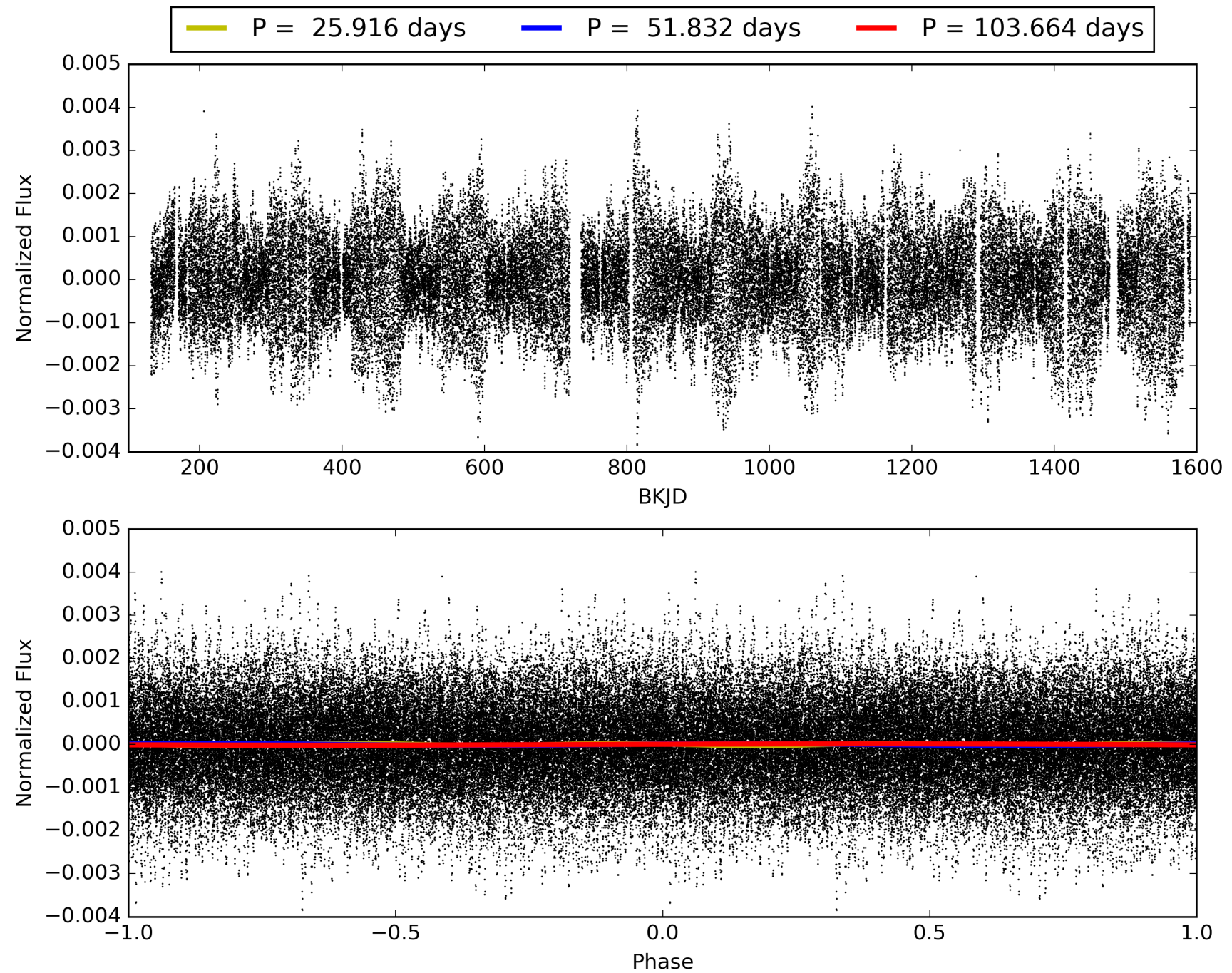
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:47 Z

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

TCE 002998070-06, PDC Light Curves

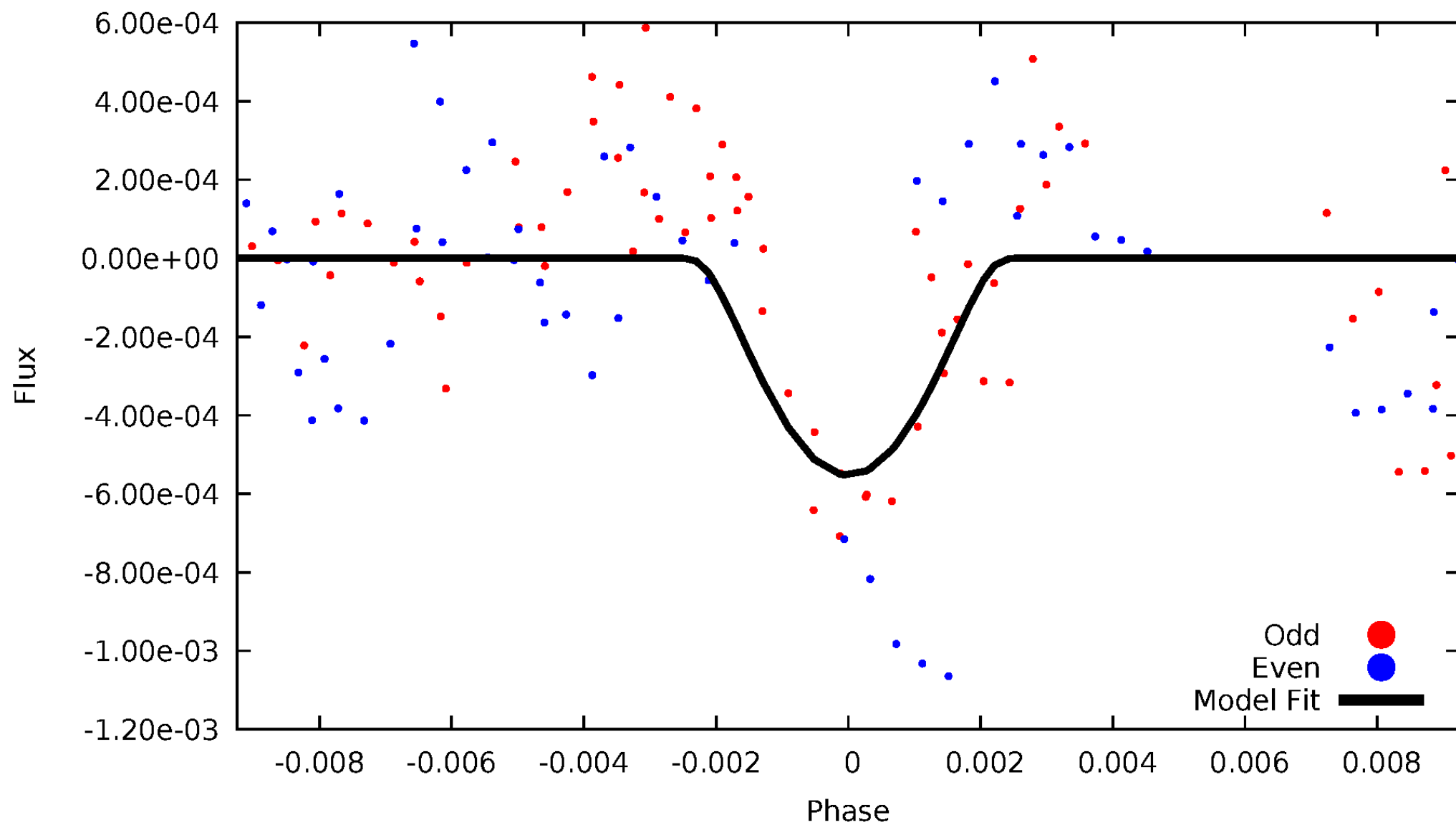


TCE 002998070-06



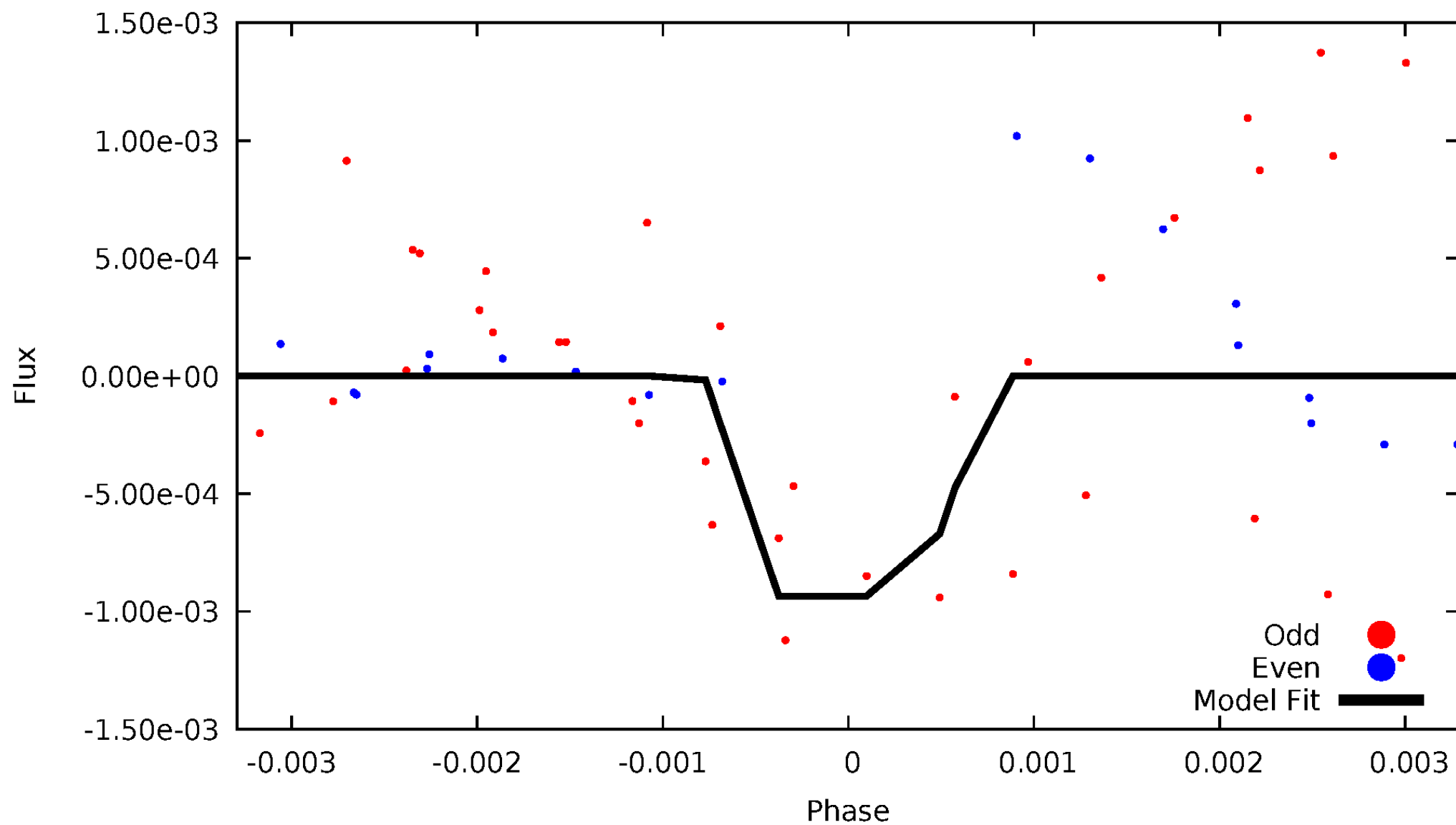
DV Odd/Even

TCE 002998070-06



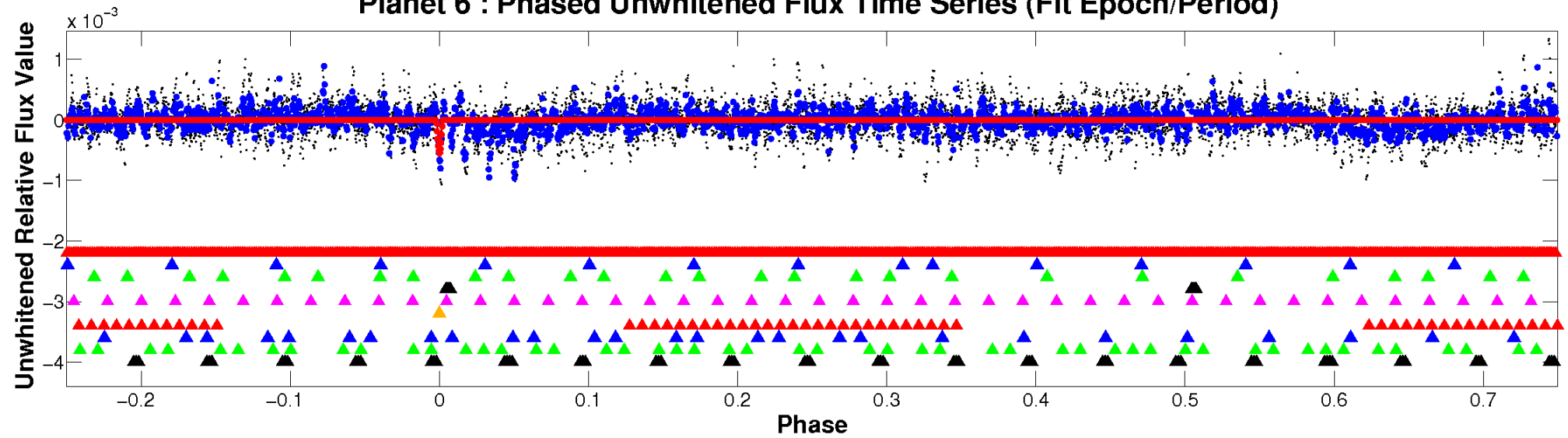
ALT Odd/Even

TCE 002998070-06

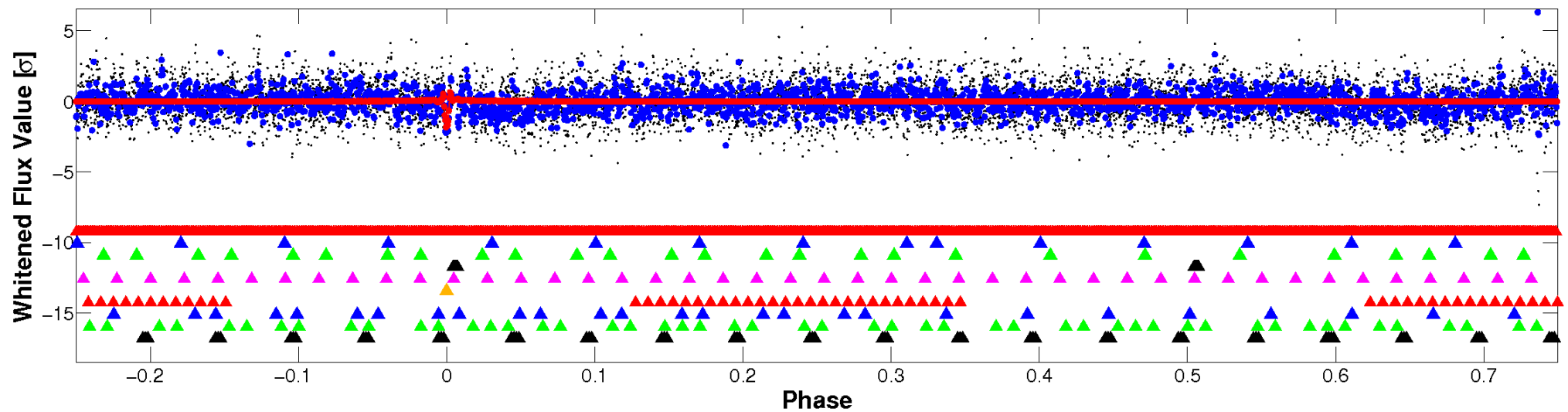


Non-Whitened Vs. Whitened Light Curve

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

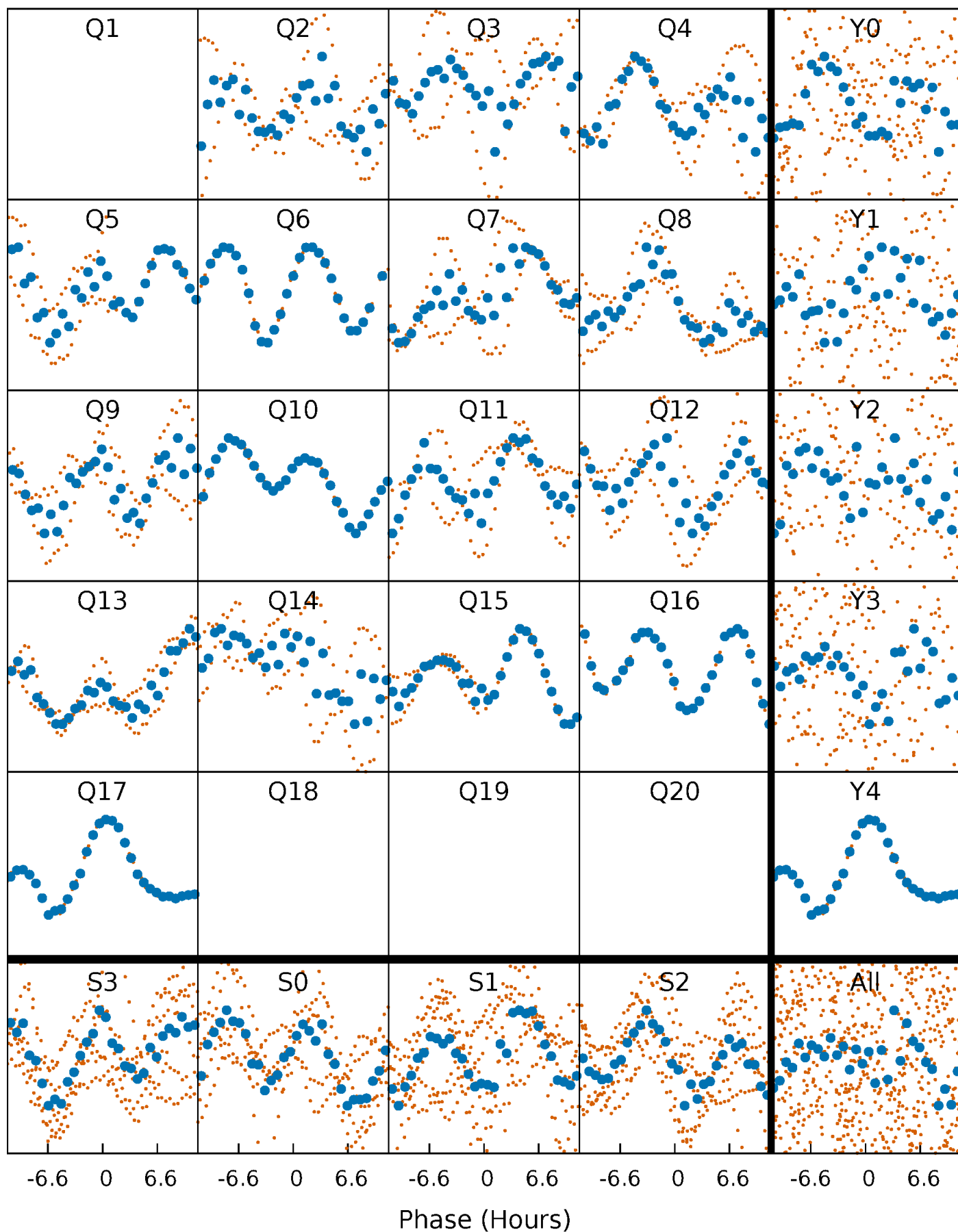


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



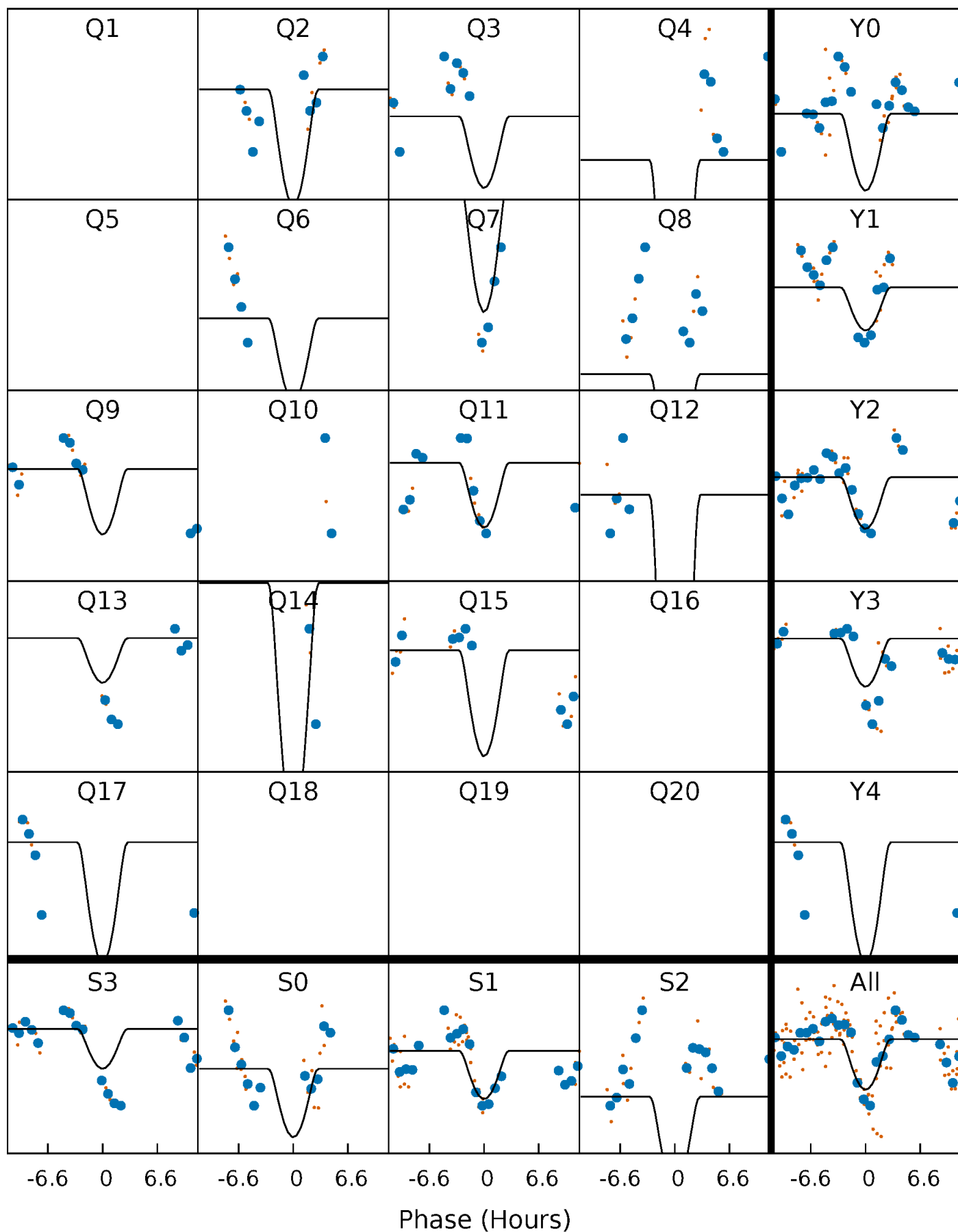
PDC Quarter-Phased Transit Curves

TCE 002998070-06 P= 51.832034 Days $T_0=175.279457$ (BKJD)



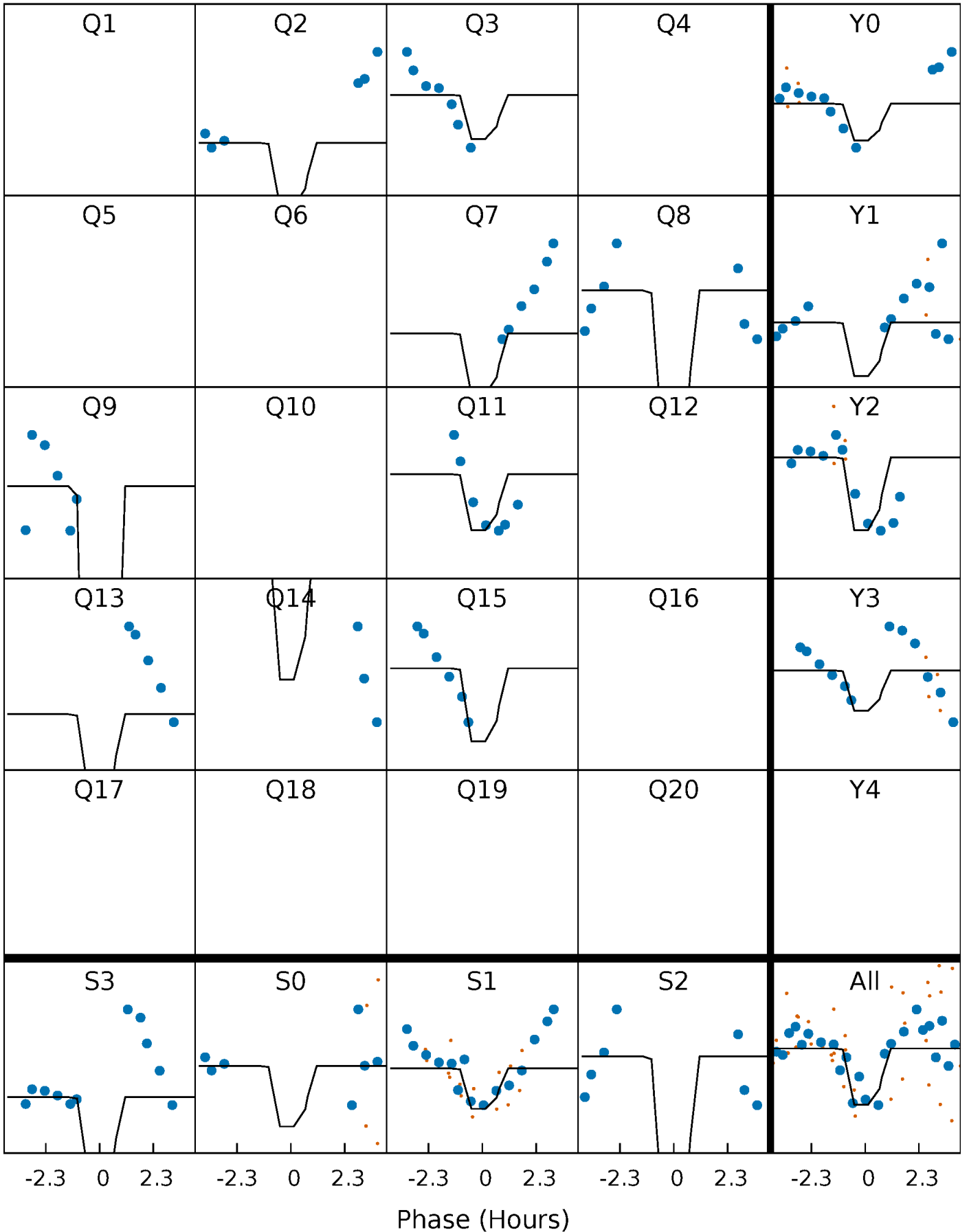
DV Quarter-Phased Transit Curves

TCE 002998070-06 P= 51.832034 Days $T_0=175.279457$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

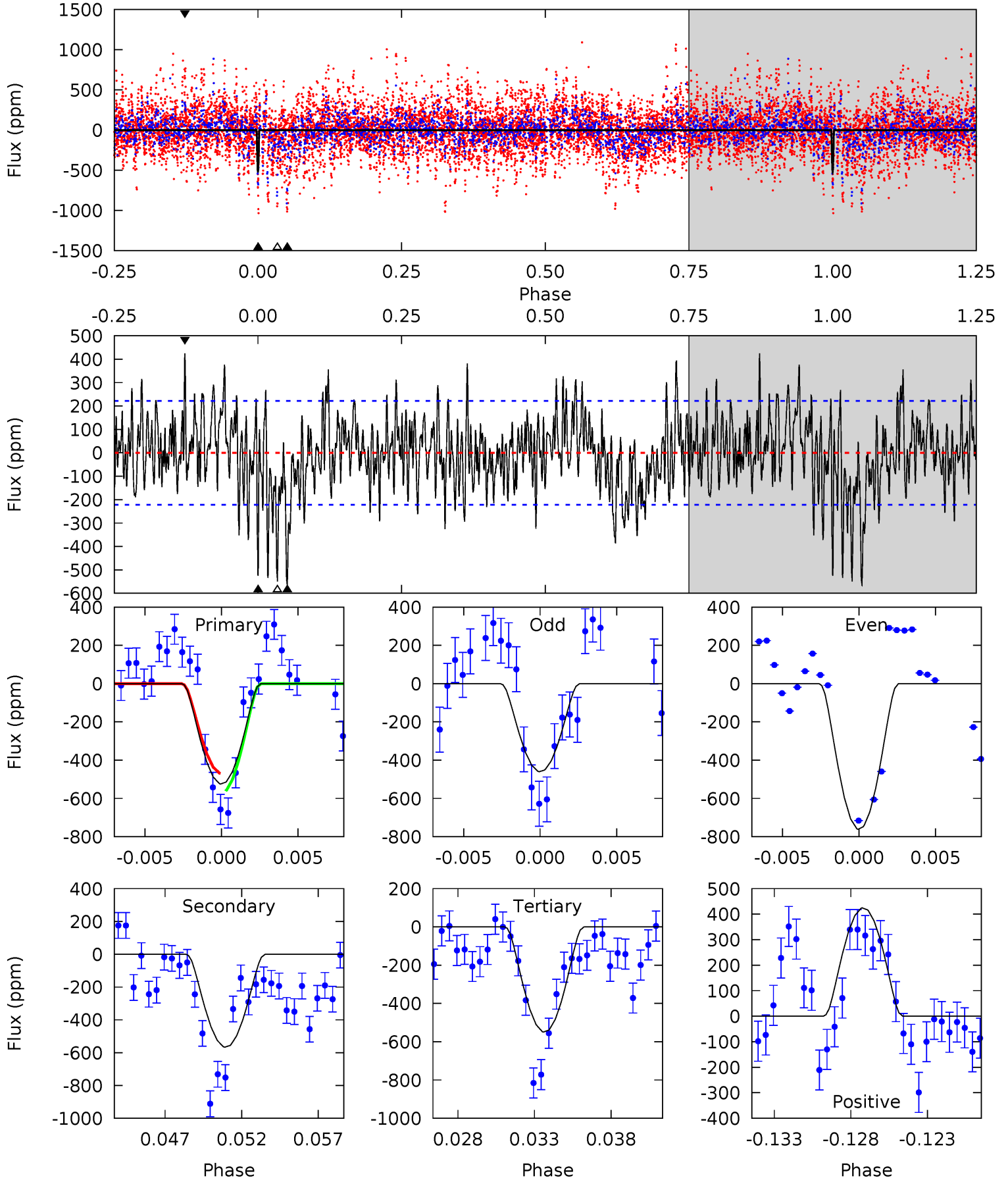
TCE 002998070-06 P= 51.832649 Days $T_0=175.216858$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-06, P = 51.832034 Days, E = 123.447423 Days

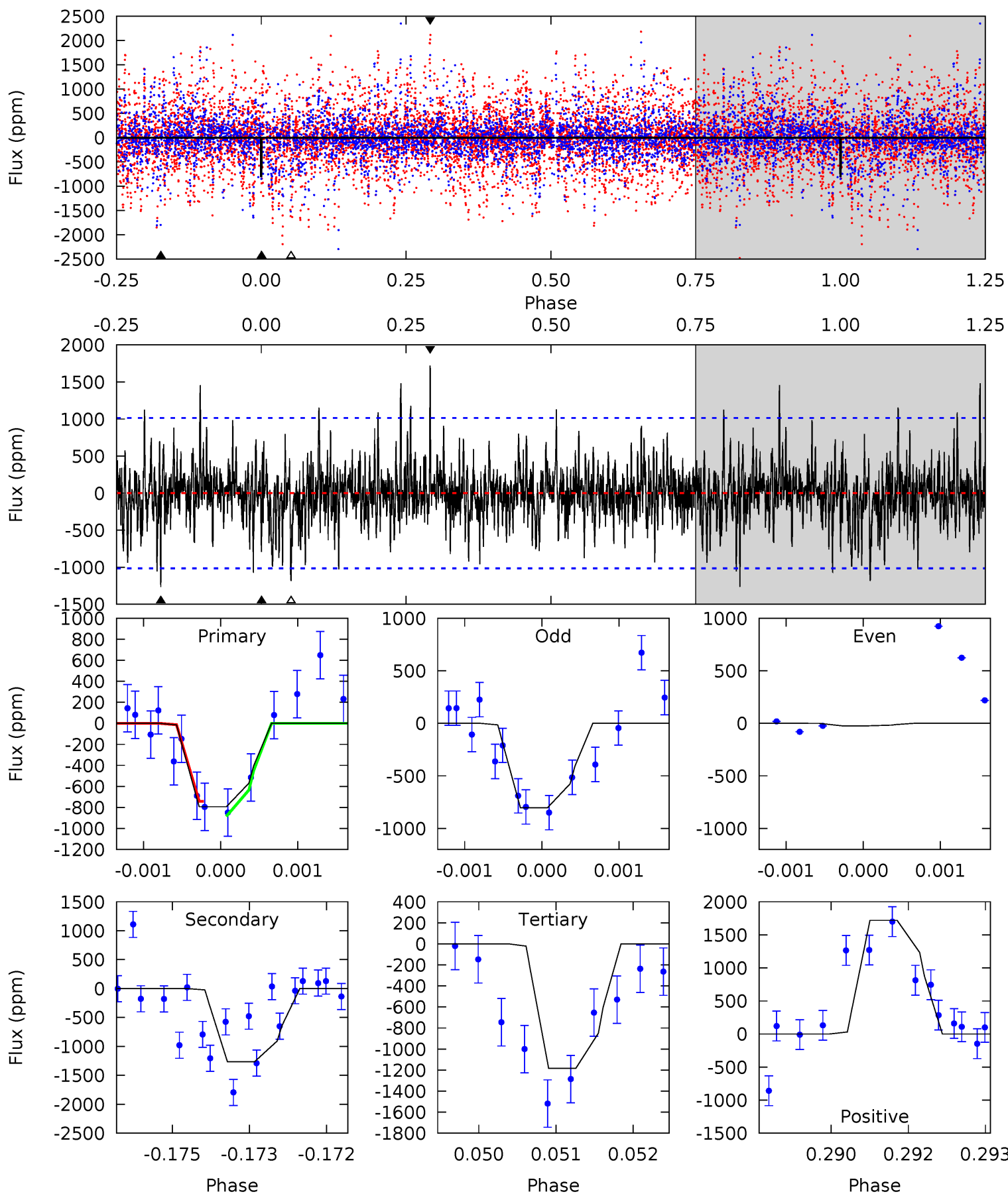
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.2	13.2	12.8	9.88	5.17	2.82	3.11	-0.58	2.33	0.40	3.30	3.25	2.44	0.43	1.06



Alt Model-Shift Uniqueness Test

002998070-06, P = 51.832649 Days, E = 123.384209 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.22	6.73	6.30	9.15	5.40	3.21	1.62	-2.08	-4.93	0.43	-2.42	1.30	1.16	0.58	0.33



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-566 ± 43	$16.71^{+14.99}_{-11.74}$	996^{+78}_{-56}	3934^{+2507}_{-747}	111^{+1141}_{-81}
Alt.	-1264 ± 188	$14.80^{+14.95}_{-9.84}$	994^{+73}_{-56}	4713^{+3624}_{-1026}	311^{+2359}_{-235}

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

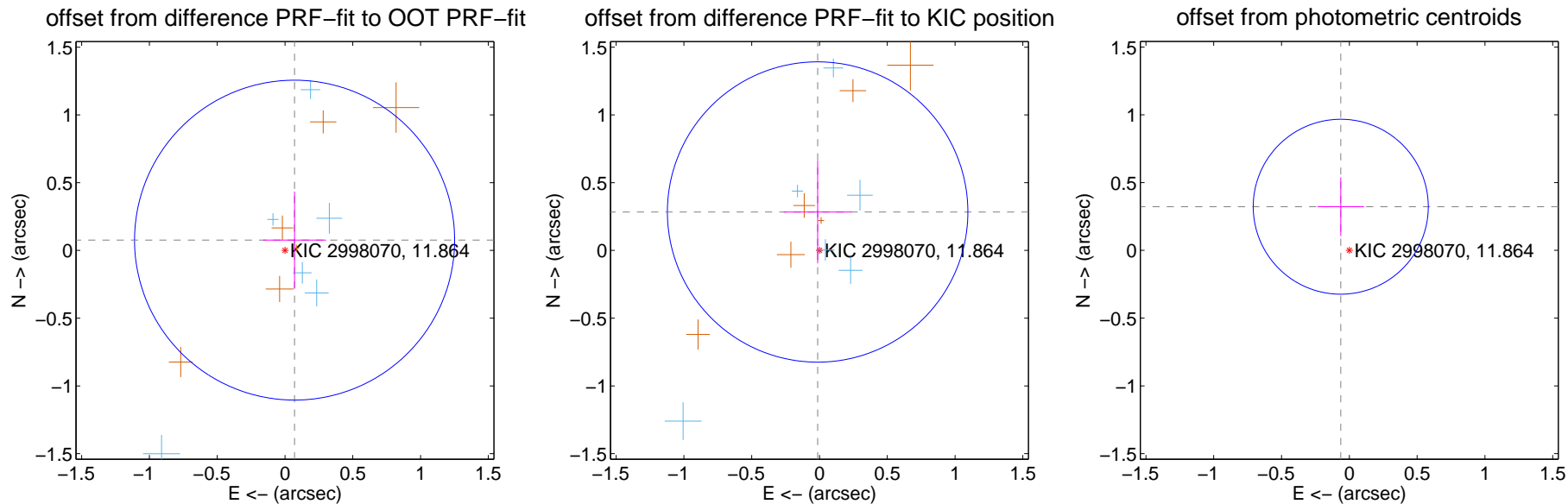
DV Centroid Data

Supplemental centroid analysis for 002998070-06. **Kepler magnitude: 11.86.** Transit SNR 7.25

There are 7 quarters with good PRF difference image offsets

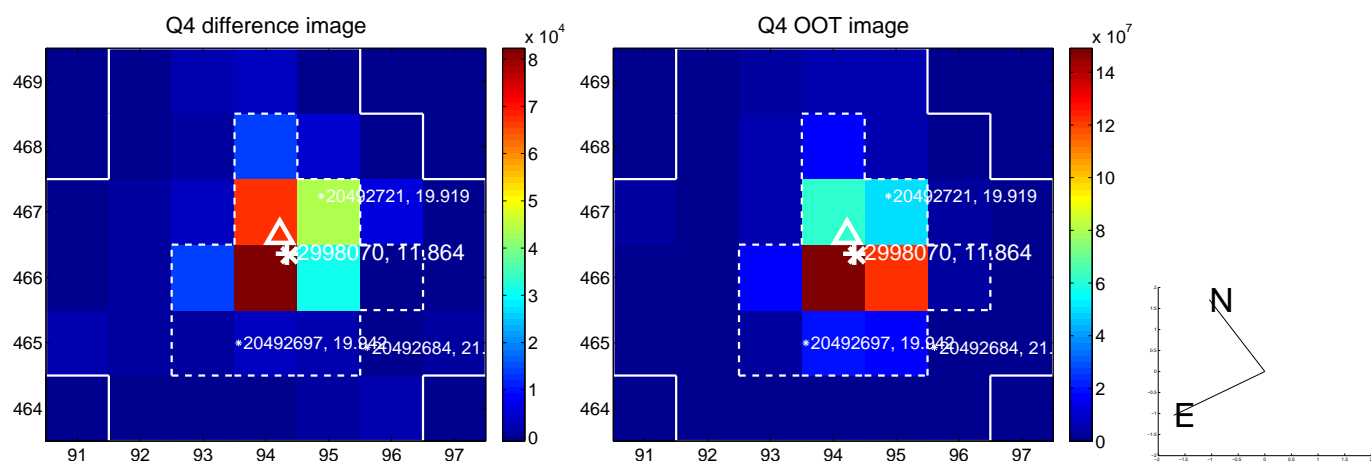
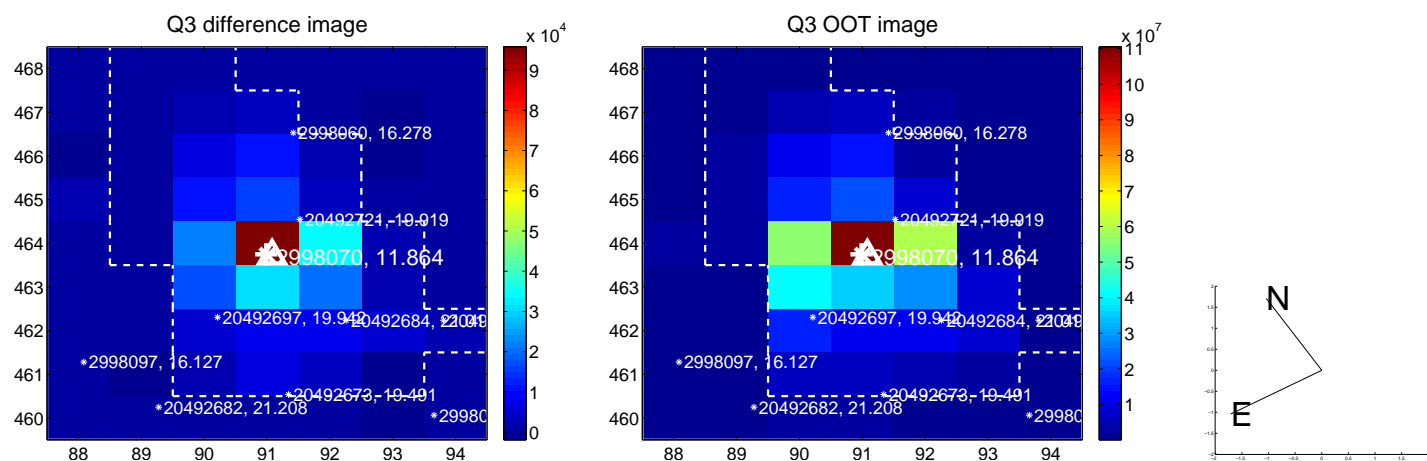
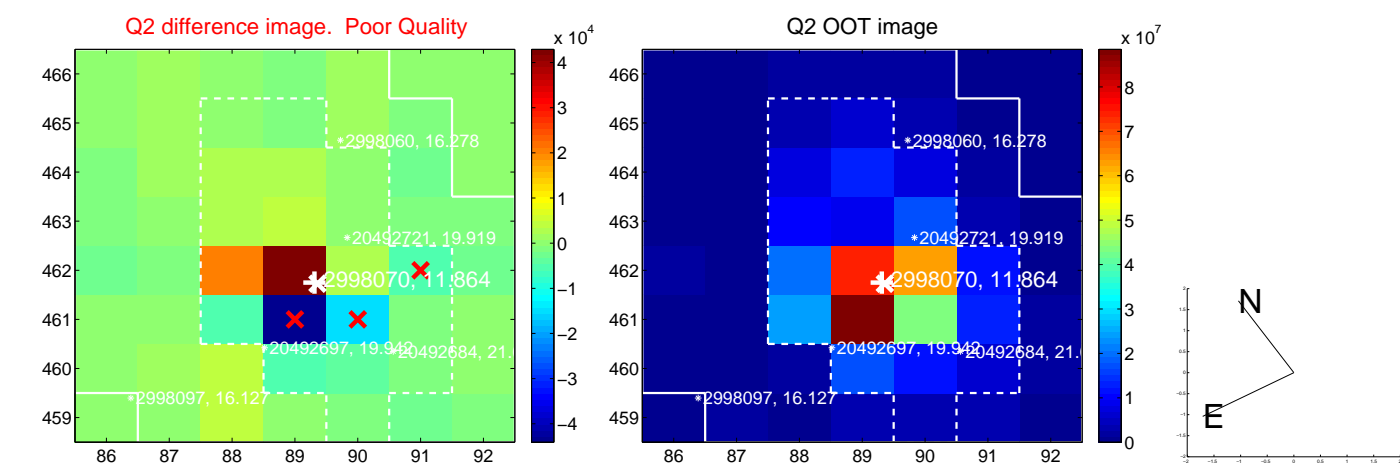
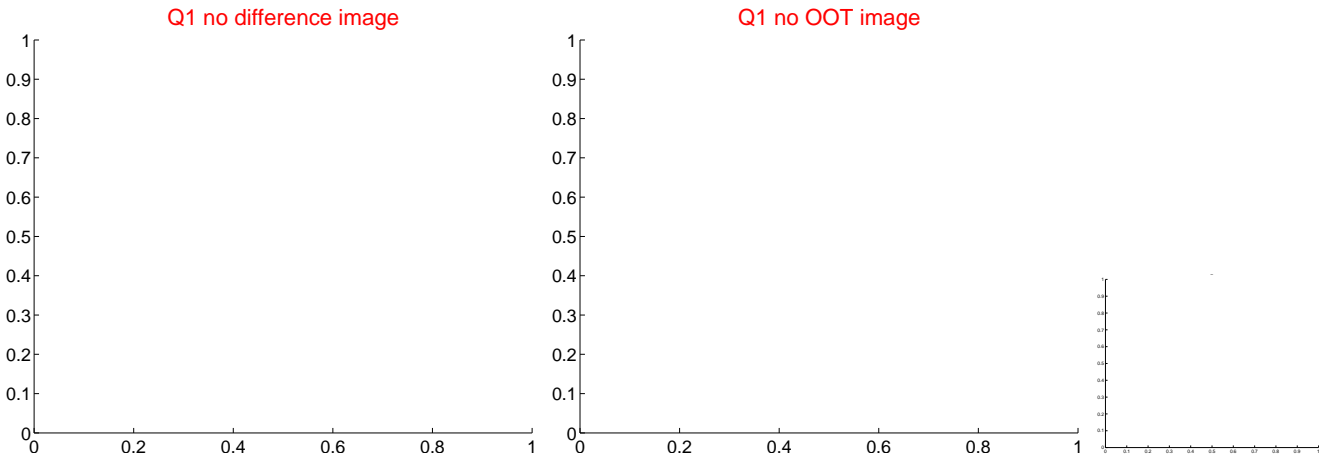
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.104 ± 0.393	0.26	-0.071 ± 0.232	0.076 ± 0.358
PRF-fit source offset from KIC position	0.284 ± 0.369	0.77	0.014 ± 0.250	0.284 ± 0.379
photometric centroid source offset	0.33 ± 0.22	1.52	0.06 ± 0.17	0.32 ± 0.22

