

KIC 007222939

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})
007222939-01	OBS	No	1.116367	132.566683	117.0	3.371	8.8	9.4	0.69	4867	0.89	656.42
007222939-02	OBS	No	2.016495	132.067777	109.2	8.027	7.7	7.0	0.69	4867	0.70	298.40
007222939-03	OBS	No	110.130451	174.899450	1067.6	17.618	20.7	10.0	0.69	4867	2.70	1.44
007222939-04	OBS	No	99.492145	137.414305	1480.4	3.560	8.3	8.6	0.69	4867	2.94	1.65
007222939-05	OBS	No	490.041345	483.534823	1159.1	4.450	7.7	7.2	0.69	4867	2.49	0.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007222939-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
007222939-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
007222939-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007222939-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_RESOLVED_OFFSET
007222939-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

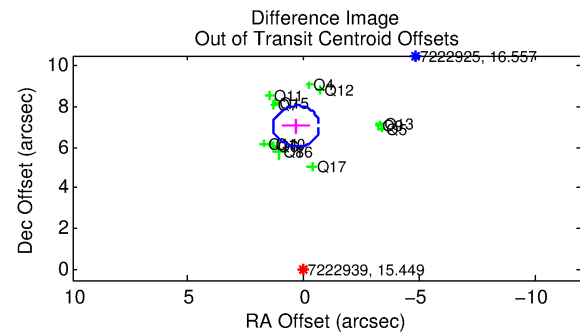
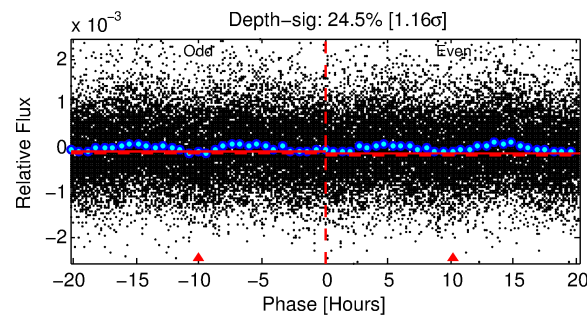
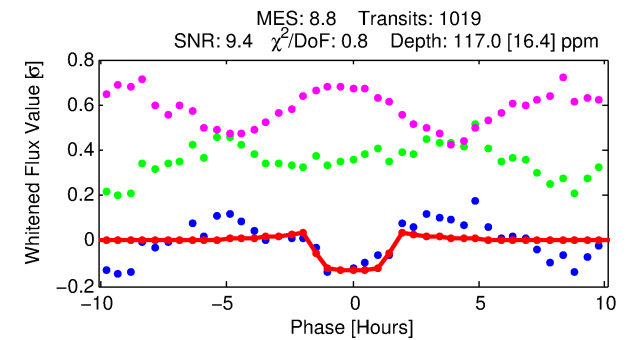
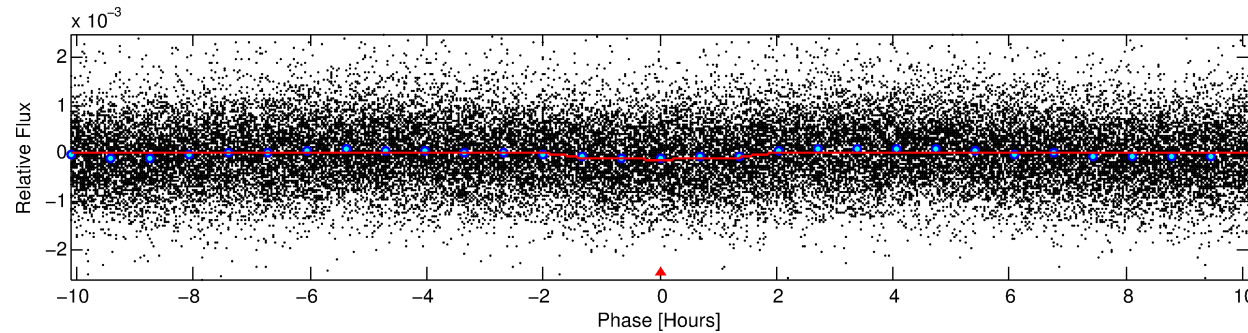
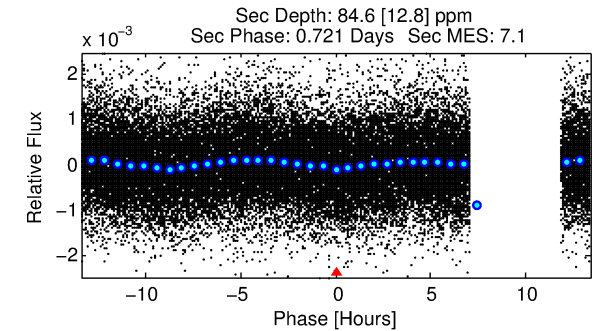
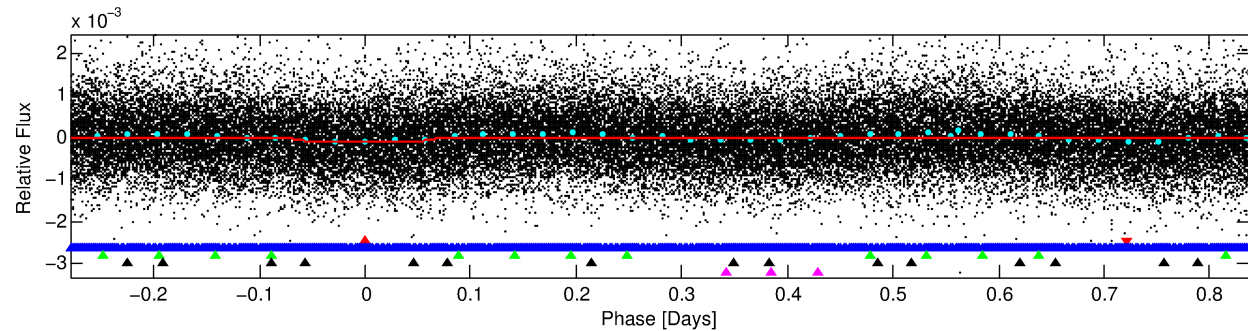
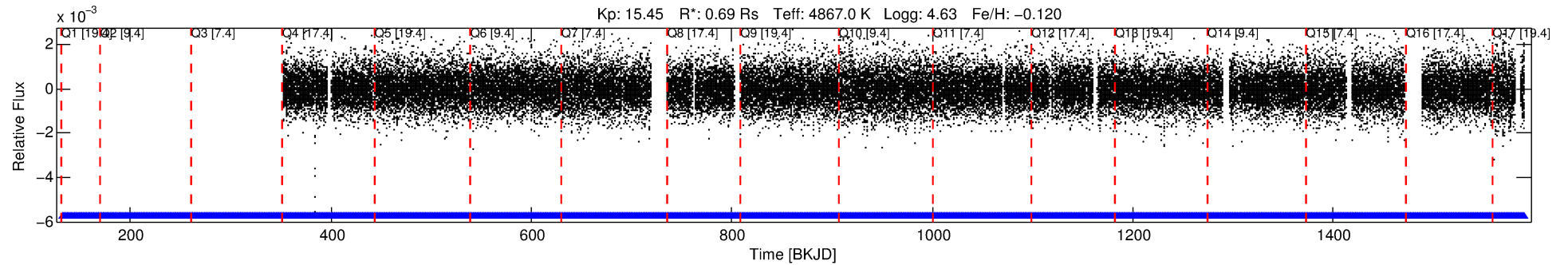
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007222939-01

No Significant Match Found

DV One-Page Summary

KIC: 7222939 Candidate: 1 of 5 Period: 1.116 d



DV Fit Results:

Period = 1.11637 [0.00001] d
Epoch = 132.5667 [0.0036] BKJD
Rp/R* = 0.0118 [0.0077]
a/R* = 1.58 [2.35]
b = 0.88 [0.68]
Seff = 656.42 [125.06]
Teq = 1291 [61] K
Rp = 0.89 [0.59] Re
a = 0.0191 [0.0018] AU
Ag = 21.51 [28.22] [0.73σ]
Teff = 4298 [1411] K [2.13σ]

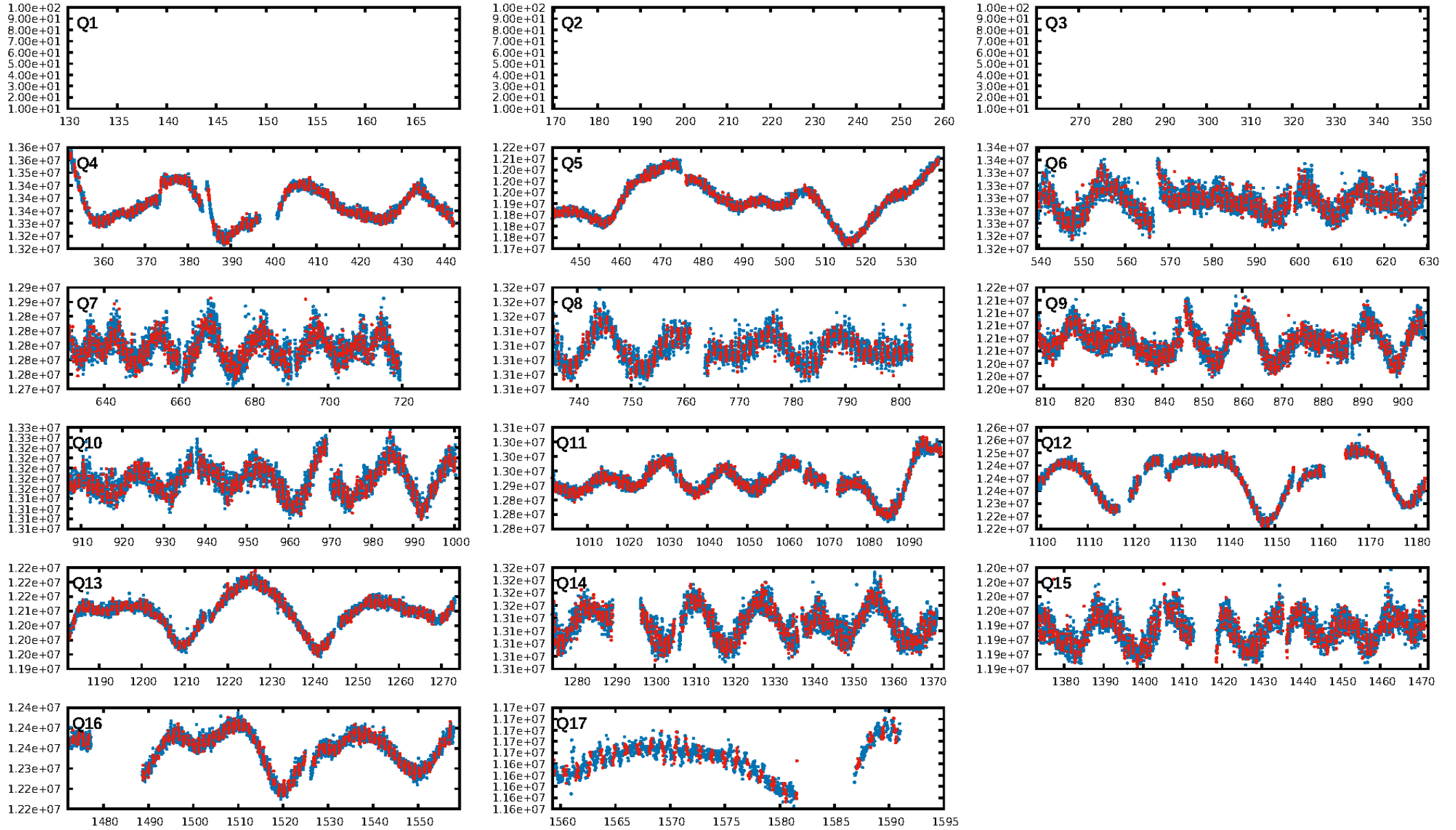
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 98.7% [2.48σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGoF-sig: N/A
Bootstrap-pfa: 9.04e-13
RollingBand-fgt: 1.00 [994/994]
GhostDiagnostic-chr: -3.079
Centroid-sig: 13.7%
Centroid-so: 2.639 arcsec [4.68σ]
OotOffset-rm: 7.042 arcsec [21.14σ]
KicOffset-rm: 6.265 arcsec [20.26σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.57 [8/14]
DiffImageOverlap-fno: 1.00 [14/14]

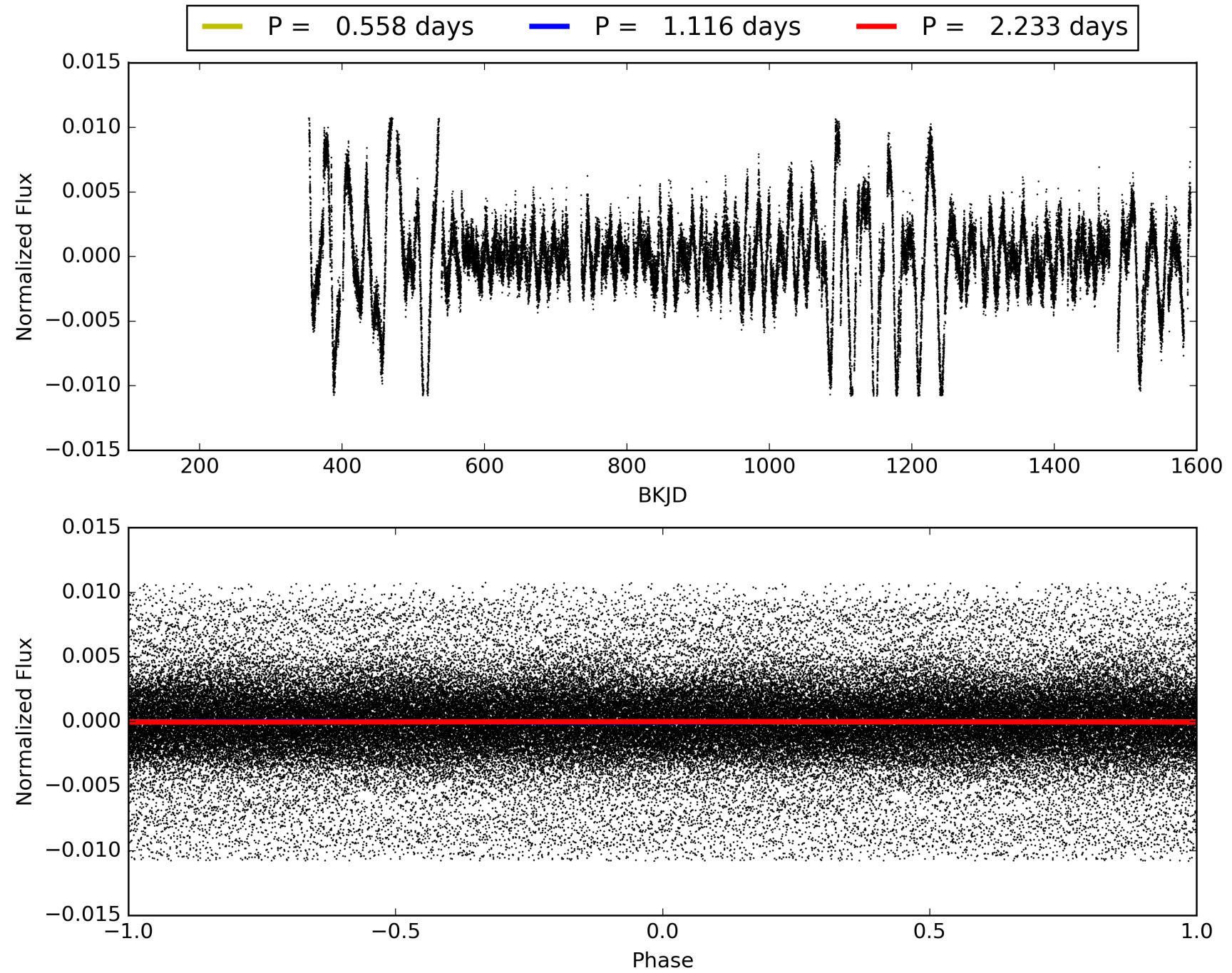
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:50:22 Z

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

TCE 007222939-01, PDC Light Curves

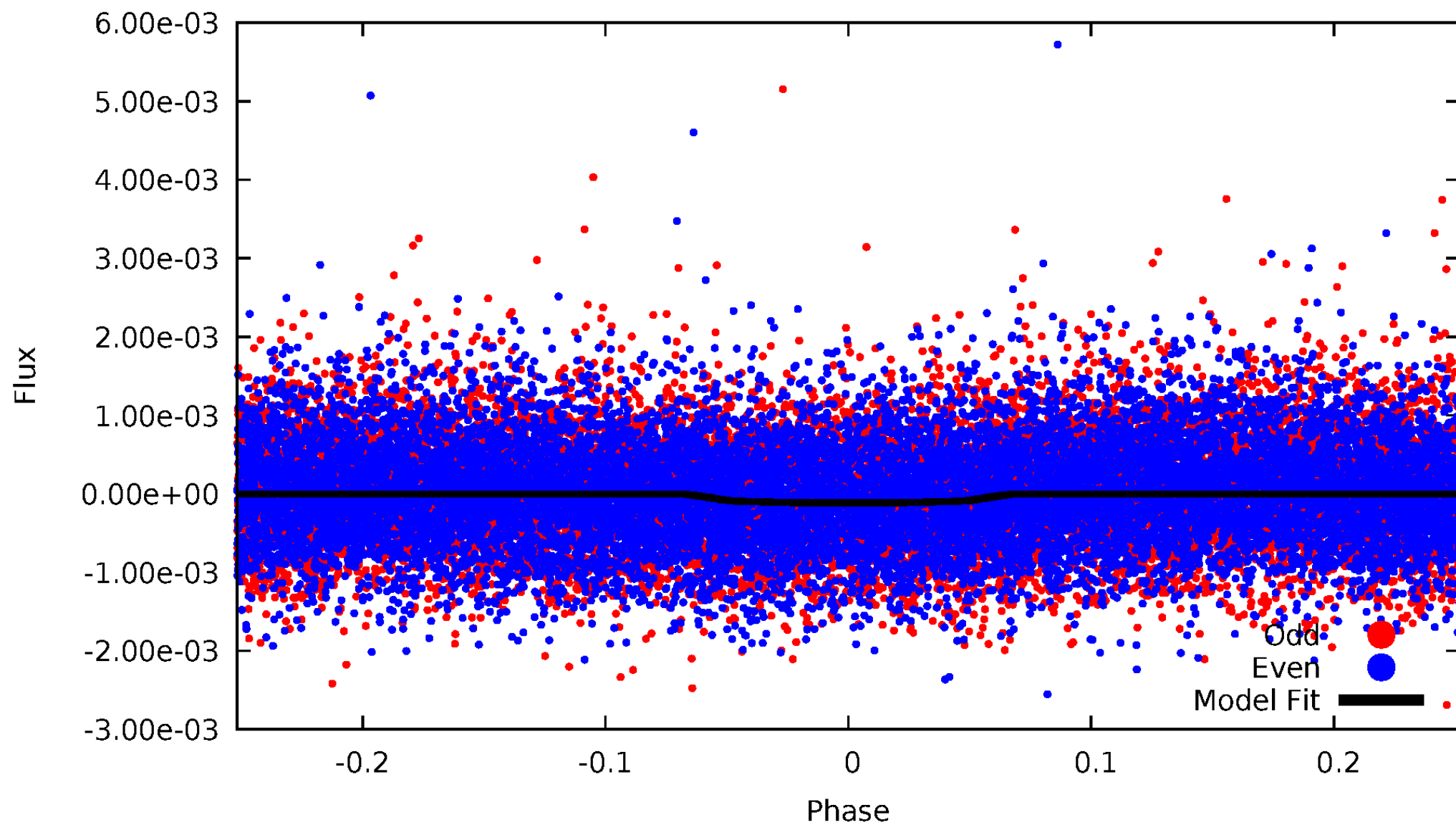


TCE 007222939-01



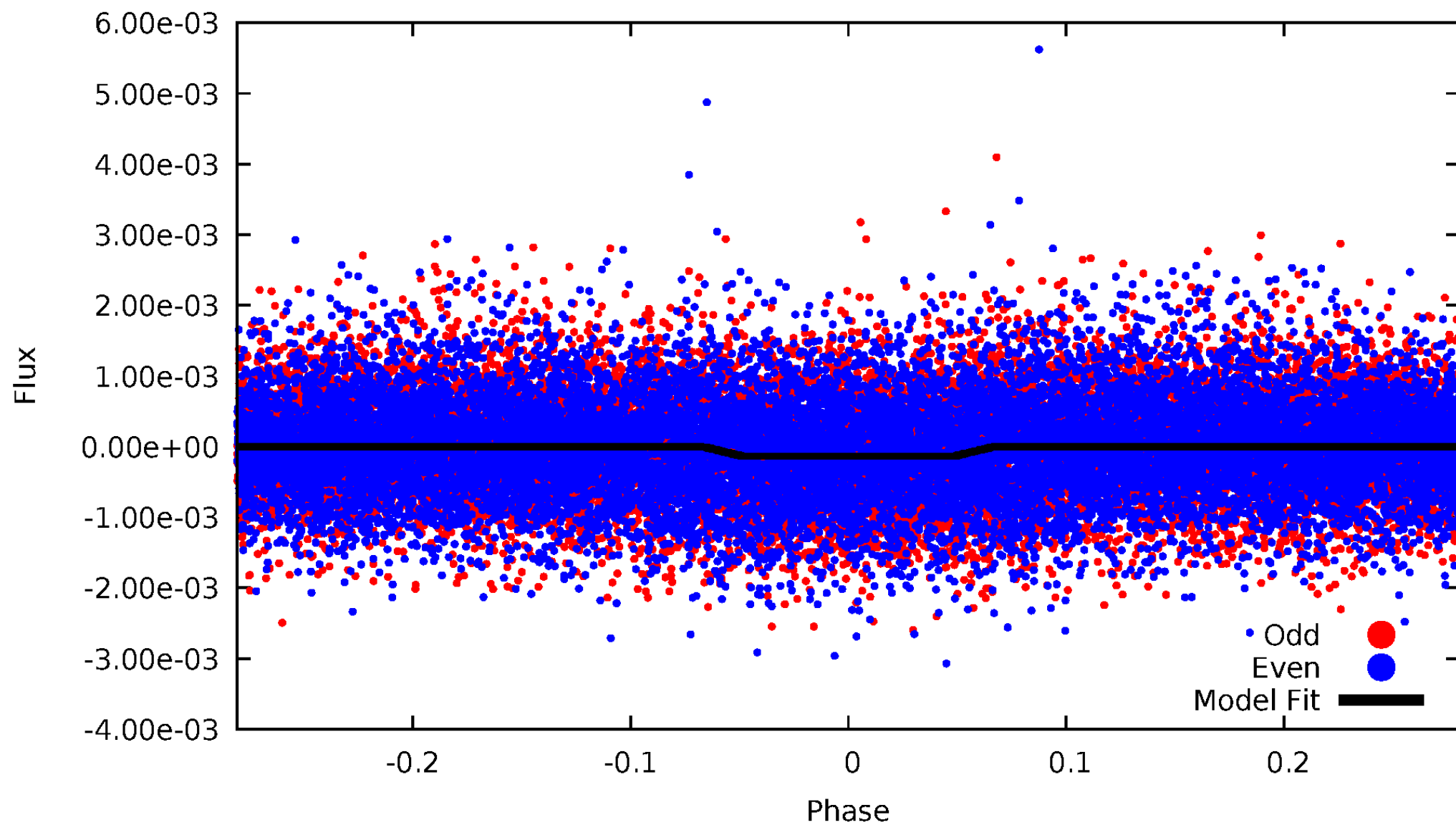
DV Odd/Even

TCE 007222939-01

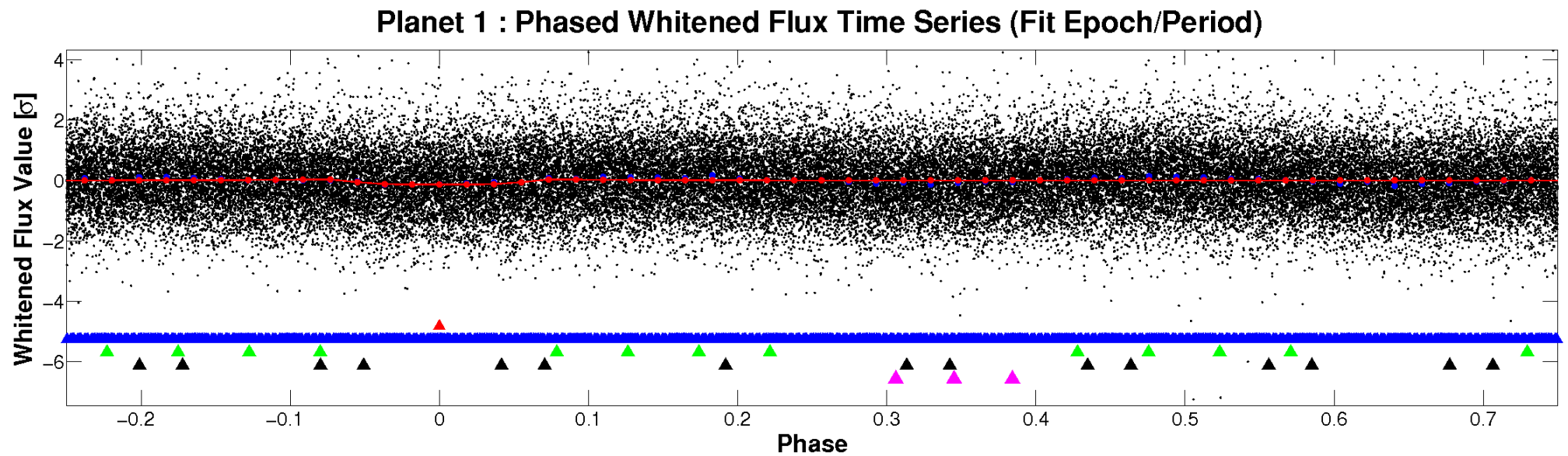
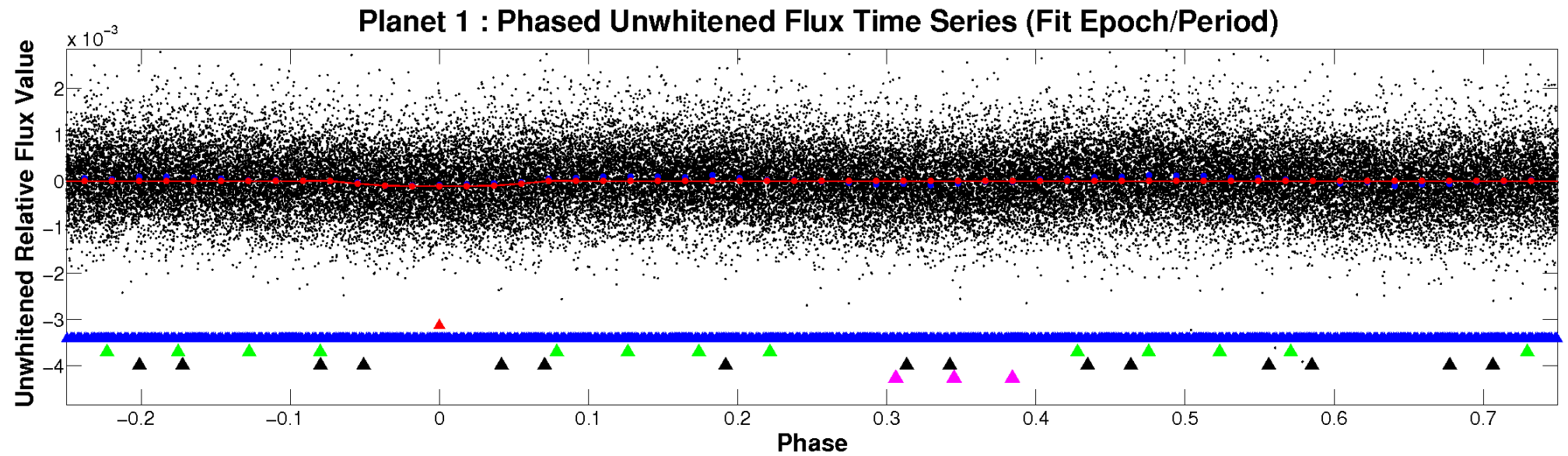