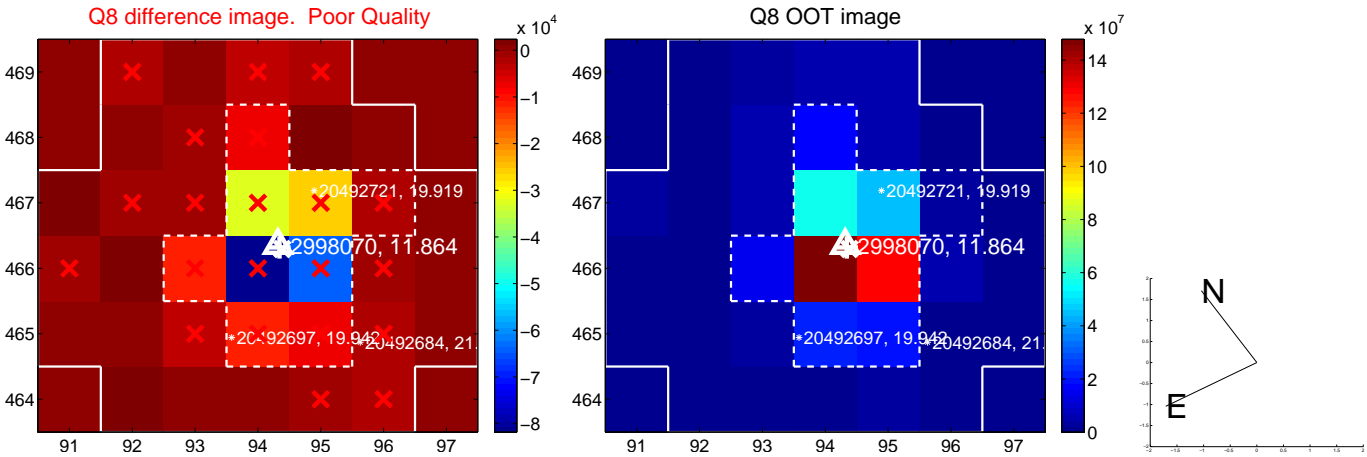
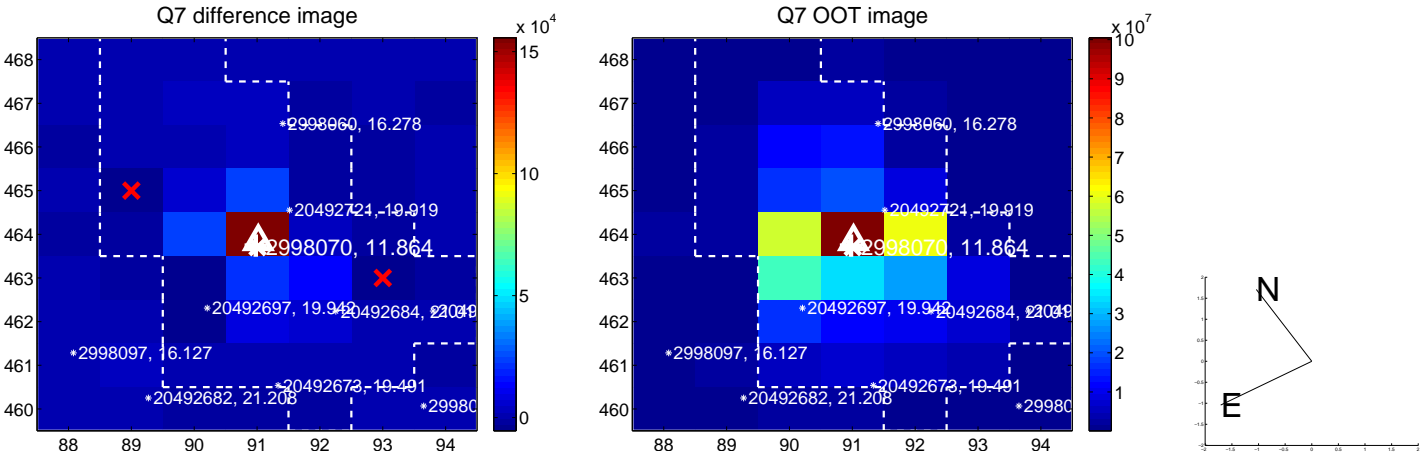
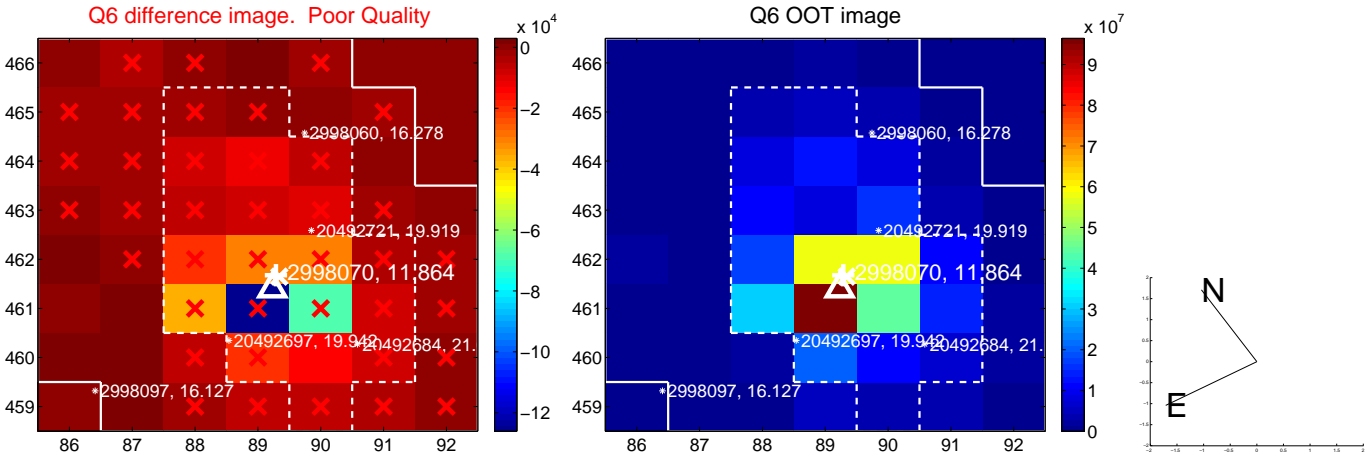
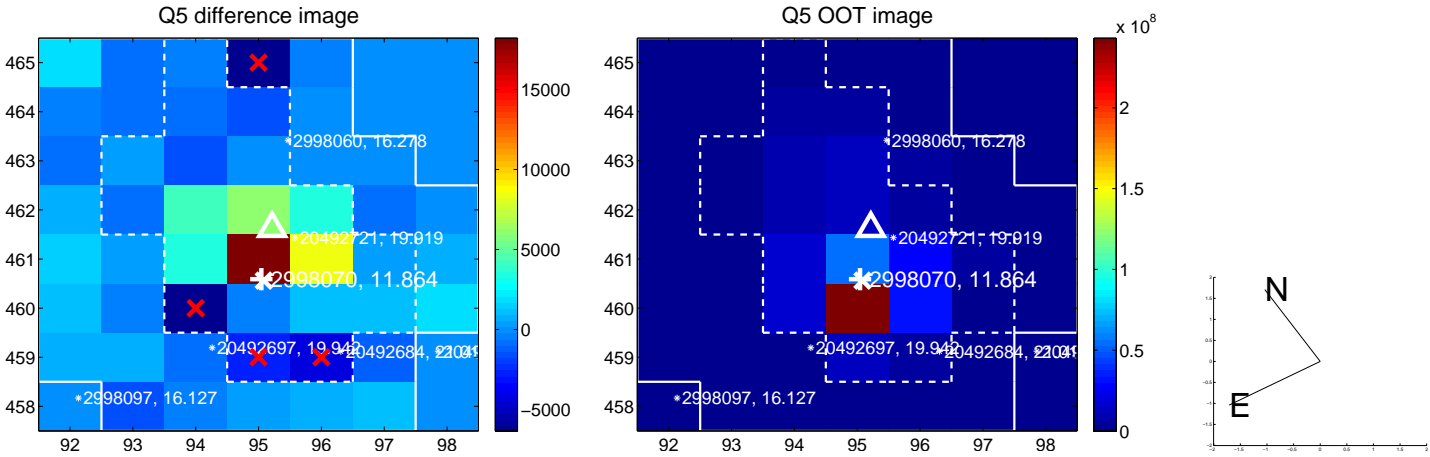


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

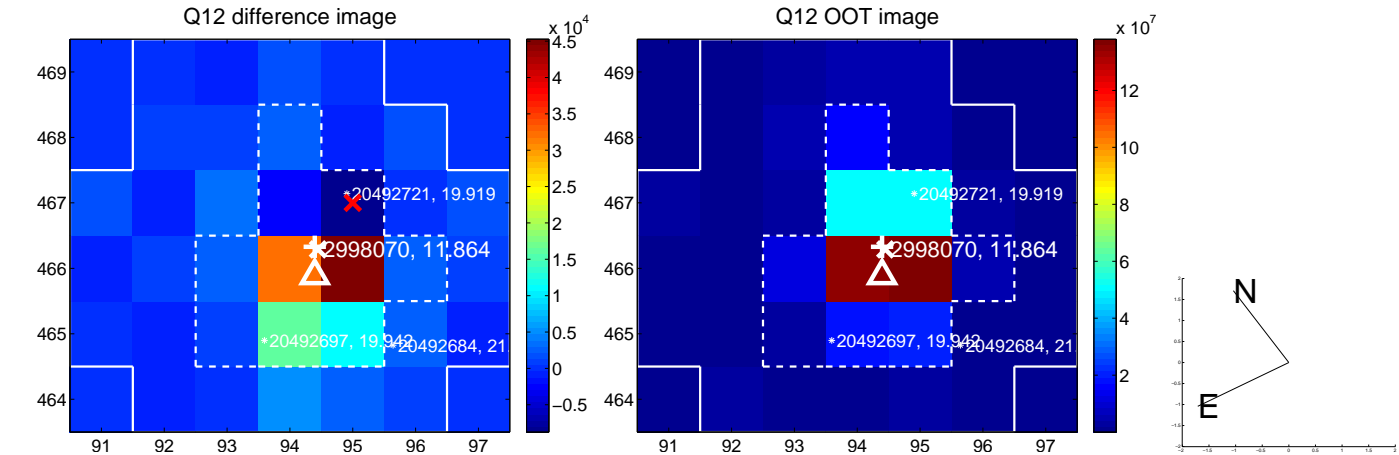
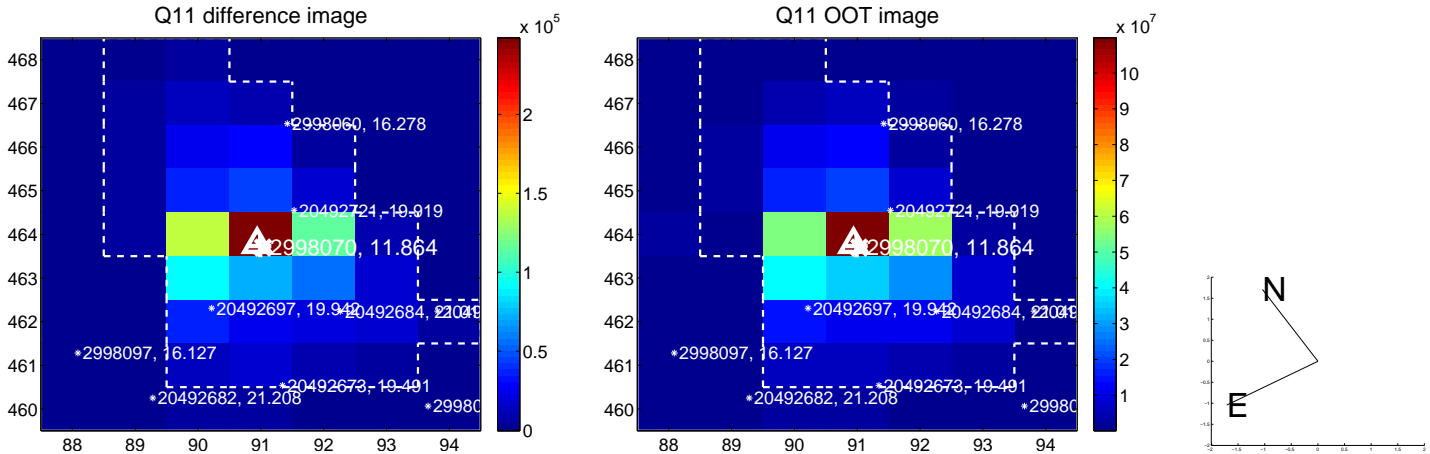
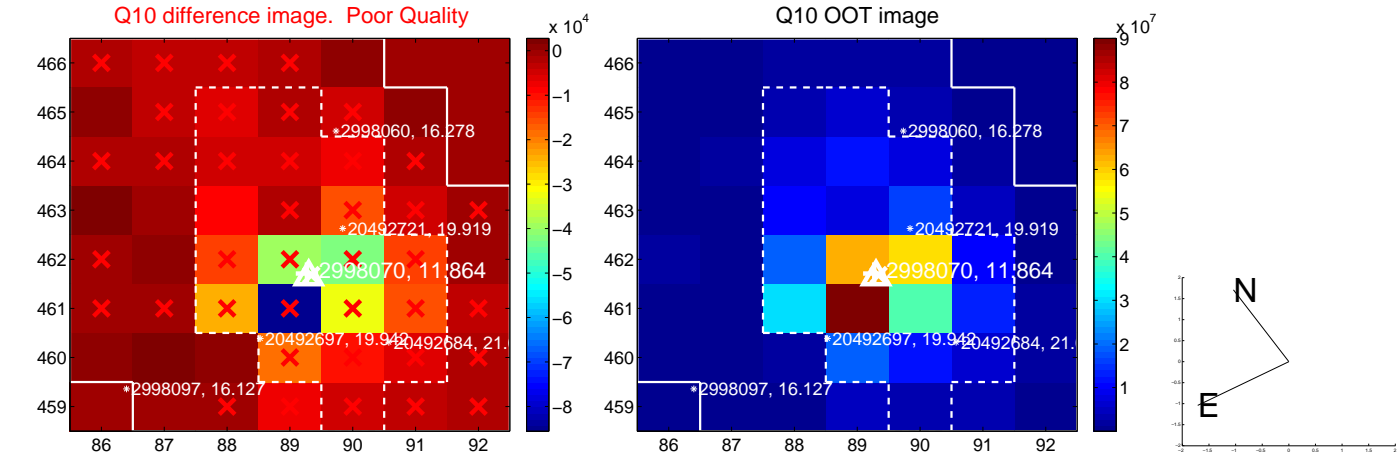
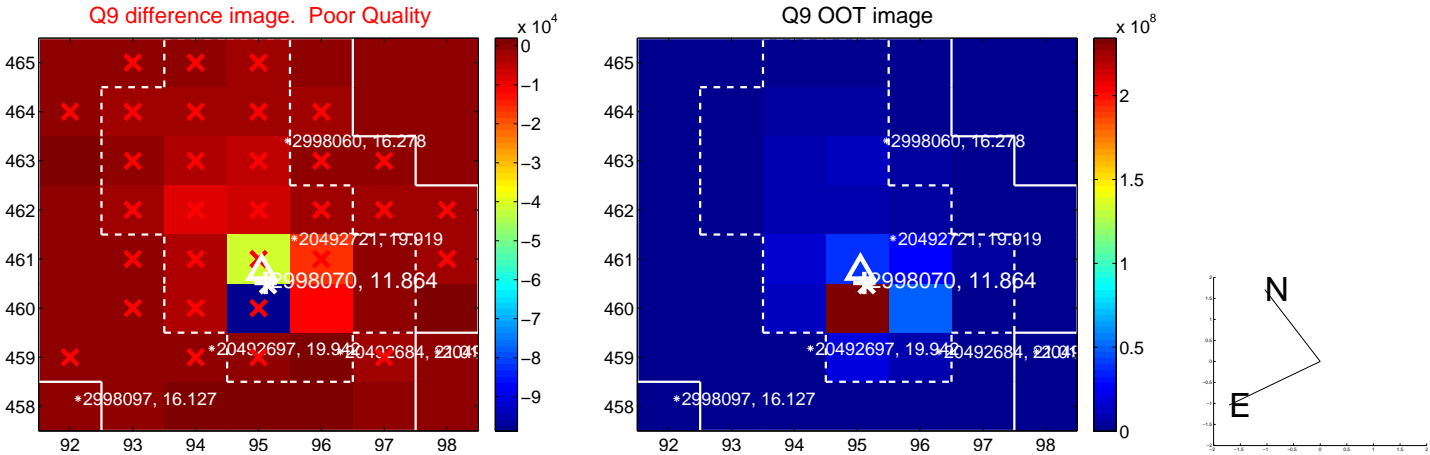
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



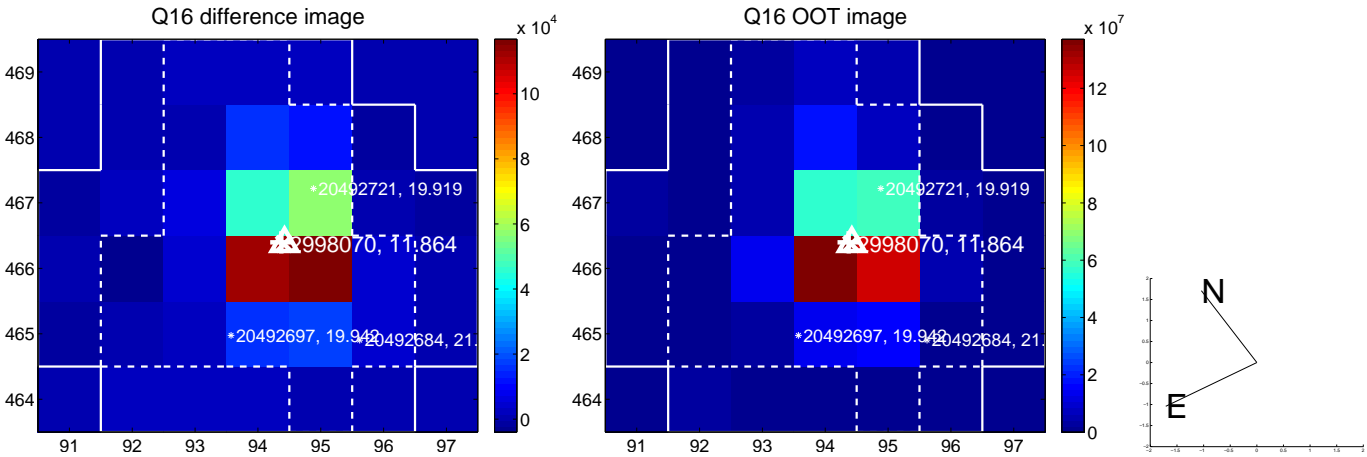
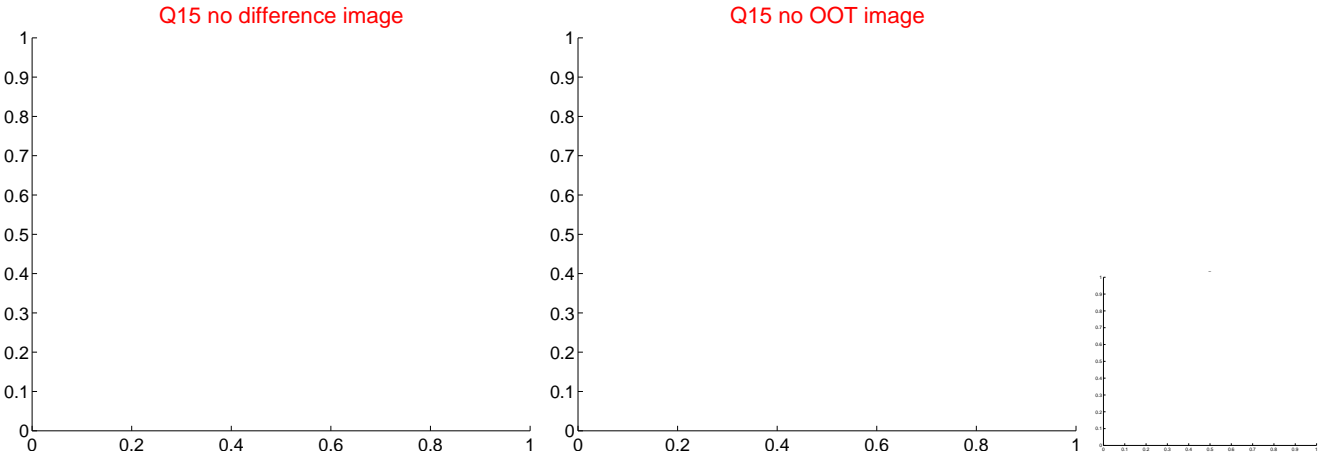
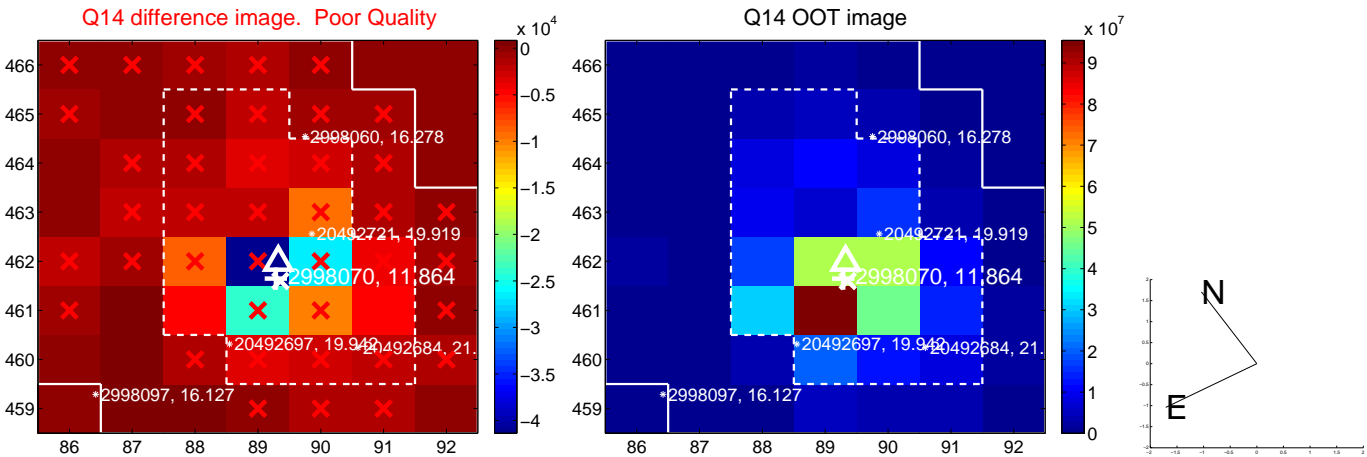
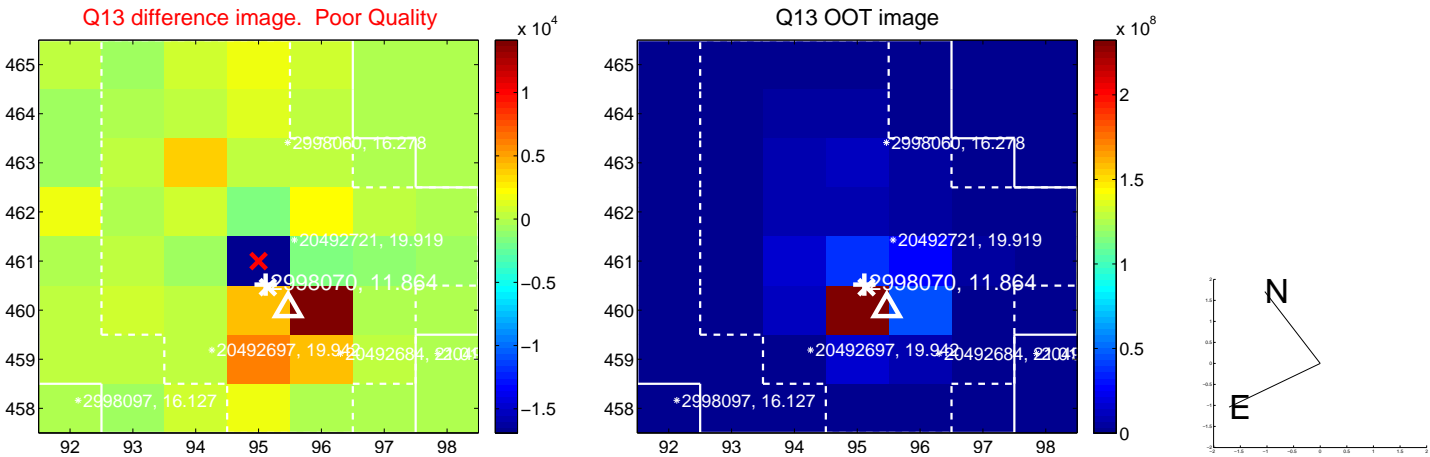
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



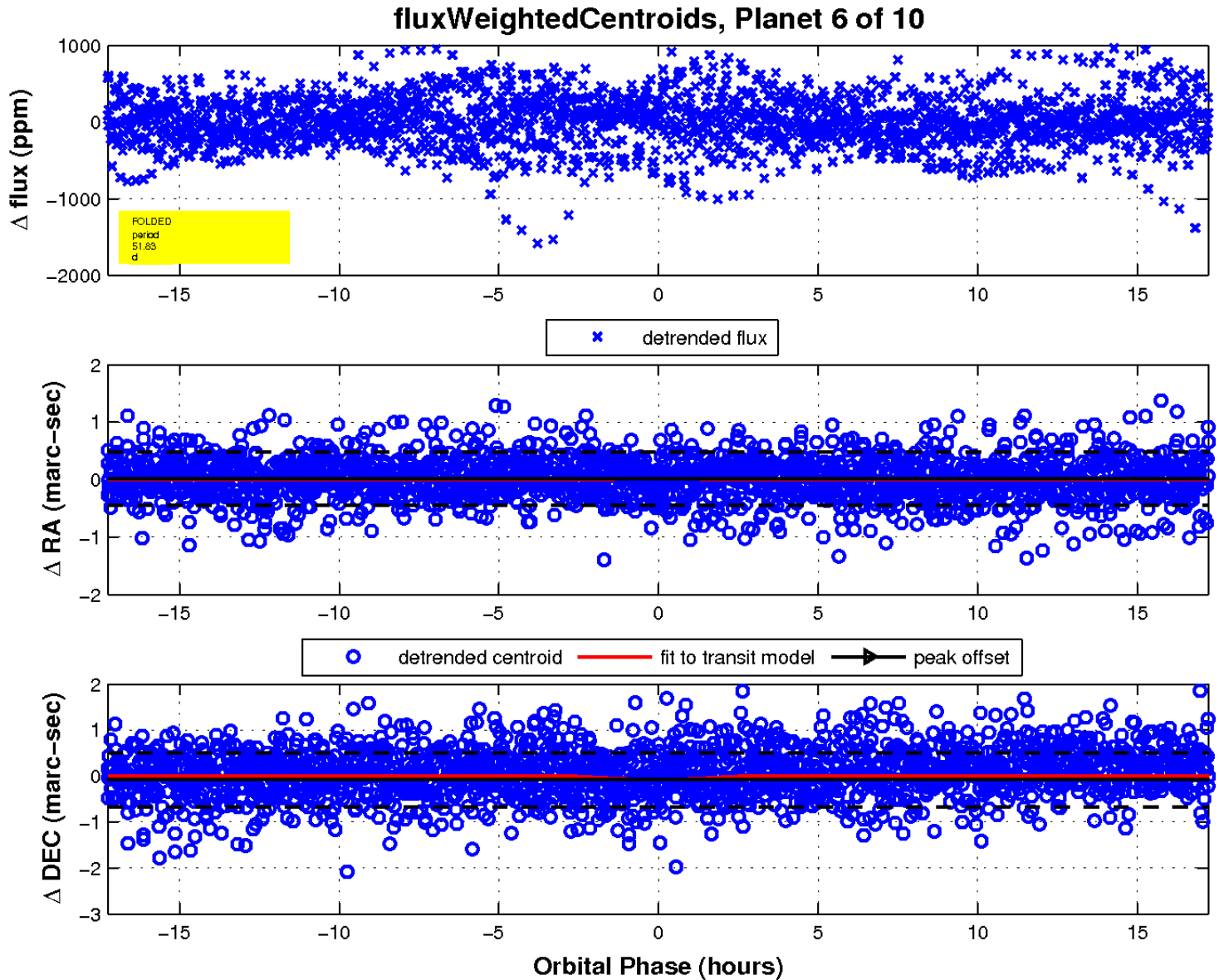
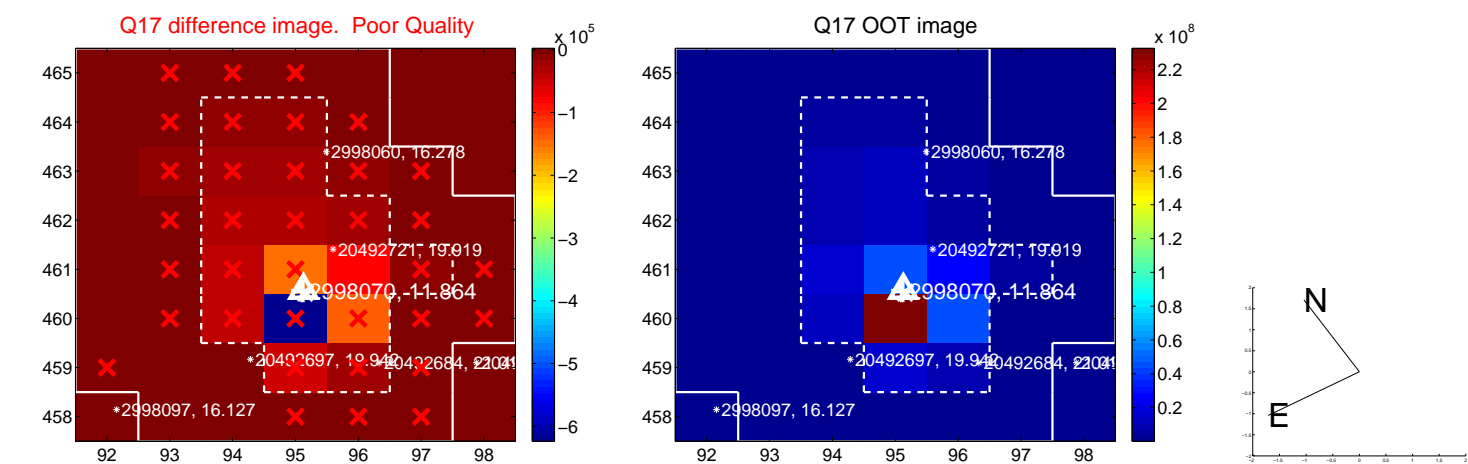
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



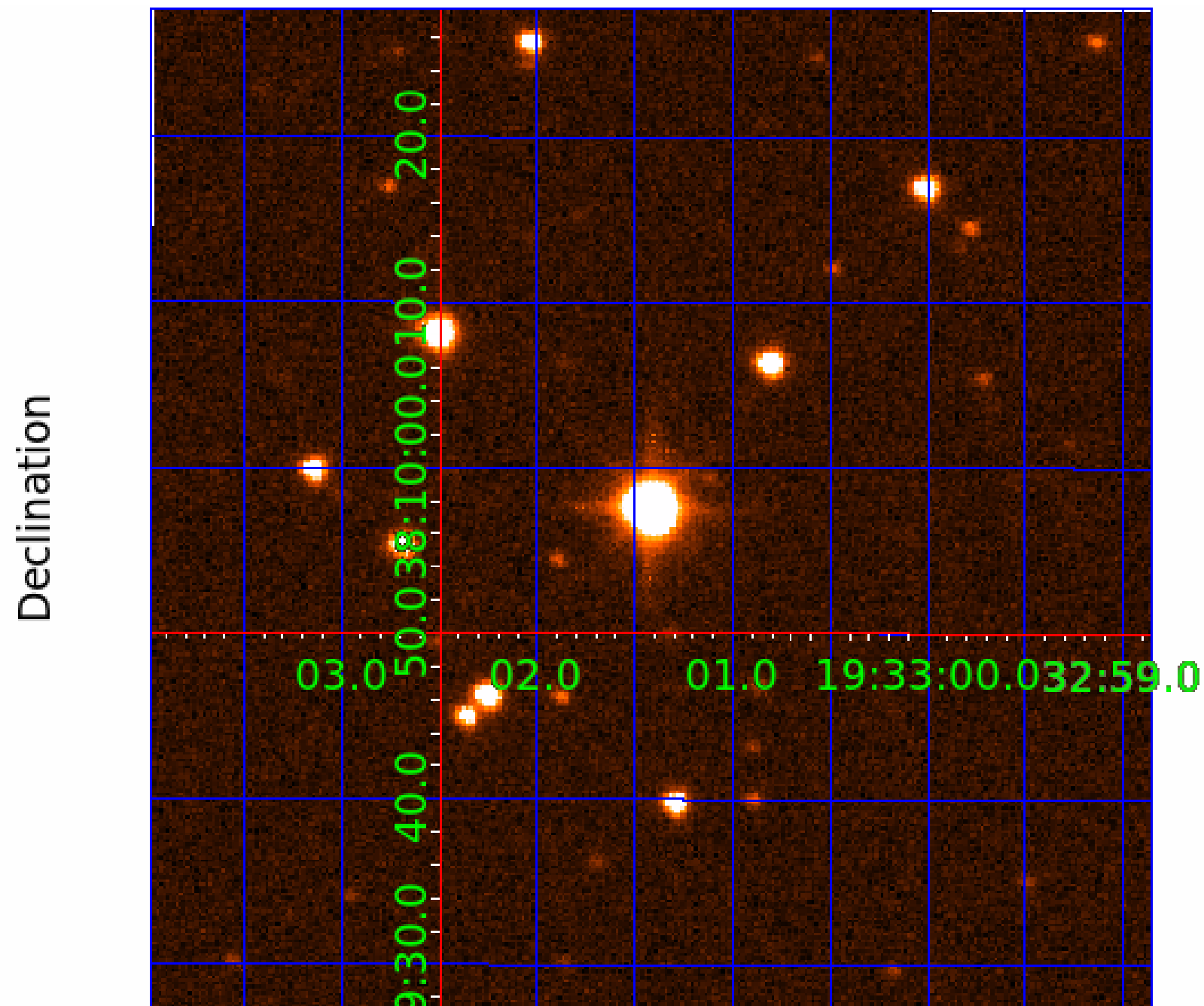
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 002998070

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

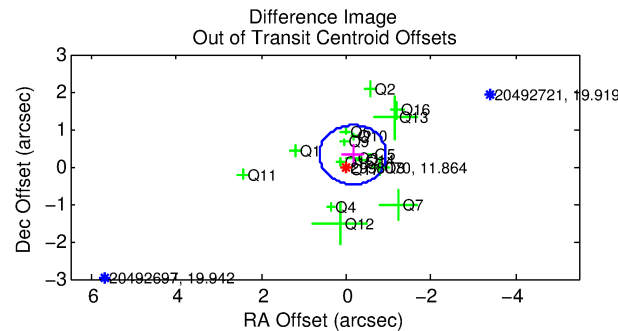
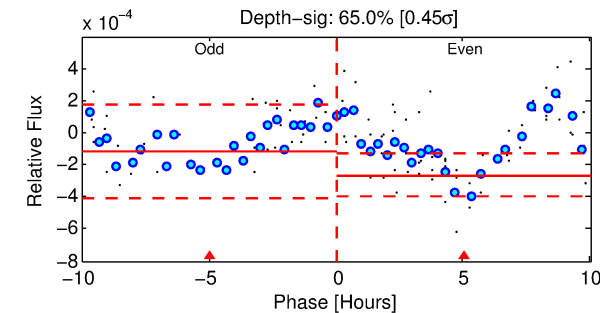
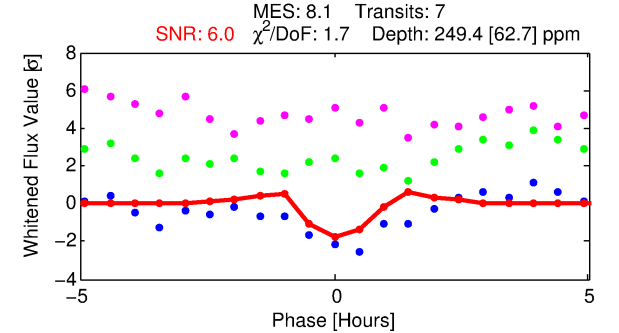
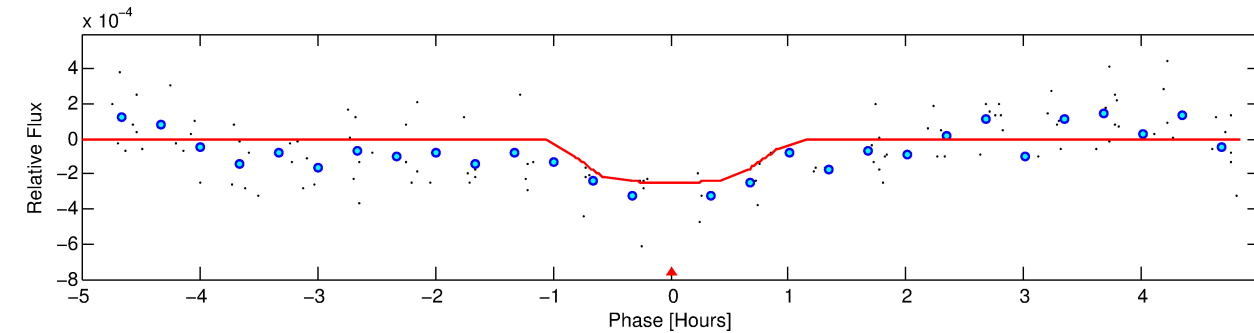
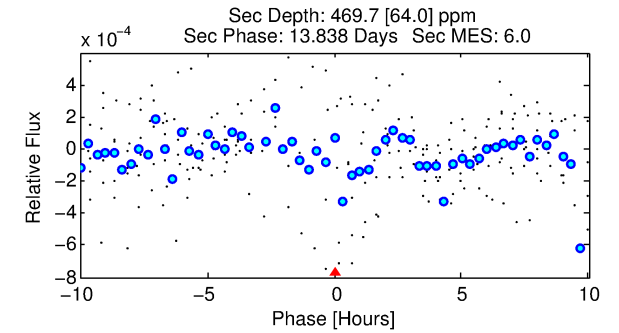
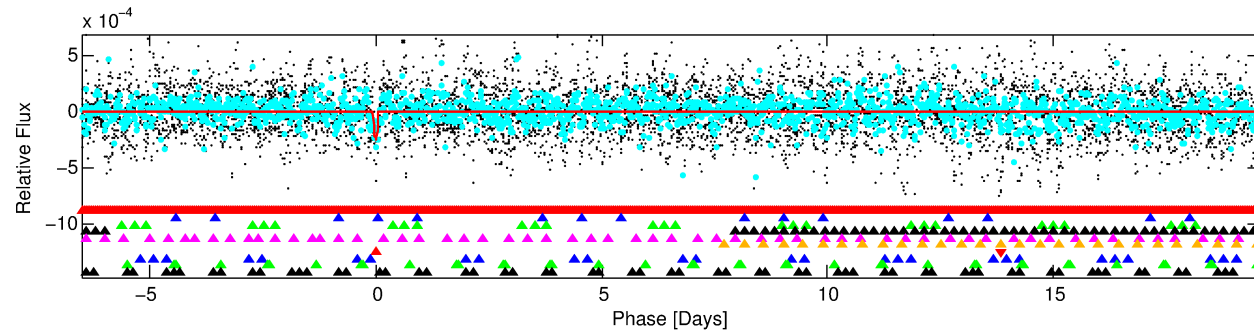
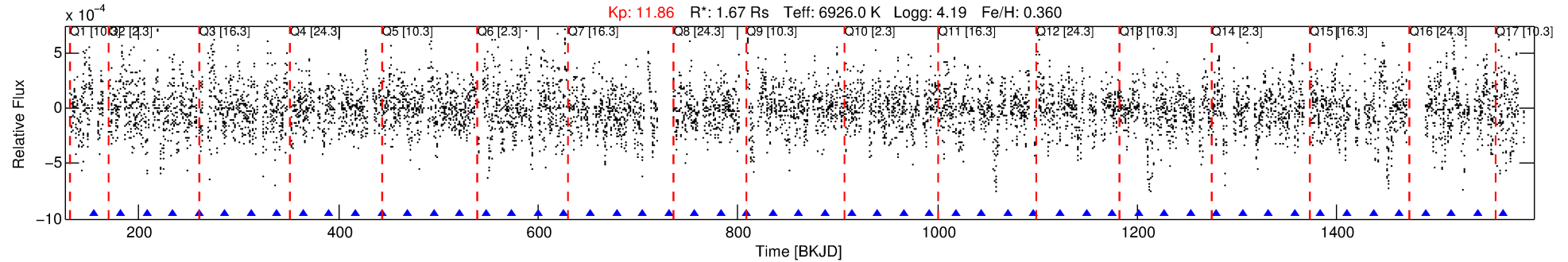
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-07

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 7 of 10 Period: 26.134 d



DV Fit Results:

Period = 26.13445 [0.00029] d
Epoch = 155.7574 [0.0088] BKJD
Rp/R* = 0.0146 [0.0470]
a/R* = 121.44 [2140.41]
b = 0.03 [687.10]
Seff = 141.95 [59.49]
Teq = 880 [92] K
Rp = 2.66 [8.59] Re
a = 0.2007 [0.0541] AU
Ag = 1470.86 [9464.79] [0.16σ]
Teffp = 8427 [13539] K [0.56σ]

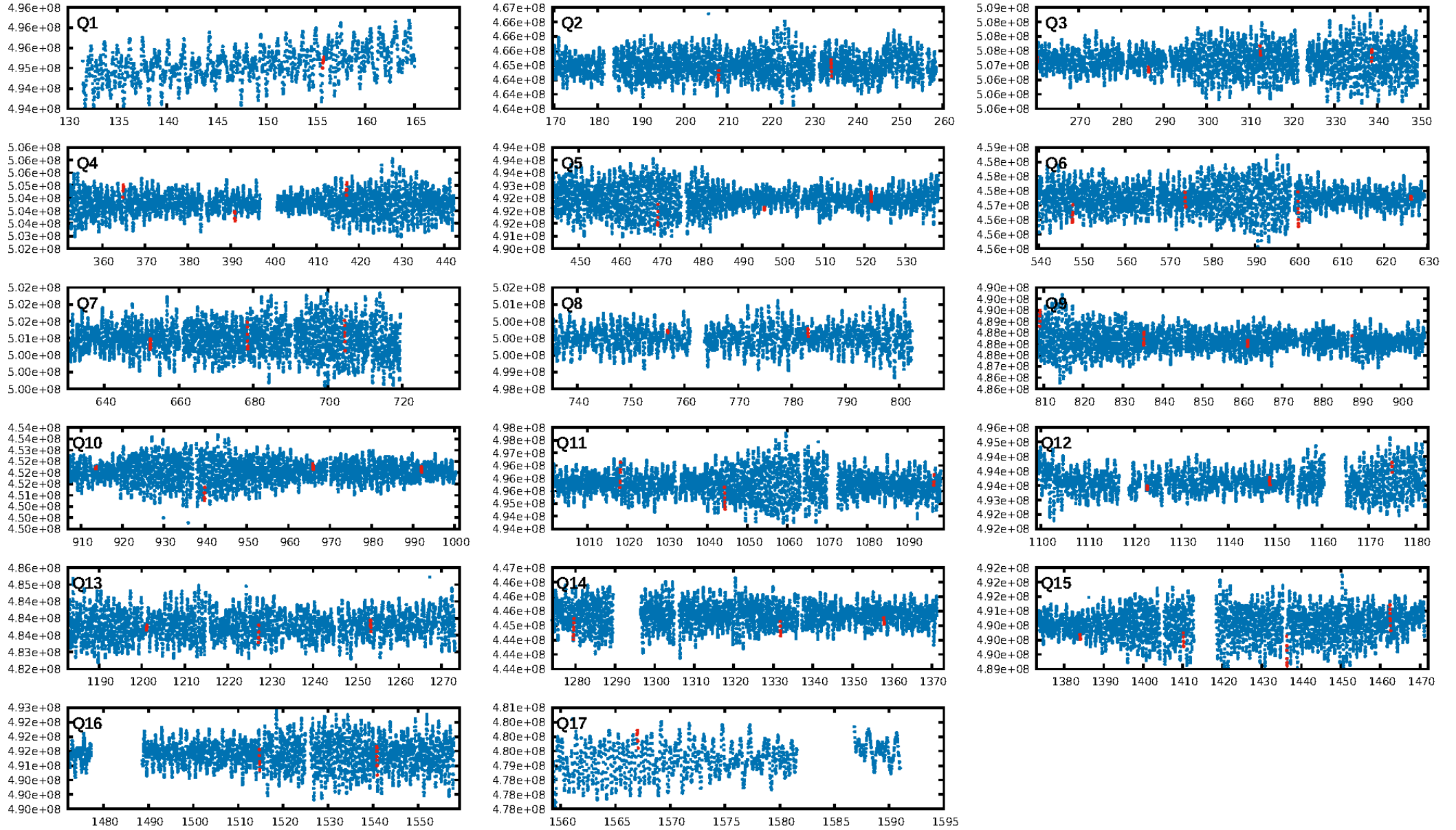
DV Diagnostic Results:

ShortPeriod-sig: 98.8% [2.50σ]
LongPeriod-sig: 100.0% [15.36σ]
ModelChiSquare2-sig: 47.3%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: 1.336
Centroid-sig: 0.1%
Centroid-so: 1.097 arcsec [2.37σ]
OotOffset-rm: 0.358 arcsec [1.36σ]
KicOffset-rm: 0.520 arcsec [2.17σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.59 [10/17]
DiffImageOverlap-fno: 0.24 [4/17]

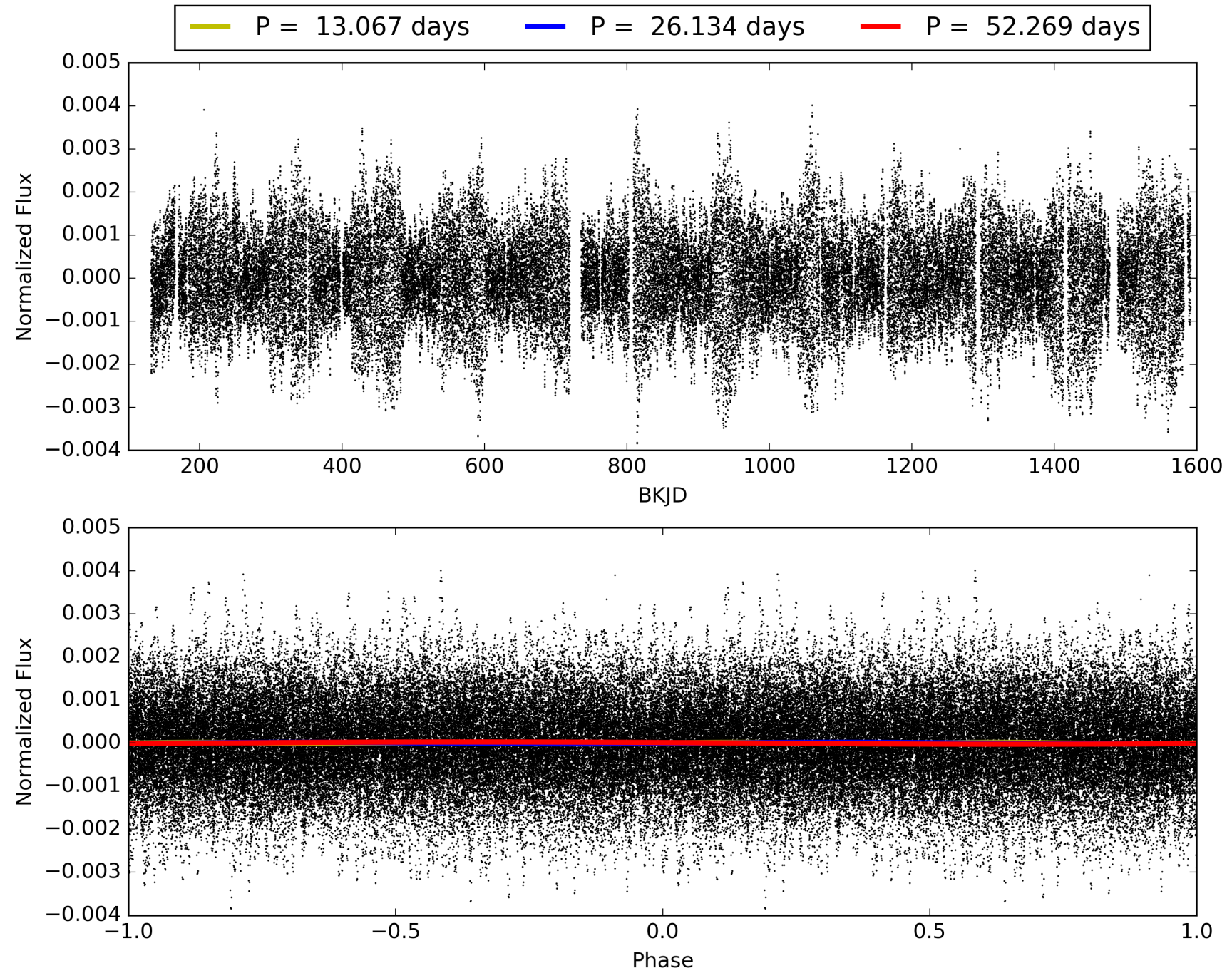
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:50 Z

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

TCE 002998070-07, PDC Light Curves

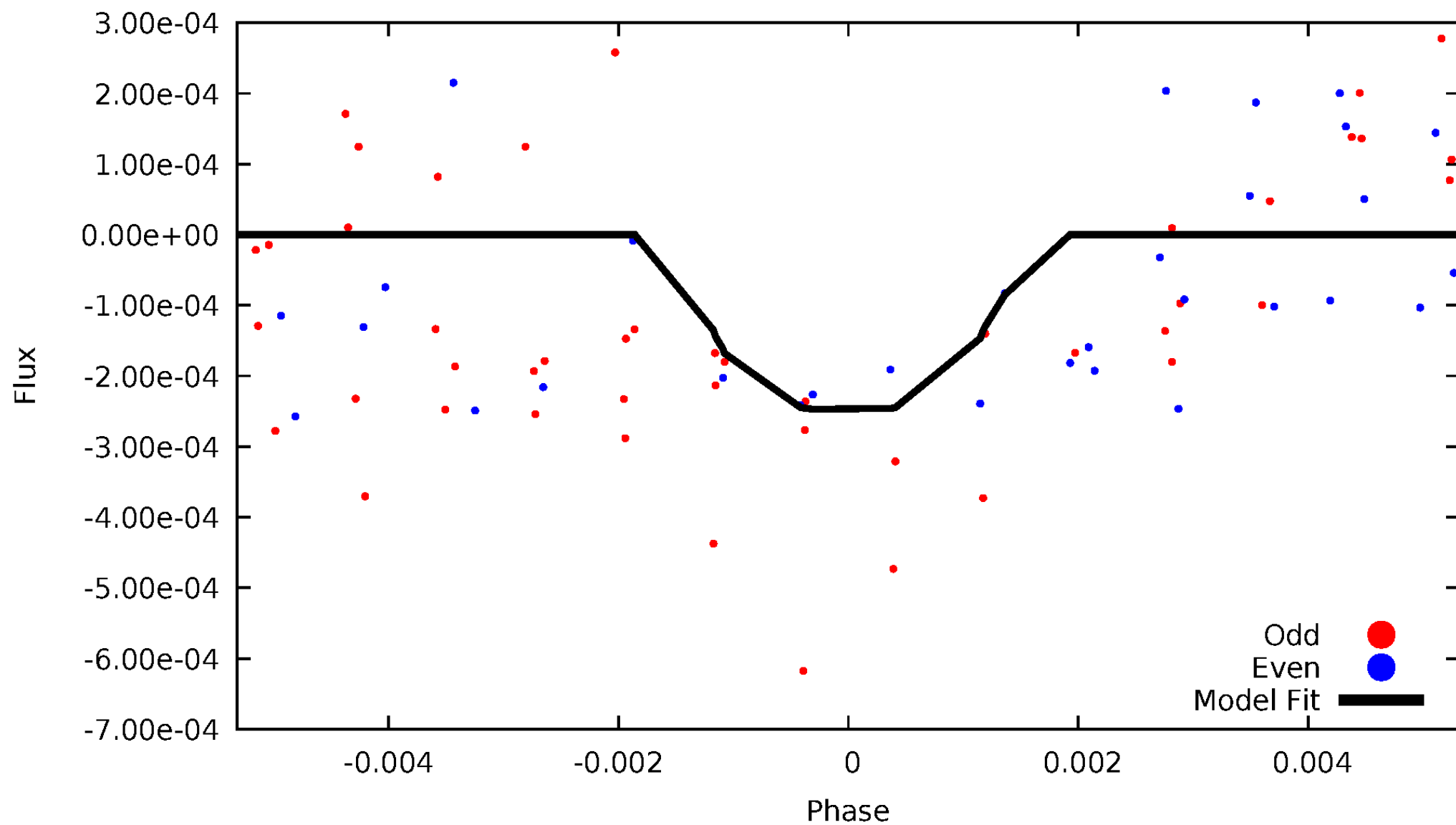


TCE 002998070-07



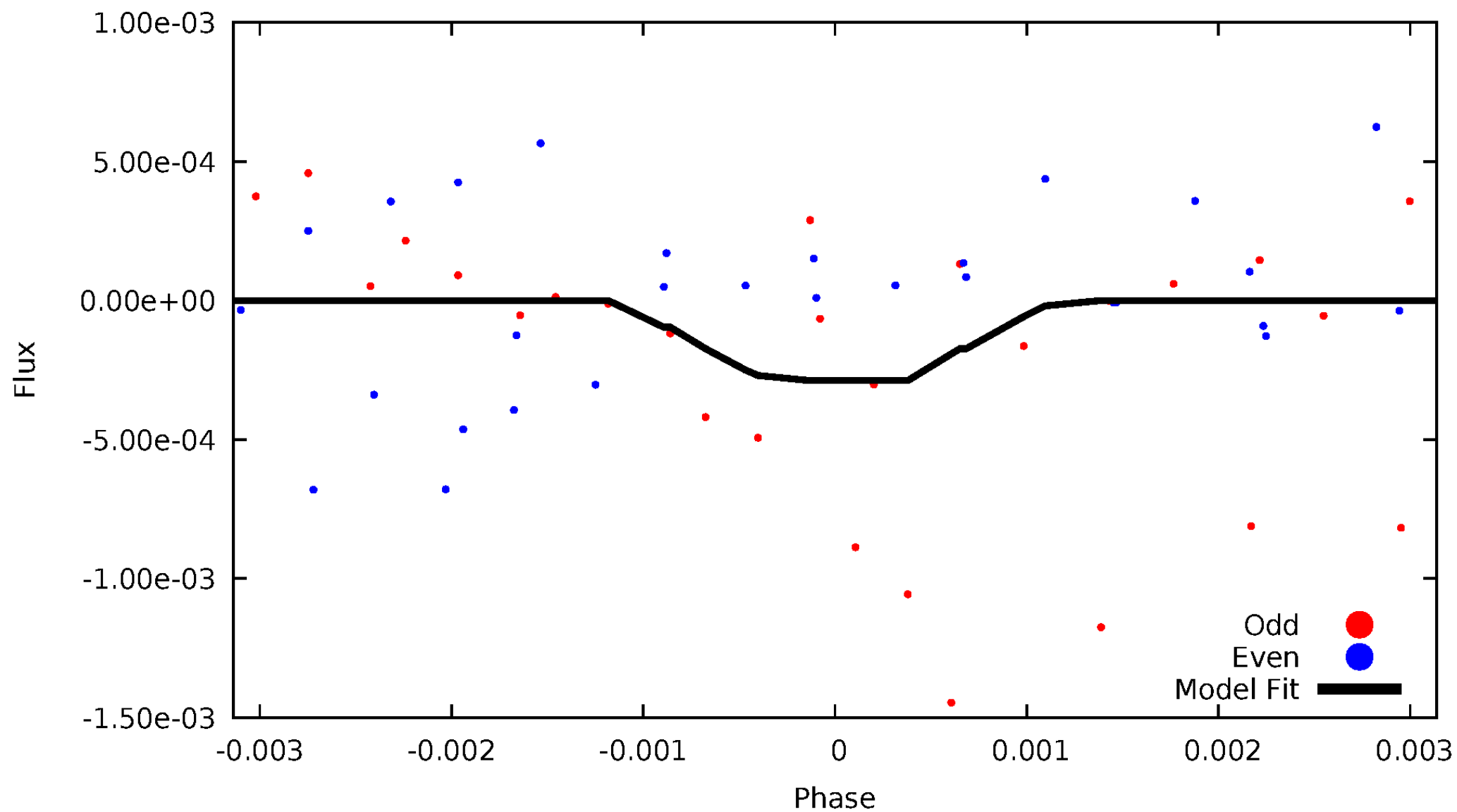
DV Odd/Even

TCE 002998070-07



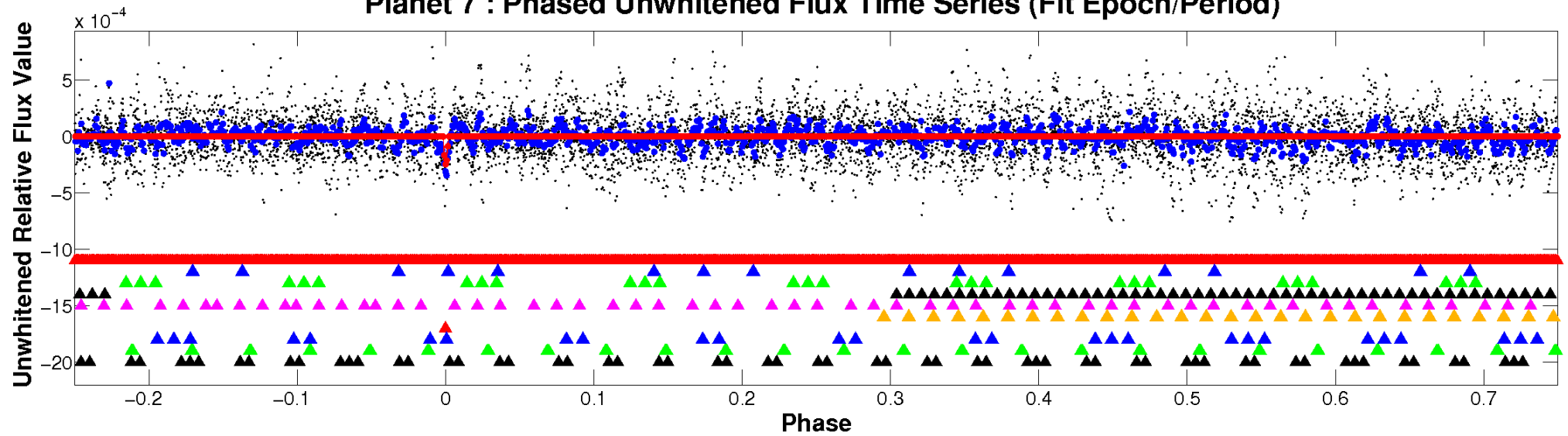
ALT Odd/Even

TCE 002998070-07

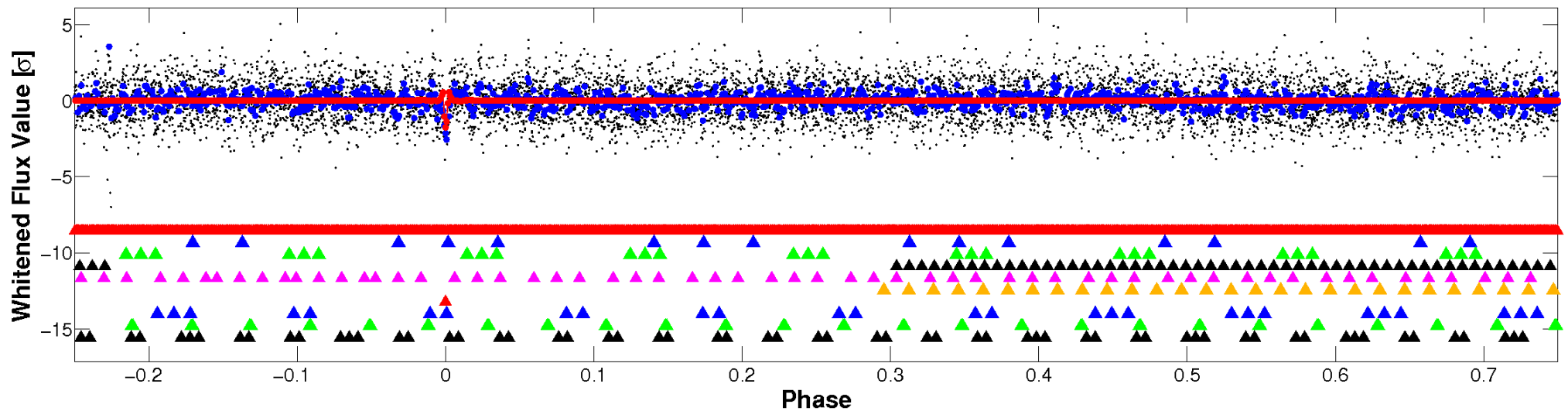


Non-Whitened Vs. Whitened Light Curve

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

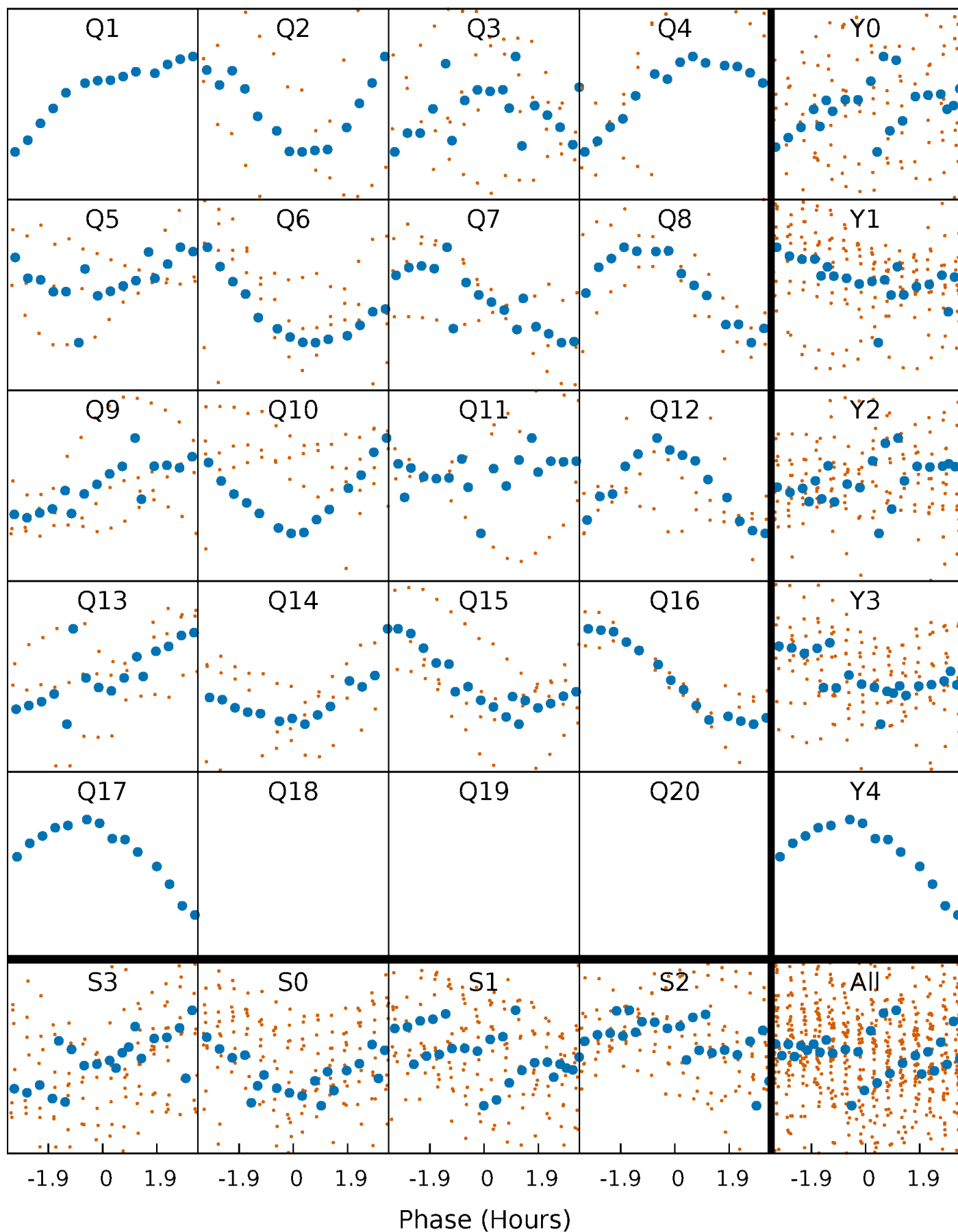


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



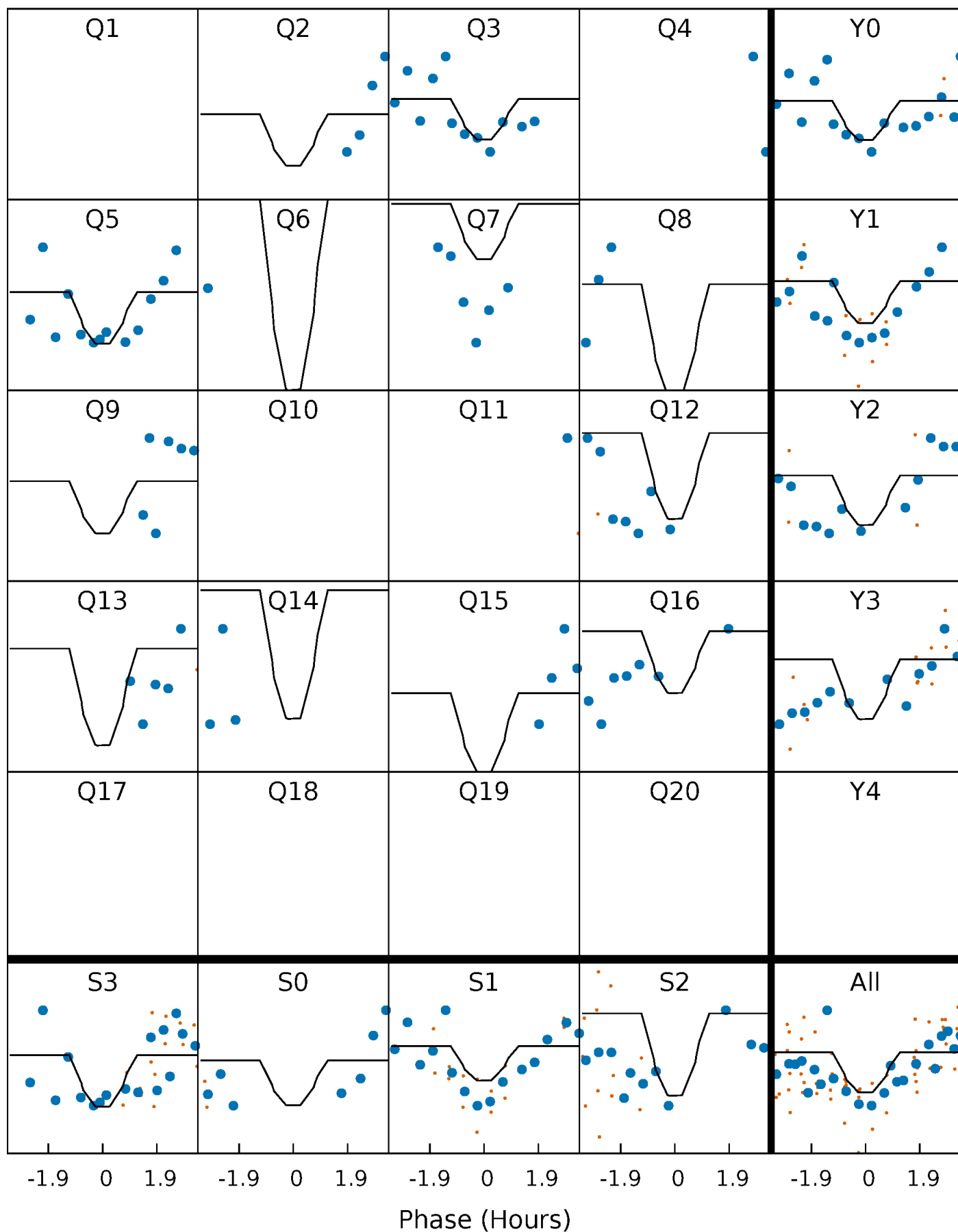
PDC Quarter-Phased Transit Curves

TCE 002998070-07 P= 26.134454 Days $T_0=155.757382$ (BKJD)



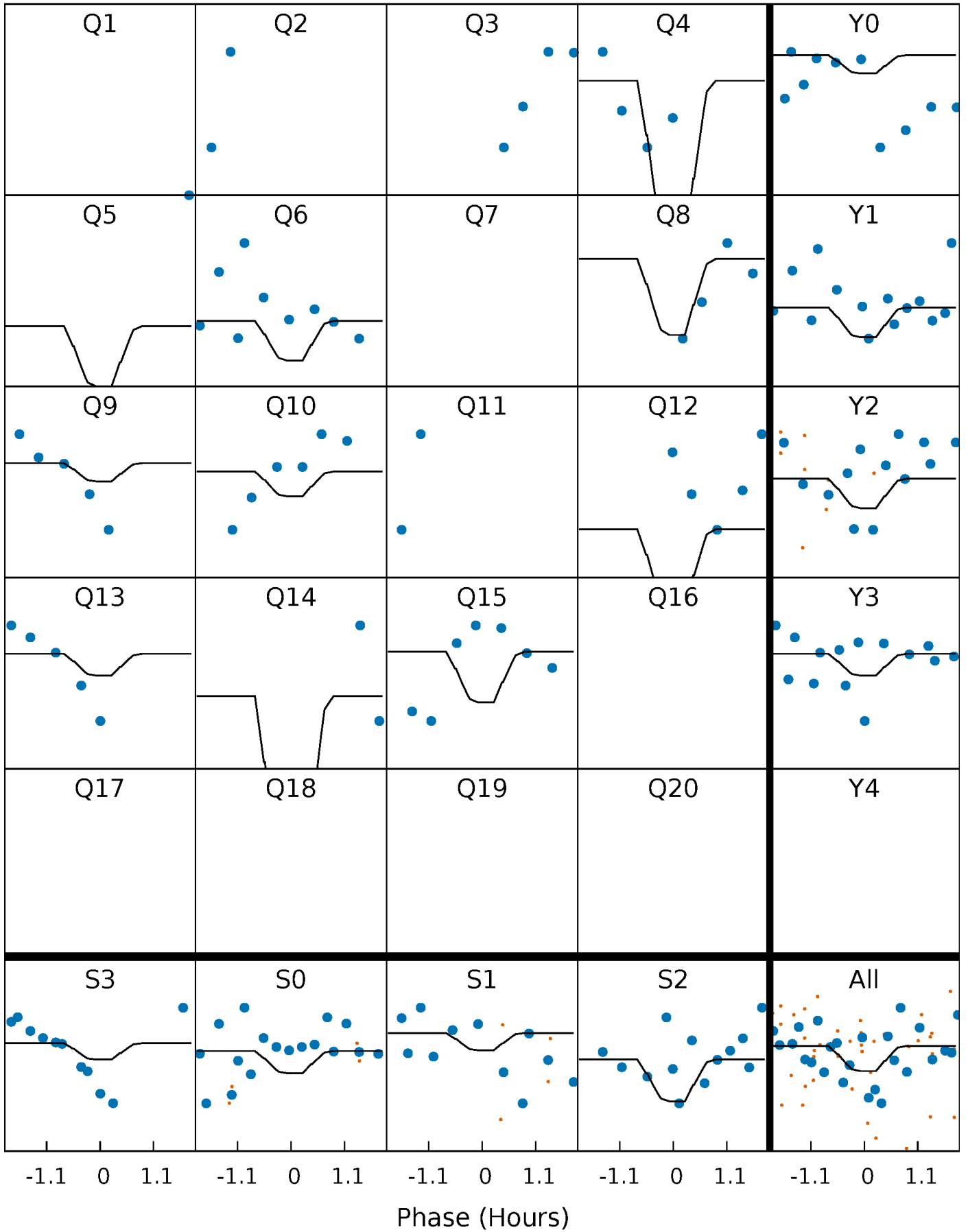
DV Quarter-Phased Transit Curves

TCE 002998070-07 P= 26.134454 Days $T_0=155.757382$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

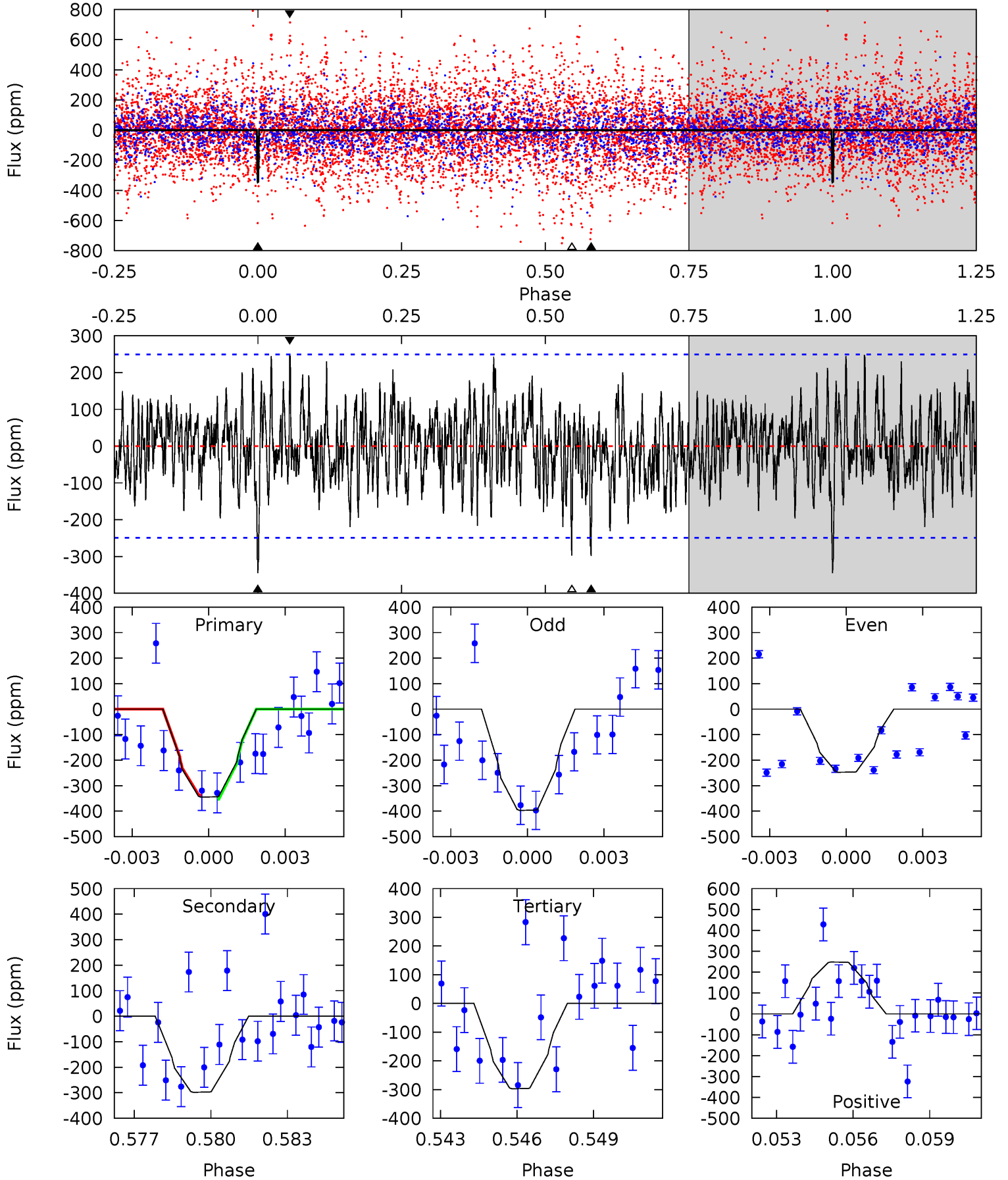
TCE 002998070-07 P= 26.132594 Days $T_0=155.599366$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-07, P = 26.134454 Days, E = 129.622928 Days

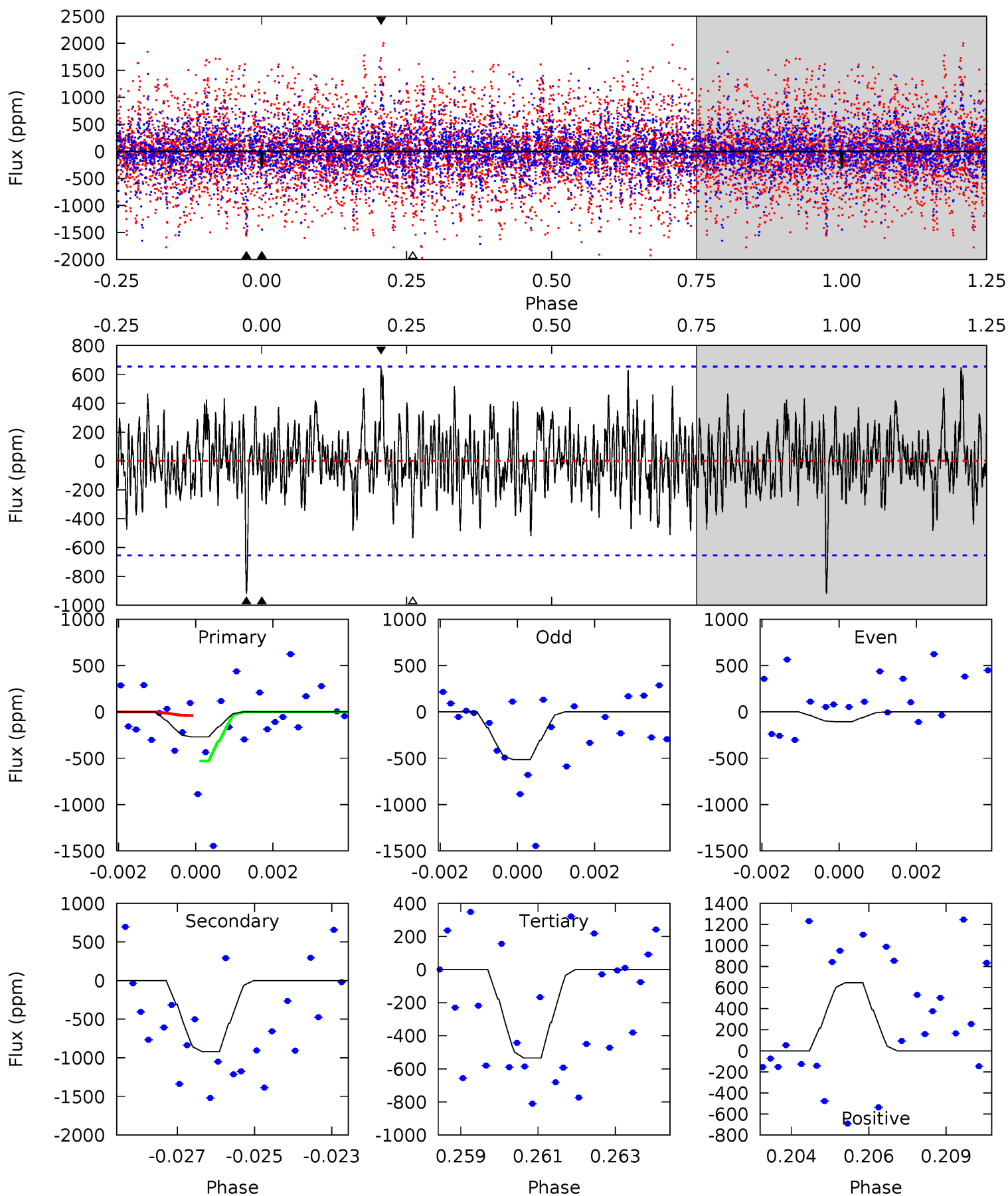
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.27	6.28	6.26	5.23	5.25	2.96	1.70	1.01	2.04	0.02	1.05	1.53	1.18	0.42	0.17



Alt Model-Shift Uniqueness Test

002998070-07, P = 26.132594 Days, E = 129.466772 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.18	7.46	4.33	5.25	5.30	3.05	1.47	-2.15	-3.07	3.13	2.21	1.56	17.9	0.41	2.01



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-298 ± 47	$7.29^{+6.96}_{-5.10}$	1249^{+94}_{-74}	4756^{+3940}_{-1047}	123^{+1227}_{-91}
Alt.	-920 ± 123	$7.72^{+7.63}_{-5.20}$	1245^{+94}_{-71}	5849^{+6233}_{-1436}	345^{+2709}_{-258}

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

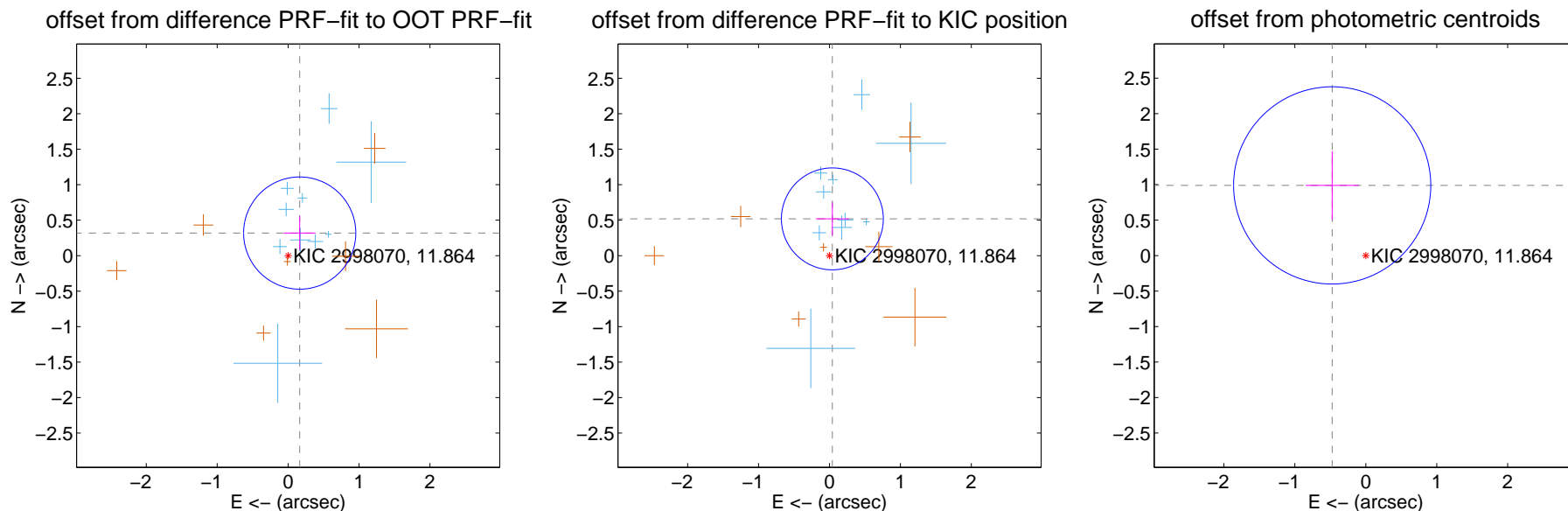
DV Centroid Data

Supplemental centroid analysis for 002998070-07. **Kepler magnitude: 11.86.** Transit SNR 5.97