ALT Odd/Even

TCE 007222939-01

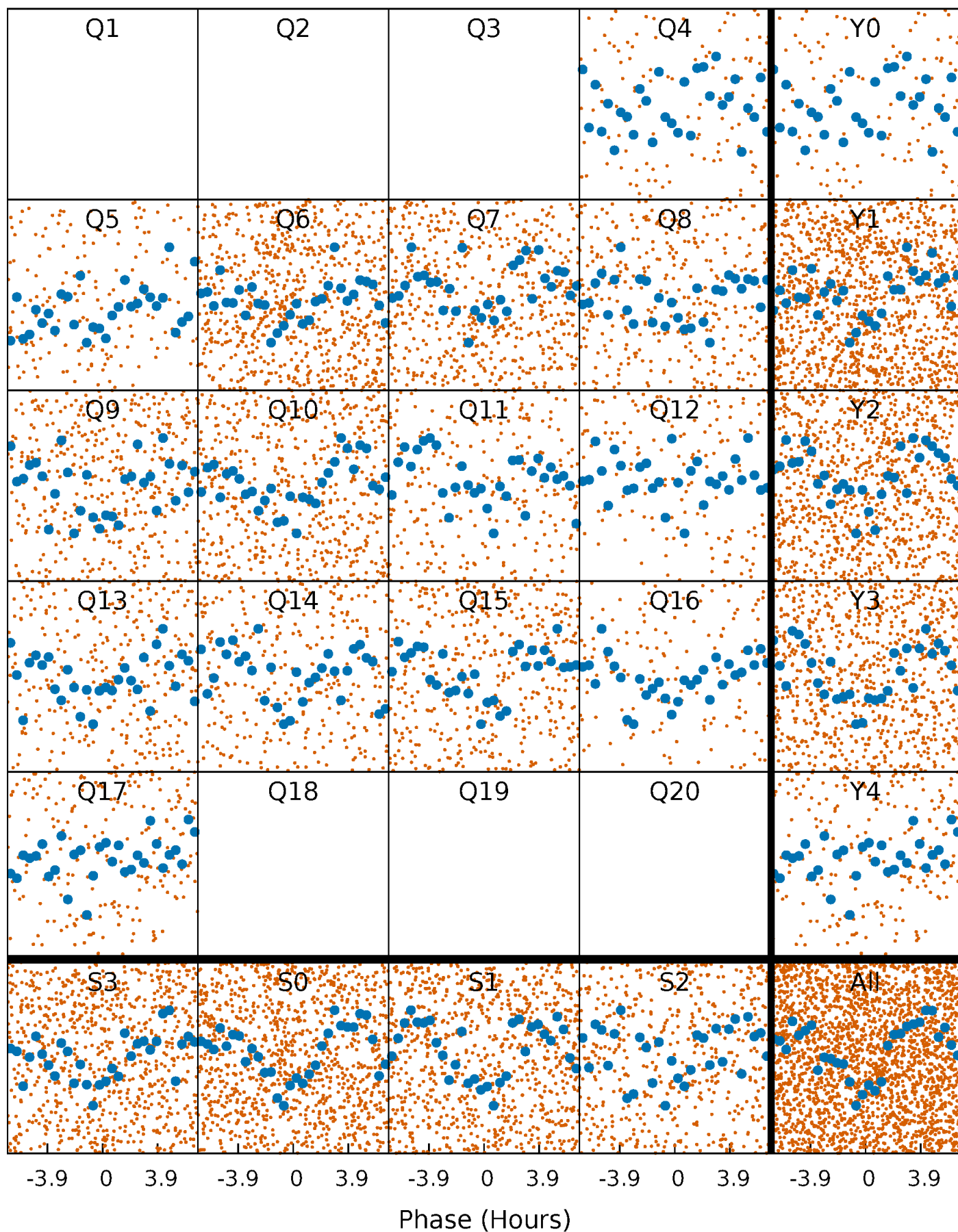


Non-Whitened Vs. Whitened Light Curve



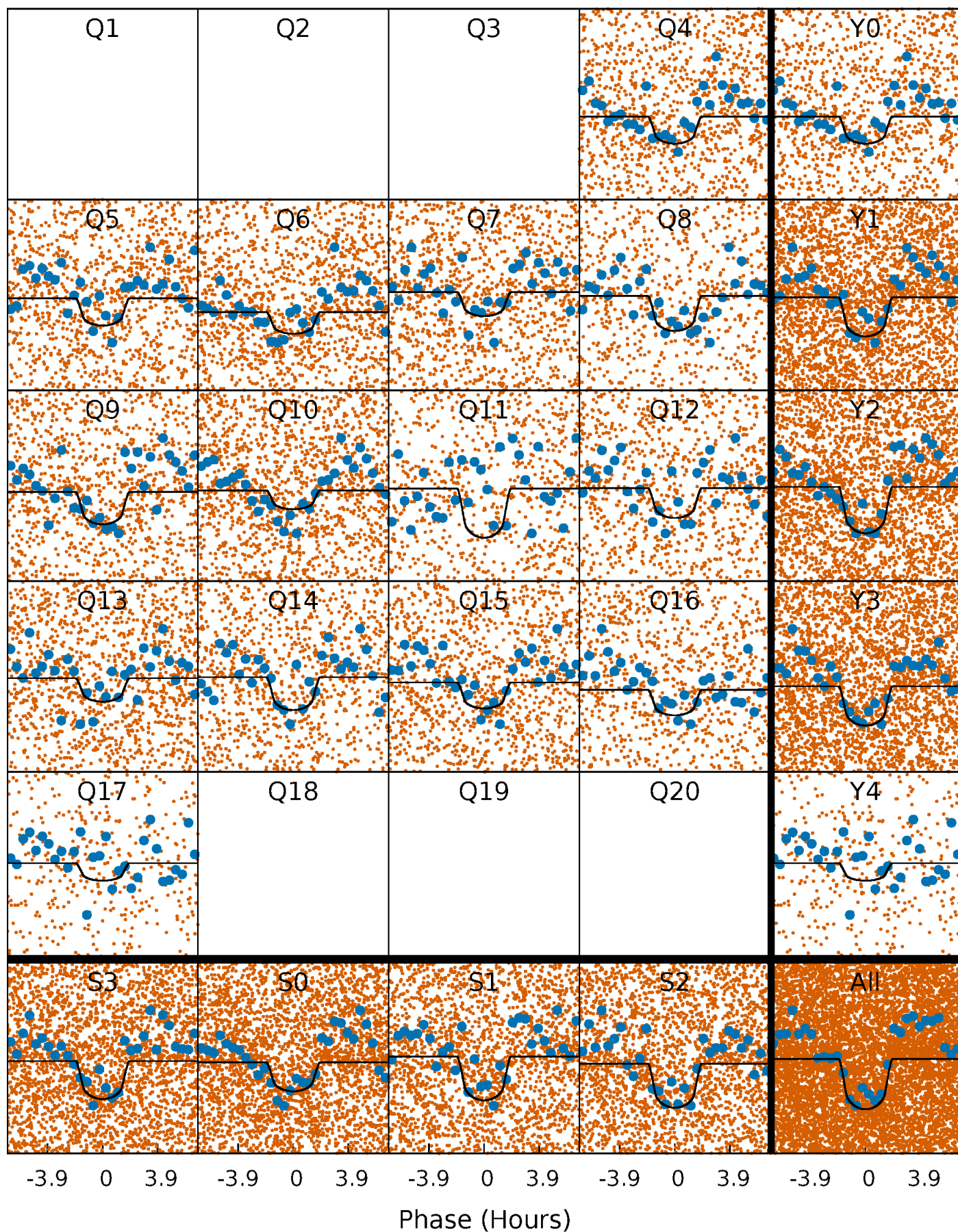
PDC Quarter-Phased Transit Curves

TCE 007222939-01 P= 1.116367 Days $T_0=132.566683$ (BKJD)



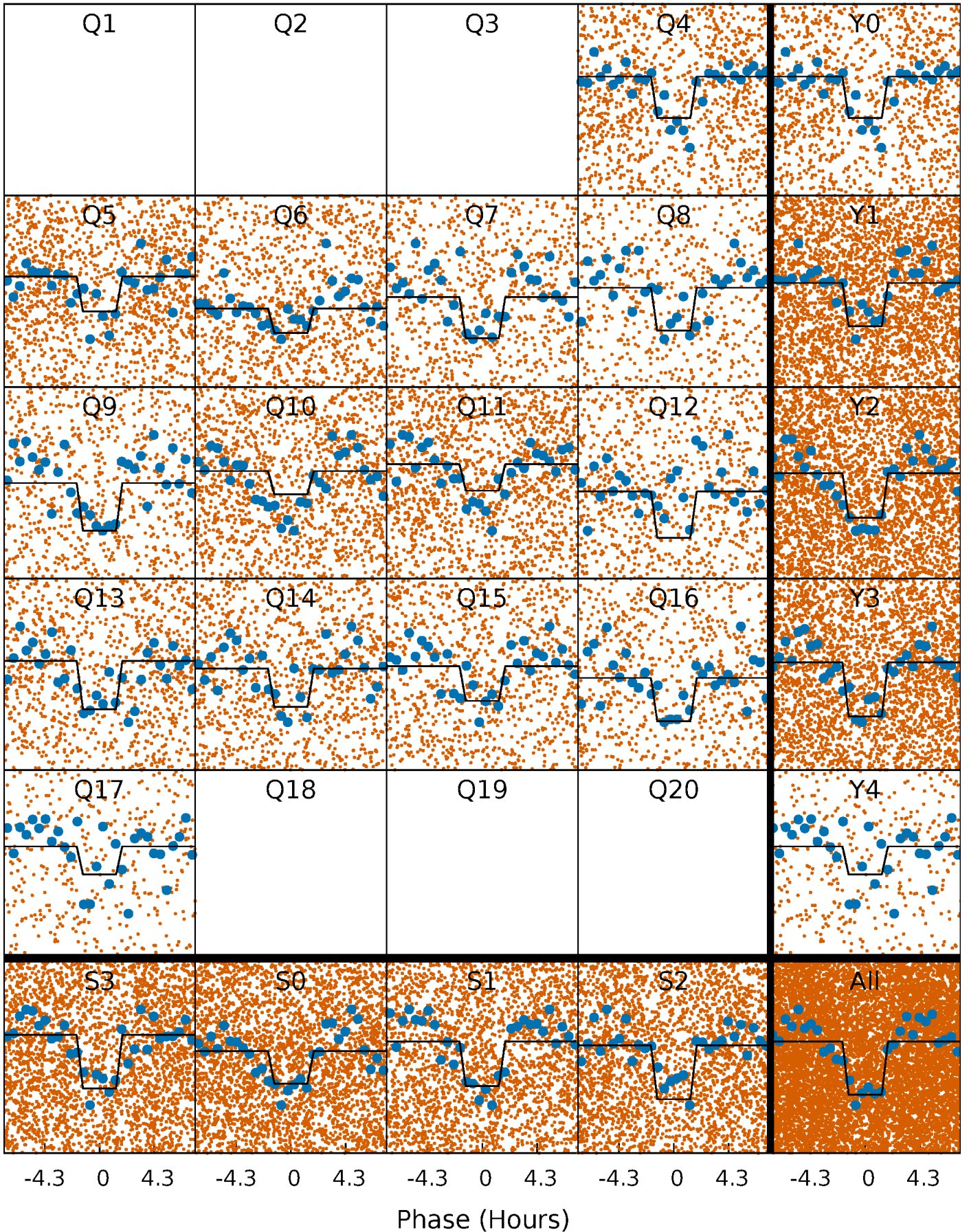
DV Quarter-Phased Transit Curves

TCE 007222939-01 P= 1.116367 Days $T_0=132.566683$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

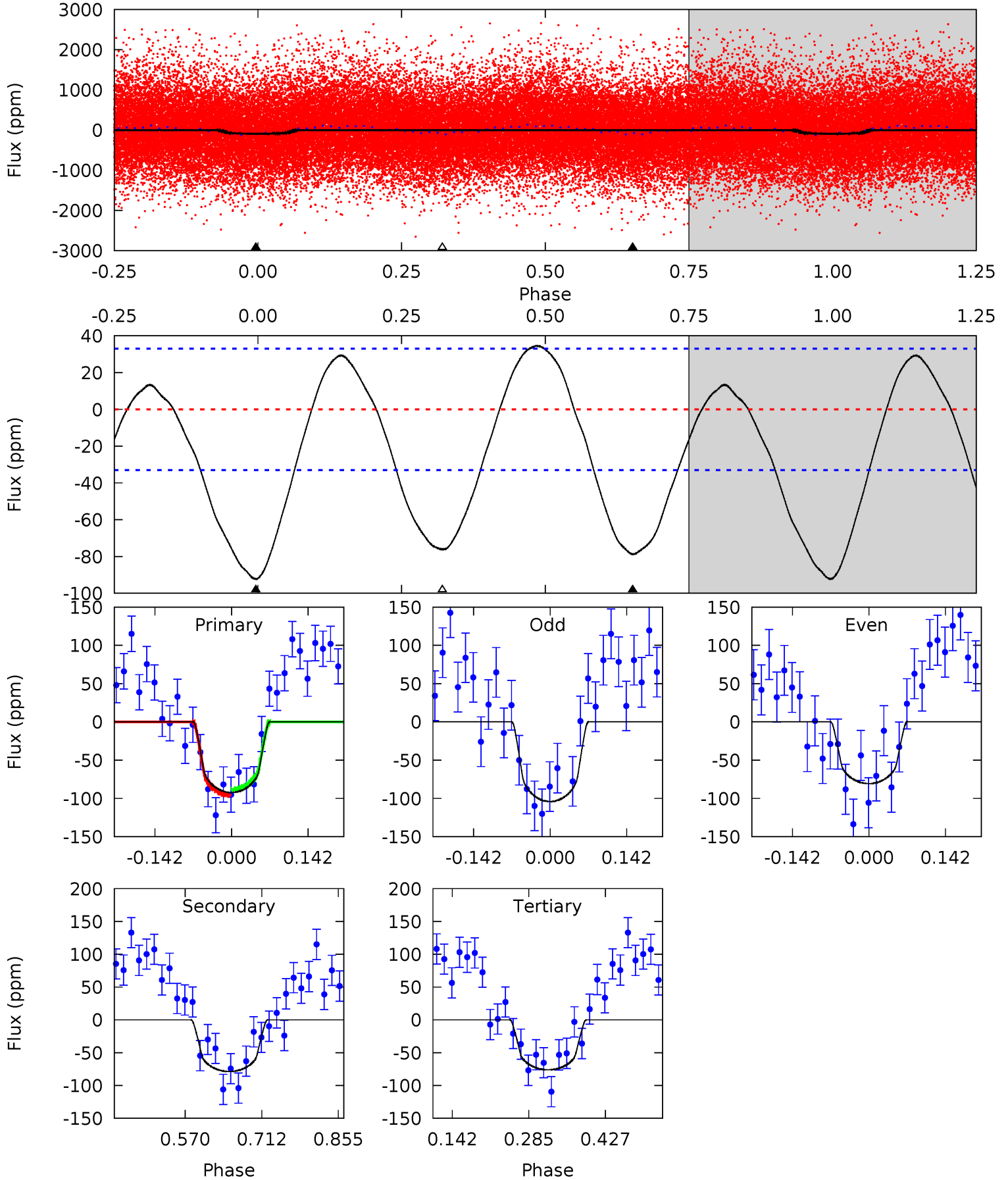
TCE 007222939-01 P= 1.116362 Days $T_0=132.570588$ (BKJD)



DV Model-Shift Uniqueness Test

007222939-01, P = 1.116367 Days, E = 132.566683 Days

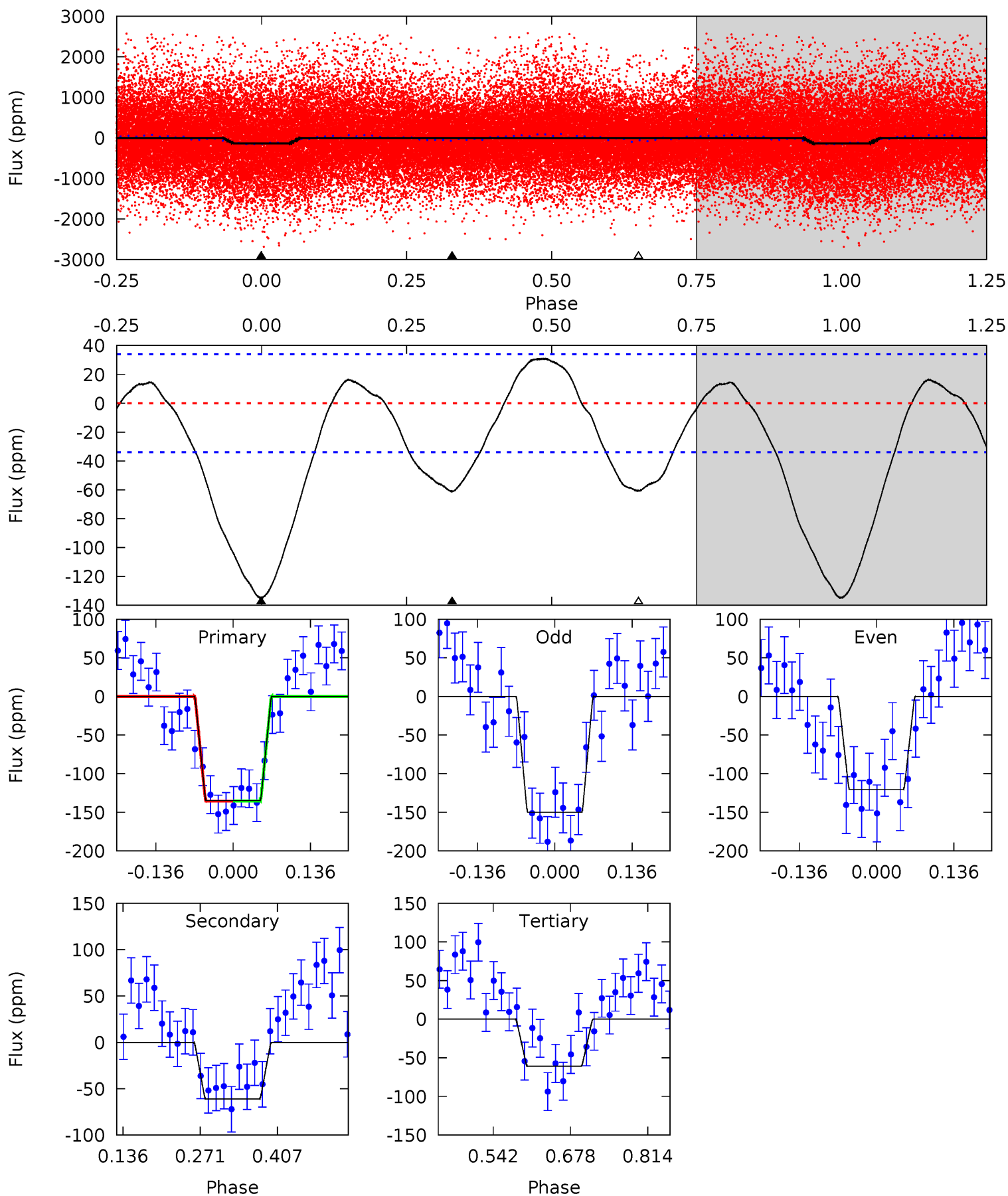
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	10.7	10.3	0	4.49	1.47	5.10	2.19	12.5	0.36	10.7	1.60	0.87	0.27	0.48



Alt Model-Shift Uniqueness Test

007222939-01, P = 1.116362 Days, E = 132.570588 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	8.10	8.06	0	4.50	1.49	3.87	9.83	17.9	0.04	8.10	1.96	0.94	0.19	0.01



Stellar Parameters For KIC 007222939

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4867^{+175}_{-156}	$4.633^{+0.027}_{-0.063}$	$-0.120^{+0.300}_{-0.300}$	$0.691^{+0.082}_{-0.048}$	$0.773^{+0.060}_{-0.083}$	$3.297^{+0.438}_{-0.833}$
	+4%/-3%	+1%/-1%	+250%/-250%	+12%/-7%	+8%/-11%	+13%/-25%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007222939-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-79 ± 7	$0.93^{+0.58}_{-0.53}$	1825^{+76}_{-71}	4271^{+1973}_{-679}	18^{+81}_{-11}
Alt.	-61 ± 8	$0.92^{+0.62}_{-0.49}$	1822^{+76}_{-66}	4117^{+1529}_{-693}	14^{+54}_{-9}

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

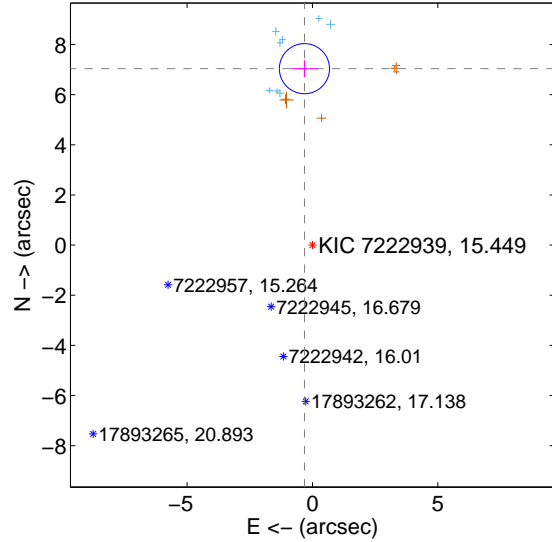
Supplemental centroid analysis for 007222939-01. Kepler magnitude: 15.45. Transit SNR 9.40

There are 8 quarters with good PRF difference image offsets

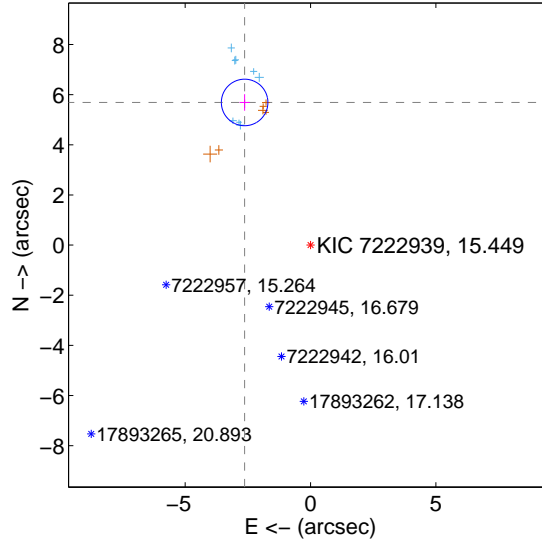
The OOT PRF centroid is offset from the target star catalog position by about 2.28 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	7.042 ± 0.333	21.14	0.319 ± 0.546	7.035 ± 0.332
PRF-fit source offset from KIC position	6.265 ± 0.309	20.26	2.627 ± 0.201	5.688 ± 0.328
photometric centroid source offset	2.64 ± 0.56	4.68	2.63 ± 0.56	-0.22 ± 0.72

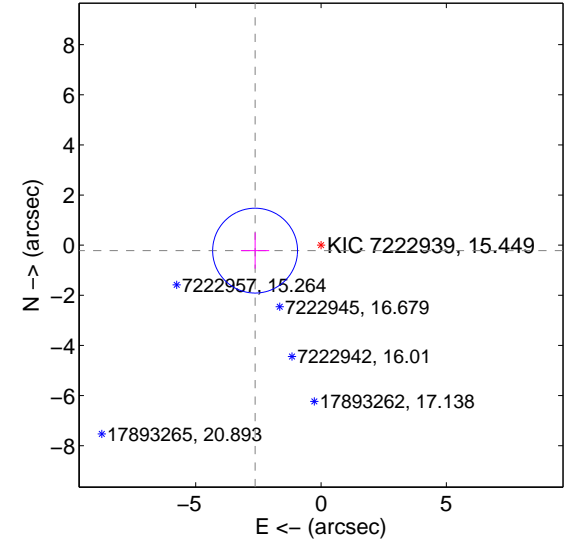
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