There are 10 quarters with good PRF difference image offsets

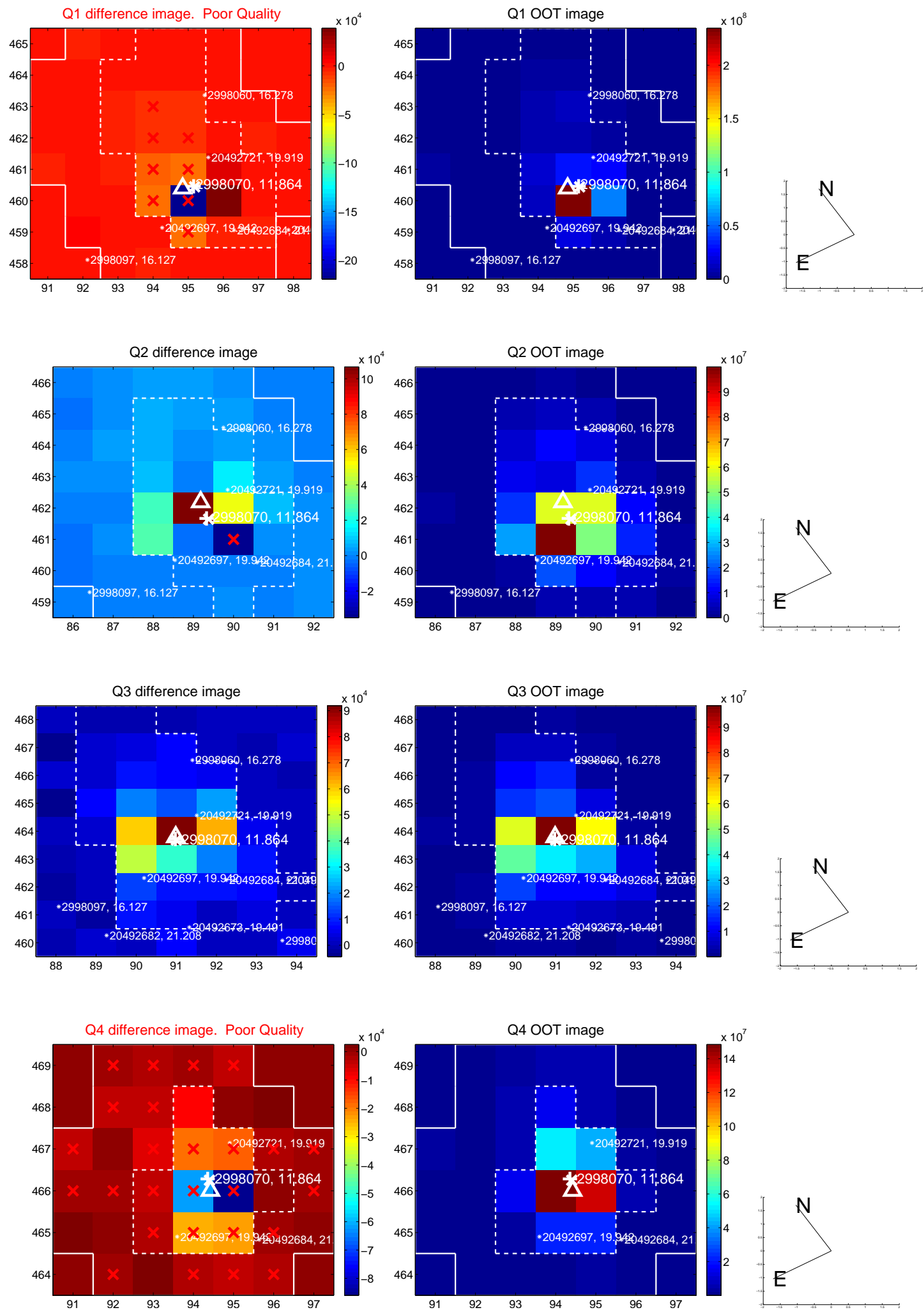
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.358 ± 0.264	1.36	-0.163 ± 0.223	0.319 ± 0.237
PRF-fit source offset from KIC position	0.520 ± 0.240	2.17	-0.041 ± 0.231	0.518 ± 0.233
photometric centroid source offset	1.10 ± 0.46	2.37	0.47 ± 0.38	0.99 ± 0.48

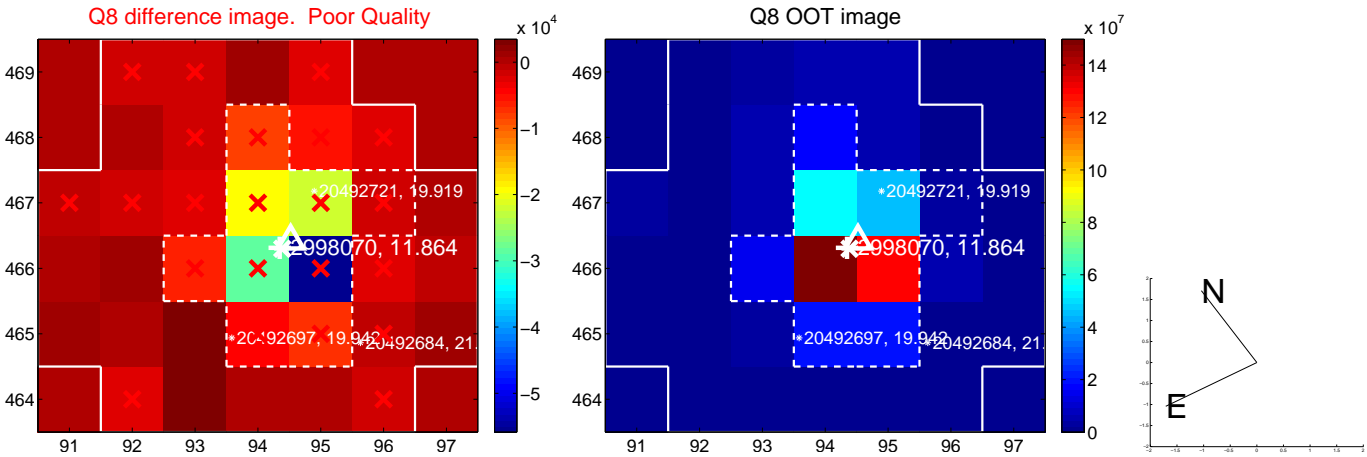
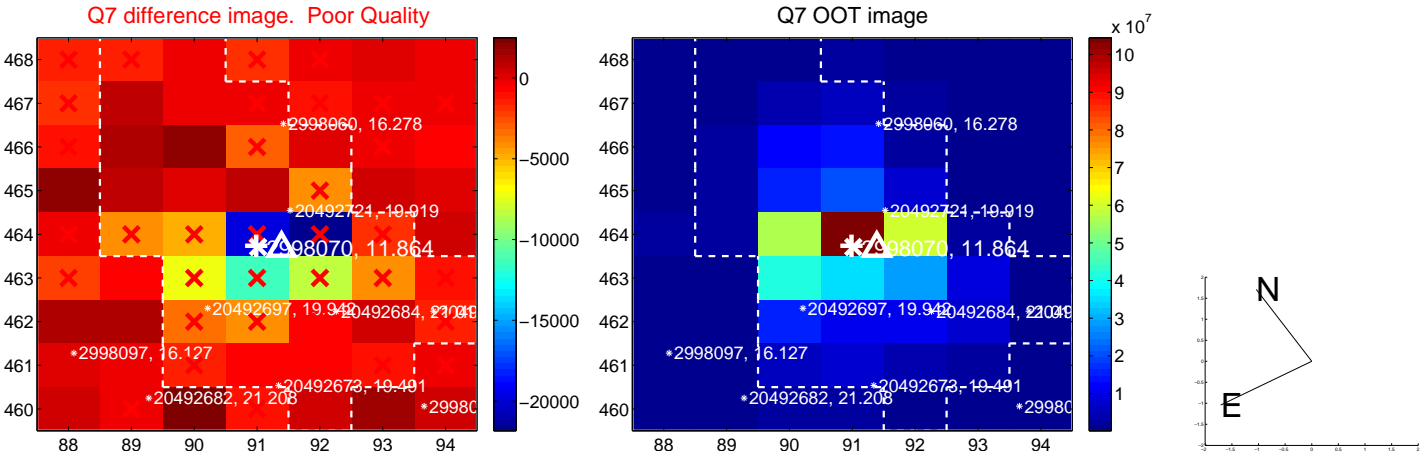
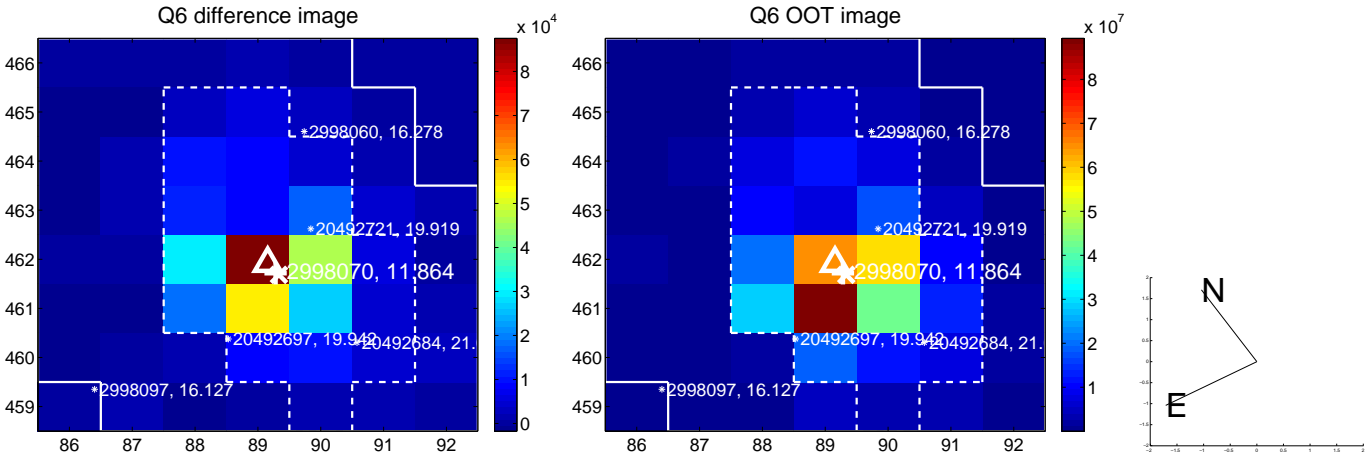
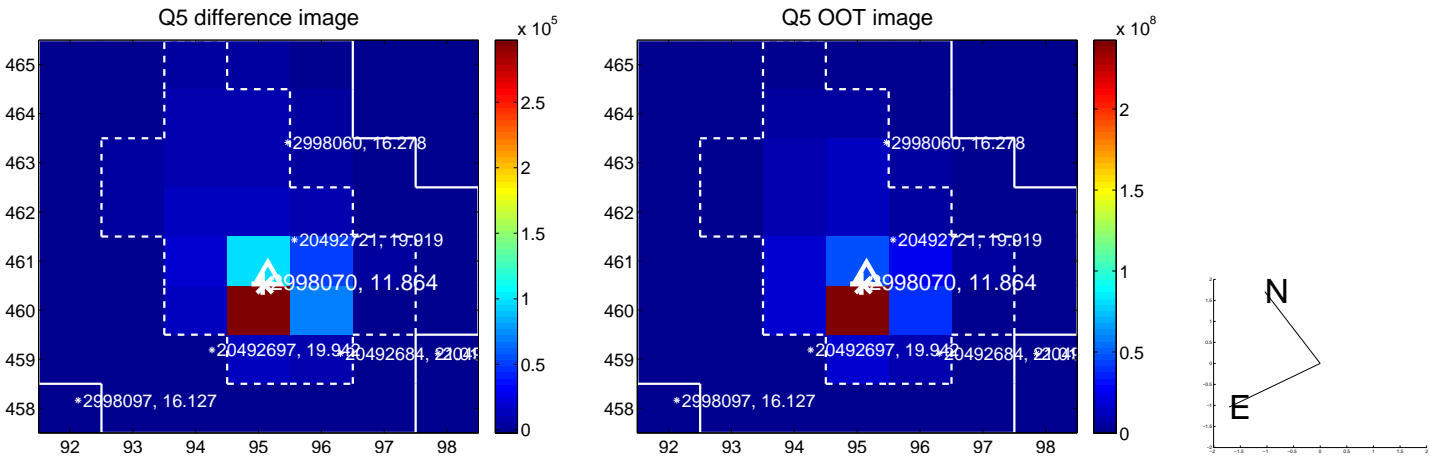


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

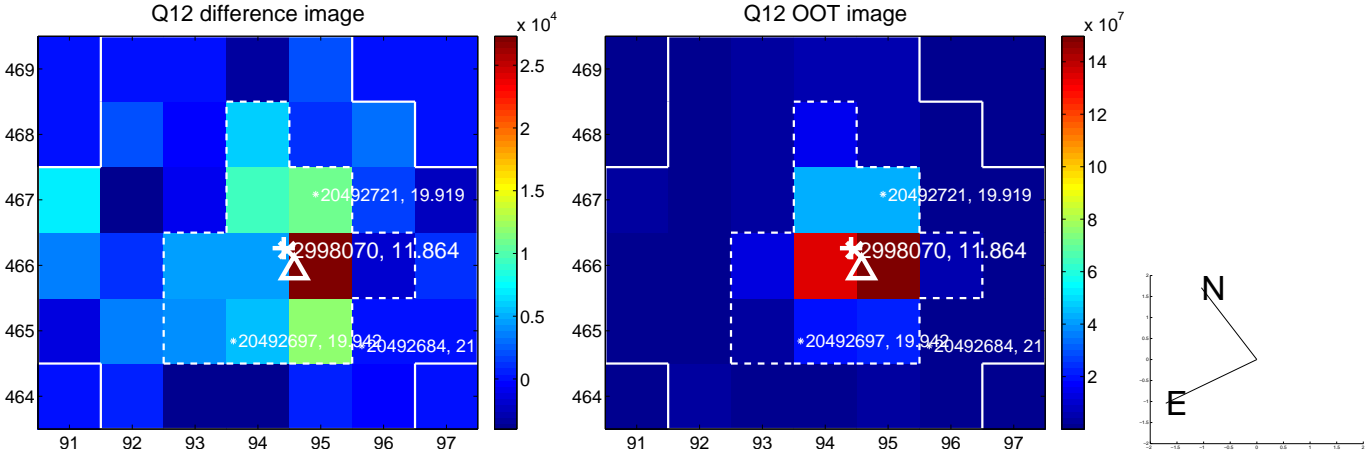
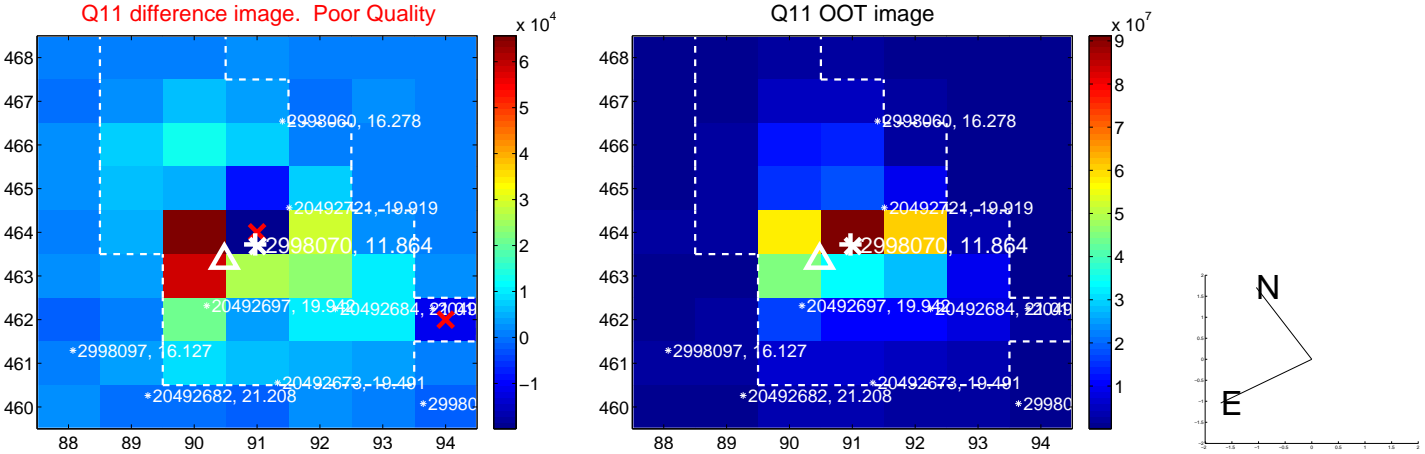
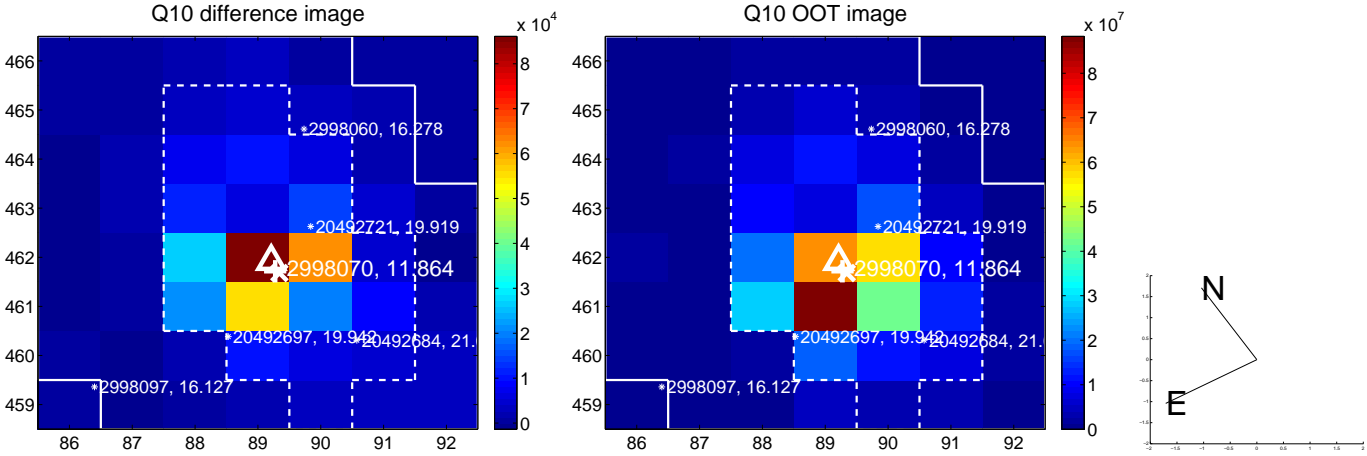
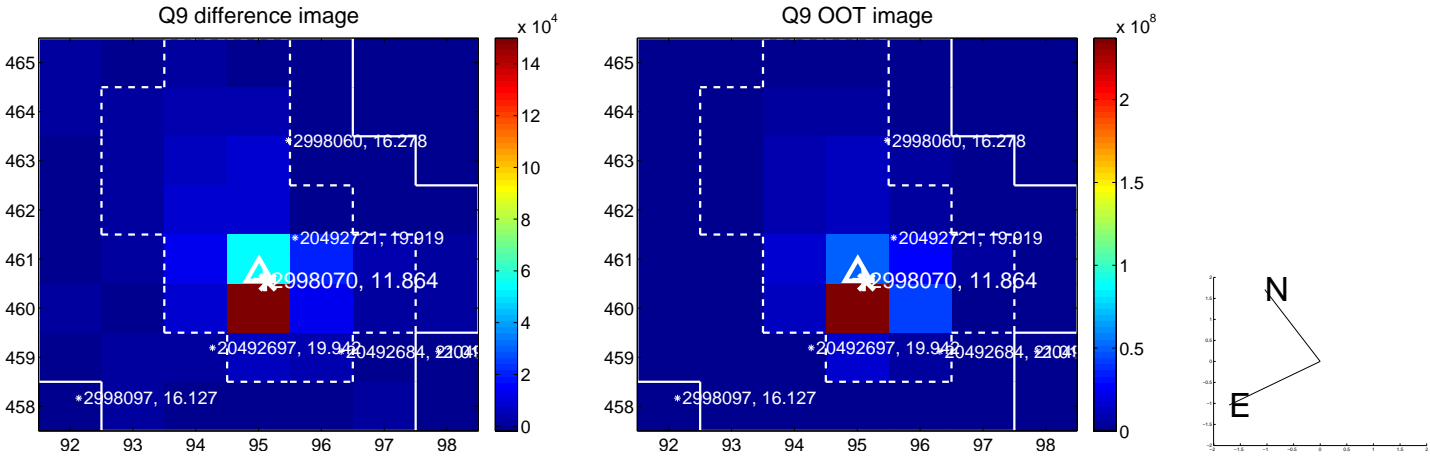
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



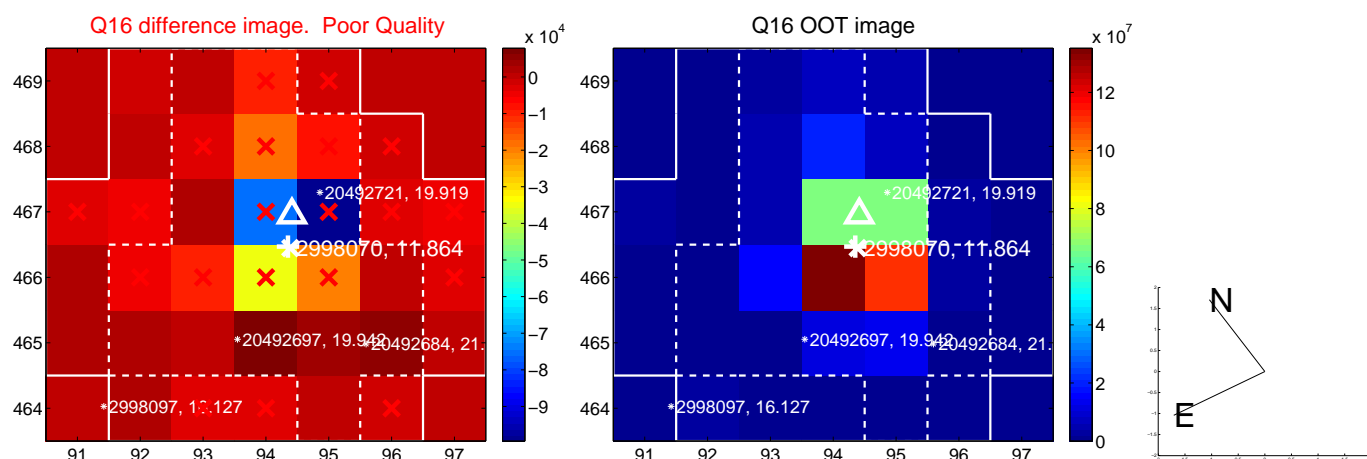
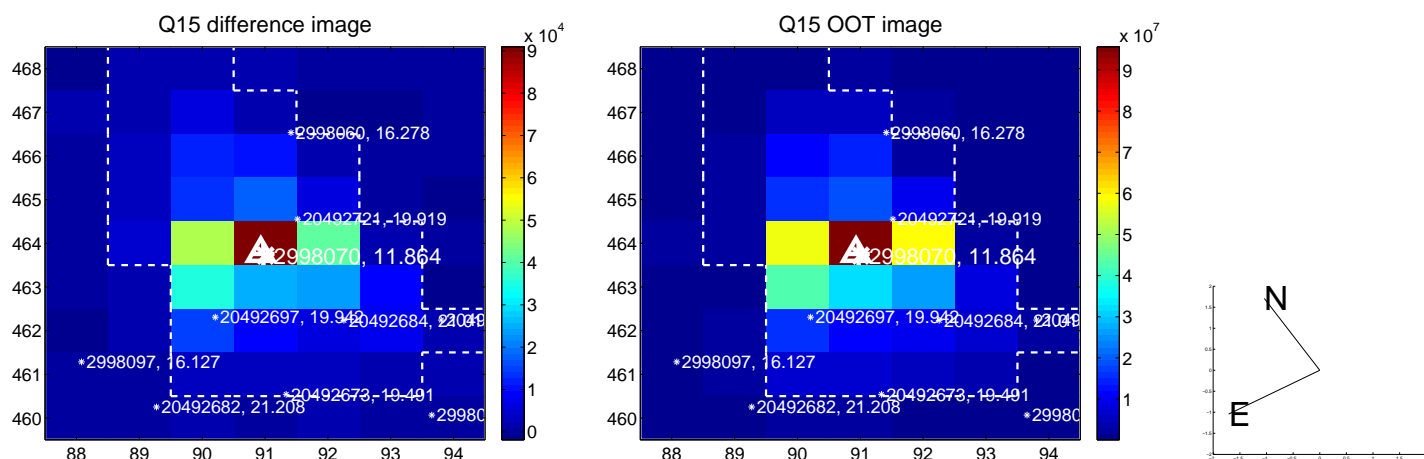
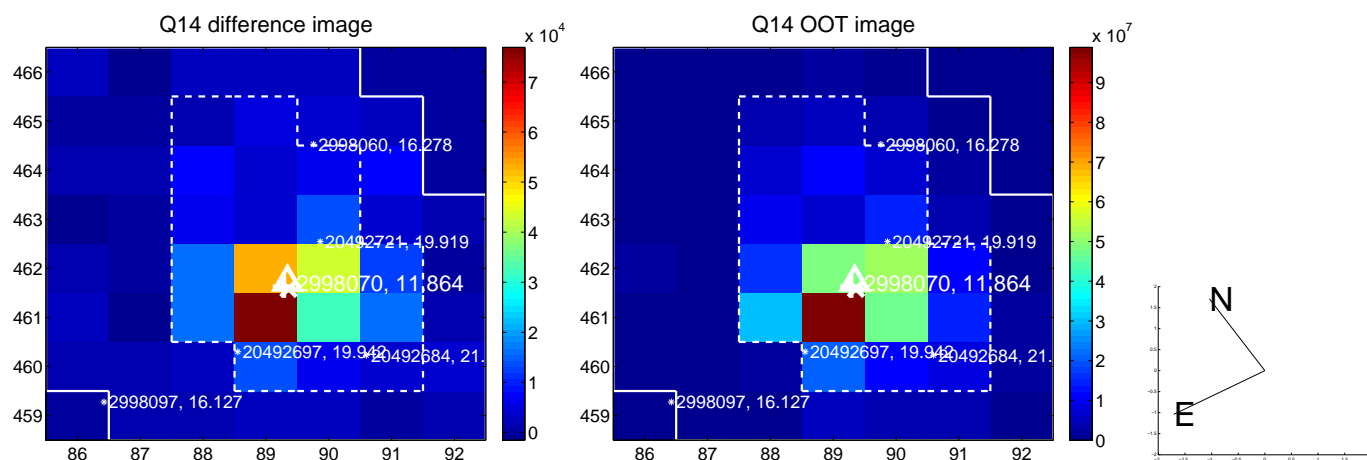
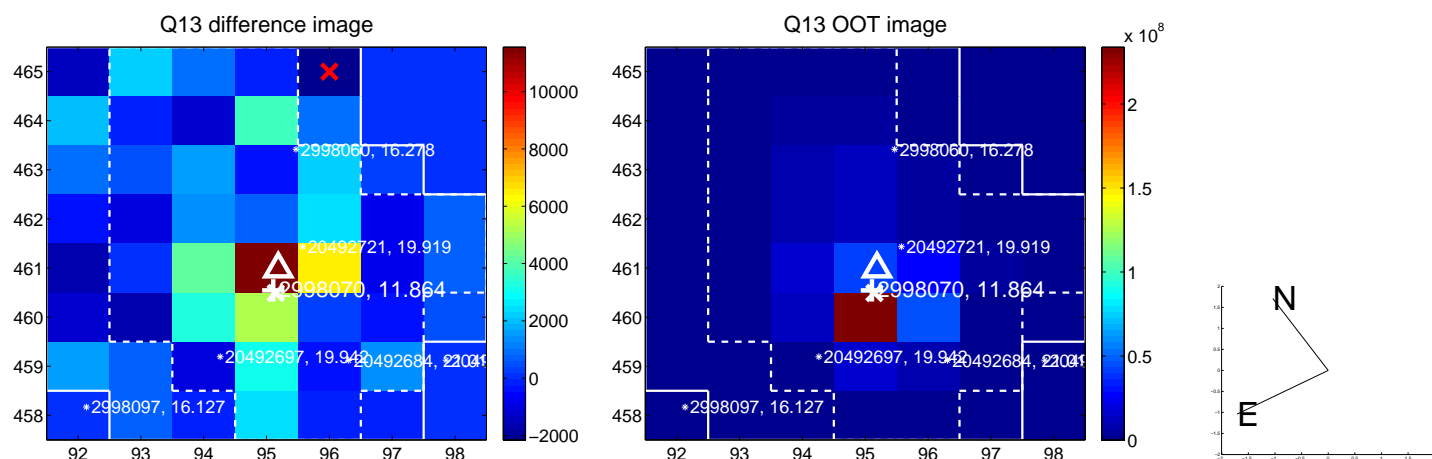
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



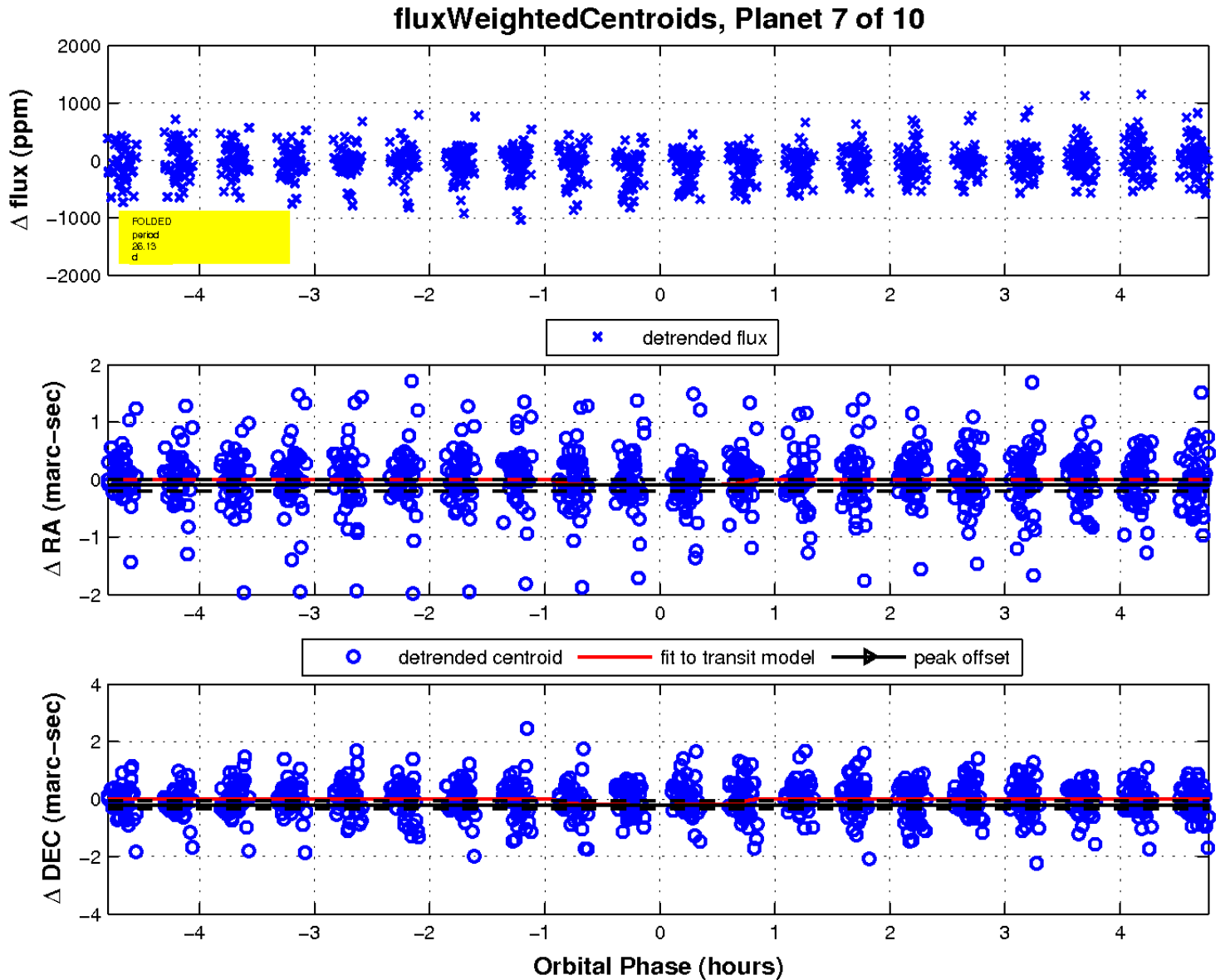
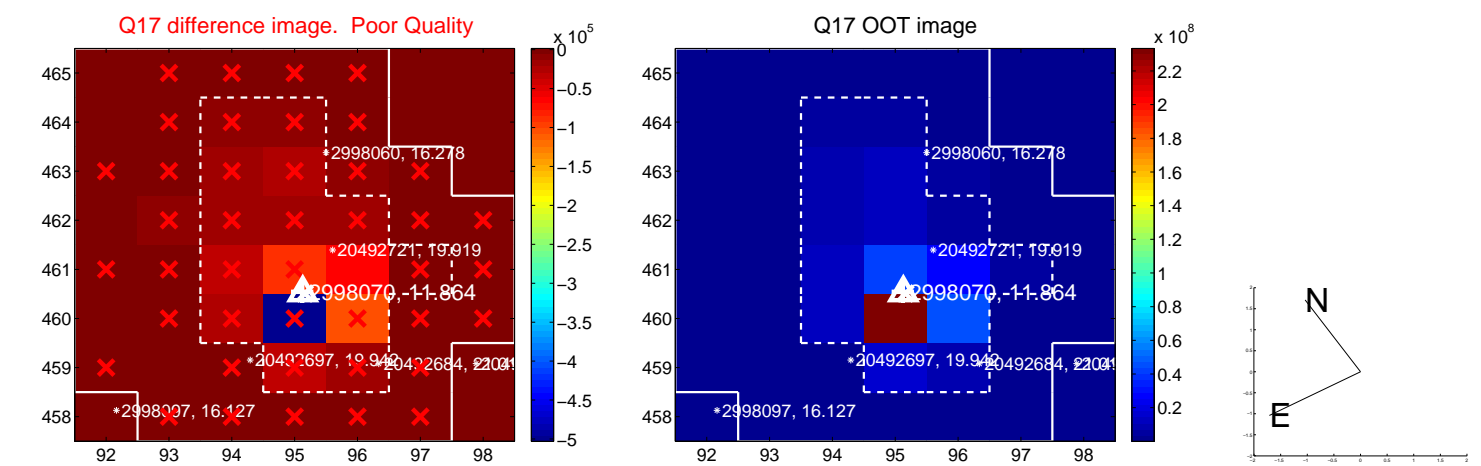
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



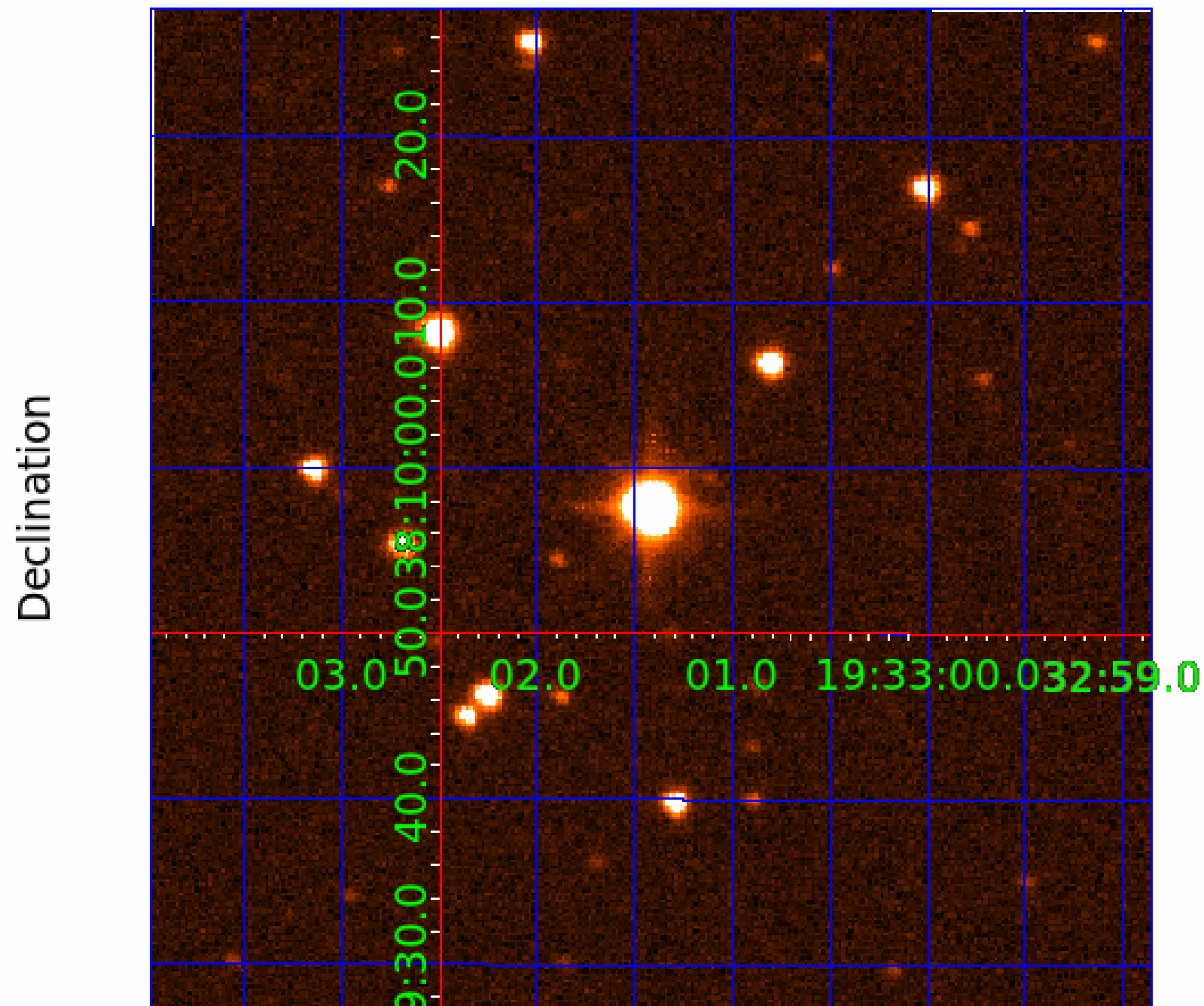
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

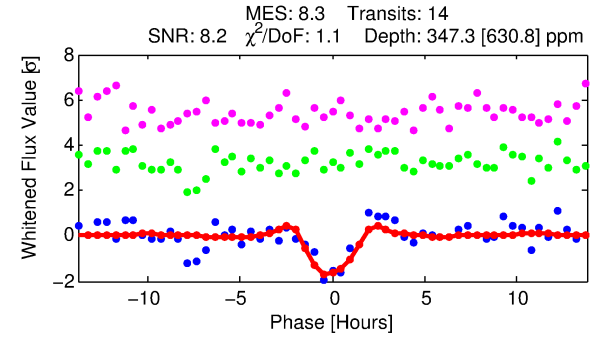
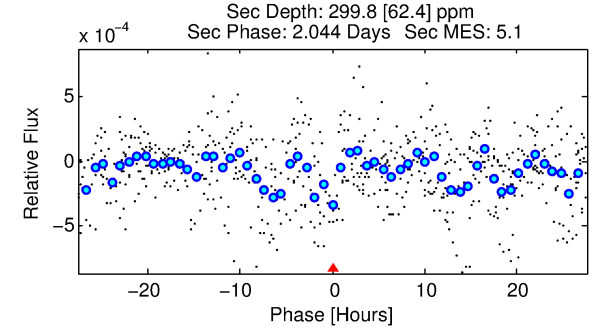
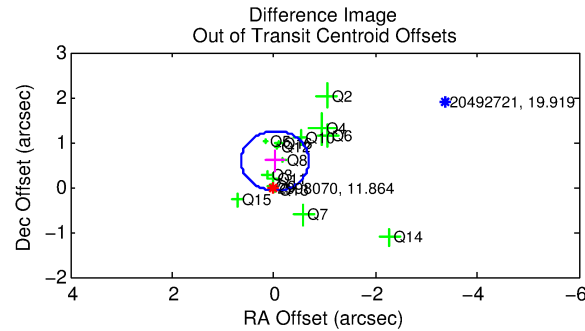
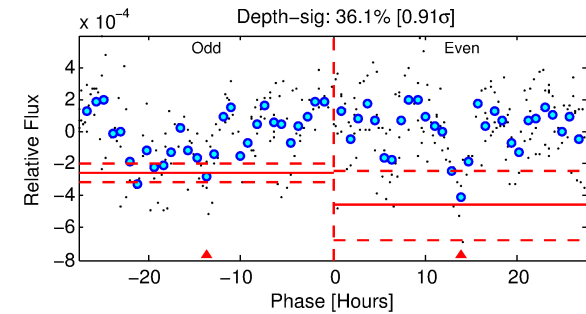
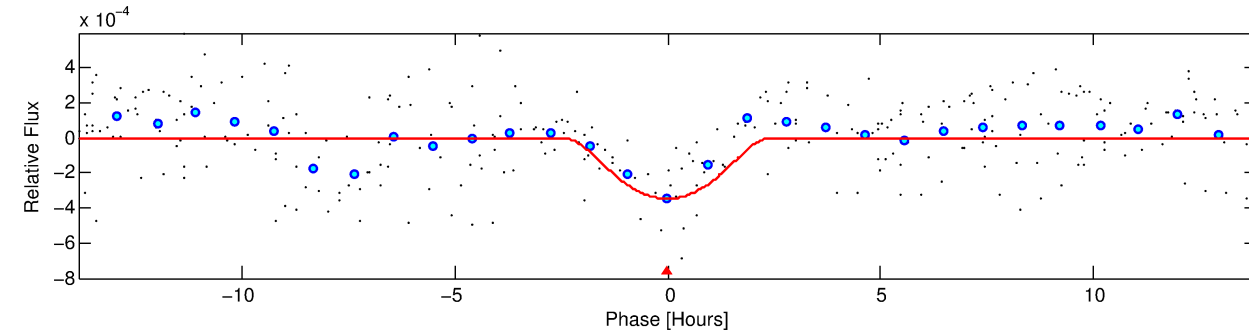
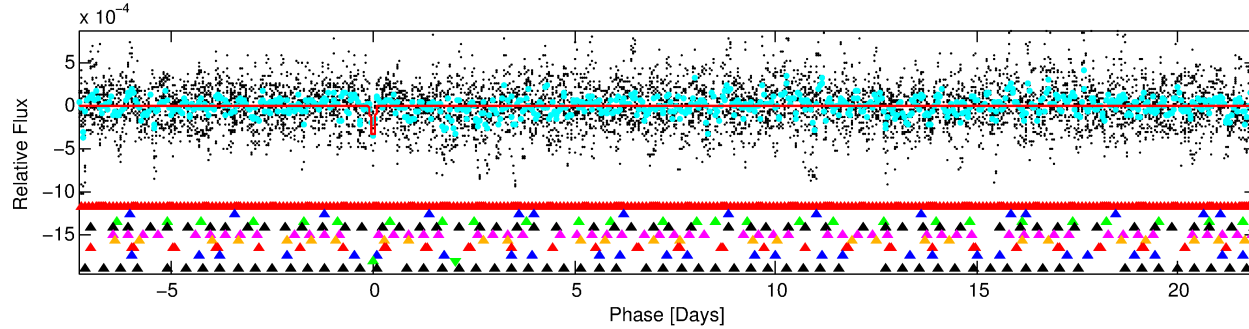
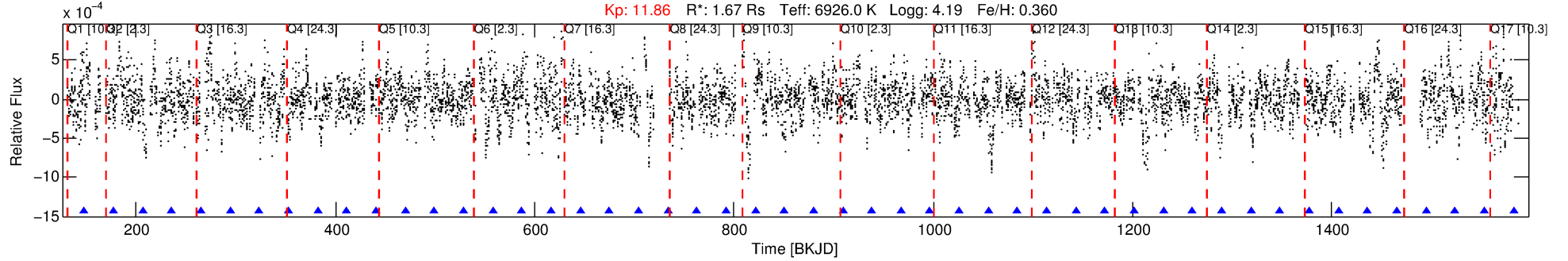
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-09