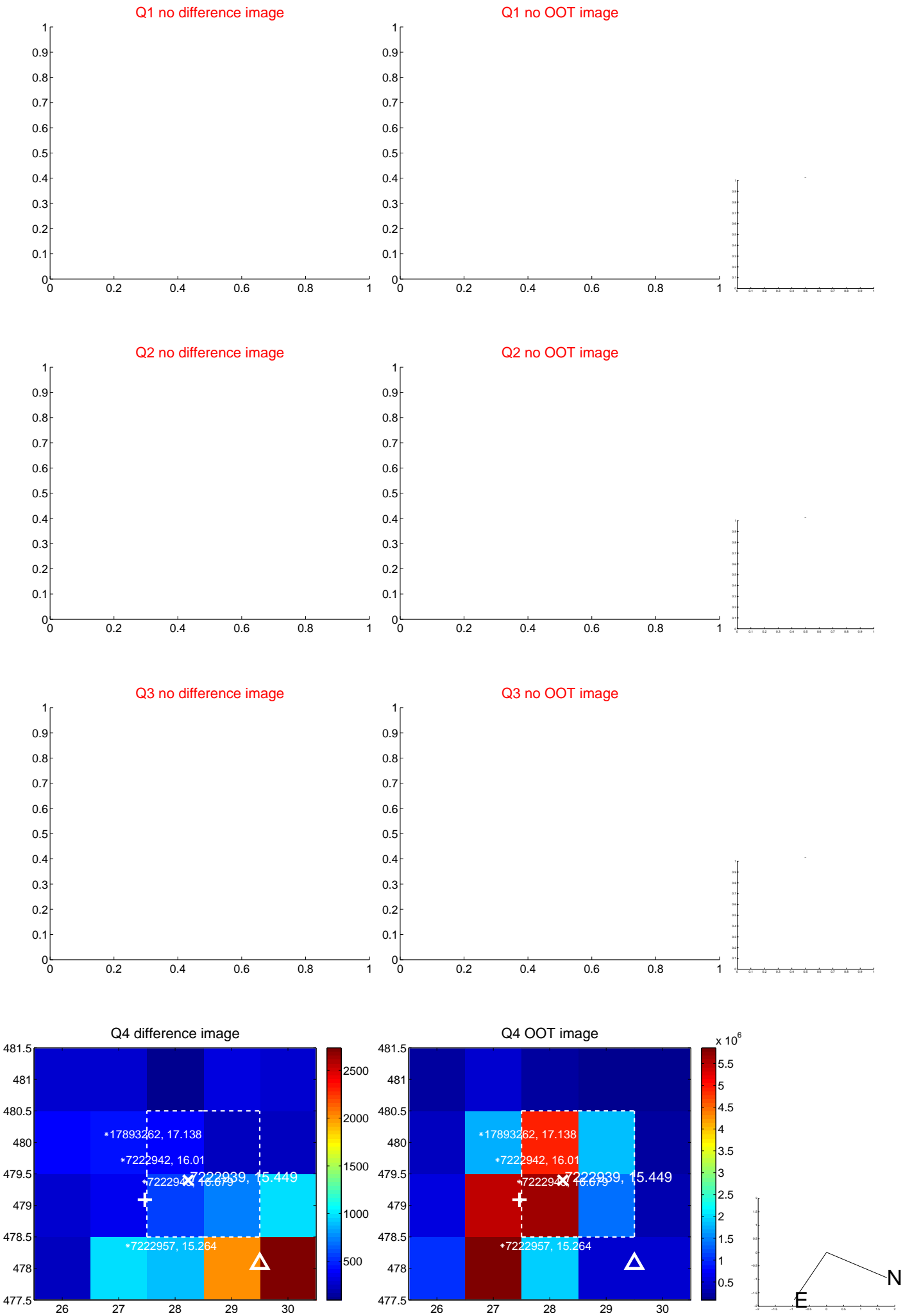


offset from photometric centroids

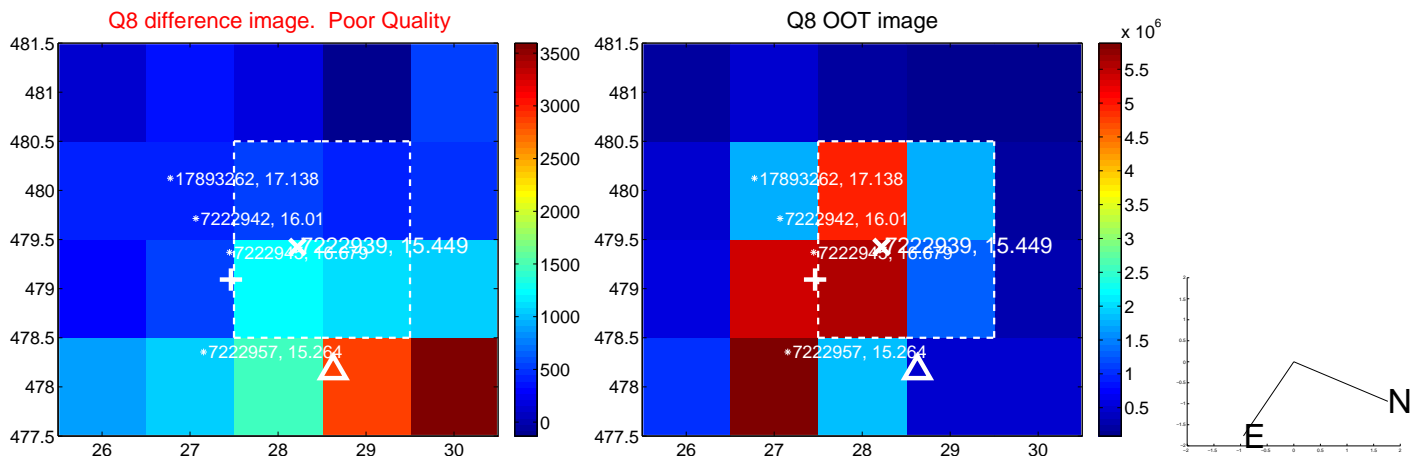
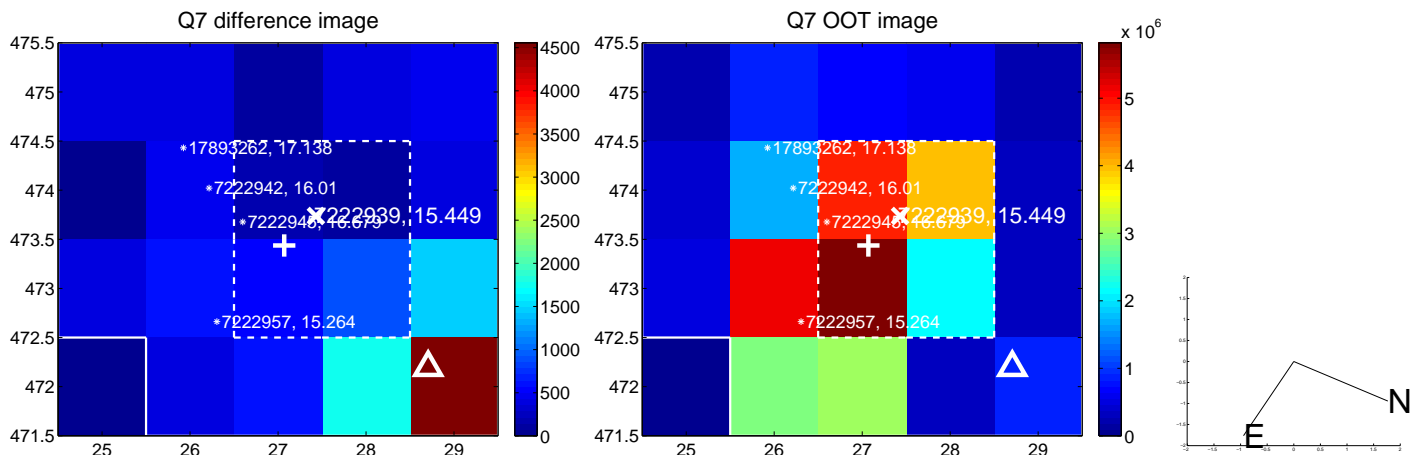
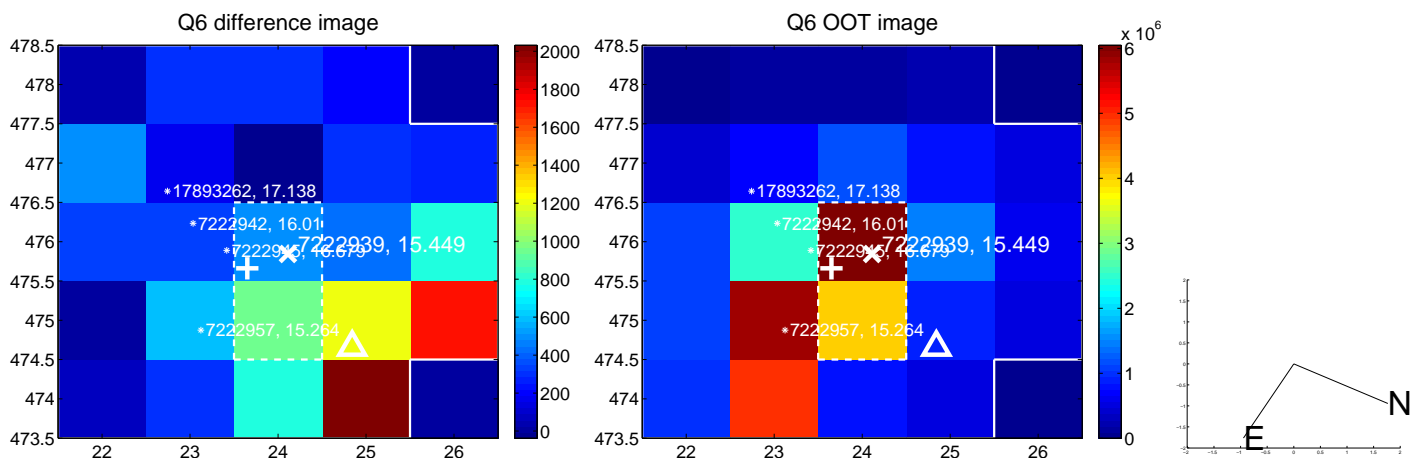
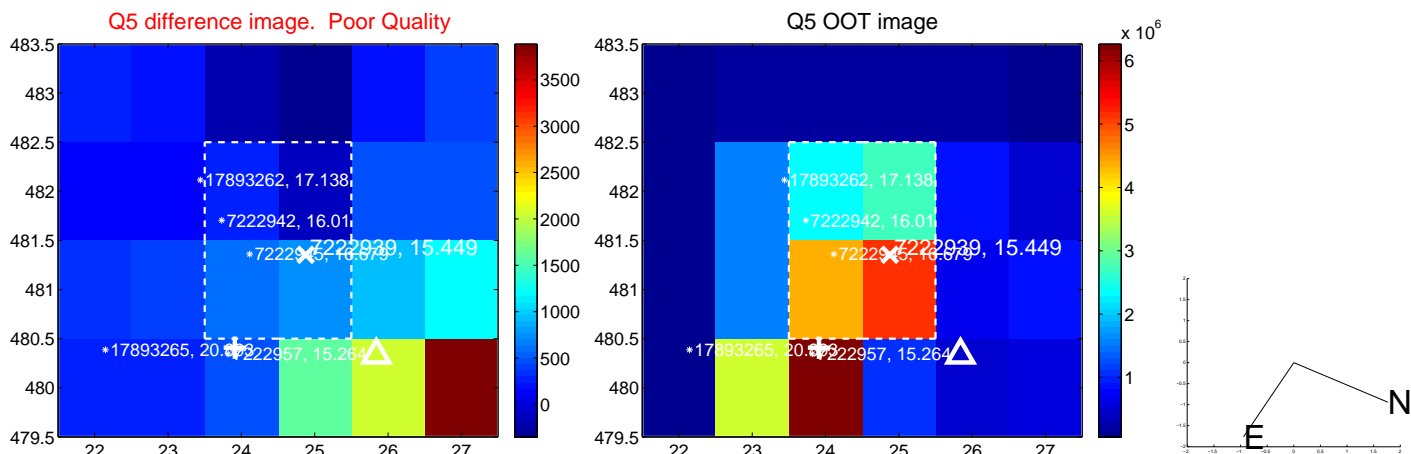


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

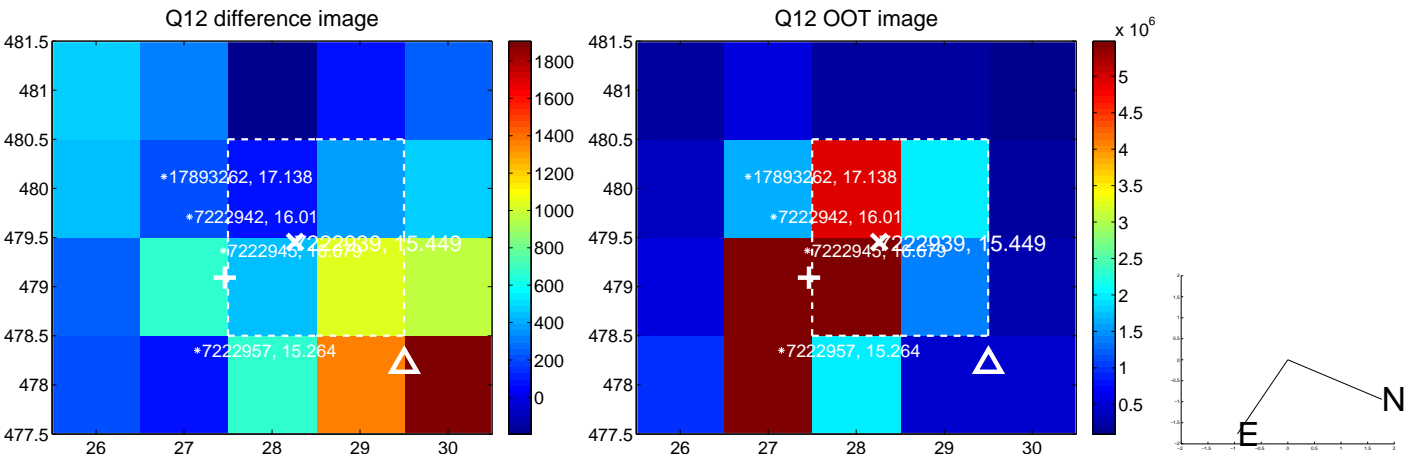
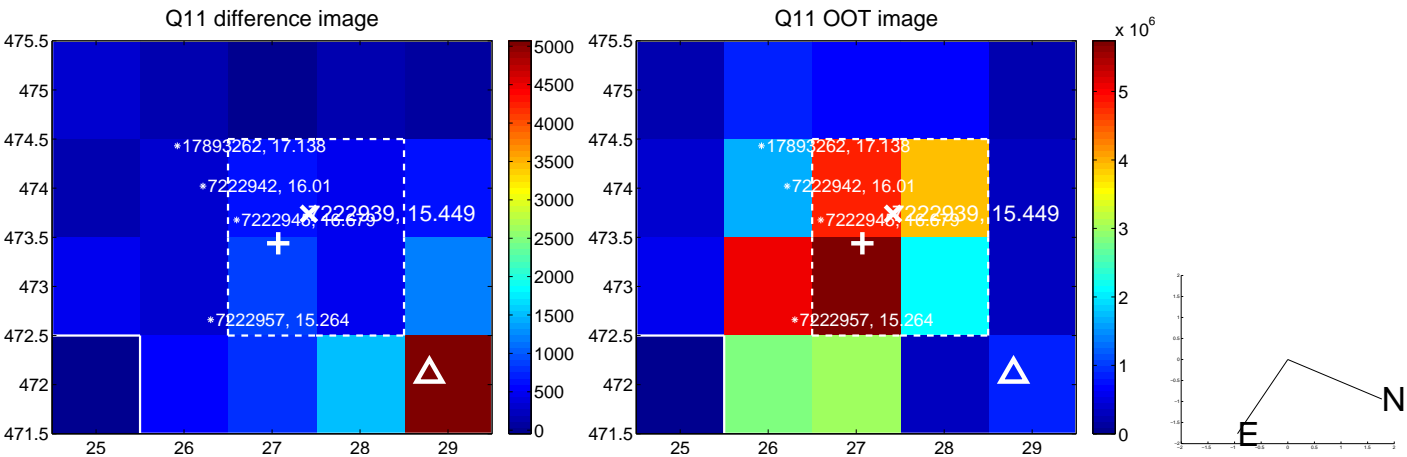
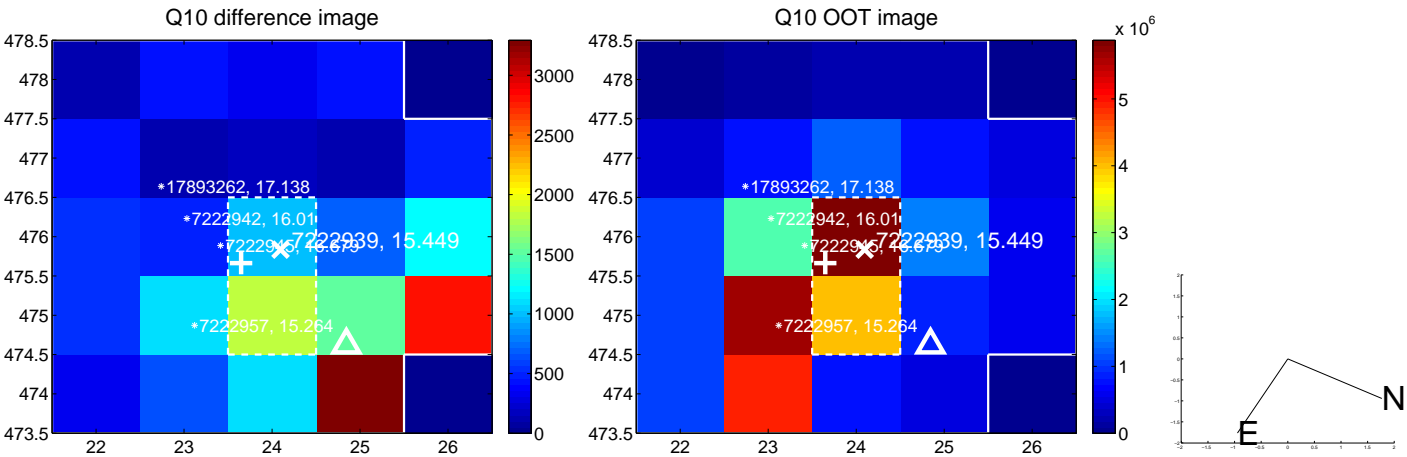
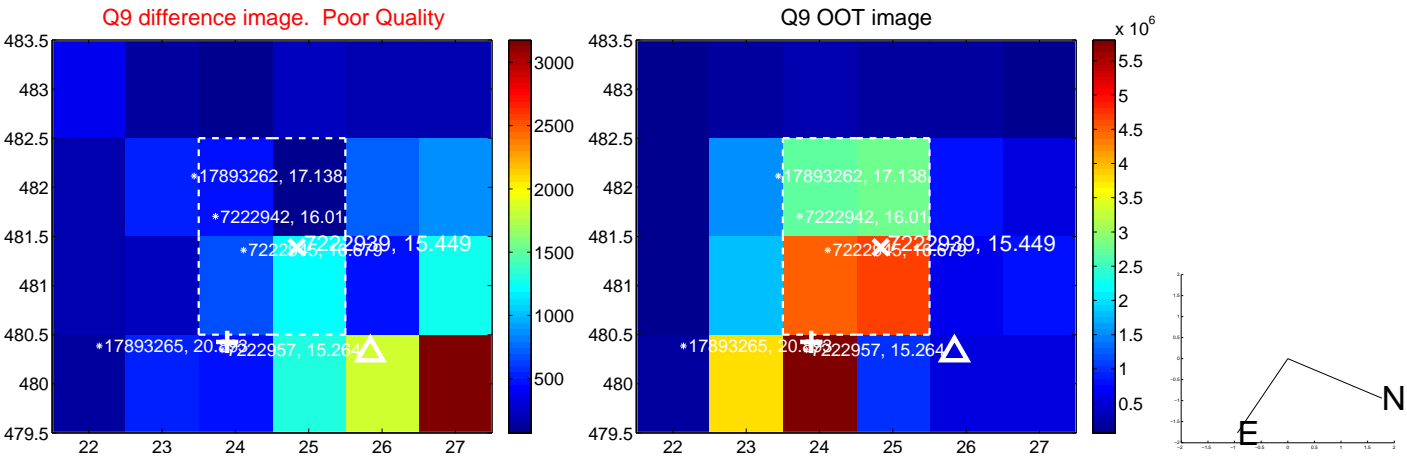
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



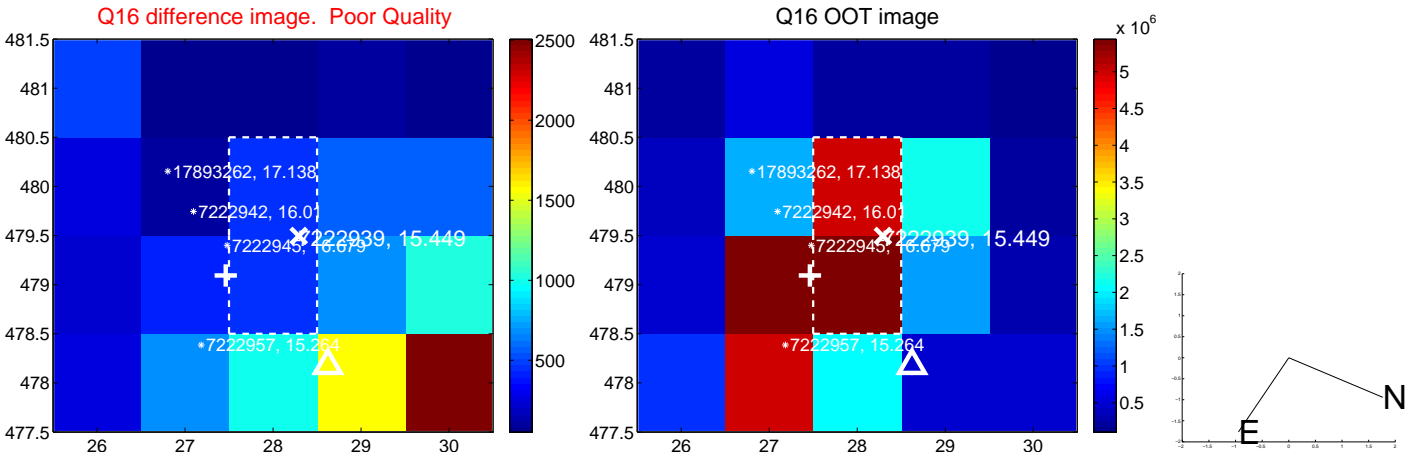
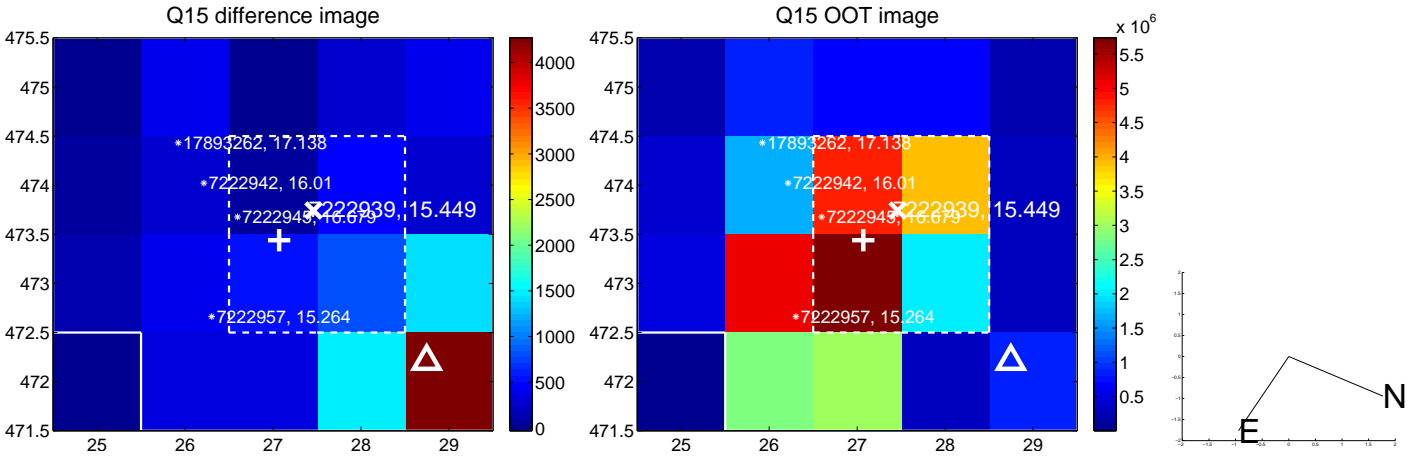
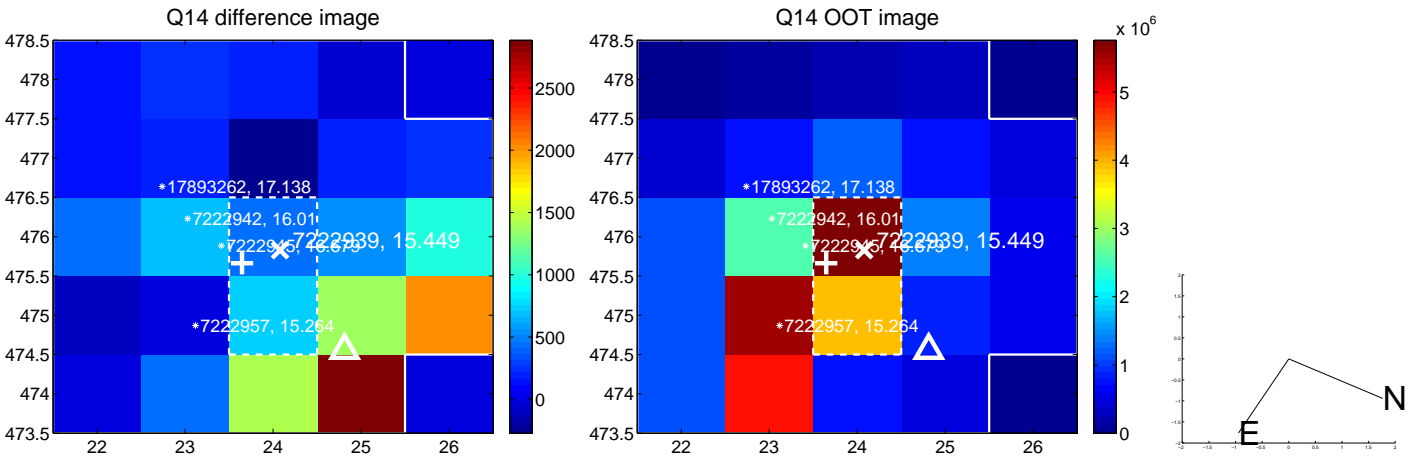
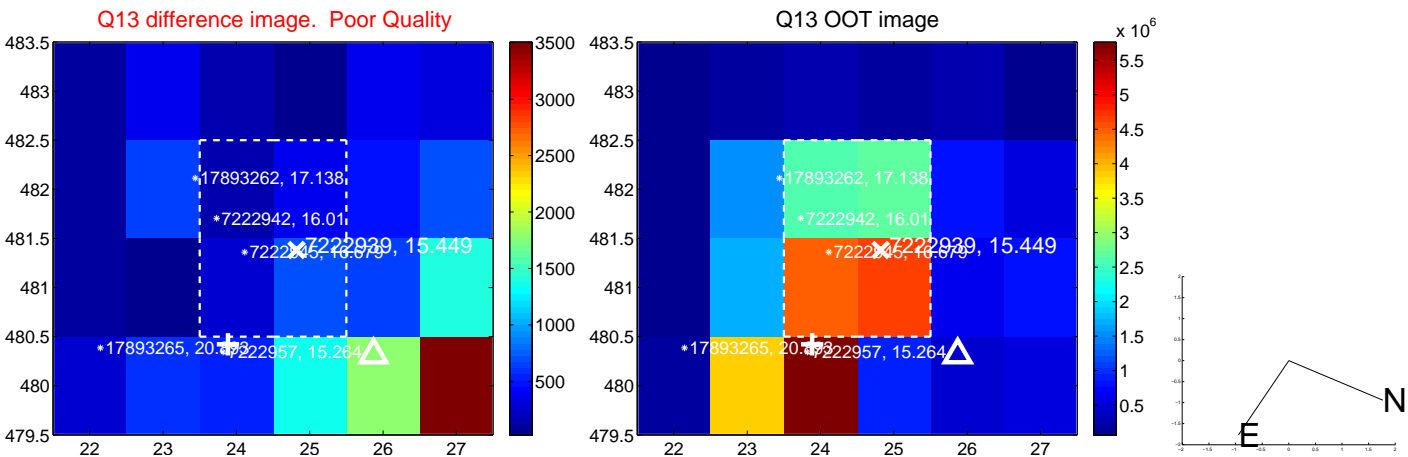
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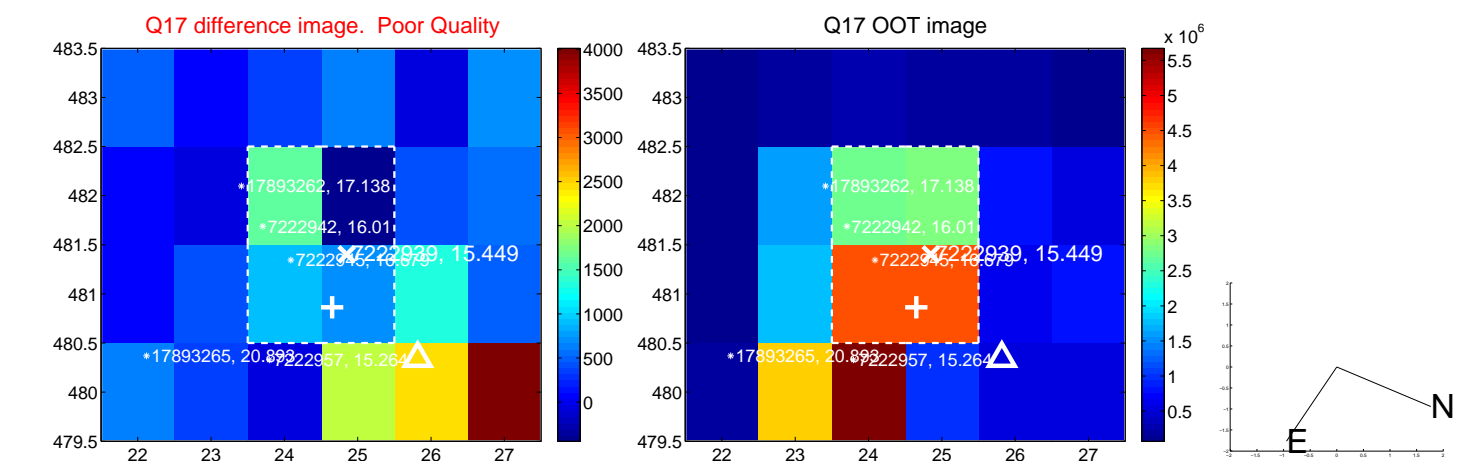
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



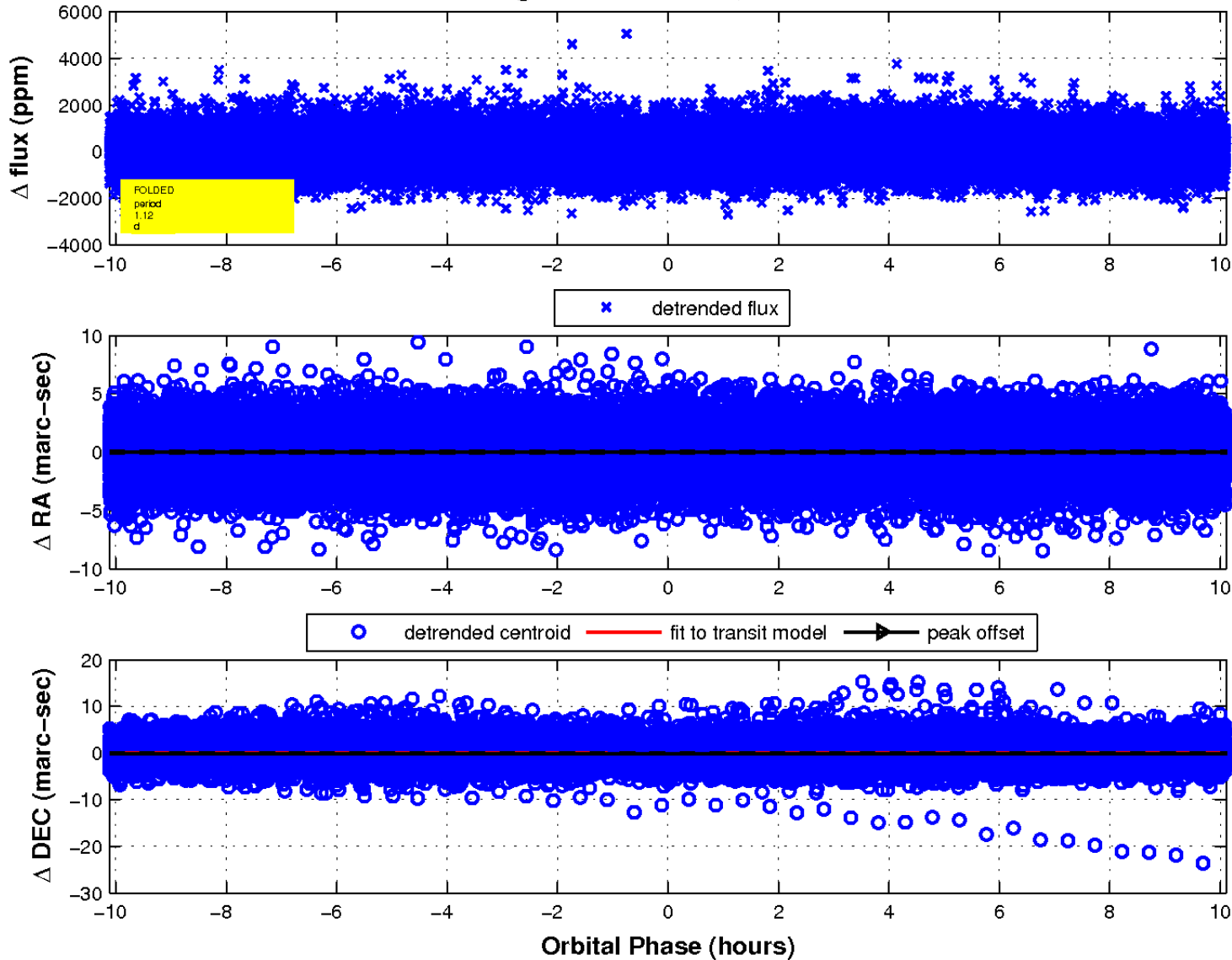
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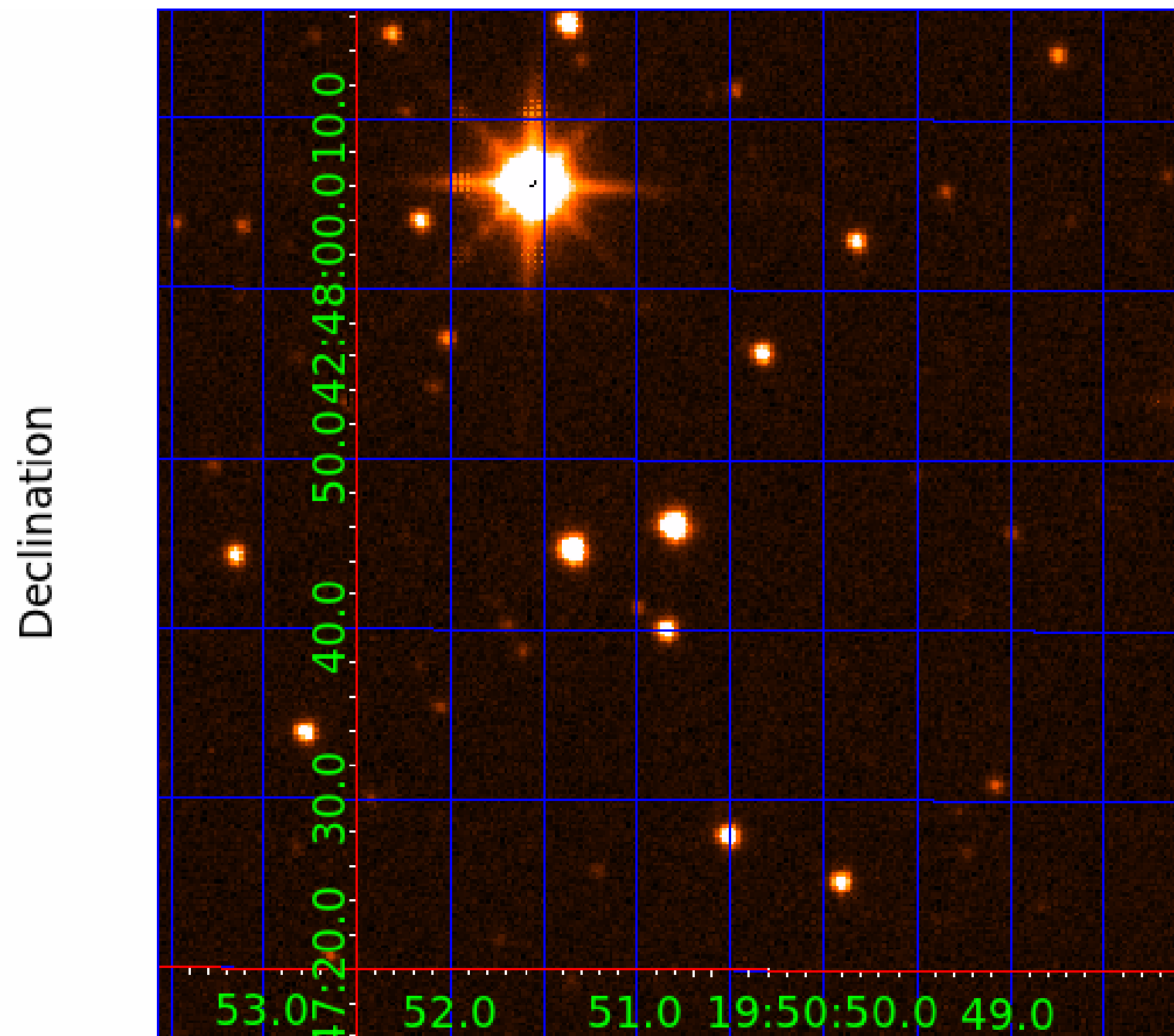
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fluxWeightedCentroids, Planet 1 of 5