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 9 of 10 Period: 29.270 d



DV Fit Results:

Period = 29.26956 [0.00048] d
Epoch = 148.1692 [0.0121] BKJD
Rp/R* = 0.0331 [0.0943]
a/R* = 12.64 [9.41]
b = 1.00 [0.10]
Seff = 122.05 [51.15]
Teq = 848 [89] K
Rp = 6.02 [17.24] Re
a = 0.2164 [0.0583] AU
Ag = 213.00 [1215.23] [0.17σ]
Teffp = 5006 [7128] K [0.58σ]

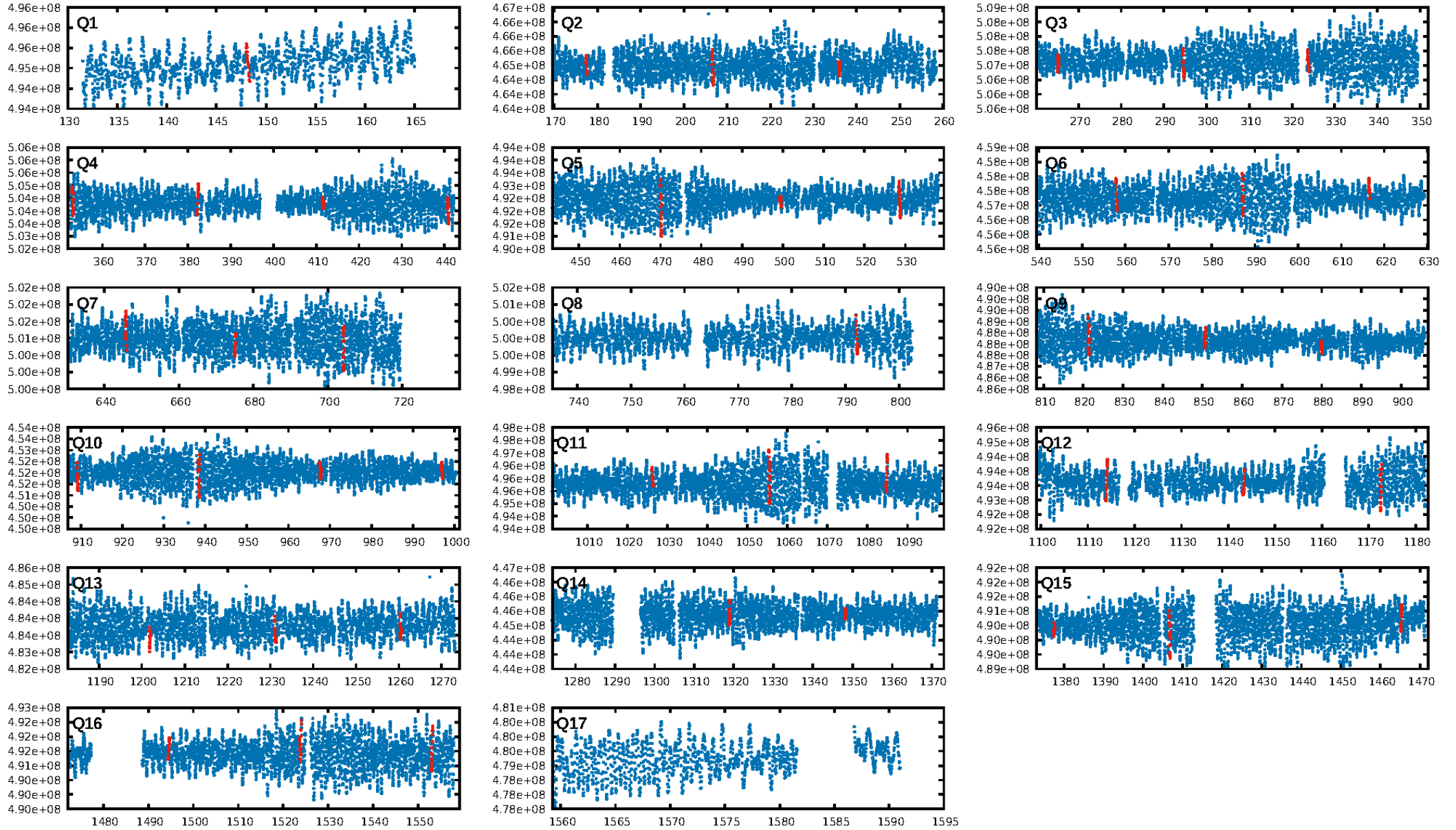
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.36σ]
LongPeriod-sig: 100.0% [73.50σ]
ModelChiSquare2-sig: 60.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: 3.456
Centroid-sig: 0.5%
Centroid-so: 0.606 arcsec [2.05σ]
OotOffset-rm: 0.584 arcsec [2.63σ]
KicOffset-rm: 0.784 arcsec [3.34σ]
OotOffset-st: 4/4/4/3 [15]
KicOffset-st: 4/4/4/3 [15]
DiffImageQuality-fgm: 0.93 [14/15]
DiffImageOverlap-fno: 0.00 [0/16]

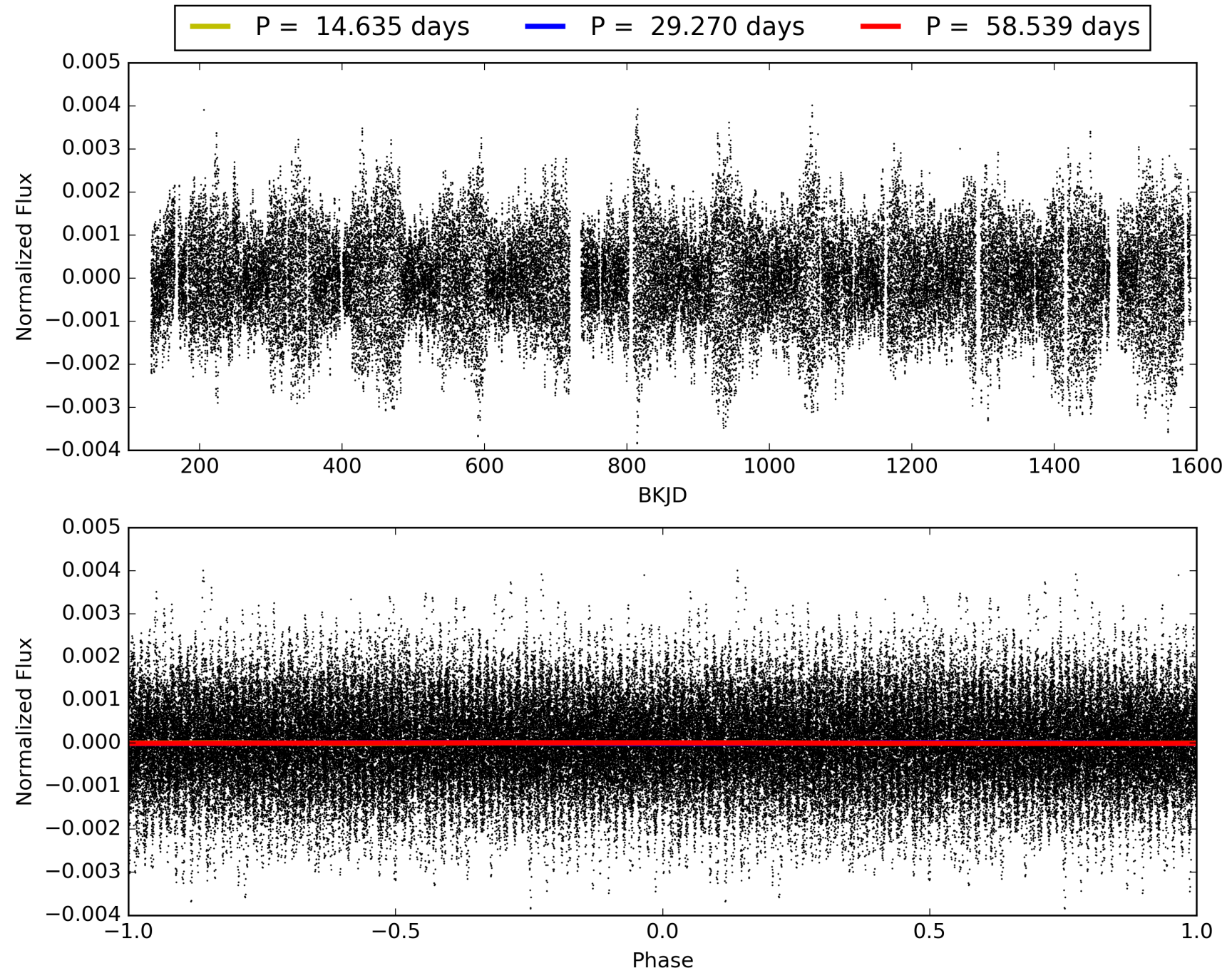
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:12:57 Z

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

TCE 002998070-09, PDC Light Curves

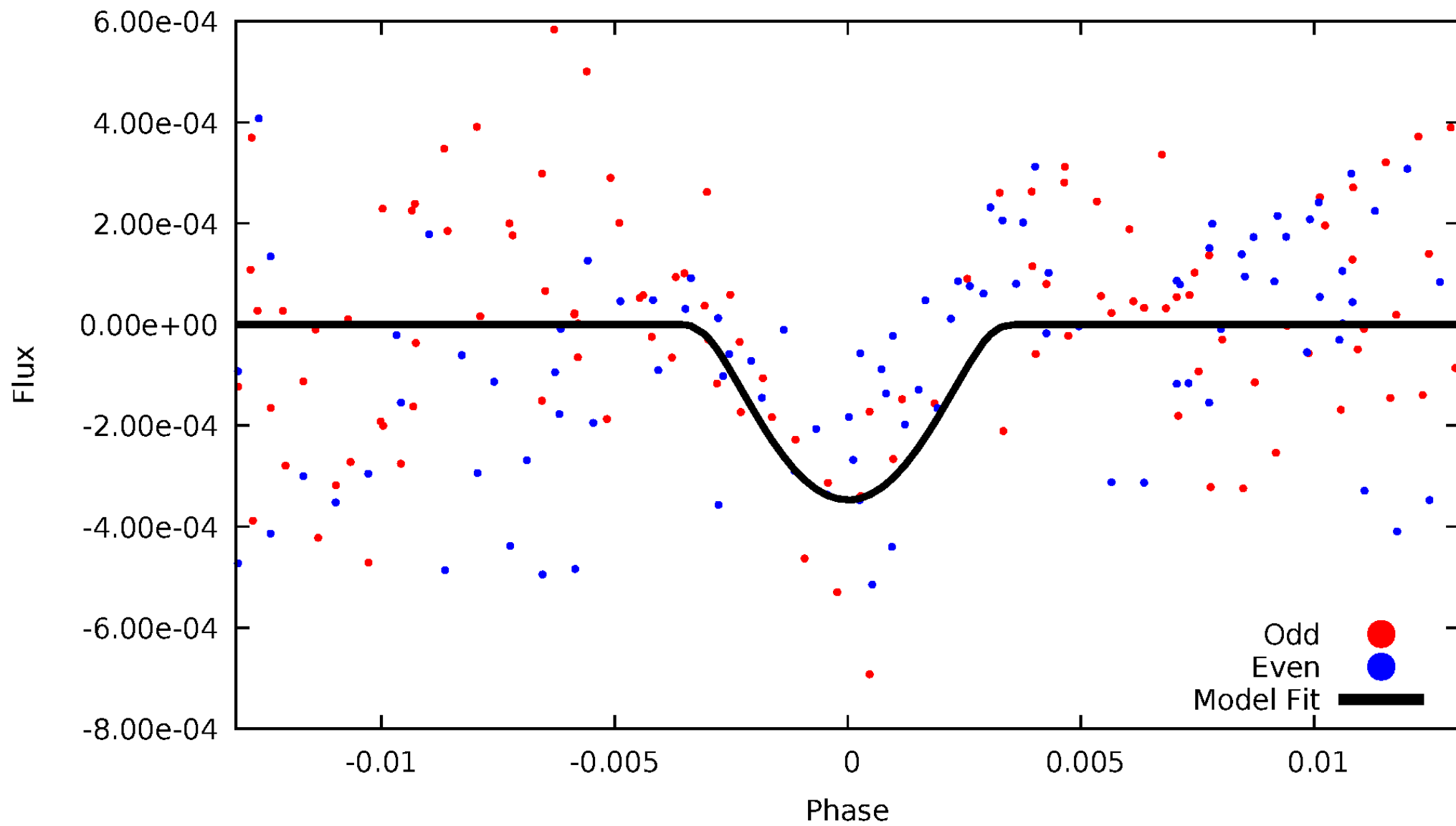


TCE 002998070-09



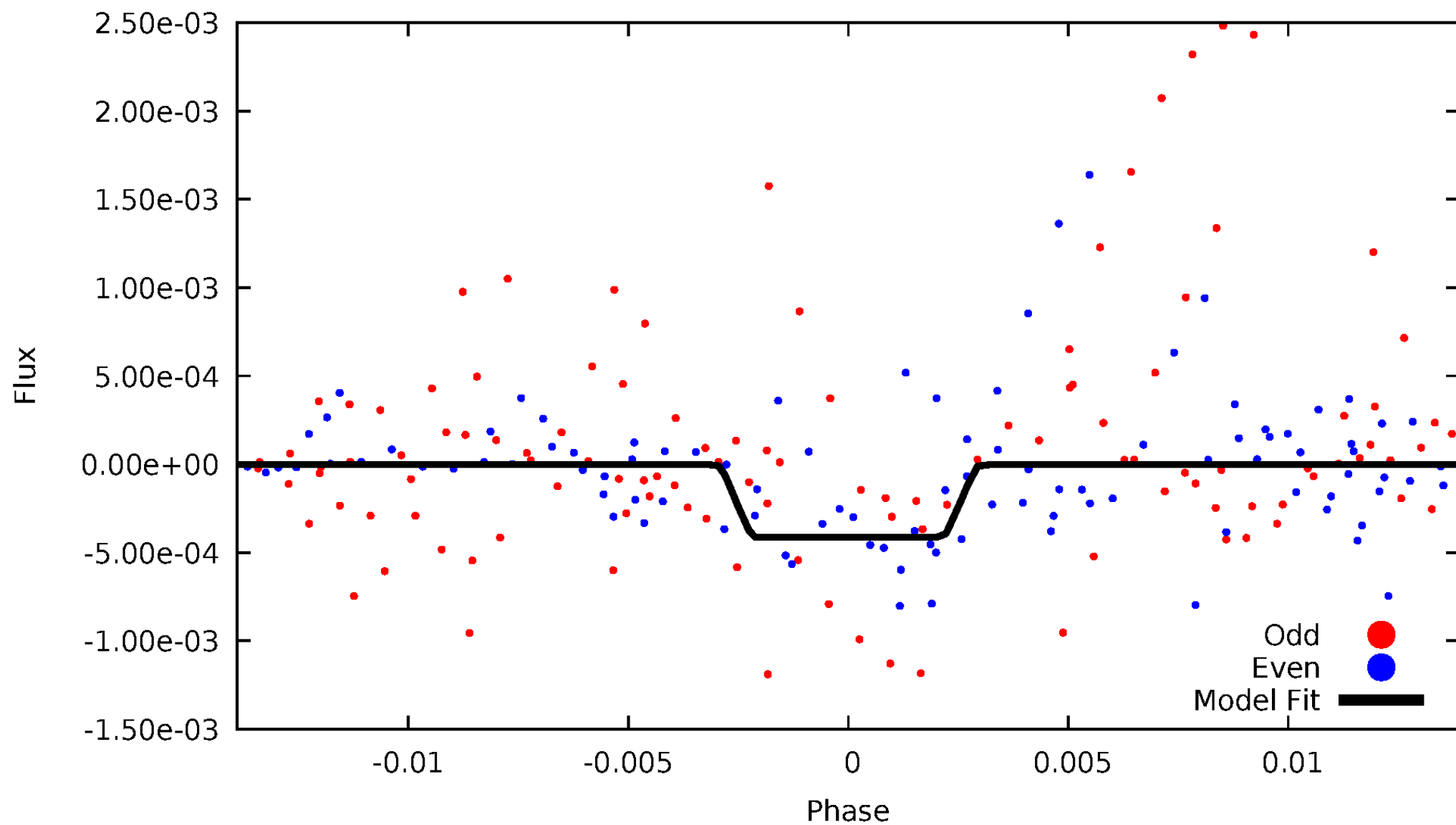
DV Odd/Even

TCE 002998070-09

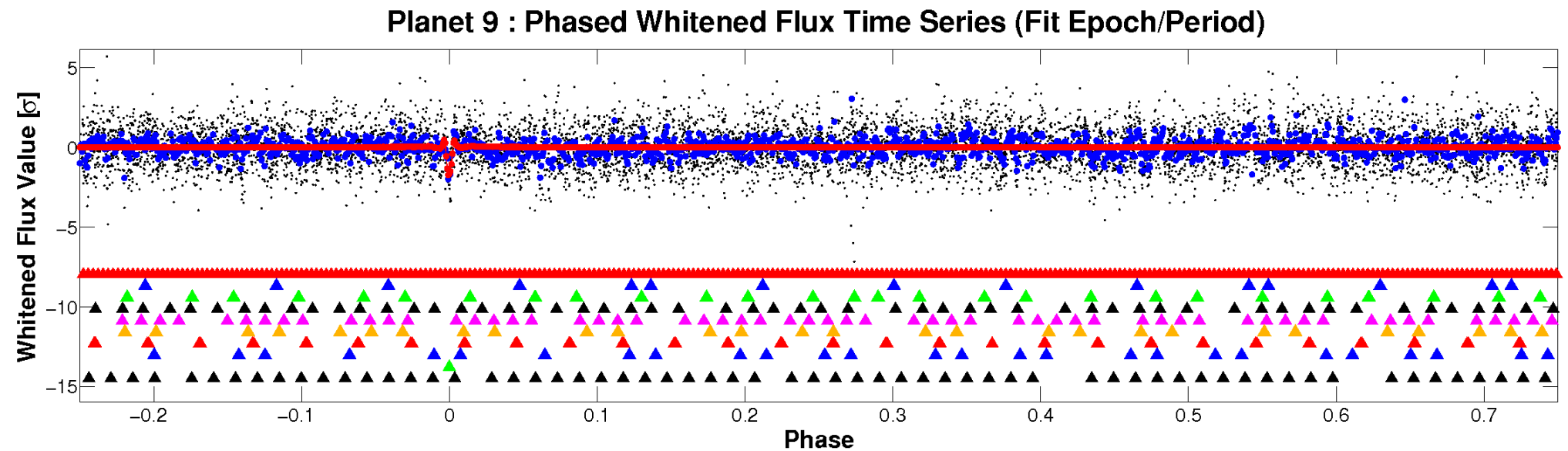
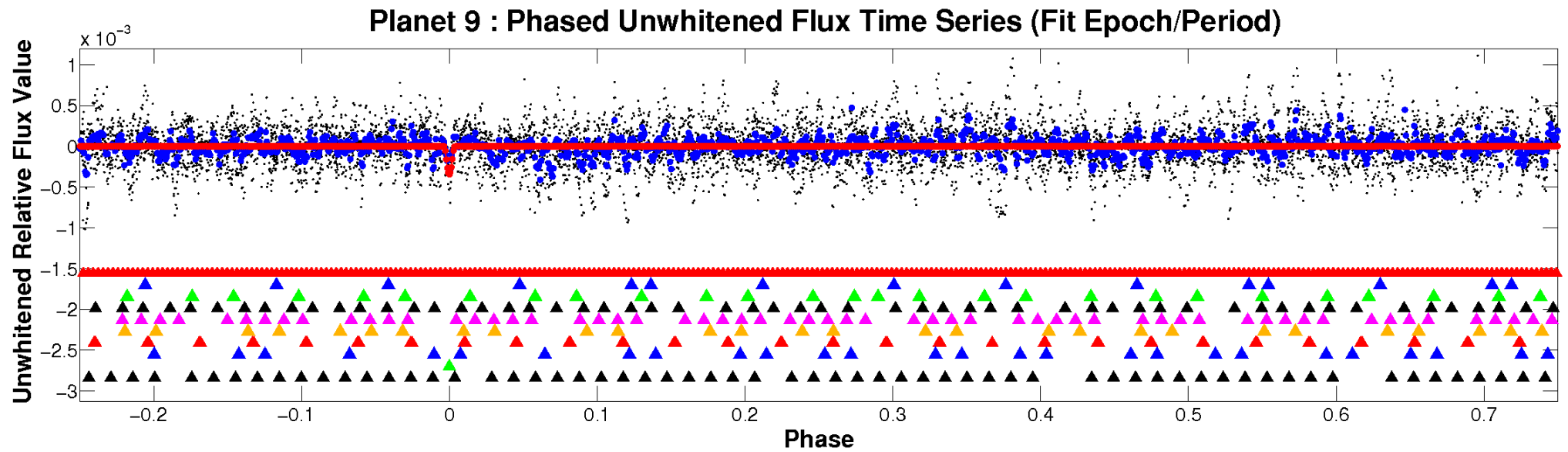


ALT Odd/Even

TCE 002998070-09

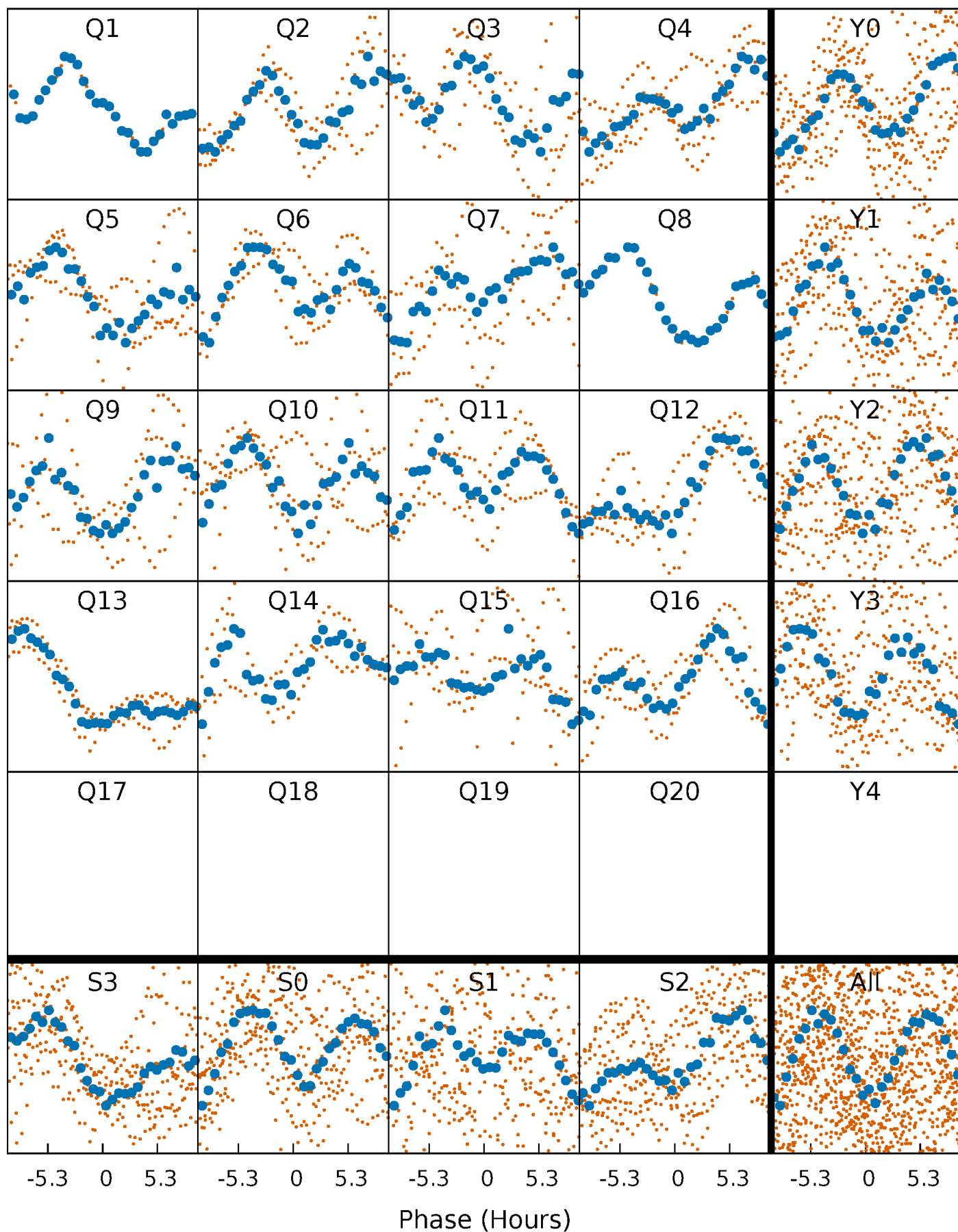


Non-Whitened Vs. Whitened Light Curve



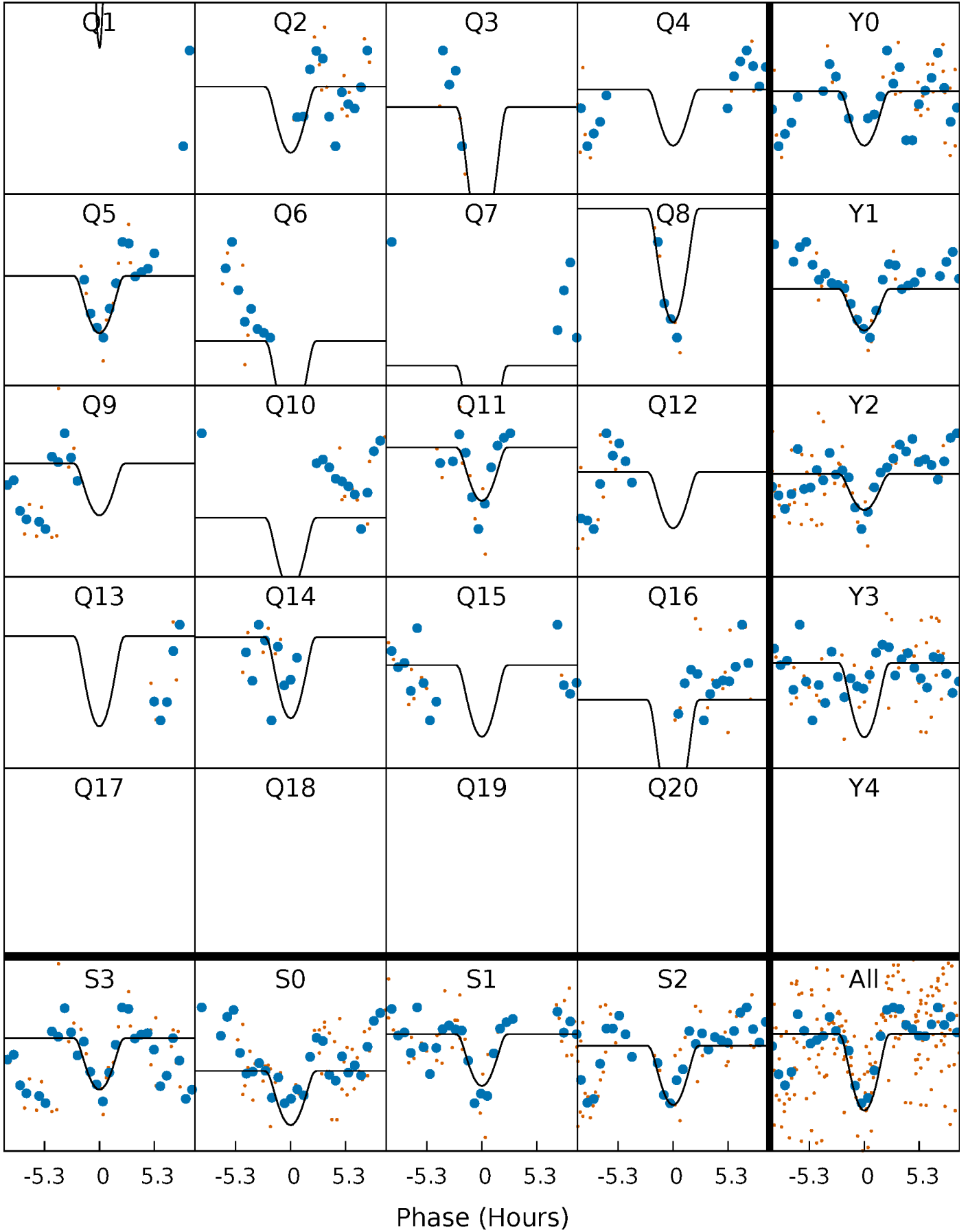
PDC Quarter-Phased Transit Curves

TCE 002998070-09 $P = 29.269556$ Days $T_0 = 148.169241$ (BKJD)



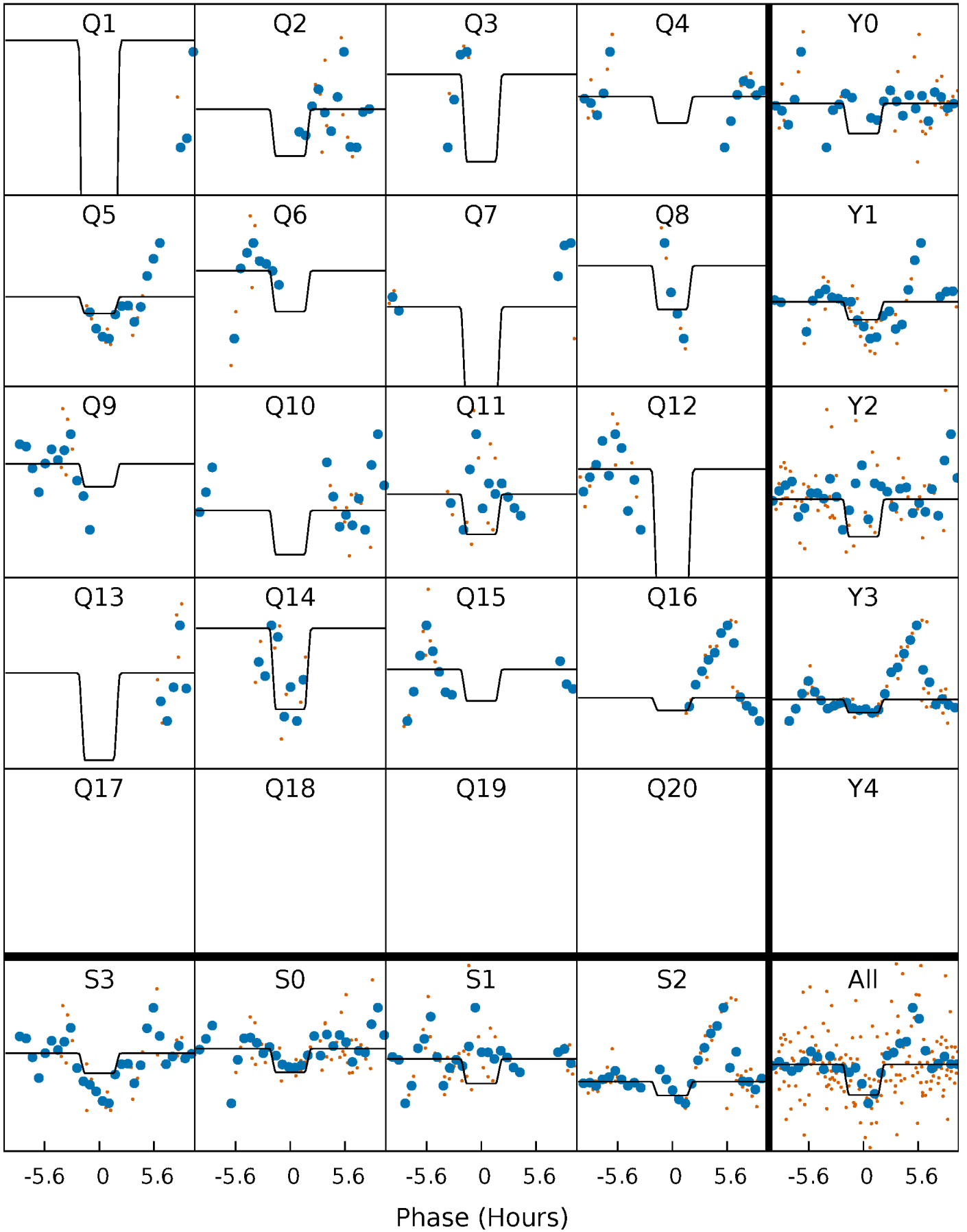
DV Quarter-Phased Transit Curves

TCE 002998070-09 P= 29.269556 Days $T_0=148.169241$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

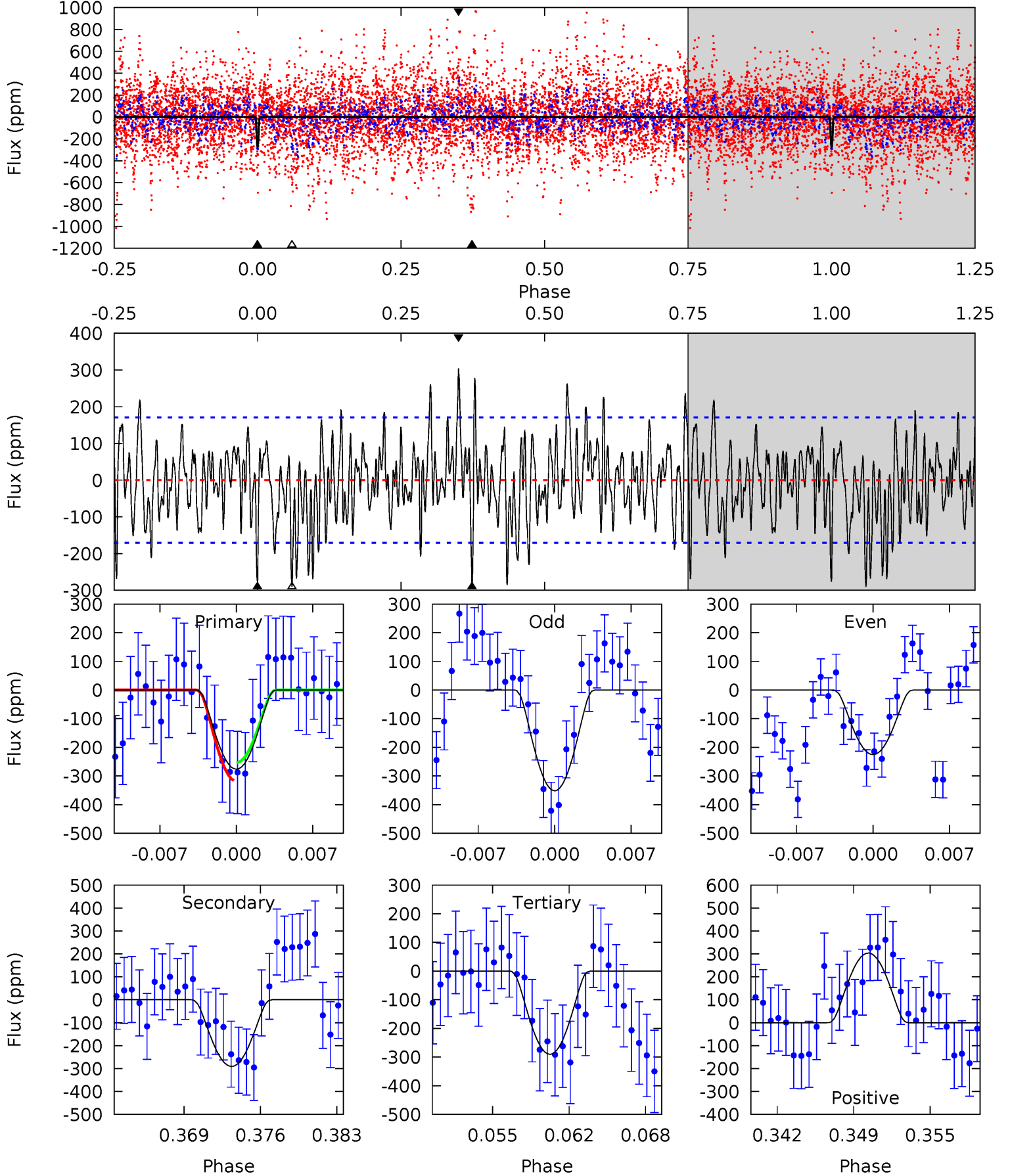
TCE 002998070-09 $P = 29.268682$ Days $T_0 = 148.160778$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-09, P = 29.269556 Days, E = 118.899685 Days

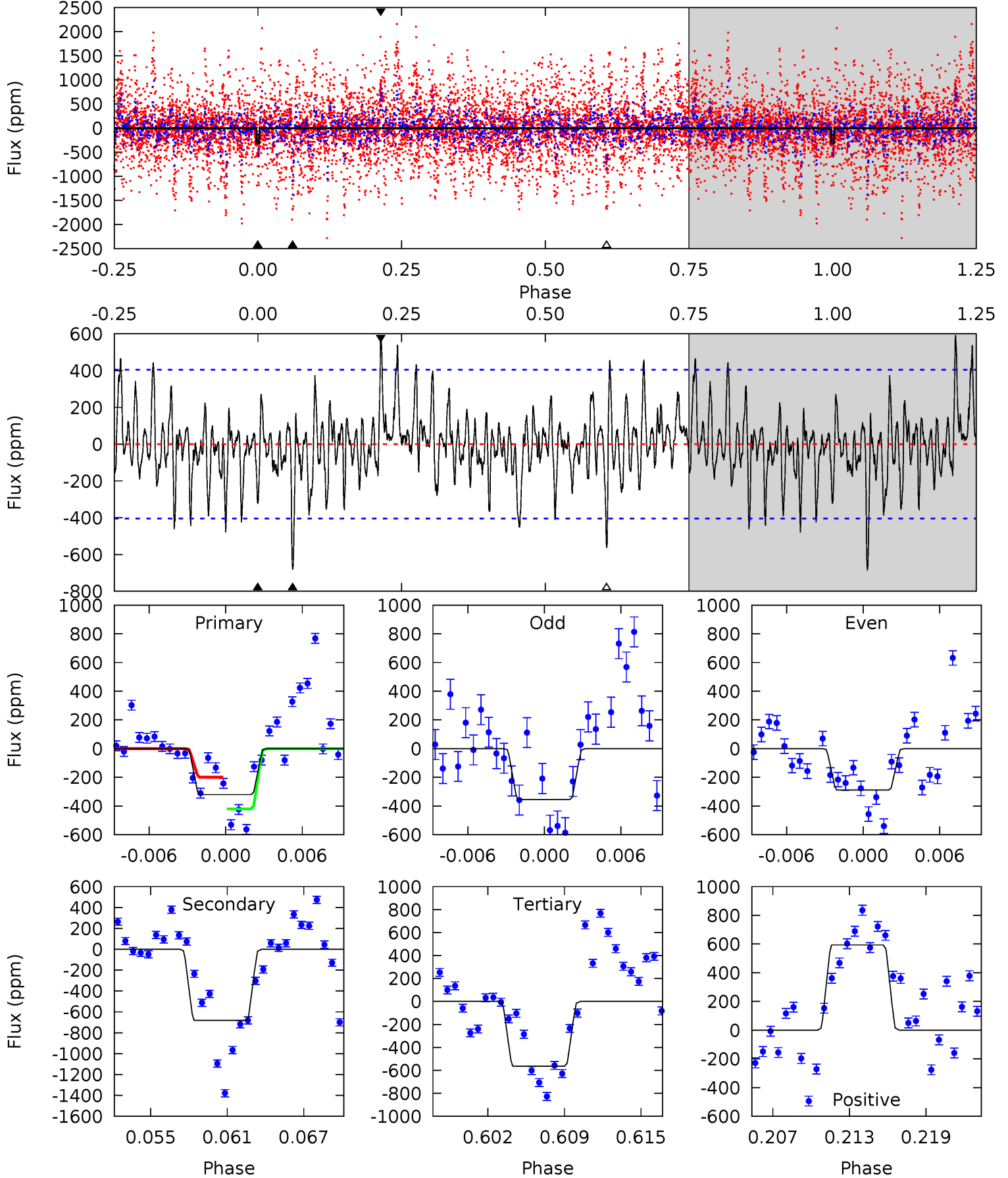
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.25	8.68	8.67	9.07	5.10	2.70	2.73	-0.41	-0.82	0.02	-0.39	1.84	0.96	0.51	0.94



Alt Model-Shift Uniqueness Test

002998070-09, P = 29.268682 Days, E = 118.892096 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.06	8.62	7.13	7.51	5.12	2.74	2.02	-3.07	-3.46	1.49	1.10	0.42	1.02	0.47	1.41



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-291 ± 33	$14.59^{+14.48}_{-10.02}$	1205^{+96}_{-73}	3657^{+2175}_{-706}	35^{+325}_{-26}
Alt.	-681 ± 79	$13.72^{+13.32}_{-9.46}$	1200^{+89}_{-70}	4345^{+3053}_{-921}	93^{+881}_{-70}

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

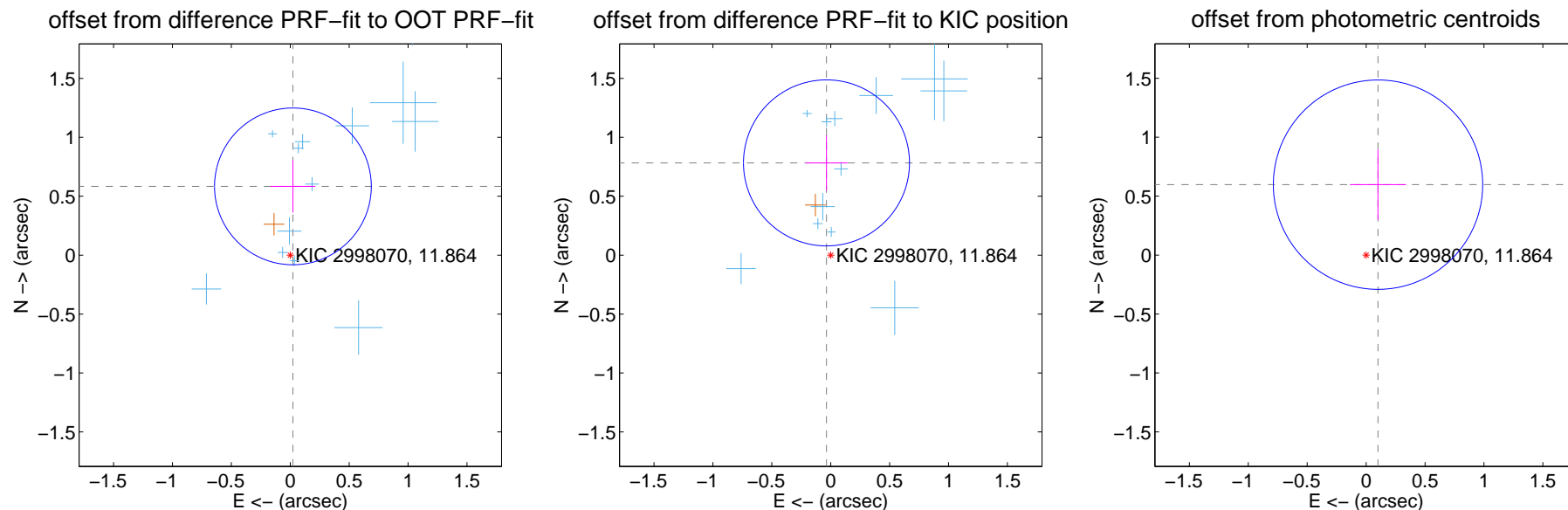
DV Centroid Data

Supplemental centroid analysis for 002998070-09. **Kepler magnitude: 11.86.** Transit SNR 8.16

There are 14 quarters with good PRF difference image offsets

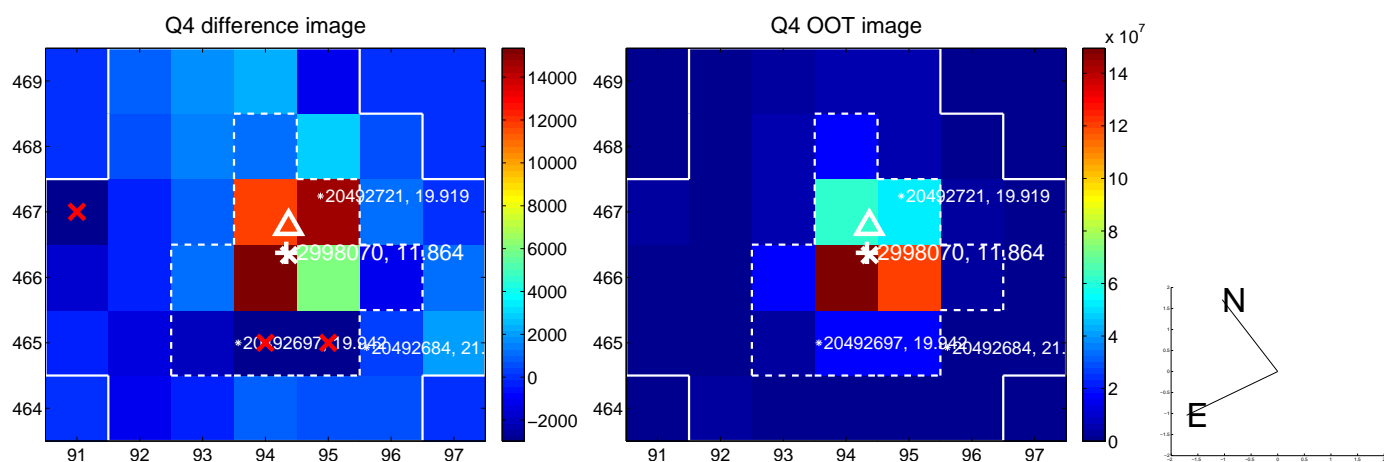
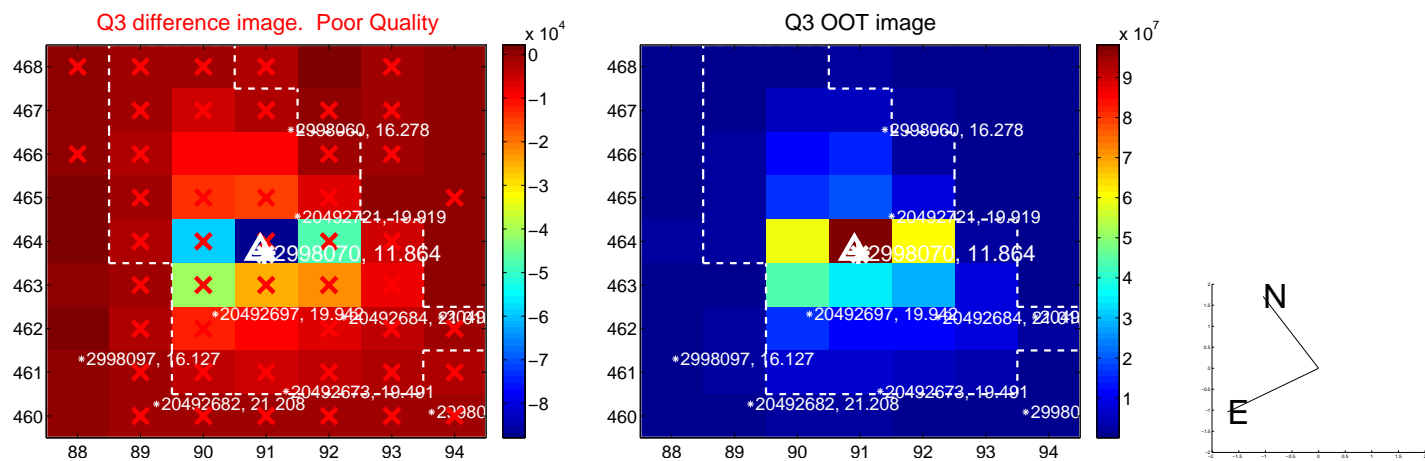
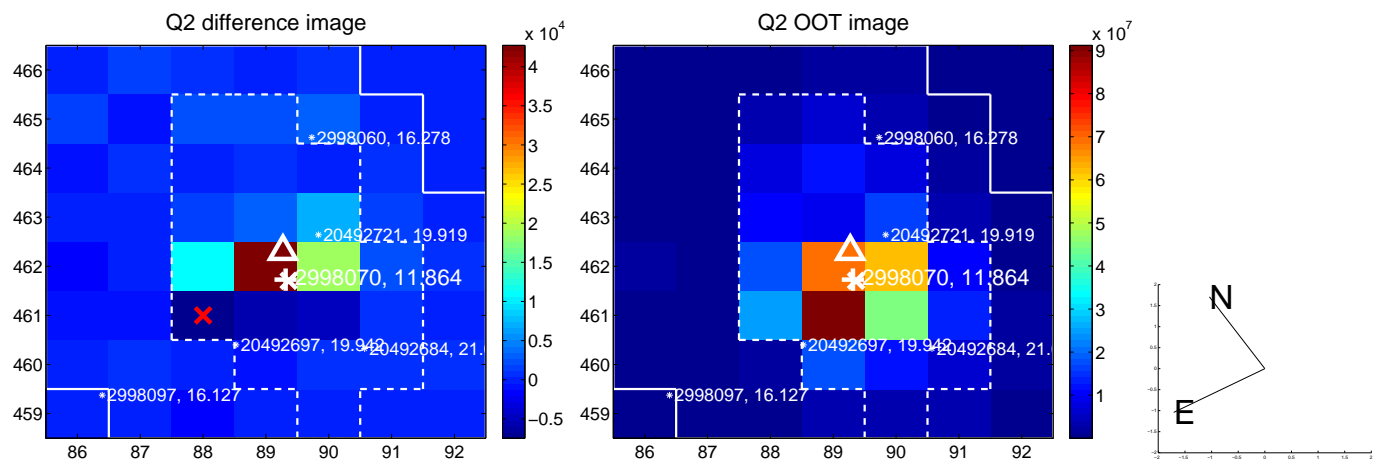
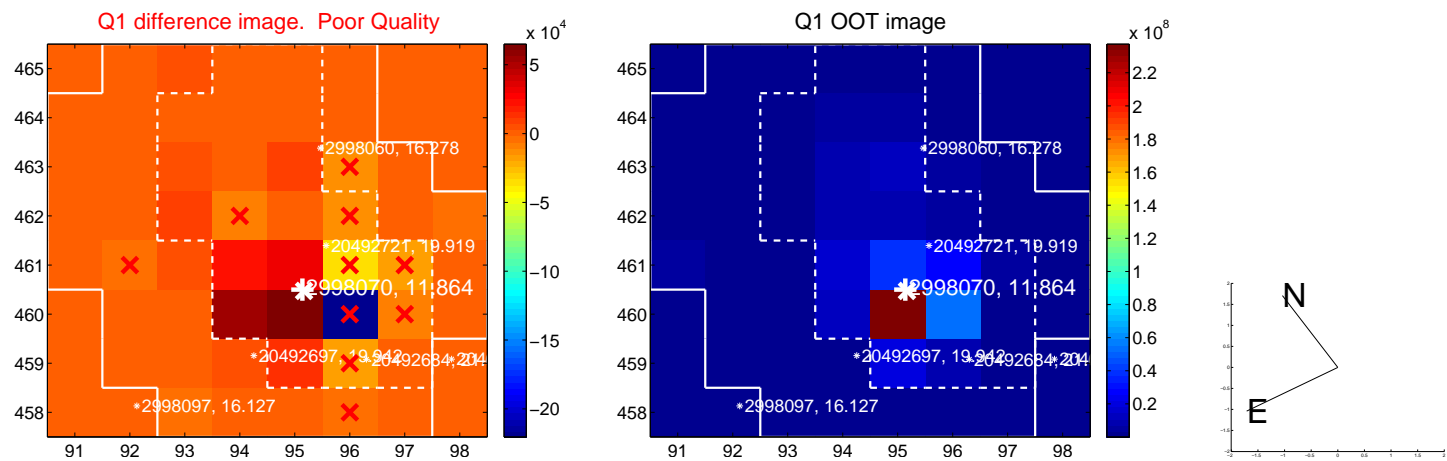
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.584 ± 0.222	2.63	-0.022 ± 0.190	0.584 ± 0.222
PRF-fit source offset from KIC position	0.784 ± 0.235	3.34	0.036 ± 0.178	0.783 ± 0.234
photometric centroid source offset	0.61 ± 0.30	2.05	-0.10 ± 0.24	0.60 ± 0.30

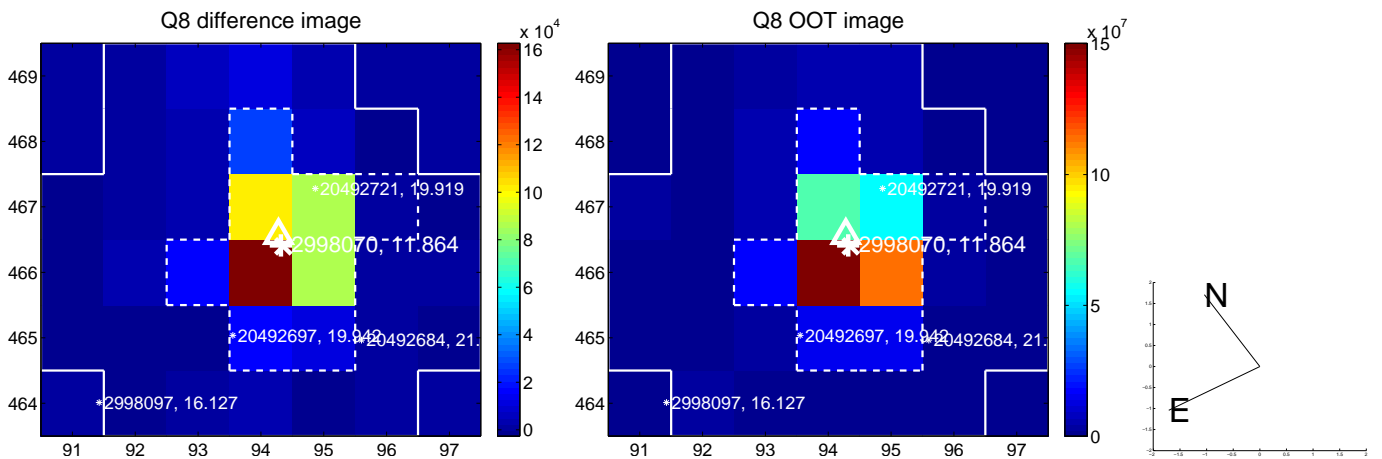
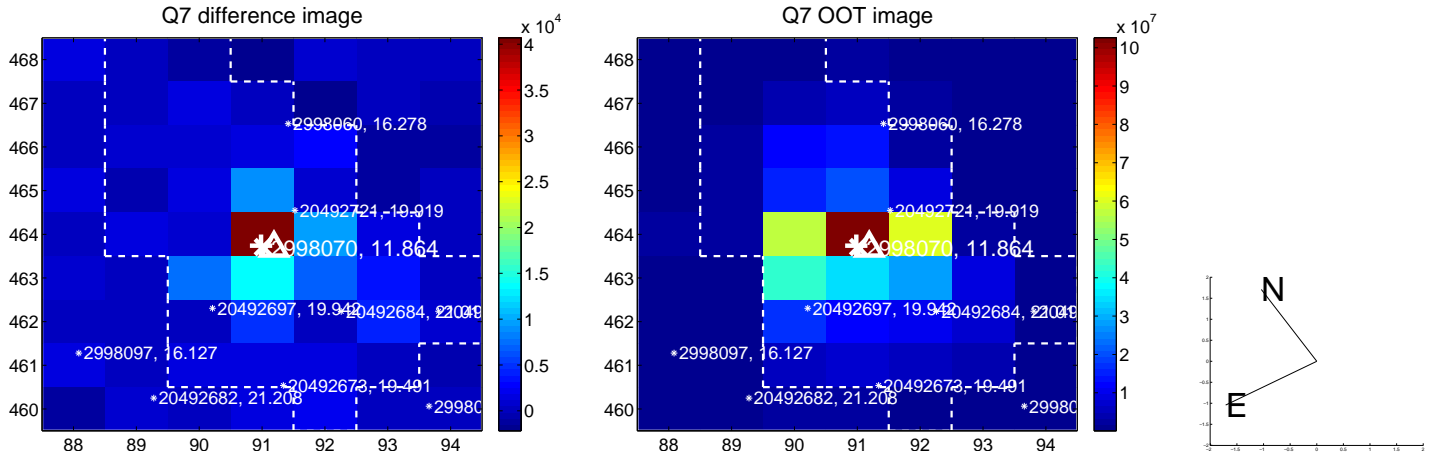
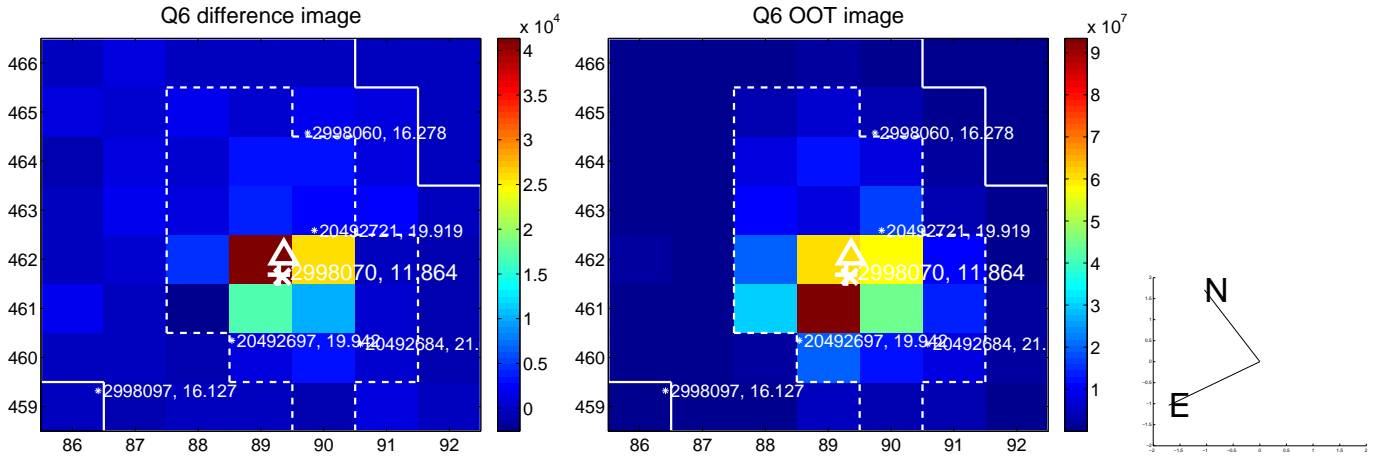
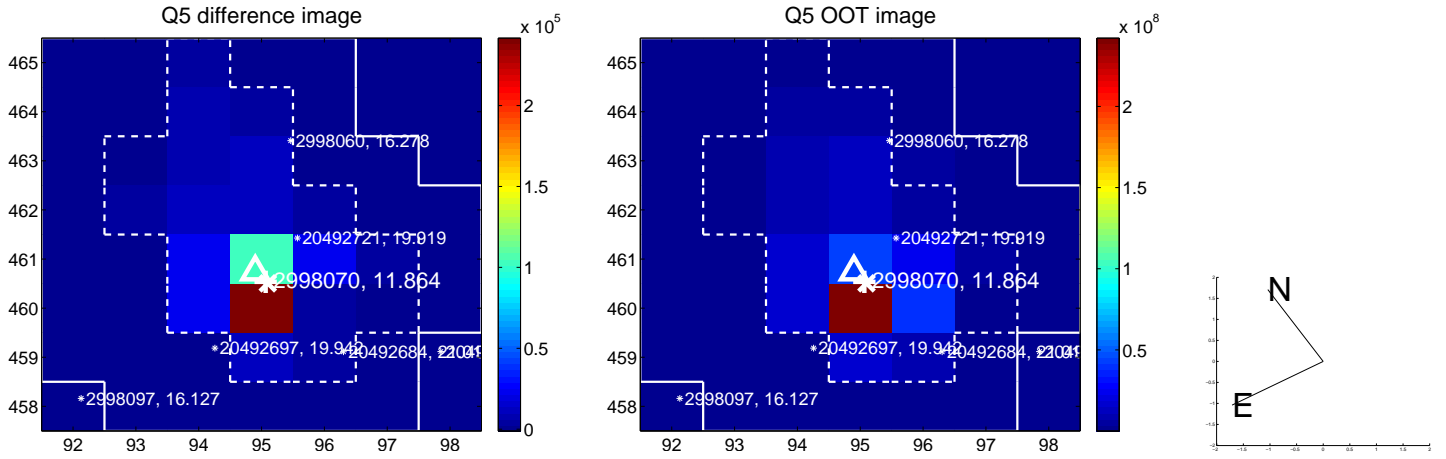


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

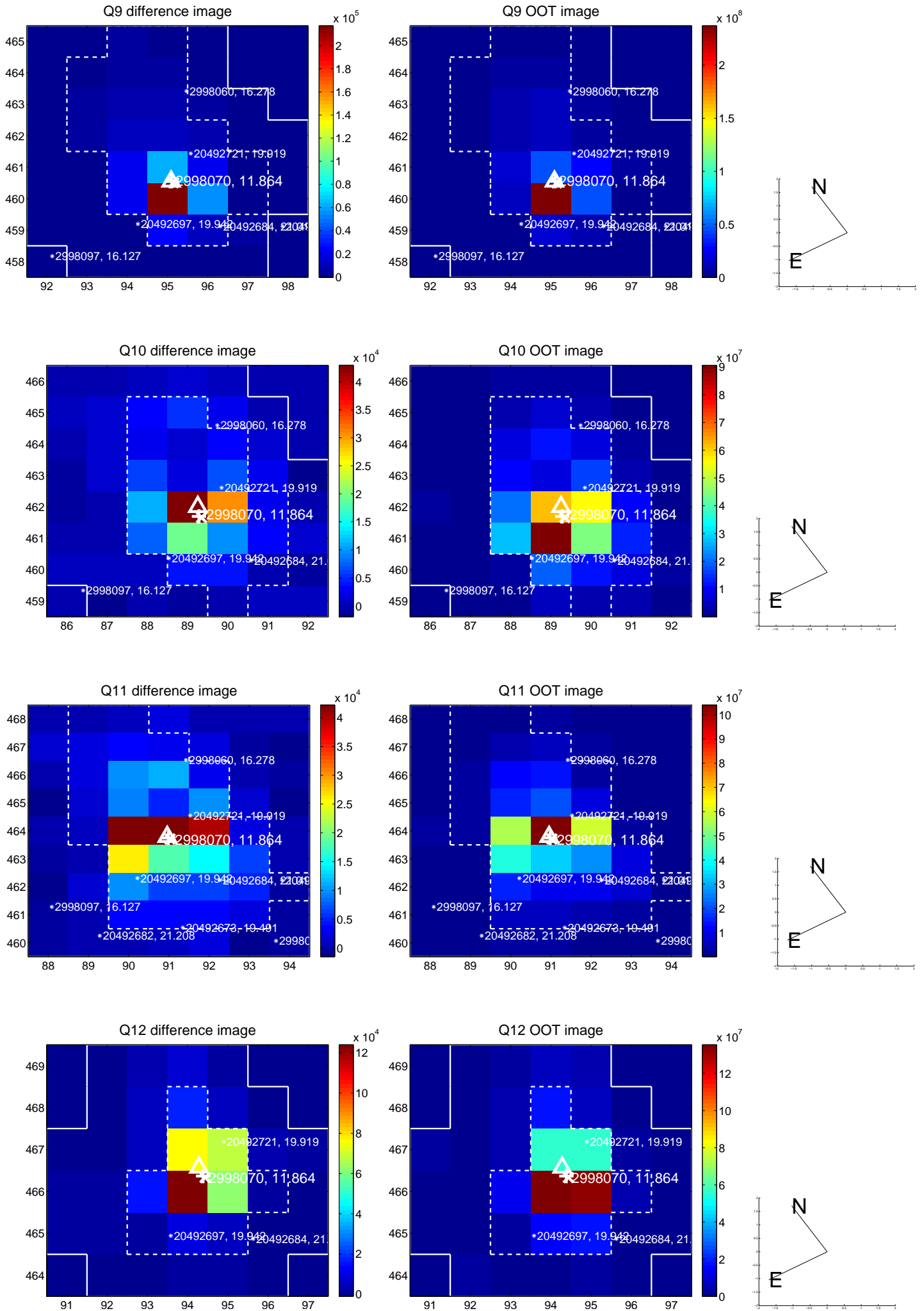
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



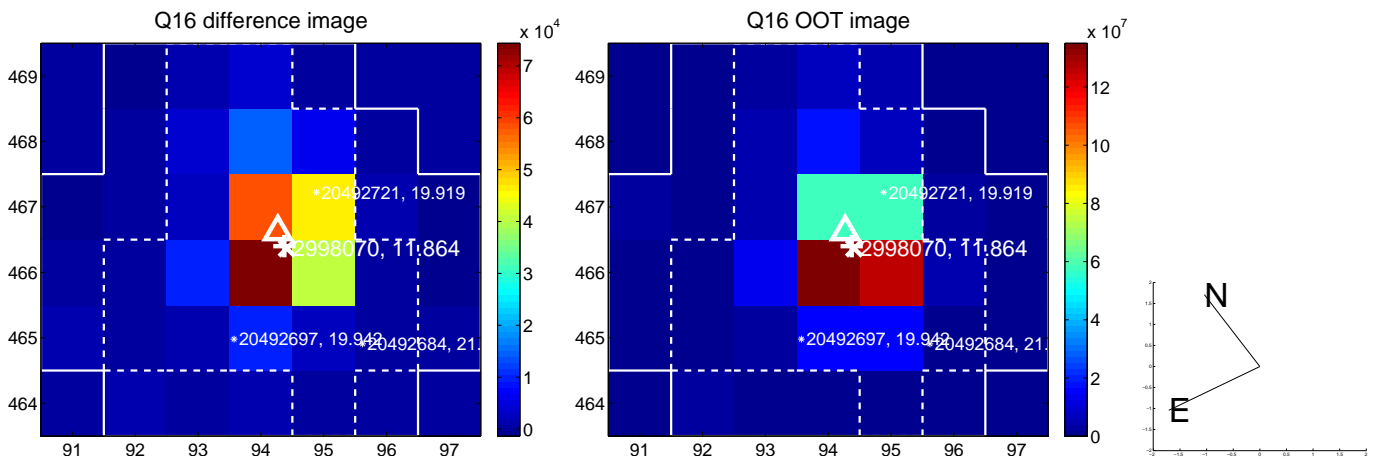
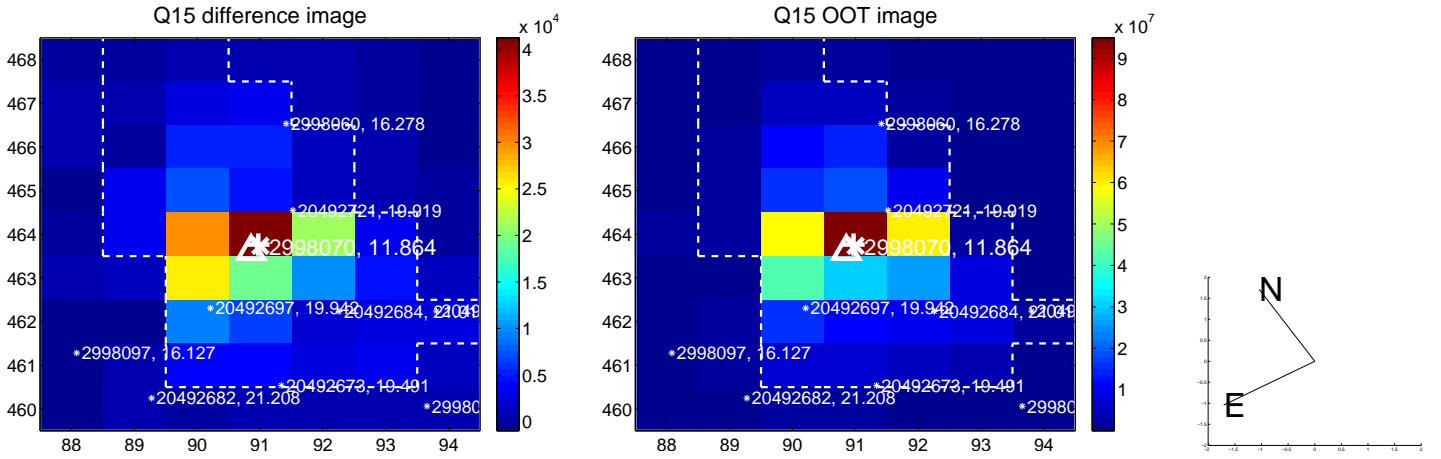
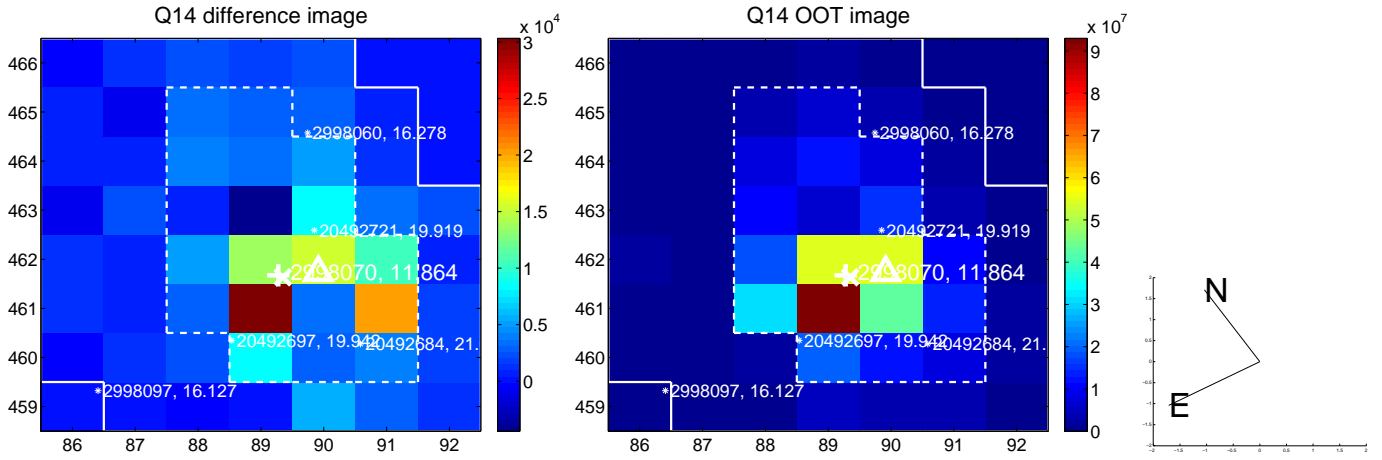
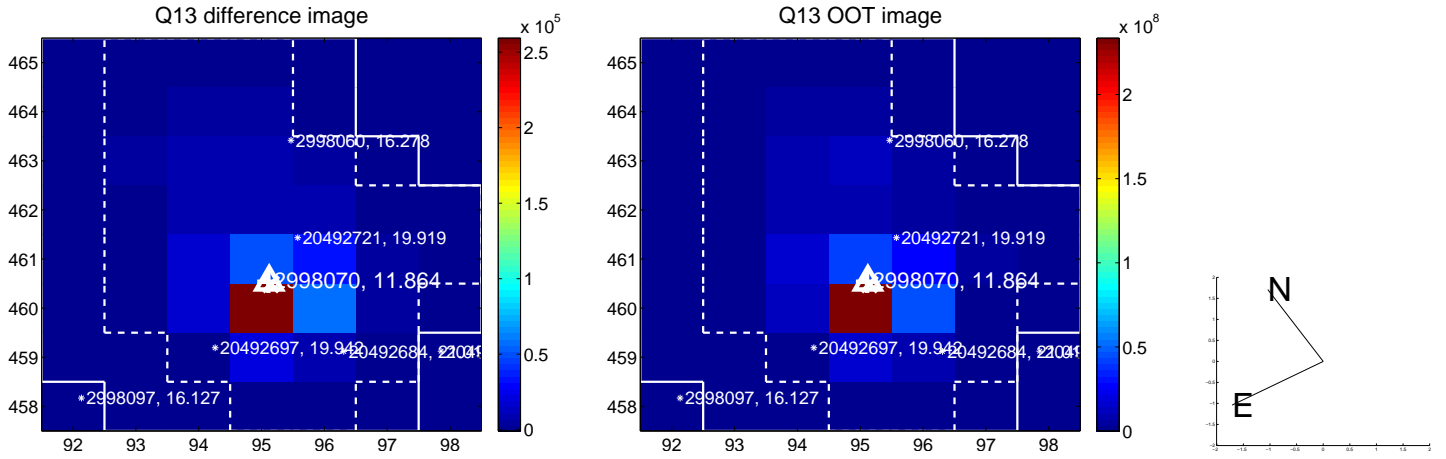
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



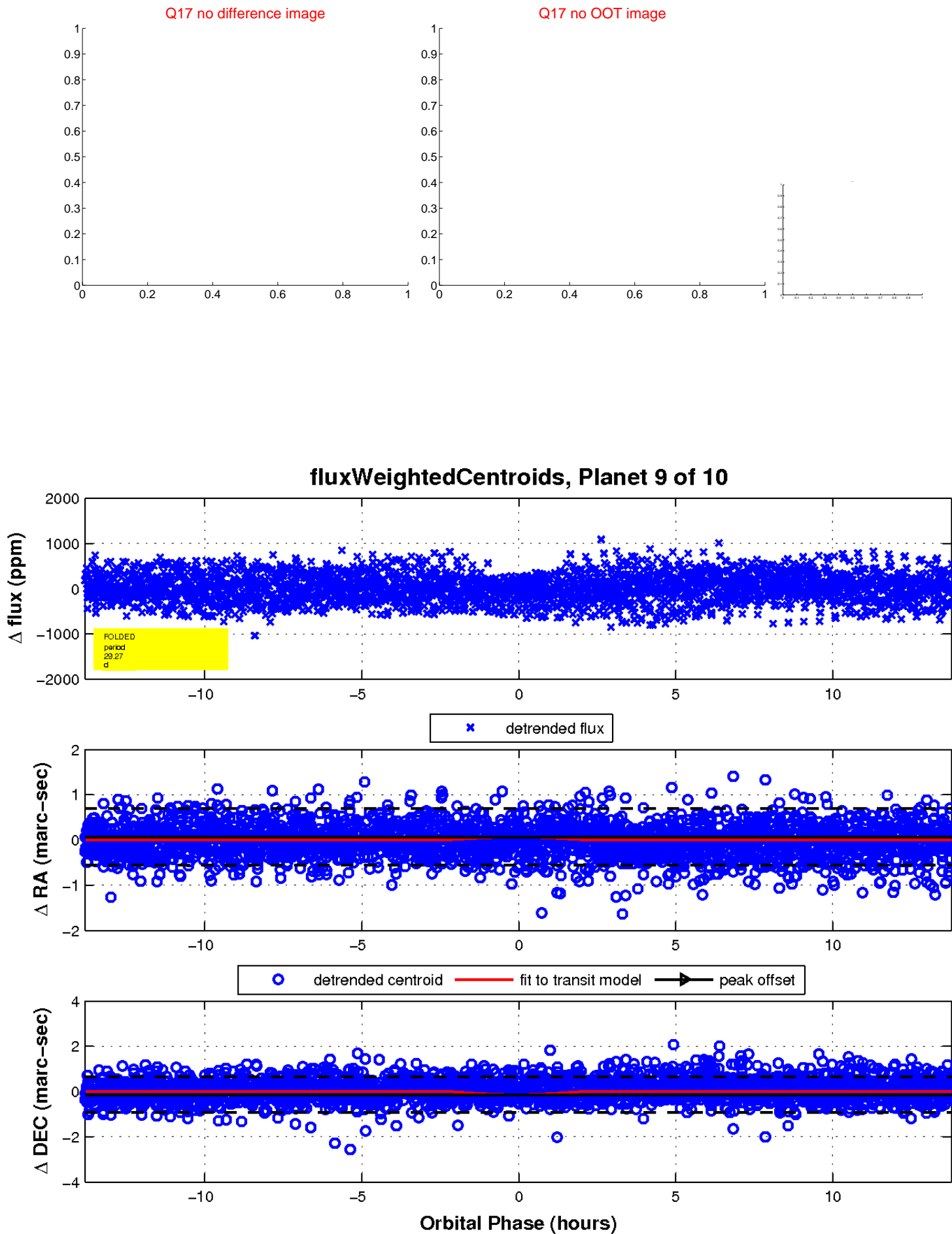
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



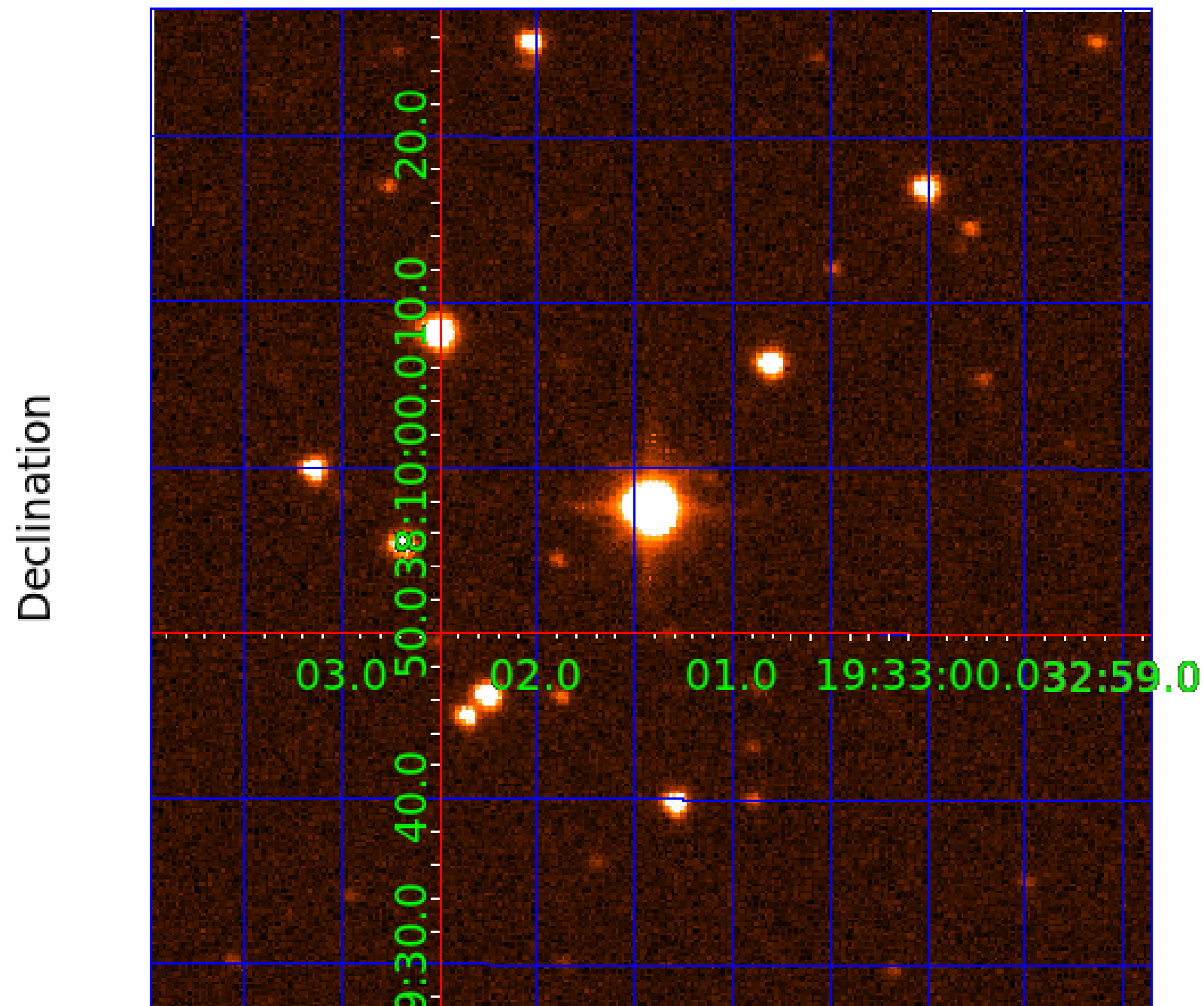
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 002998070

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})
002998070-01	OBS	No	0.883970	132.185672	50.5	5.898	10.1	9.9	1.67	6926	1.97	12977.27
002998070-02	OBS	No	100.036321	139.548042	470.5	5.025	8.3	7.4	1.67	6926	4.13	23.71
002998070-03	OBS	No	55.143844	156.658582	131.2	34.911	8.2	4.5	1.67	6926	2.05	52.45
002998070-04	OBS	No	25.912951	149.754961	120.3	1.314	9.1	3.4	1.67	6926	2.23	143.57
002998070-05	OBS	No	24.737832	154.330126	37.3	1.649	8.8	1.3	1.67	6926	1.19	152.74
002998070-06	OBS	No	51.832034	175.279457	552.5	5.749	8.9	7.2	1.67	6926	7.48	56.97
002998070-07	OBS	No	26.134454	155.757382	249.4	1.668	8.1	6.0	1.67	6926	2.66	141.96
002998070-09	OBS	No	29.269556	148.169241	347.3	4.607	8.3	8.2	1.67	6926	6.02	122.05
002998070-10	OBS	No	23.328855	154.215882	269.5	4.023	8.0	7.3	1.67	6926	3.21	165.16

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002998070-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002998070-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
002998070-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
002998070-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD
002998070-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
002998070-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

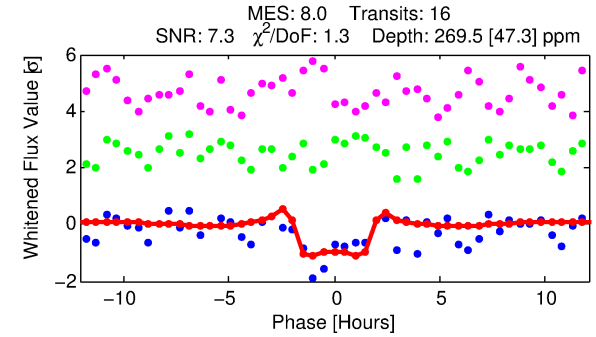
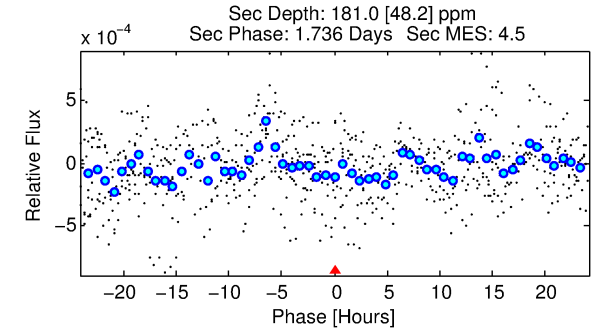
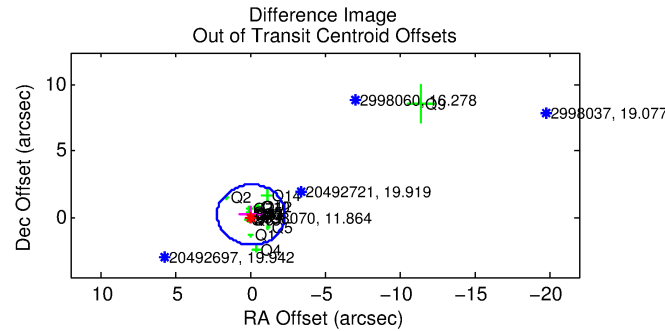
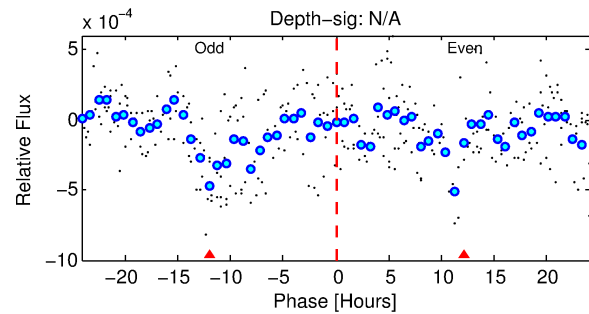
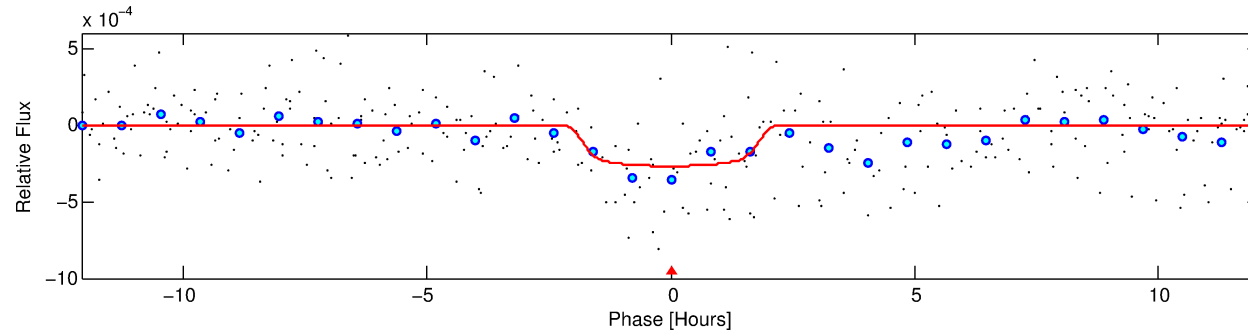
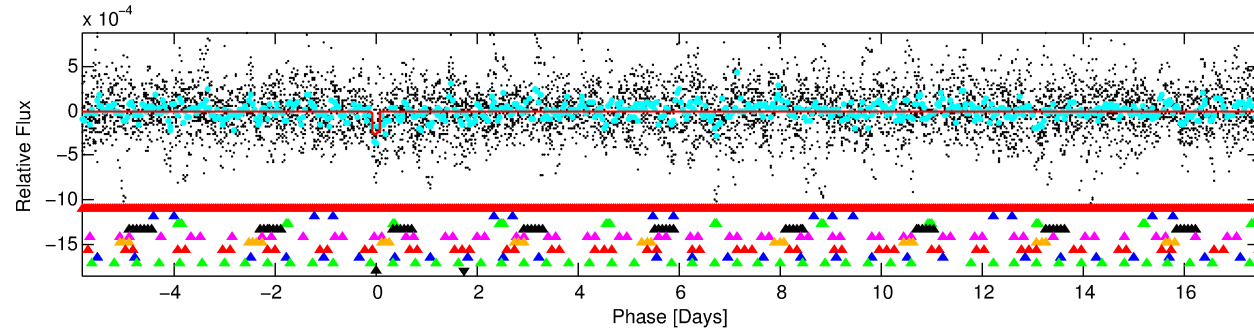
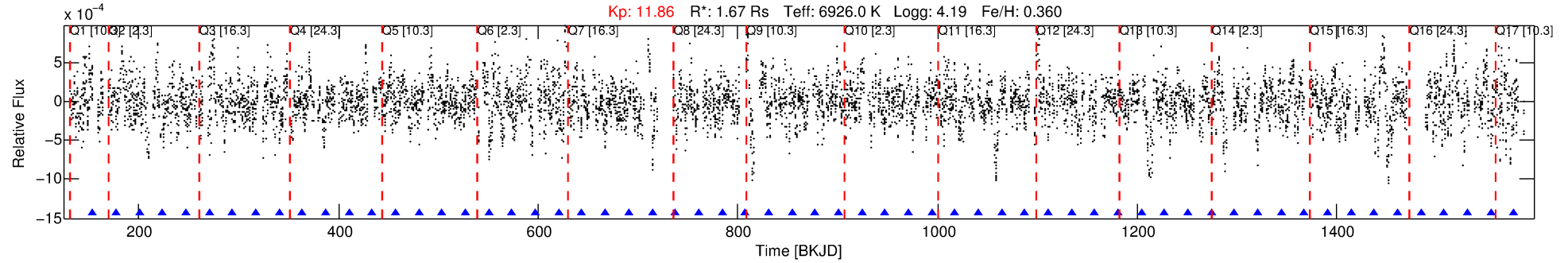
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002998070-10