UKIRT Image



KIC 007222939

Q1-17 DR25 TCE Parameters

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007222939-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_RESOLVED_OFFSET
007222939-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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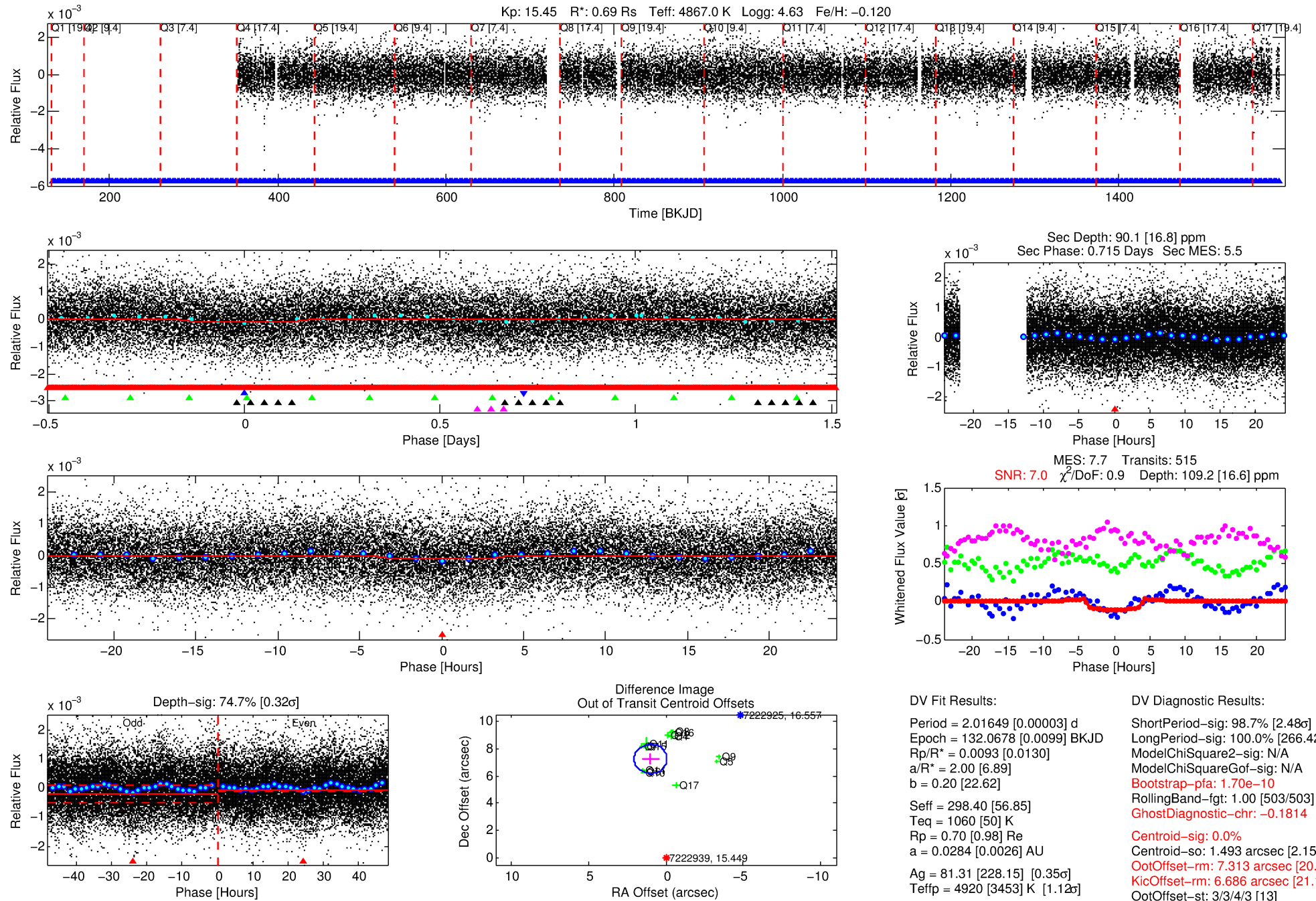
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007222939-02

No Significant Match Found

DV One-Page Summary

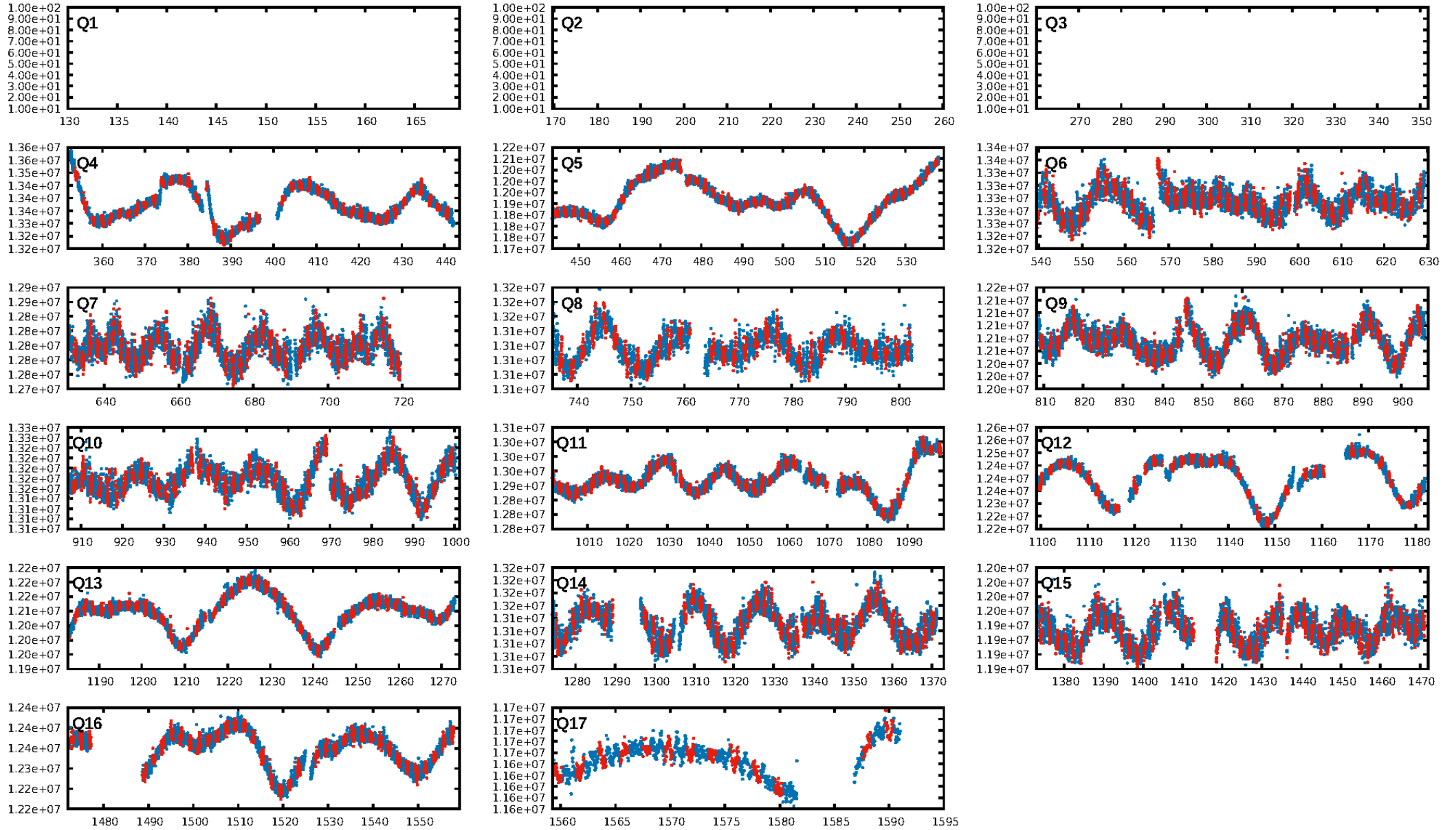
KIC: 7222939 Candidate: 2 of 5 Period: 2.016 d



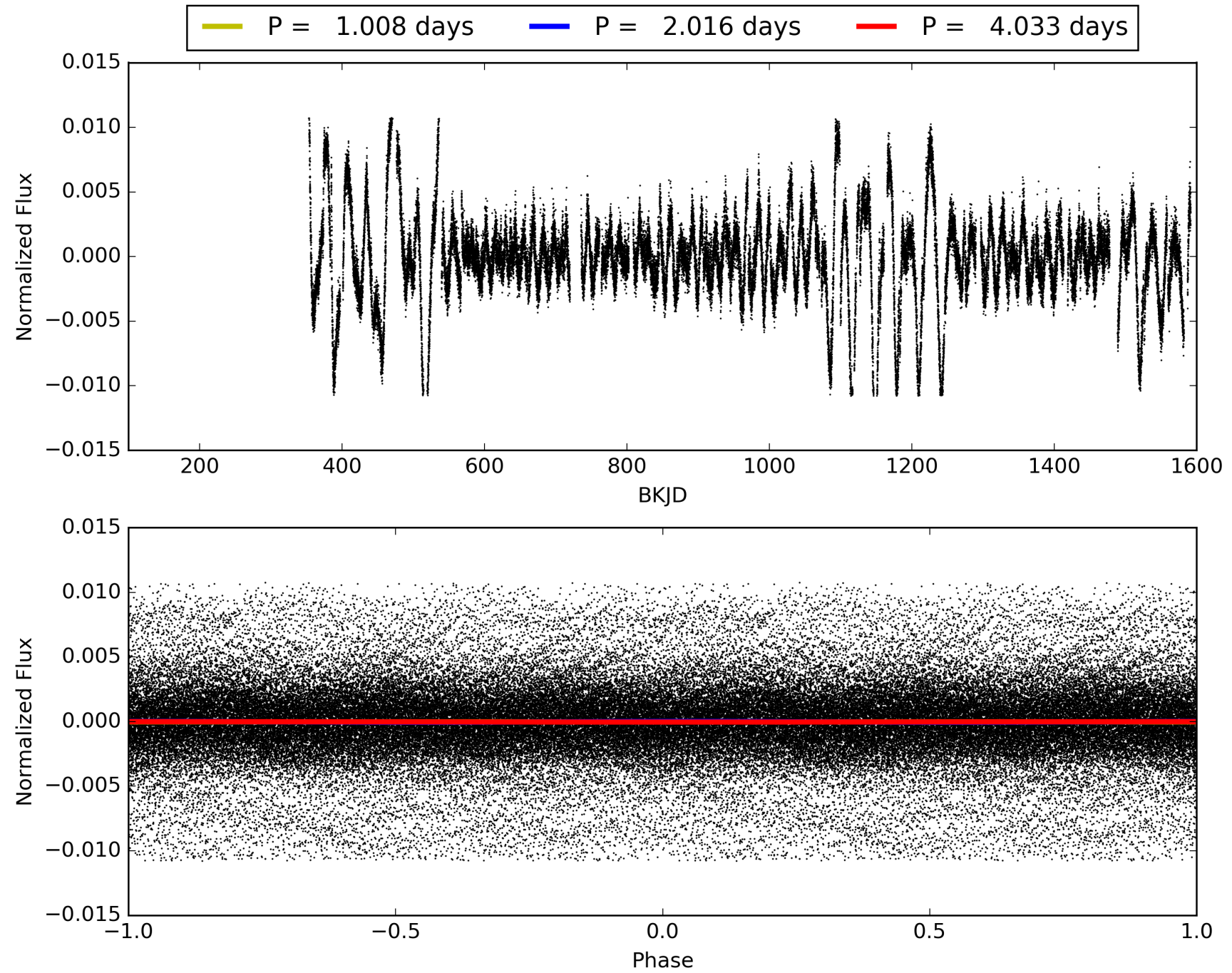
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TCE 007222939-02, PDC Light Curves