No Significant Match Found

DV One-Page Summary

KIC: 2998070 Candidate: 10 of 10 Period: 23.329 d



DV Fit Results:

Period = 23.32885 [0.00022] d
Epoch = 154.2159 [0.0090] BKJD
Rp/R* = 0.0176 [0.0043]
a/R* = 20.35 [25.18]
b = 0.91 [0.24]
Seff = 165.16 [69.22]
Teq = 914 [96] K
Rp = 3.21 [1.31] Re
a = 0.1860 [0.0501] AU
Ag = 335.51 [224.83] [1.49σ]
Teffp = 6049 [874] K [5.84σ]

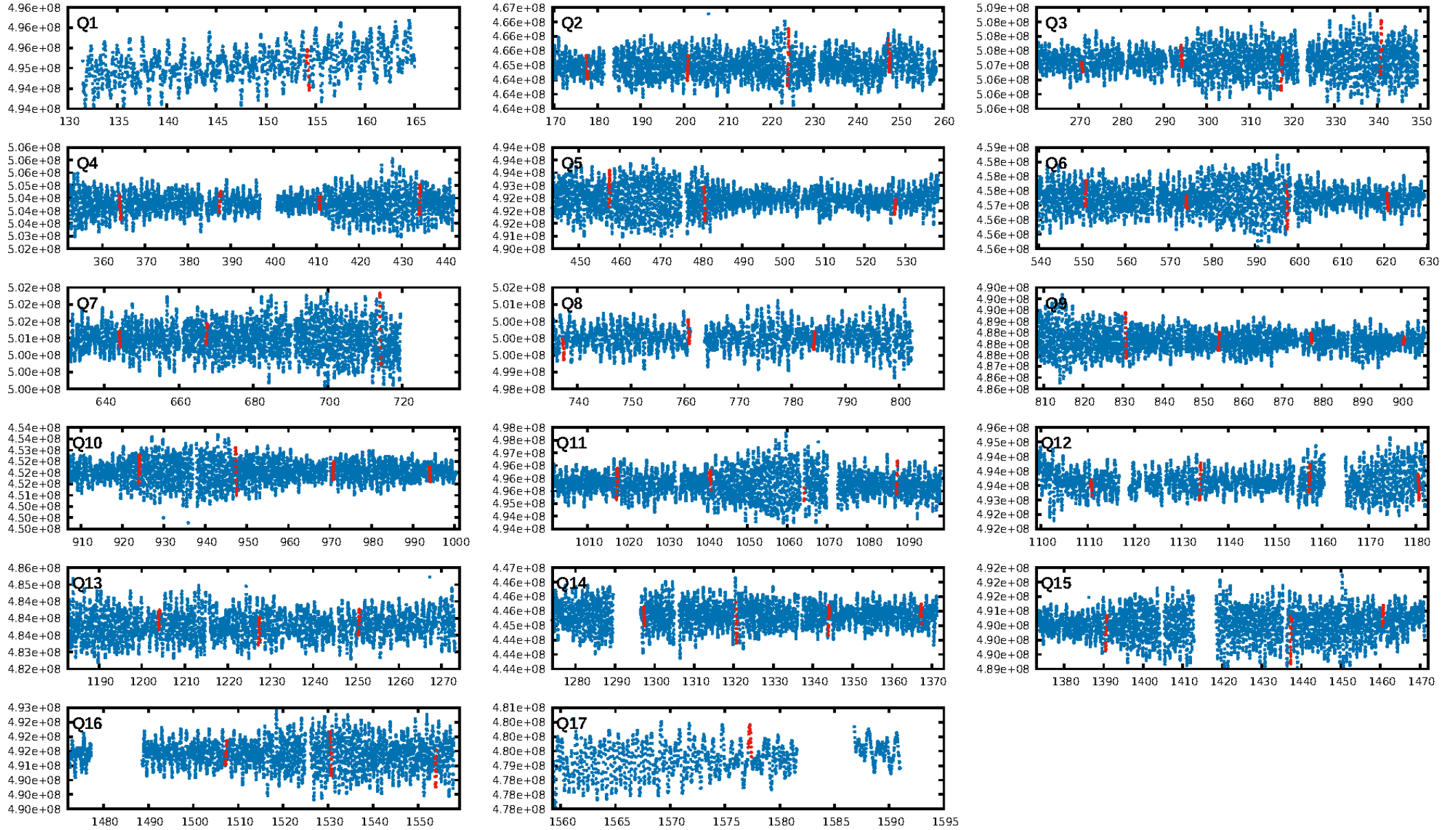
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [75.45σ]
LongPeriod-sig: 100.0% [7.78σ]
ModelChiSquare2-sig: 11.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [16/16]
GhostDiagnostic-chr: 2.192
Centroid-sig: 82.7%
Centroid-so: 0.118 arcsec [0.43σ]
OotOffset-rm: 0.228 arcsec [0.30σ]
KicOffset-rm: 0.395 arcsec [0.73σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.47 [8/17]
DiffImageOverlap-fno: 0.00 [0/17]

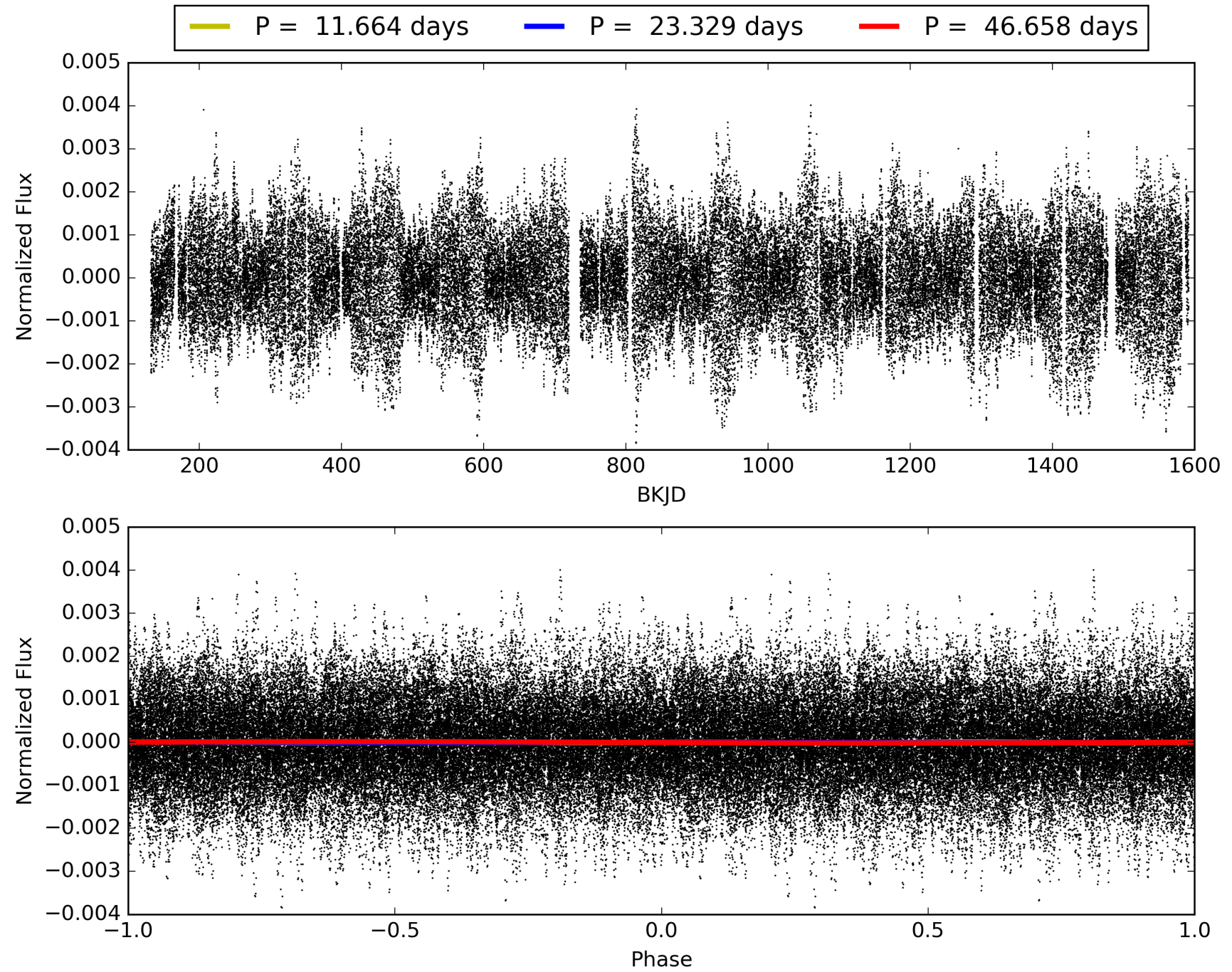
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:13:00 Z

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

TCE 002998070-10, PDC Light Curves

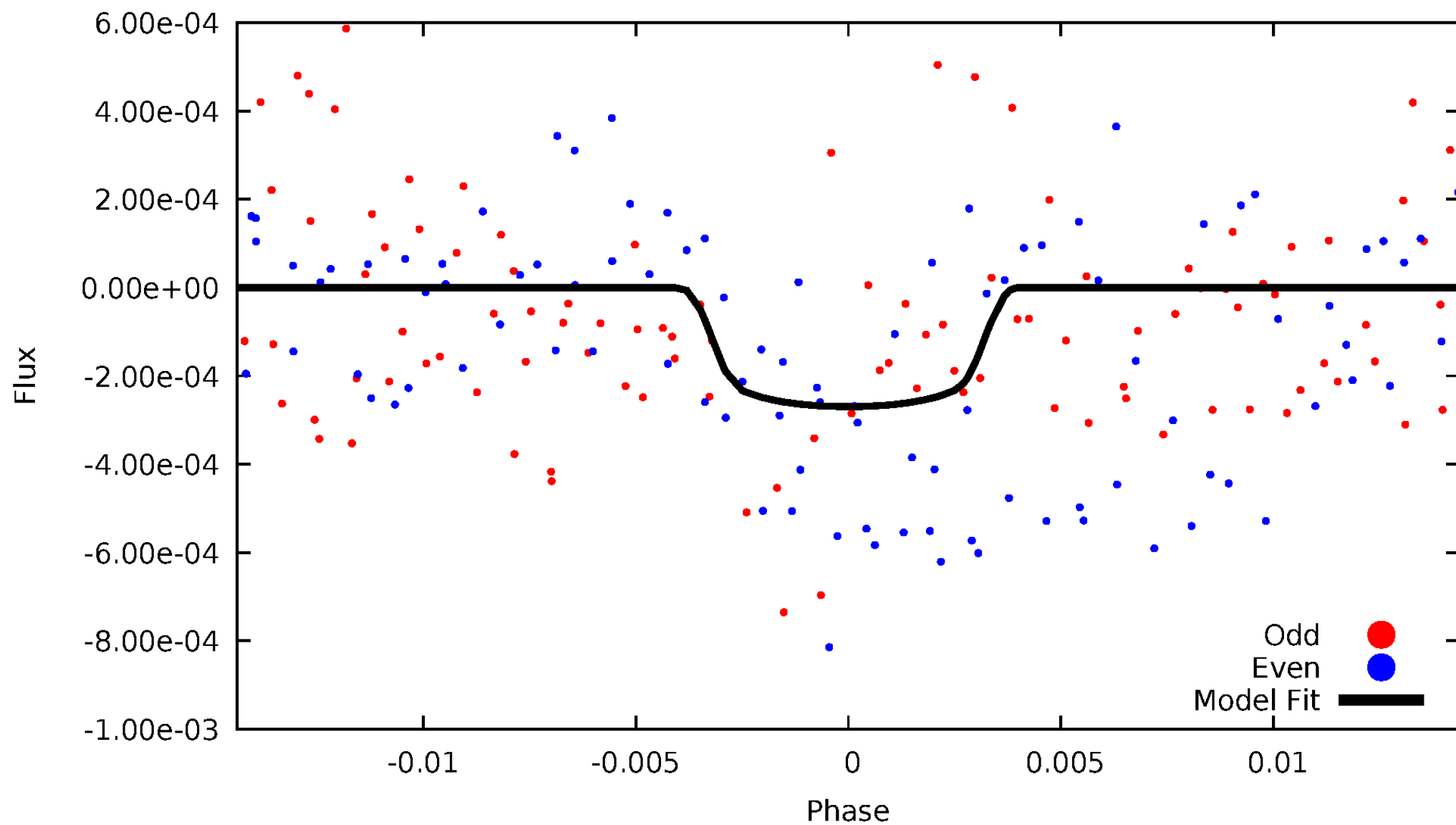


TCE 002998070-10



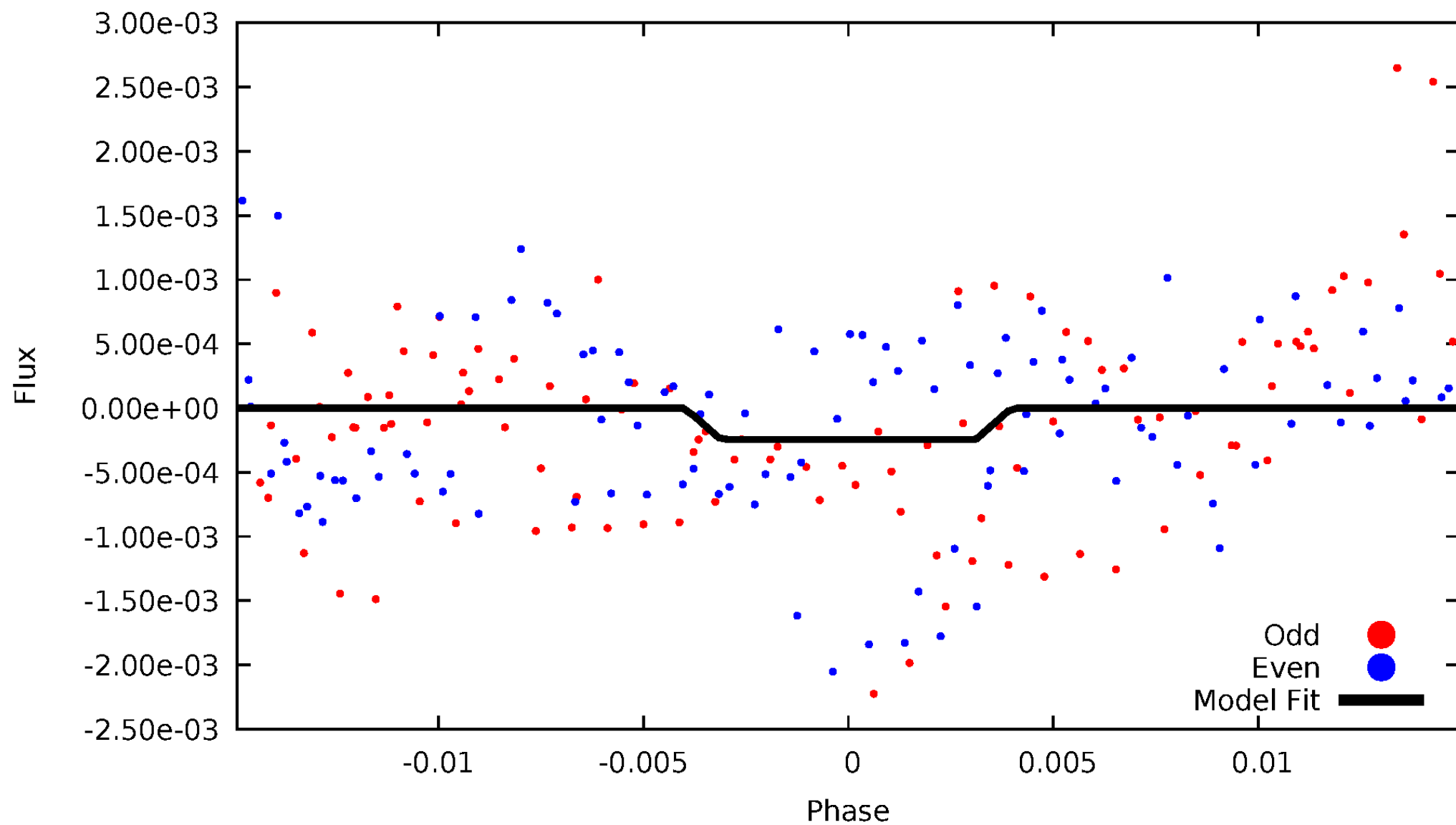
DV Odd/Even

TCE 002998070-10



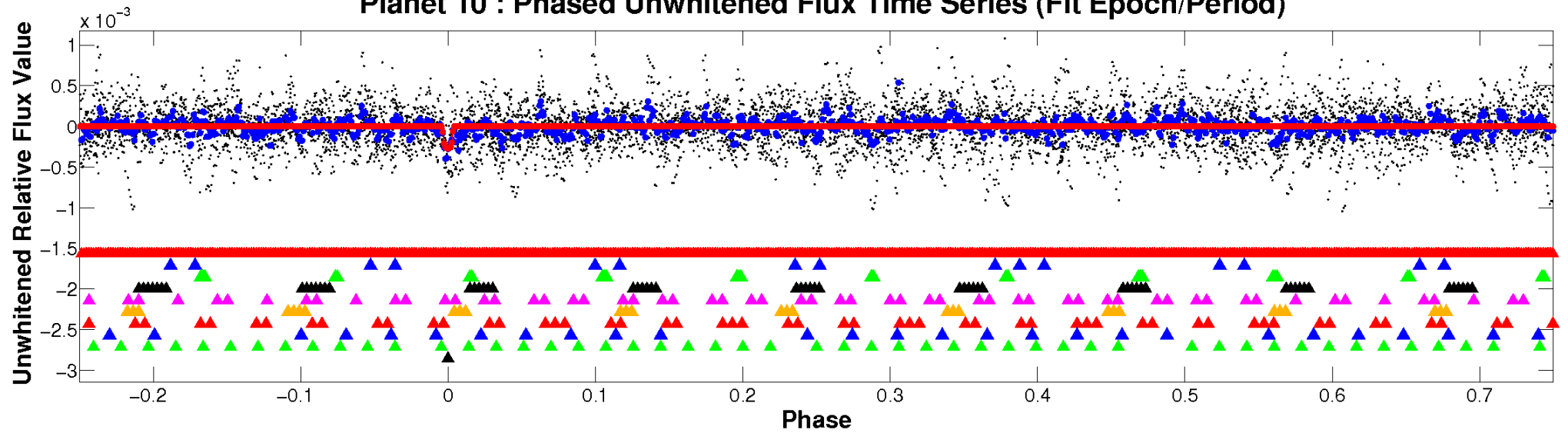
ALT Odd/Even

TCE 002998070-10

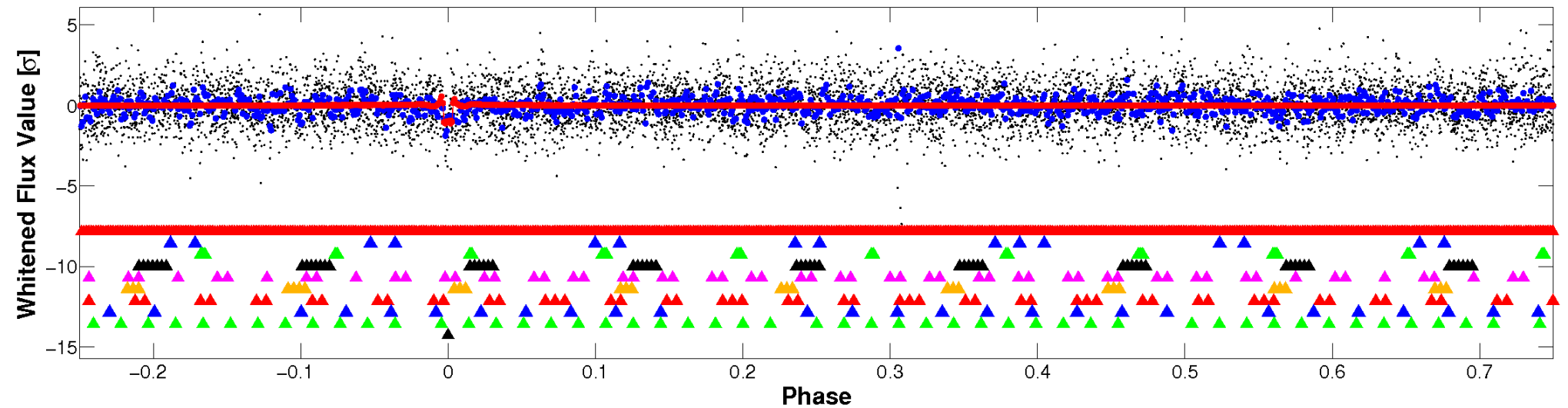


Non-Whitened Vs. Whitened Light Curve

Planet 10 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

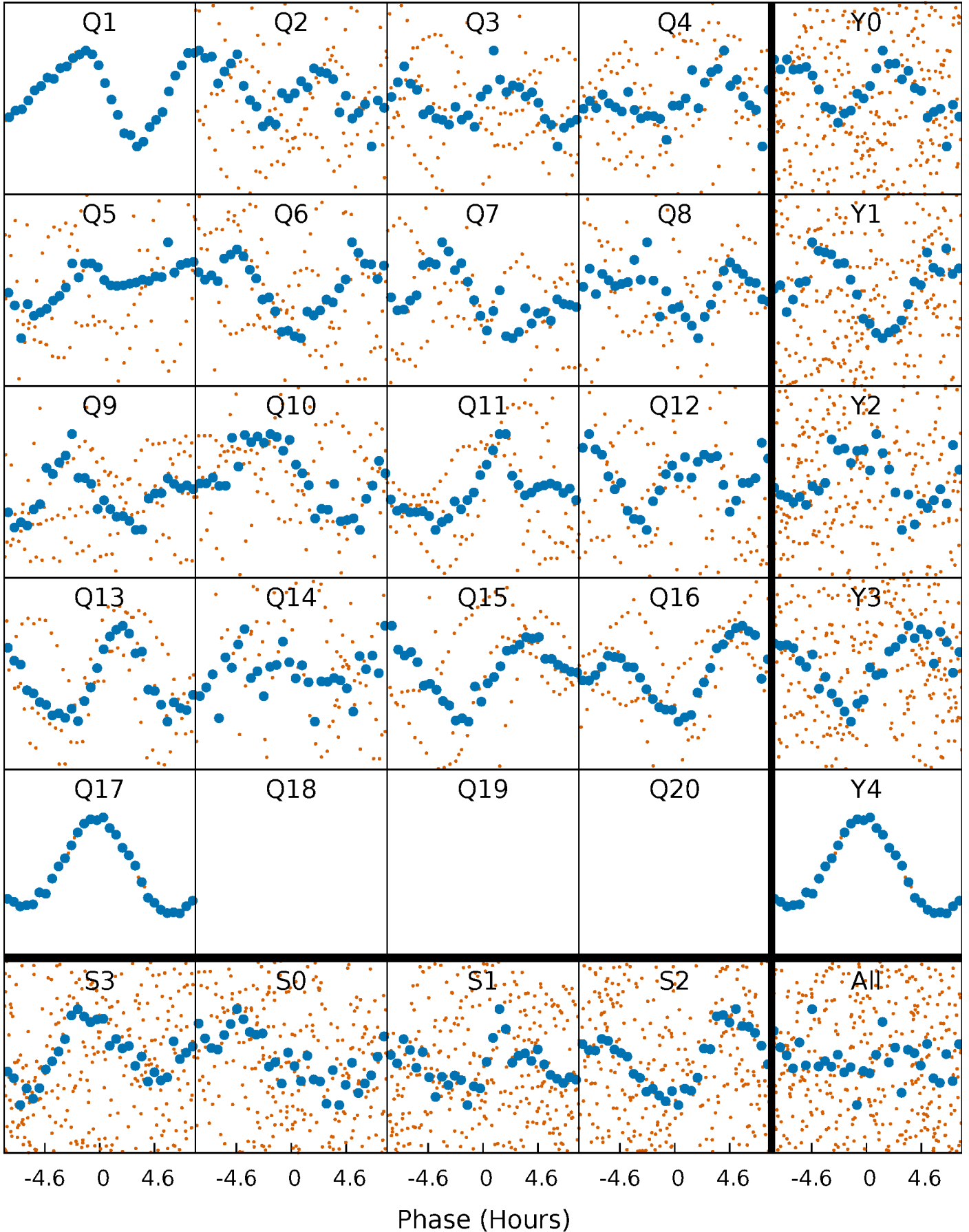


Planet 10 : Phased Whitened Flux Time Series (Fit Epoch/Period)



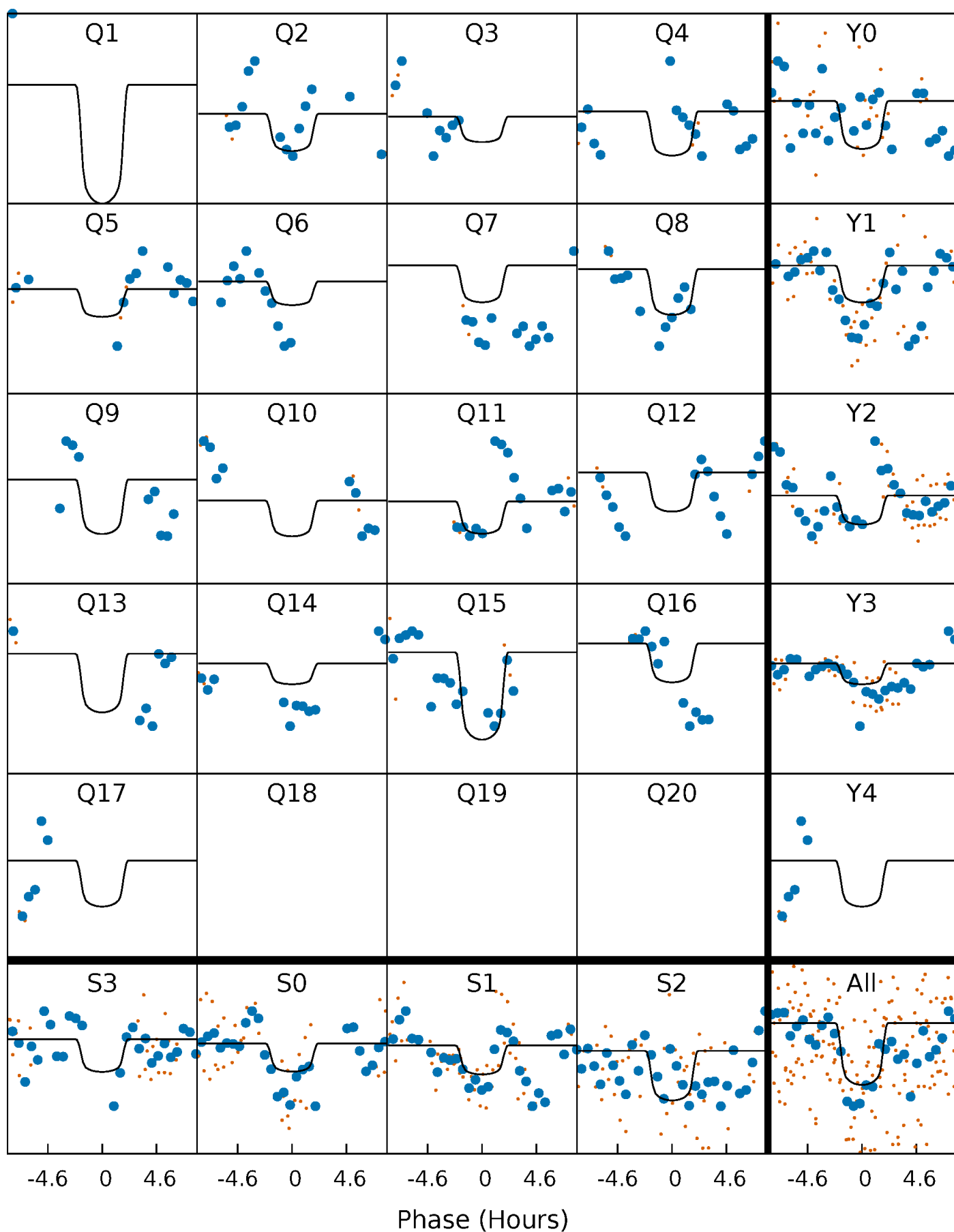
PDC Quarter-Phased Transit Curves

TCE 002998070-10 P= 23.328855 Days $T_0=154.215882$ (BKJD)



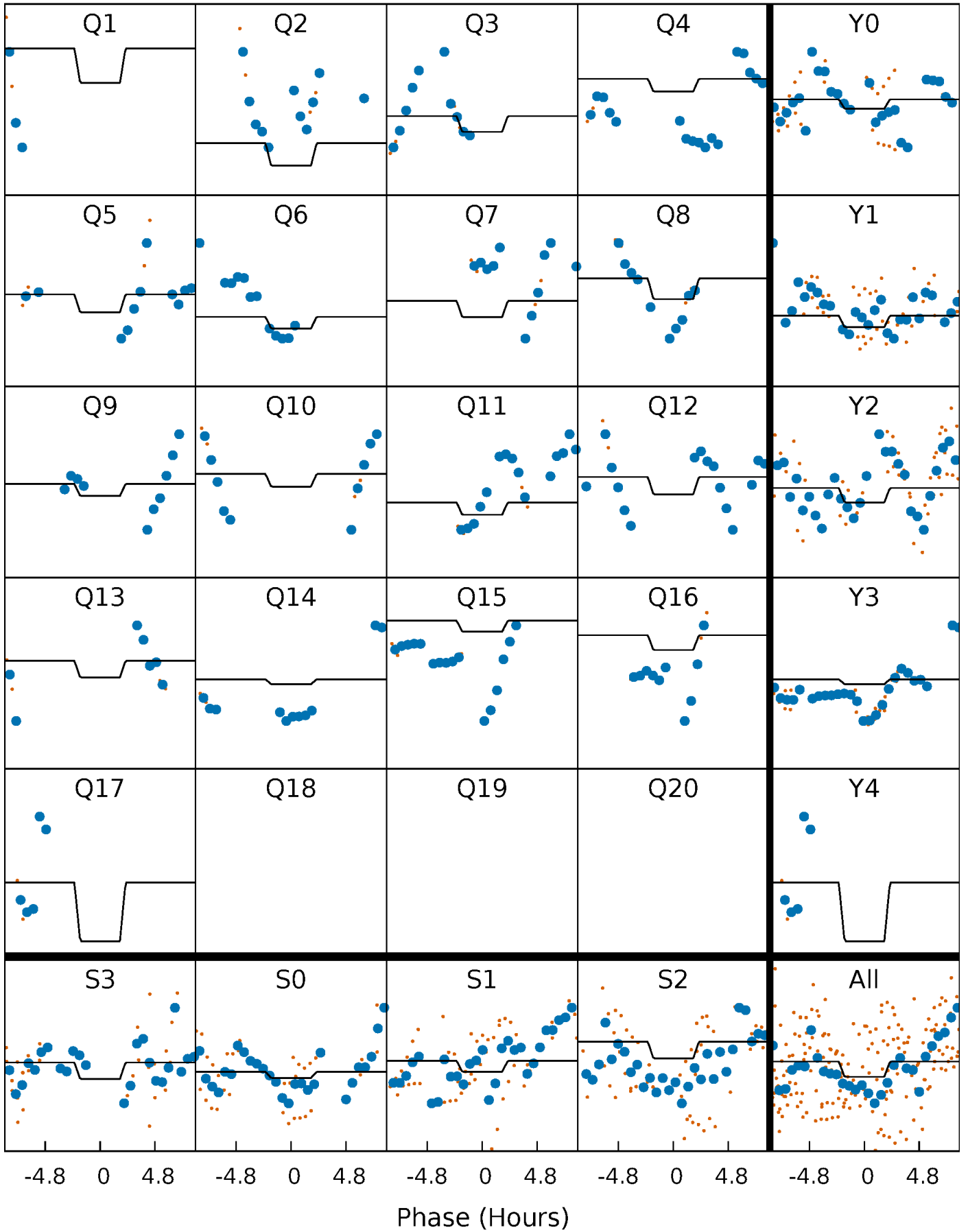
DV Quarter-Phased Transit Curves

TCE 002998070-10 P= 23.328855 Days $T_0=154.215882$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

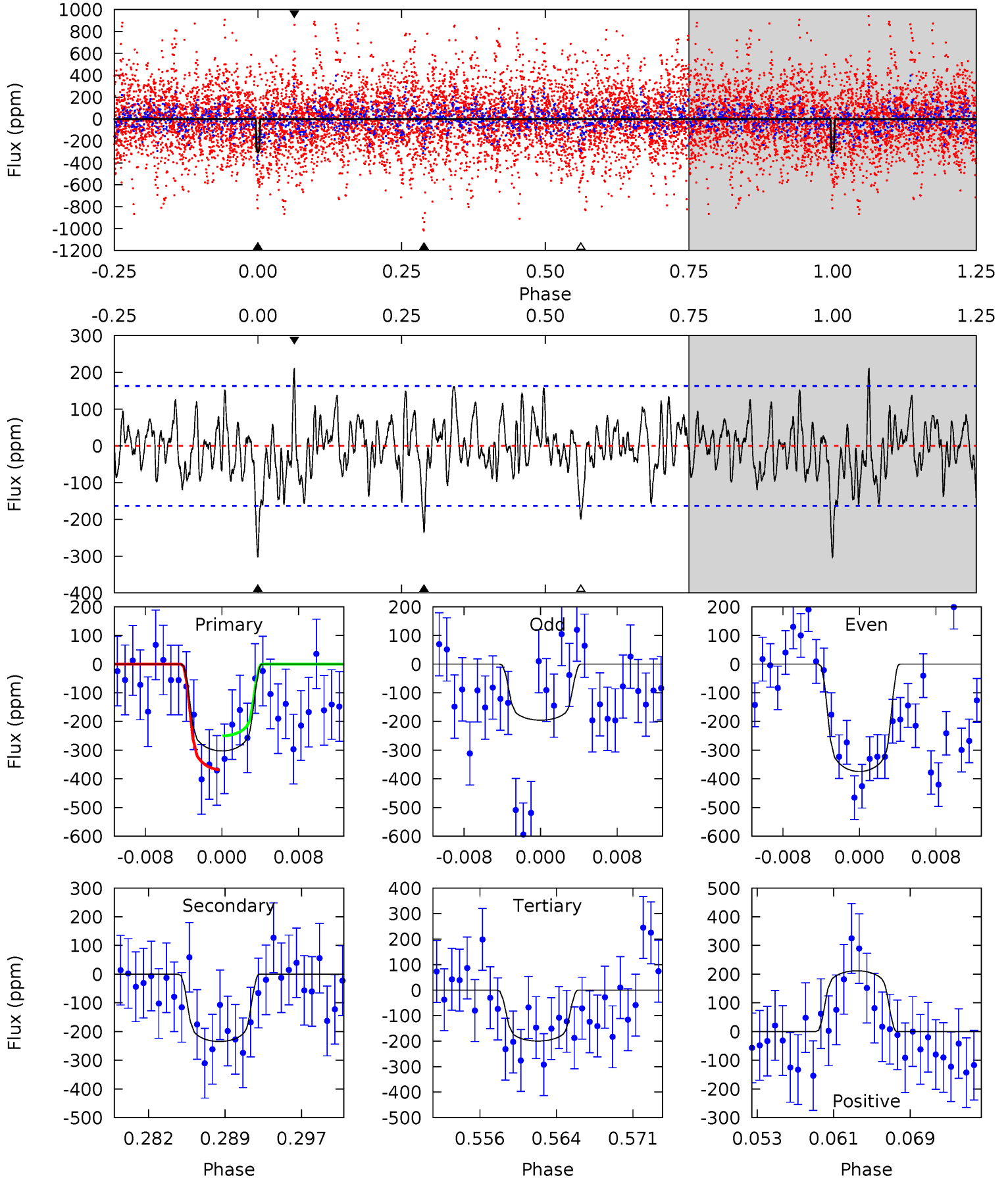
TCE 002998070-10 P= 23.329768 Days $T_0=154.168431$ (BKJD)



DV Model-Shift Uniqueness Test

002998070-10, P = 23.328855 Days, E = 130.887027 Days

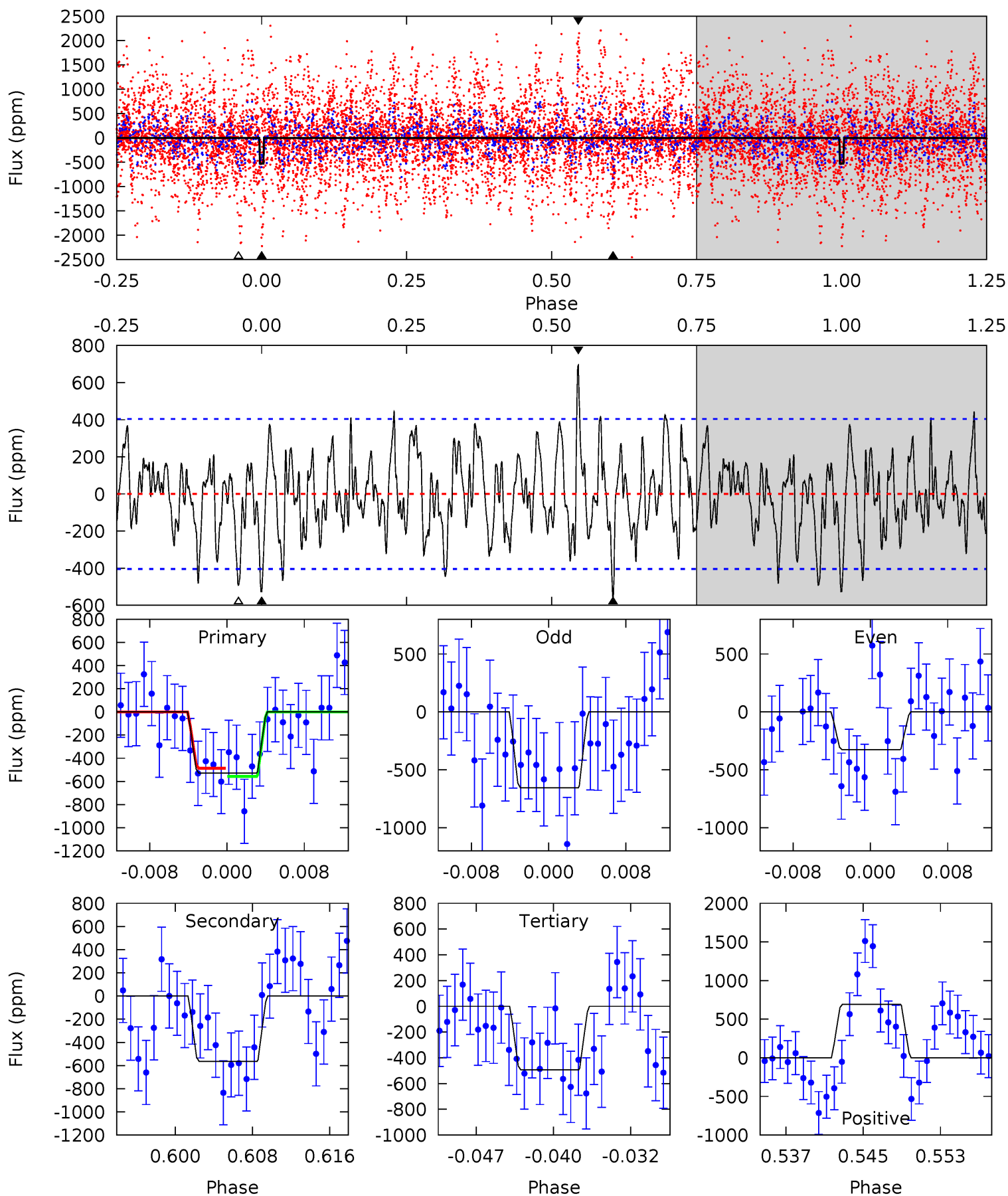
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.42	7.30	6.21	6.59	5.08	2.67	1.94	3.20	2.83	1.09	0.71	2.74	0.97	0.41	1.83



Alt Model-Shift Uniqueness Test

002998070-10, P = 23.329768 Days, E = 130.838663 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.62	7.08	6.19	8.71	5.07	2.66	2.36	0.43	-2.09	0.88	-1.63	1.99	1.16	0.55	0.44



Stellar Parameters For KIC 002998070

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6926^{+191}_{-301}	$4.193^{+0.072}_{-0.203}$	$0.360^{+0.100}_{-0.350}$	$1.665^{+0.549}_{-0.235}$	$1.577^{+0.196}_{-0.217}$	$0.482^{+0.189}_{-0.259}$
	+3%/-4%	+2%/-5%	+28%/-97%	+33%/-14%	+12%/-14%	+39%/-54%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 002998070-10 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-235 ± 32	$3.29^{+0.92}_{-0.86}$	1293^{+97}_{-69}	6399^{+1135}_{-736}	399^{+344}_{-155}
Alt.	-564 ± 80	$2.99^{+0.95}_{-0.87}$	1296^{+104}_{-78}	8767^{+2284}_{-1307}	1158^{+1206}_{-502}

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

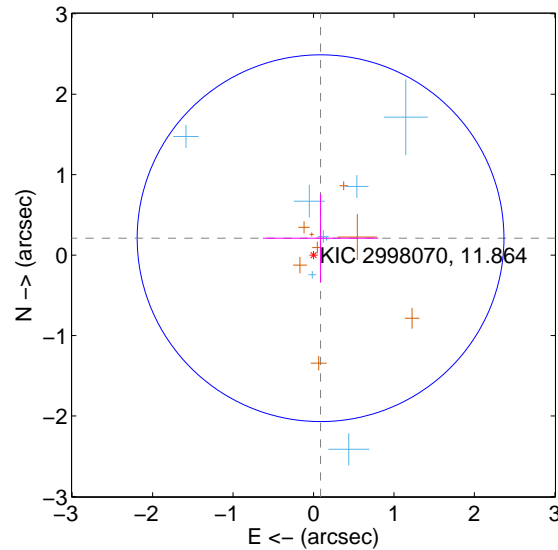
Supplemental centroid analysis for 002998070-10. **Kepler magnitude: 11.86.** Transit SNR 7.34

There are 8 quarters with good PRF difference image offsets

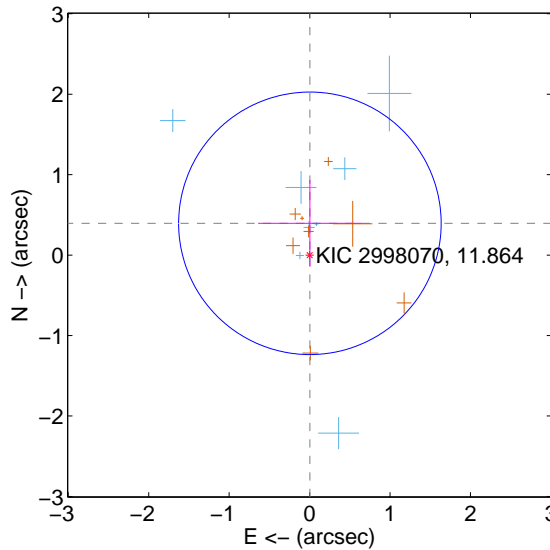
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.228 ± 0.760	0.30	-0.088 ± 0.717	0.210 ± 0.550
PRF-fit source offset from KIC position	0.395 ± 0.544	0.73	-0.004 ± 0.644	0.395 ± 0.539
photometric centroid source offset	0.12 ± 0.27	0.43	0.07 ± 0.23	0.10 ± 0.29

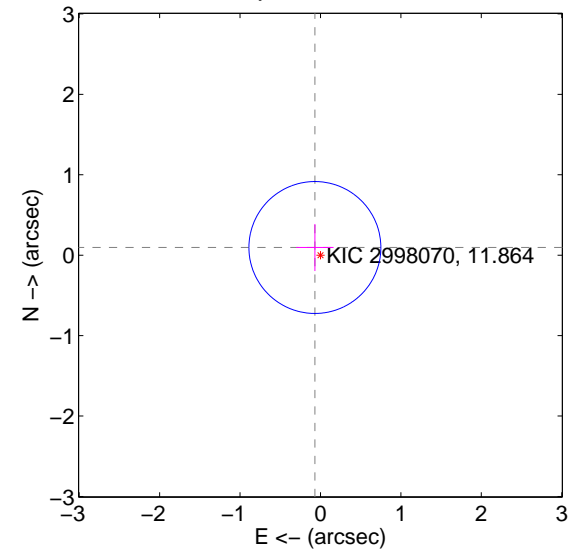
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

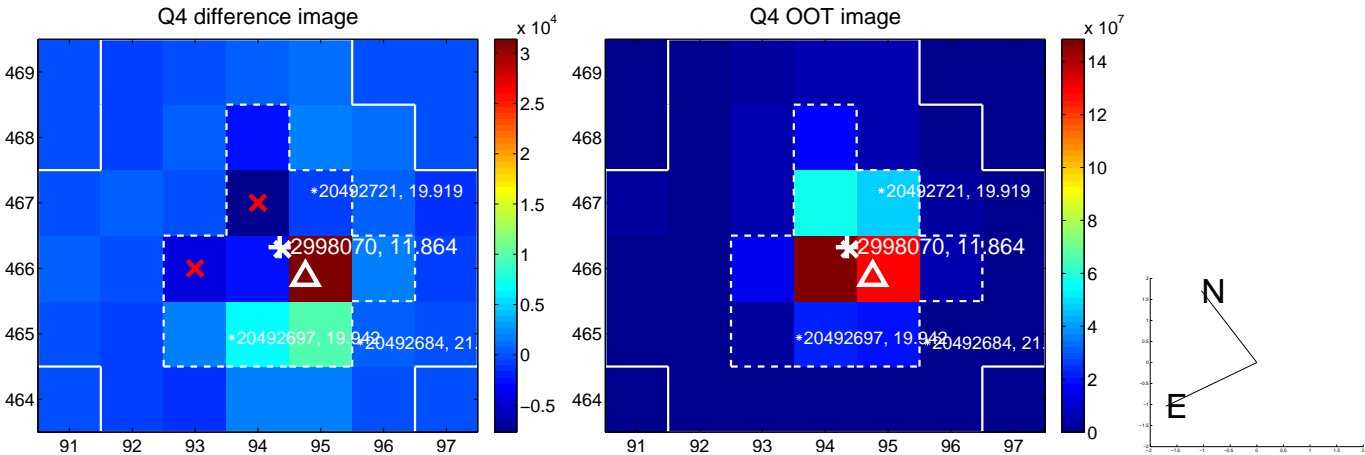
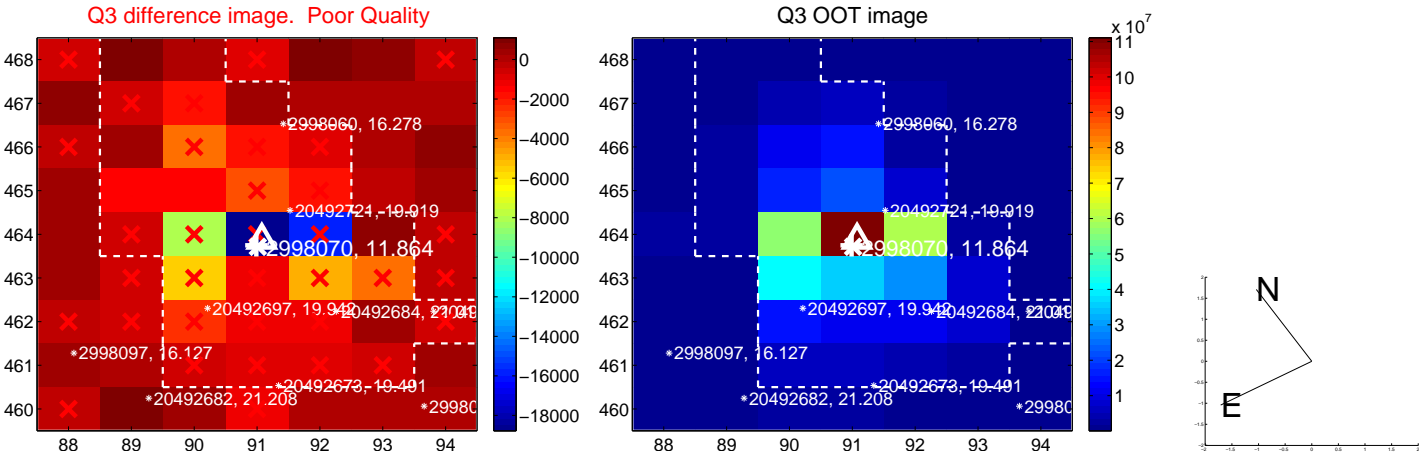
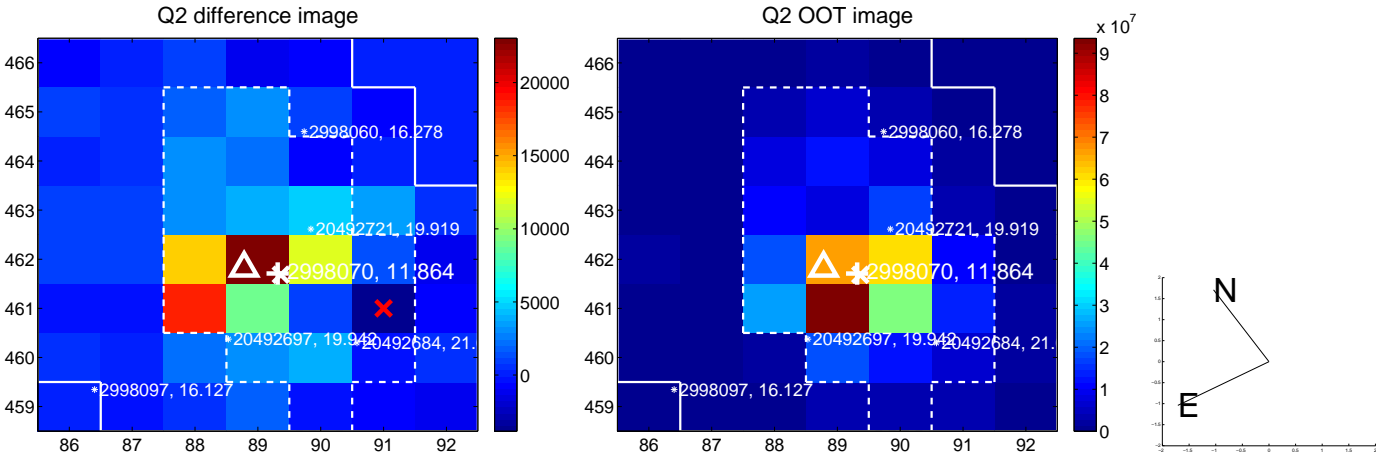
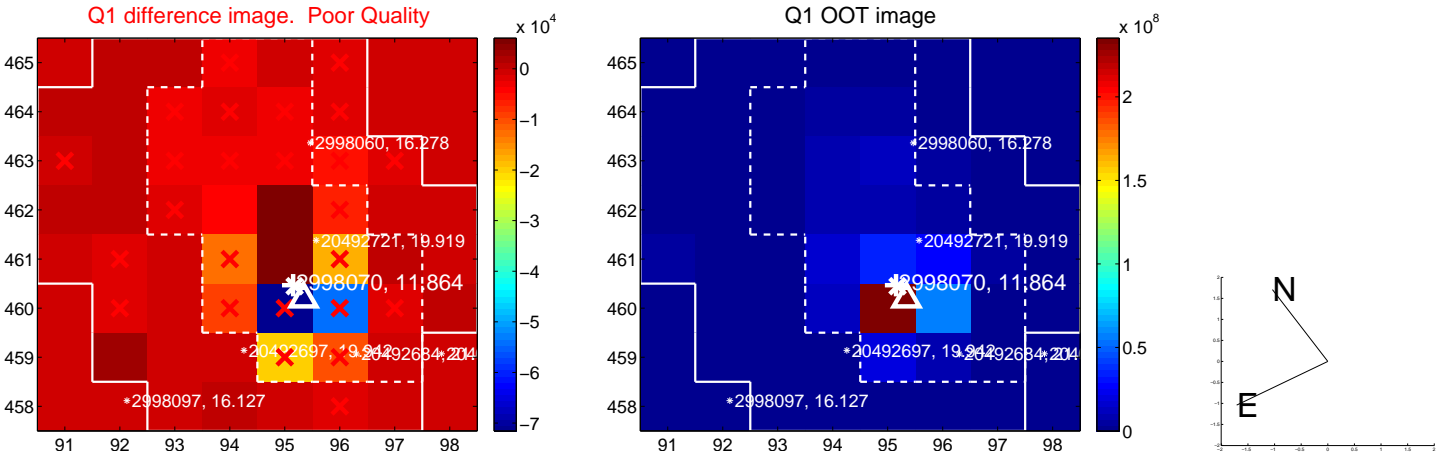


offset from photometric centroids

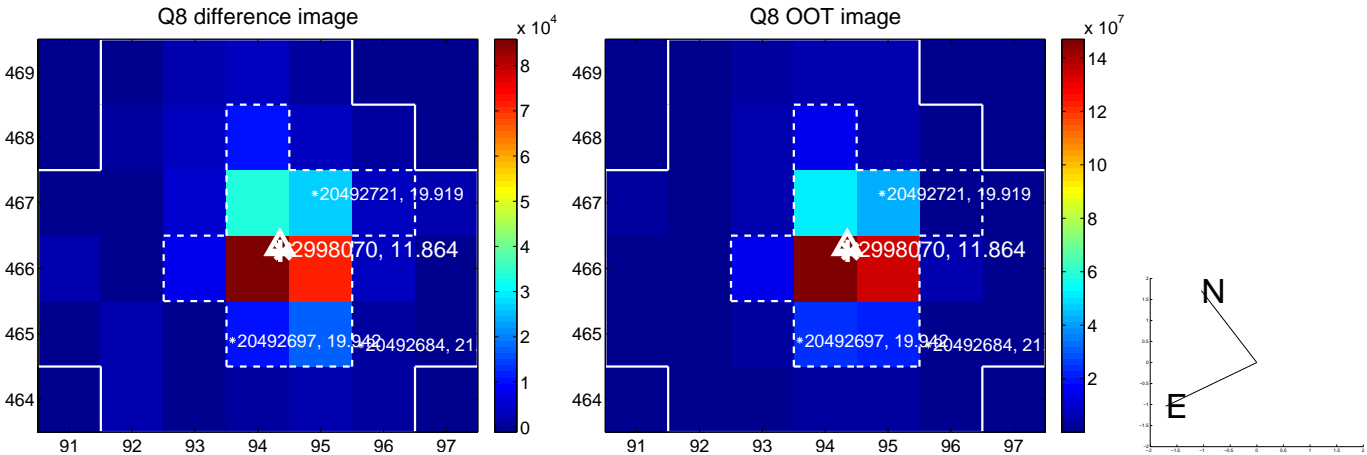
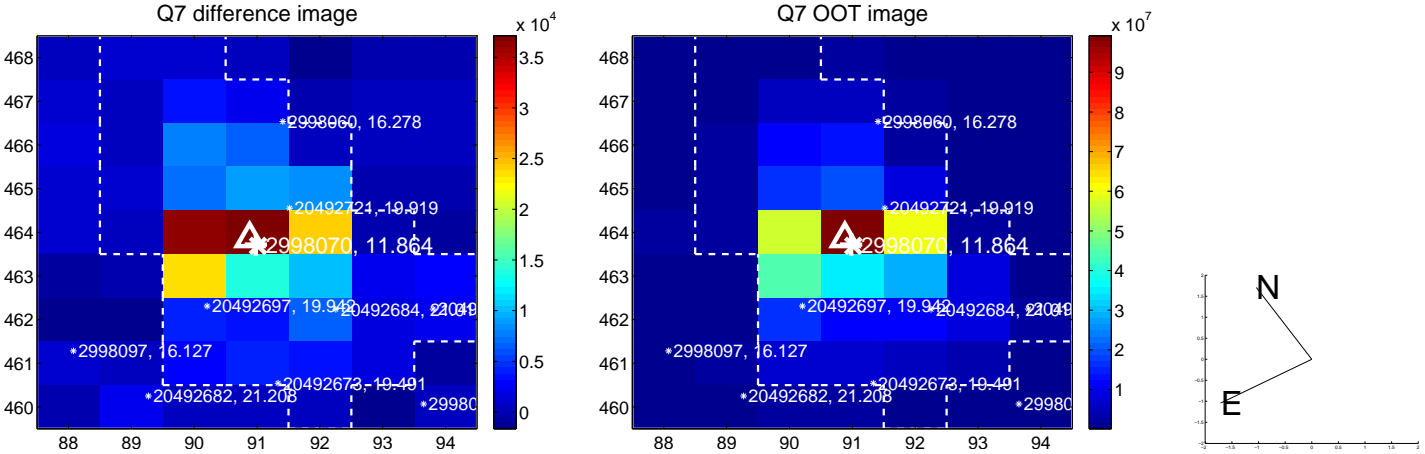
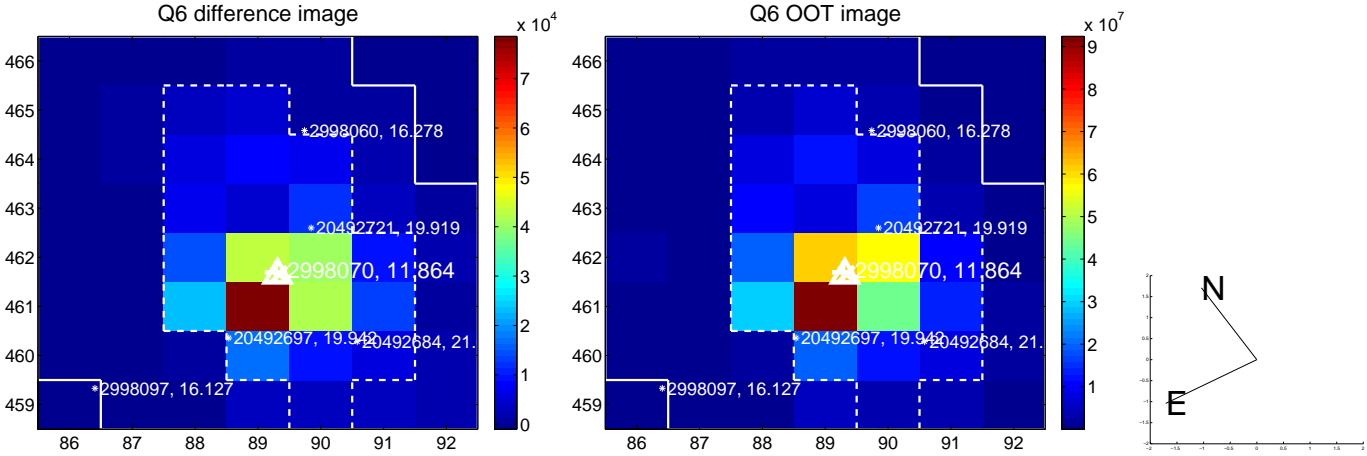
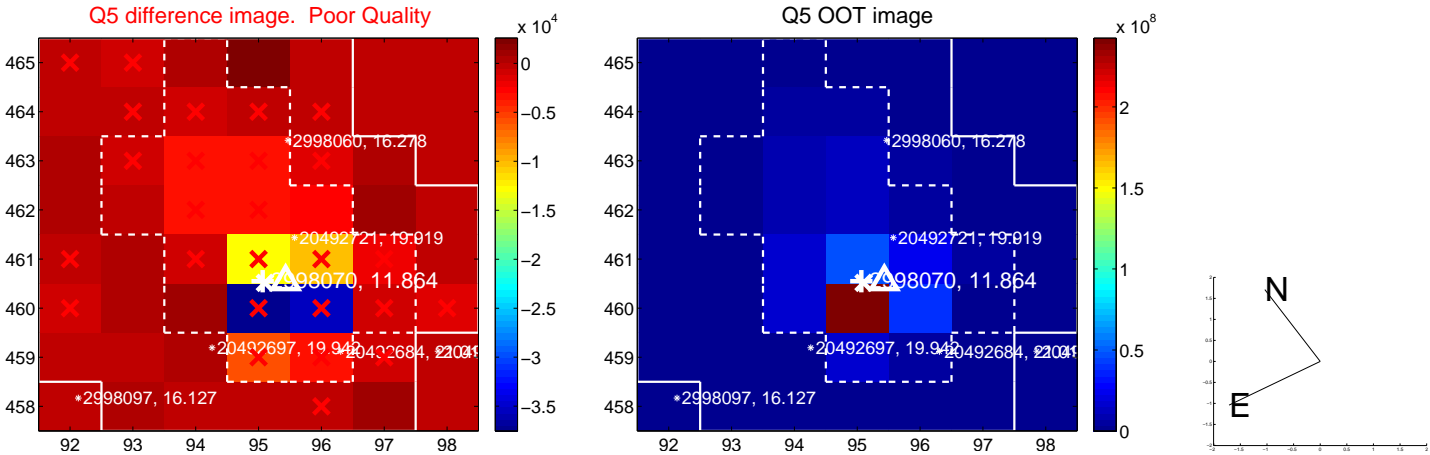


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

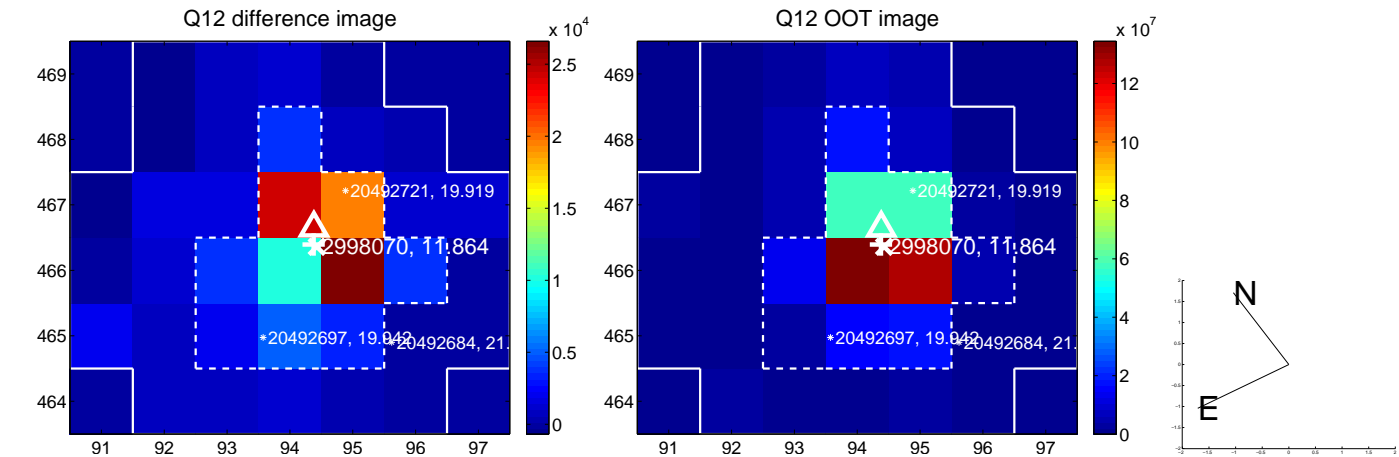
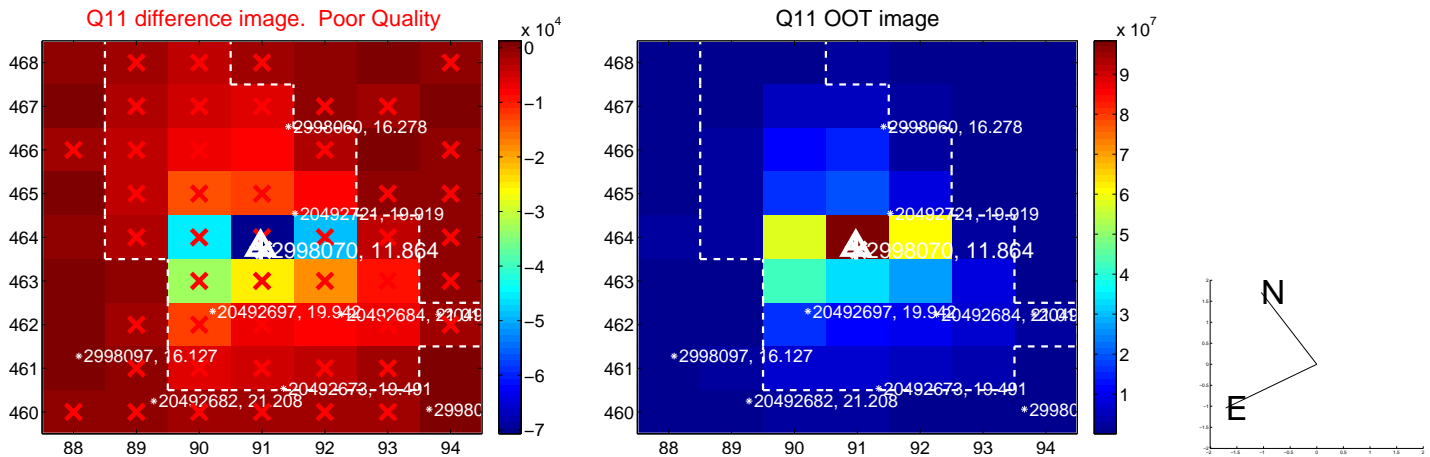
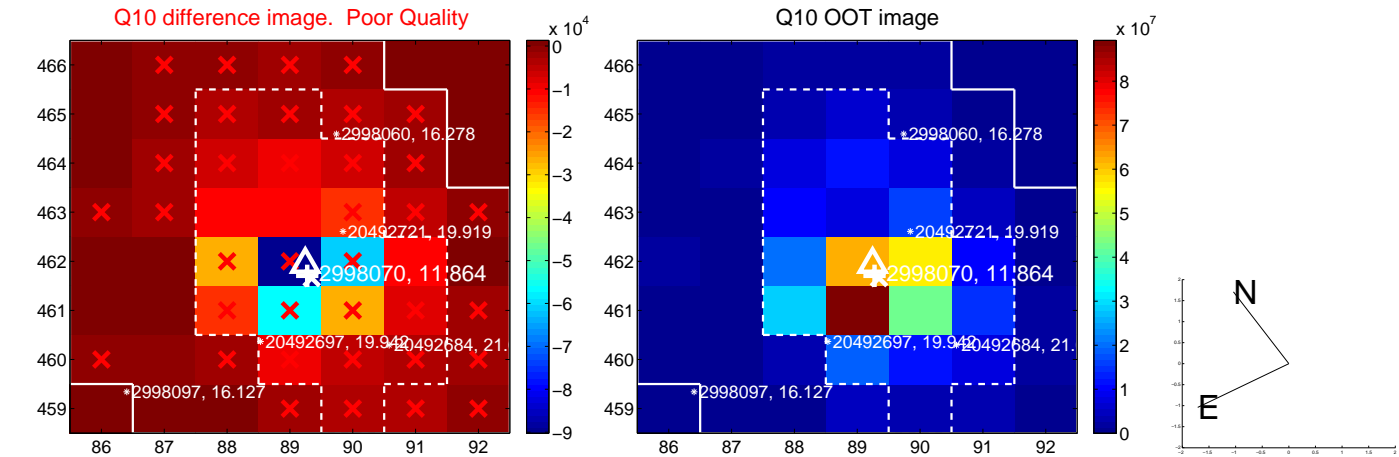
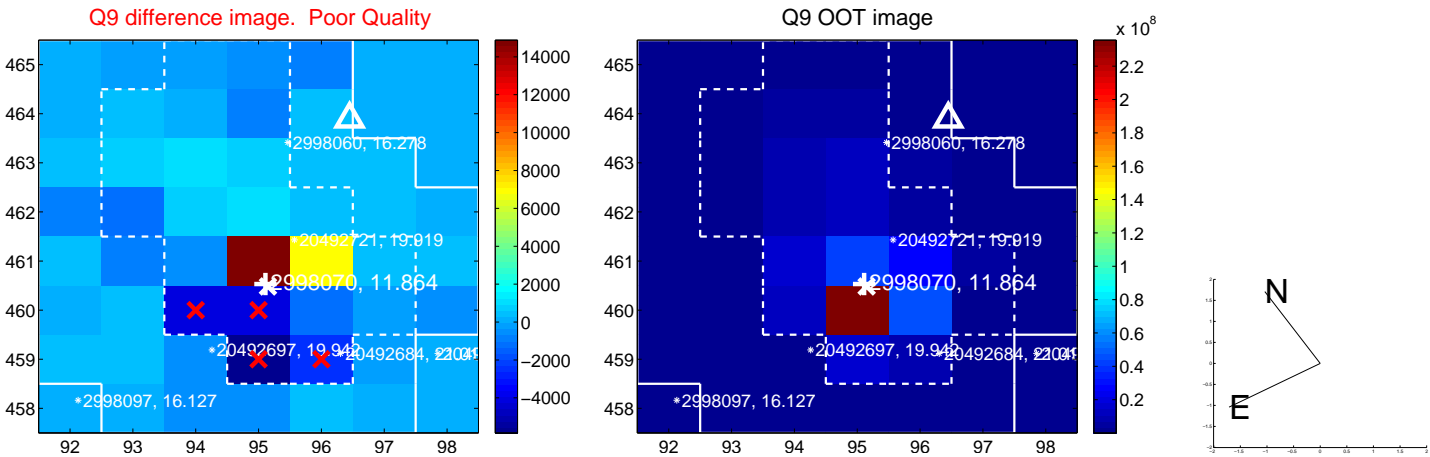
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



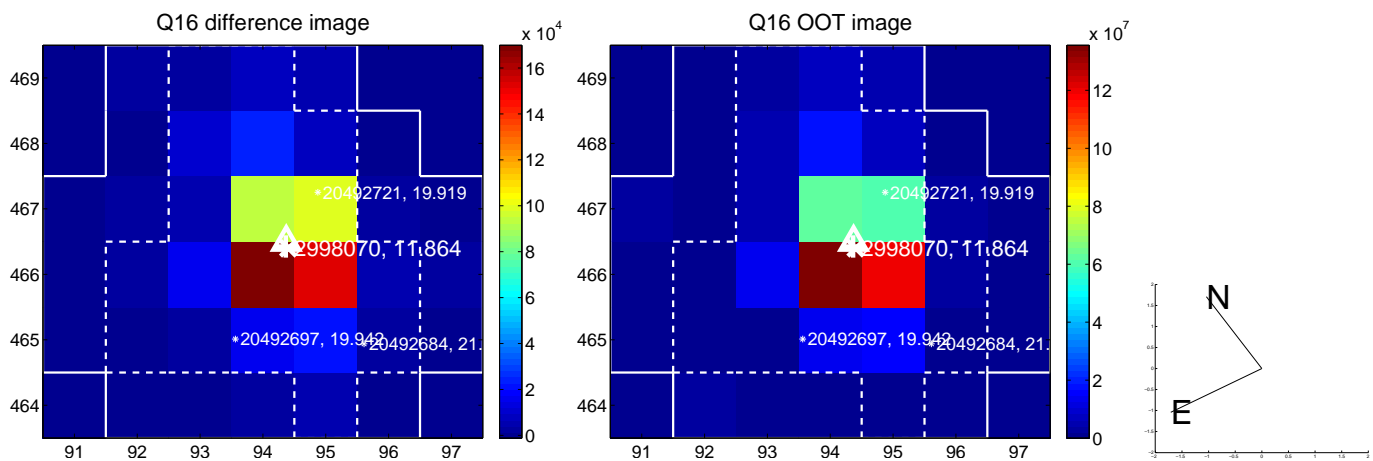
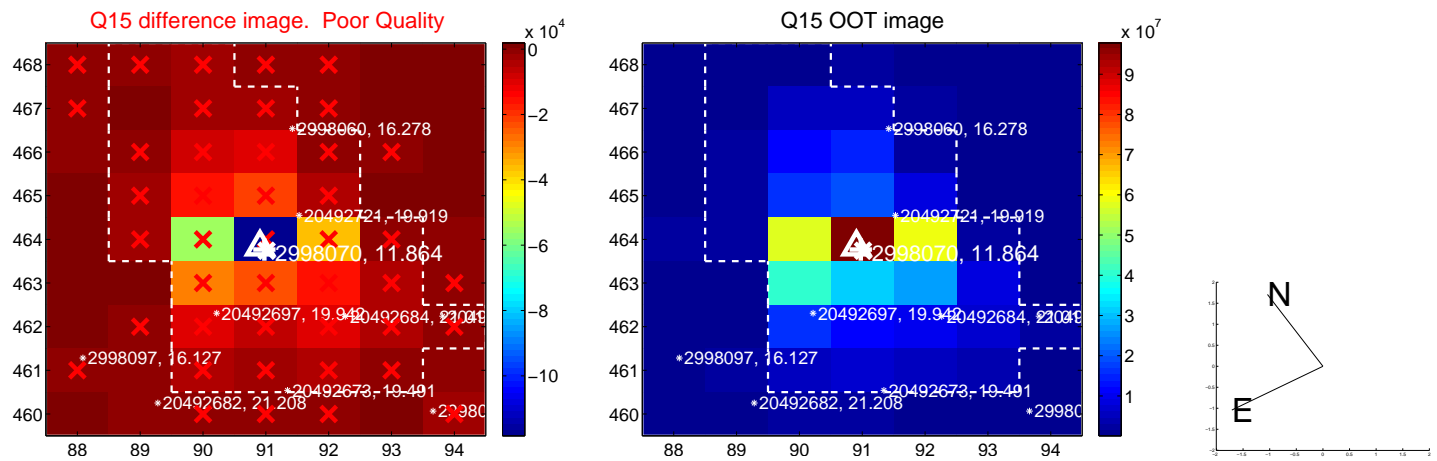
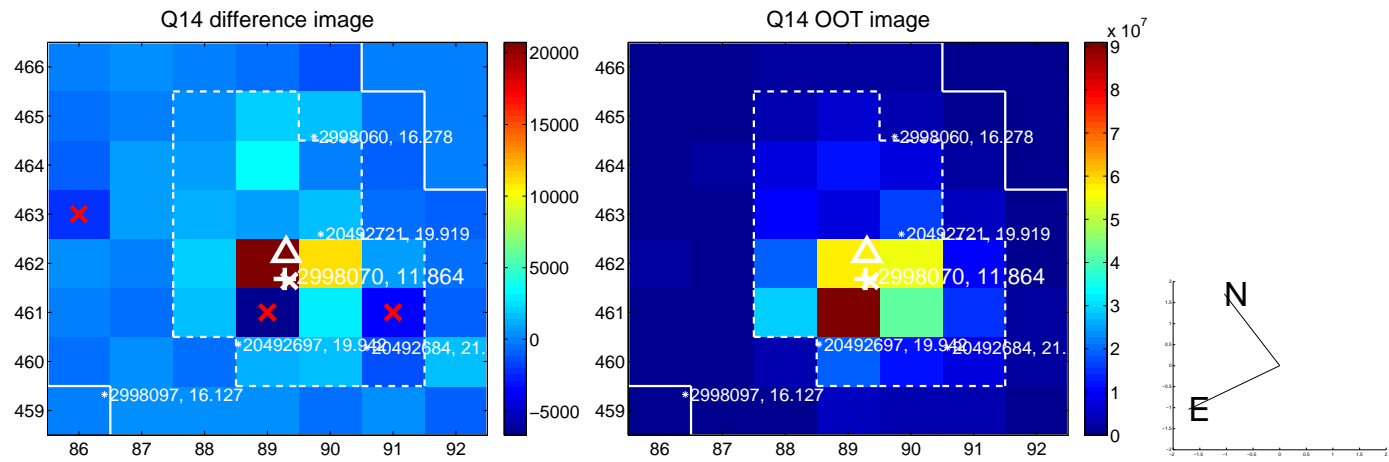
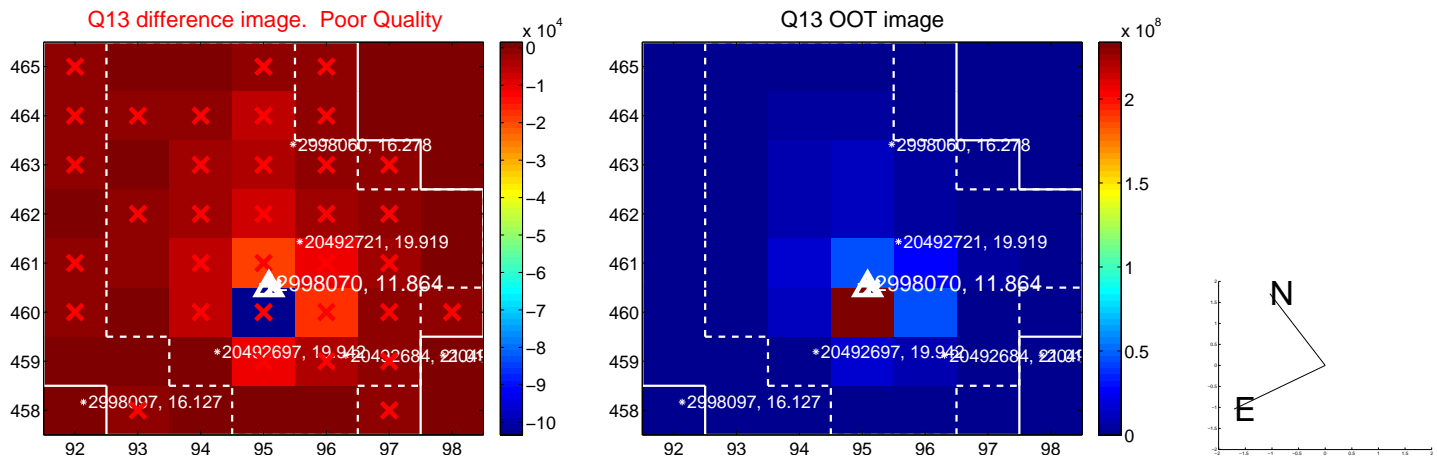
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



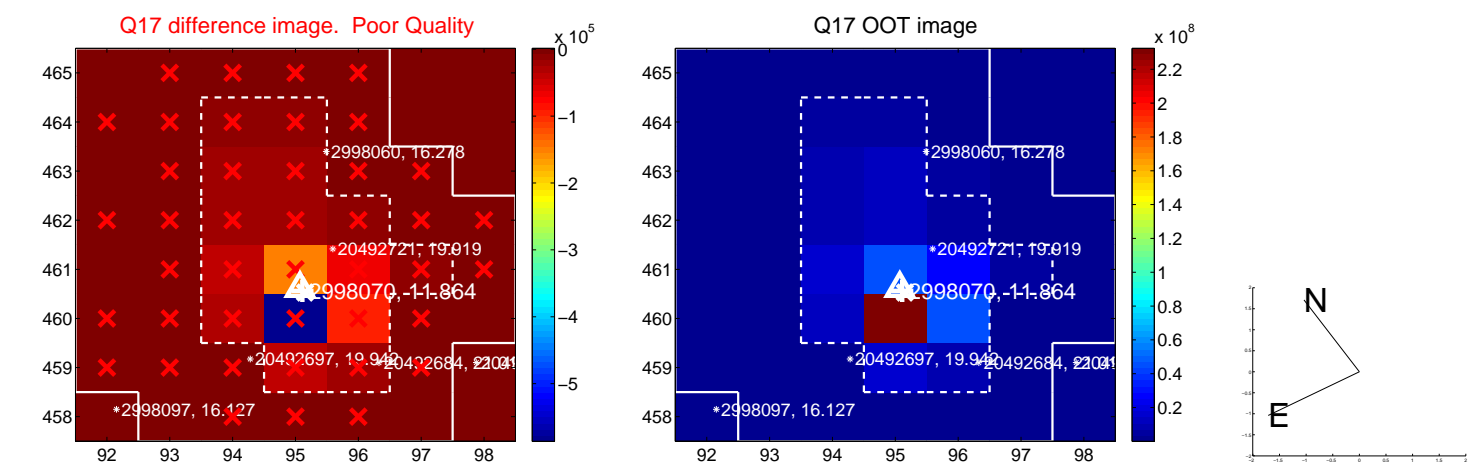
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



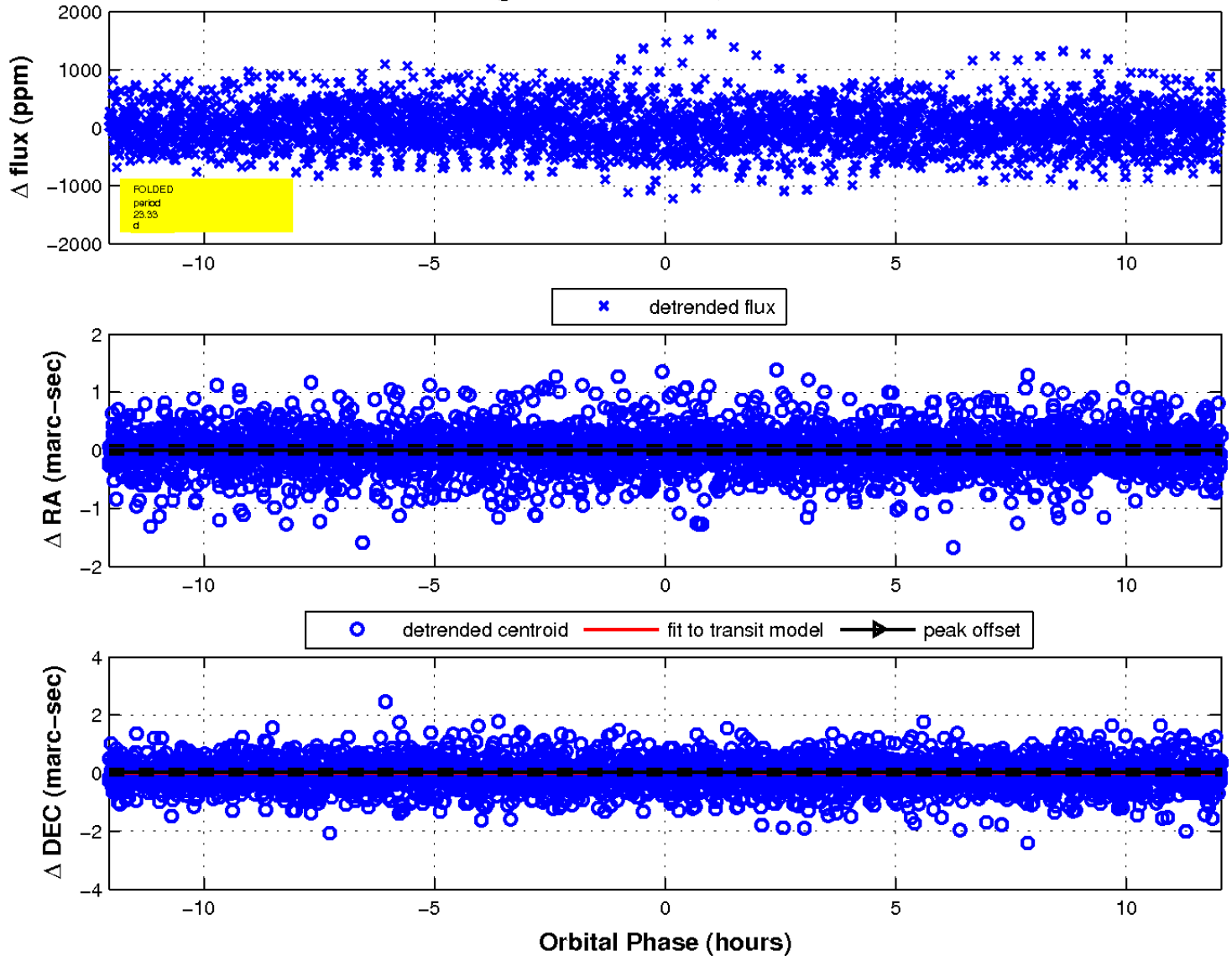
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 10 of 10



UKIRT Image