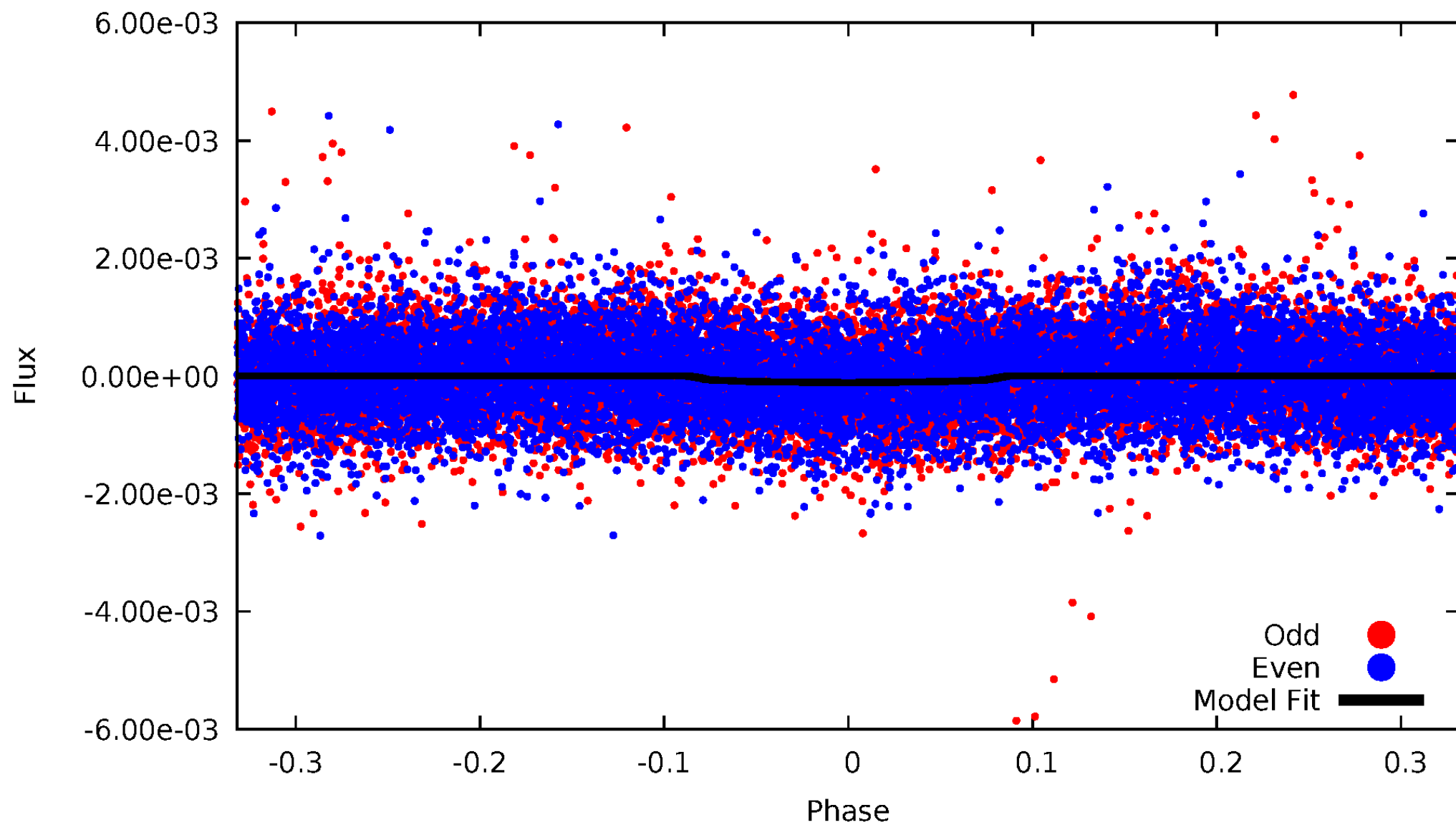


TCE 007222939-02



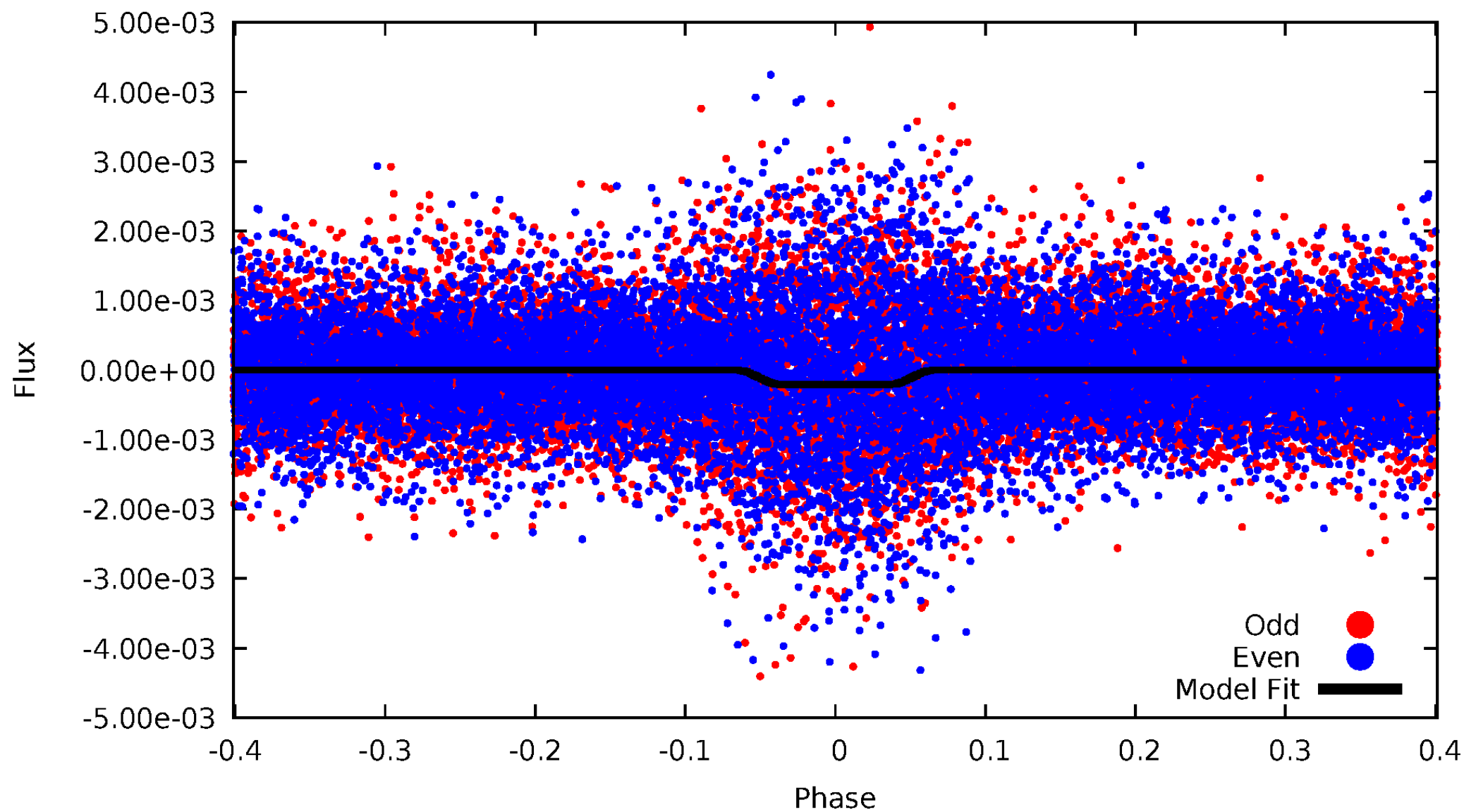
DV Odd/Even

TCE 007222939-02



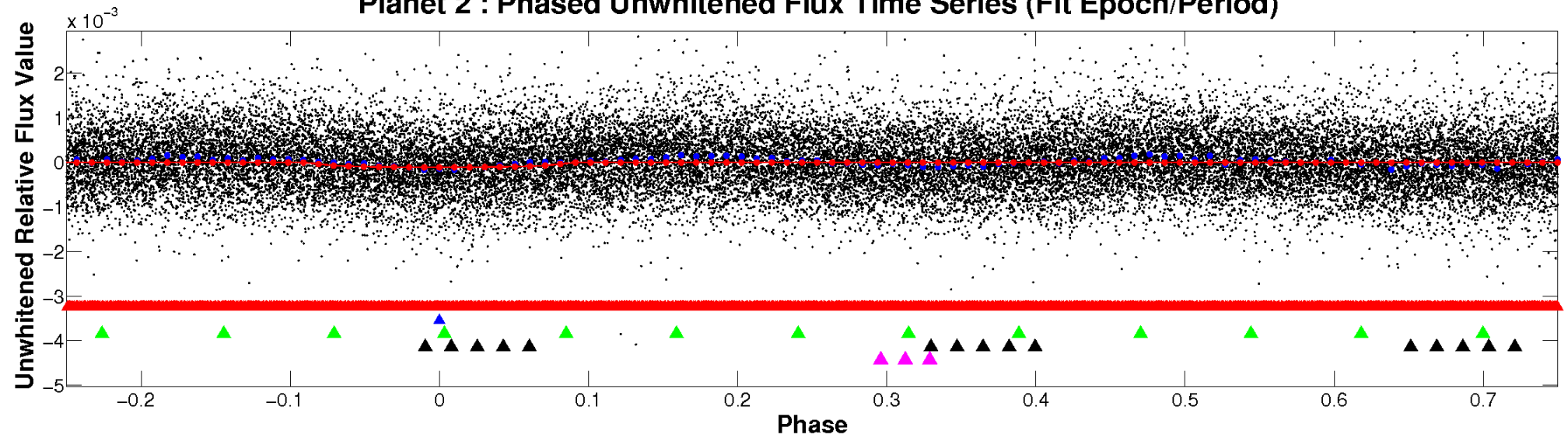
ALT Odd/Even

TCE 007222939-02

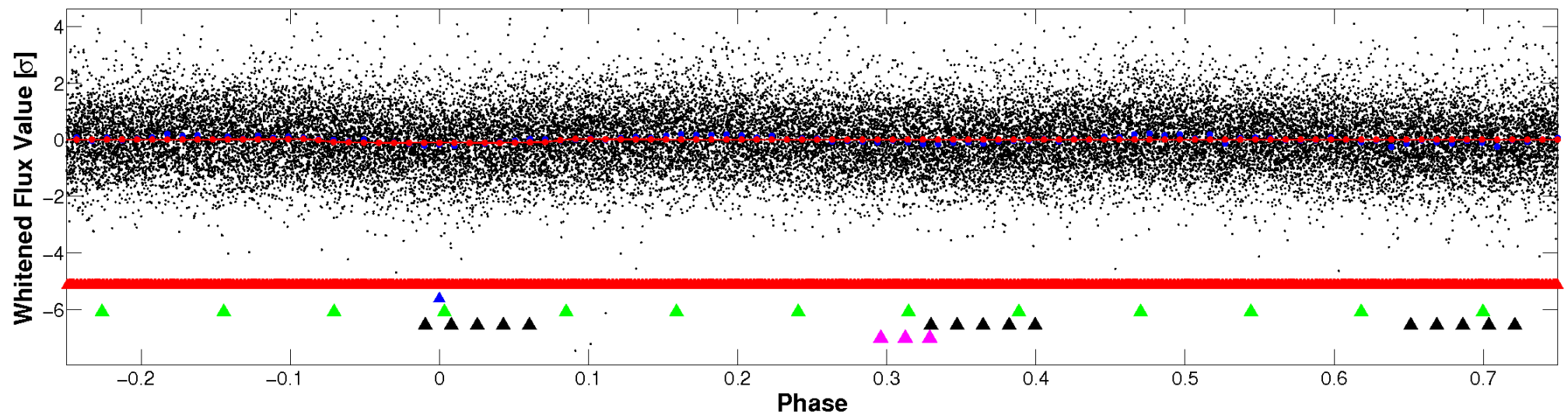


Non-Whitened Vs. Whitened Light Curve

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

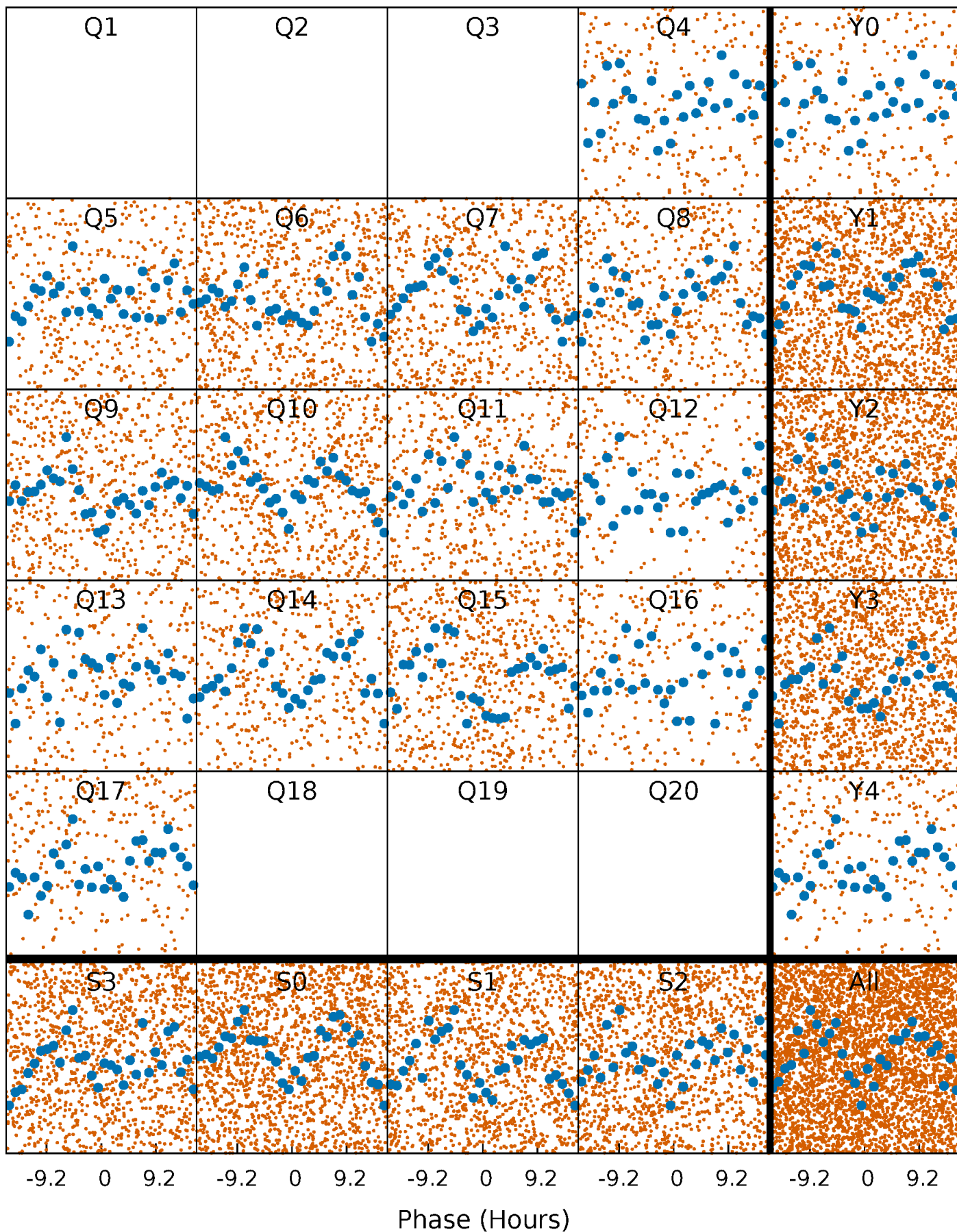


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



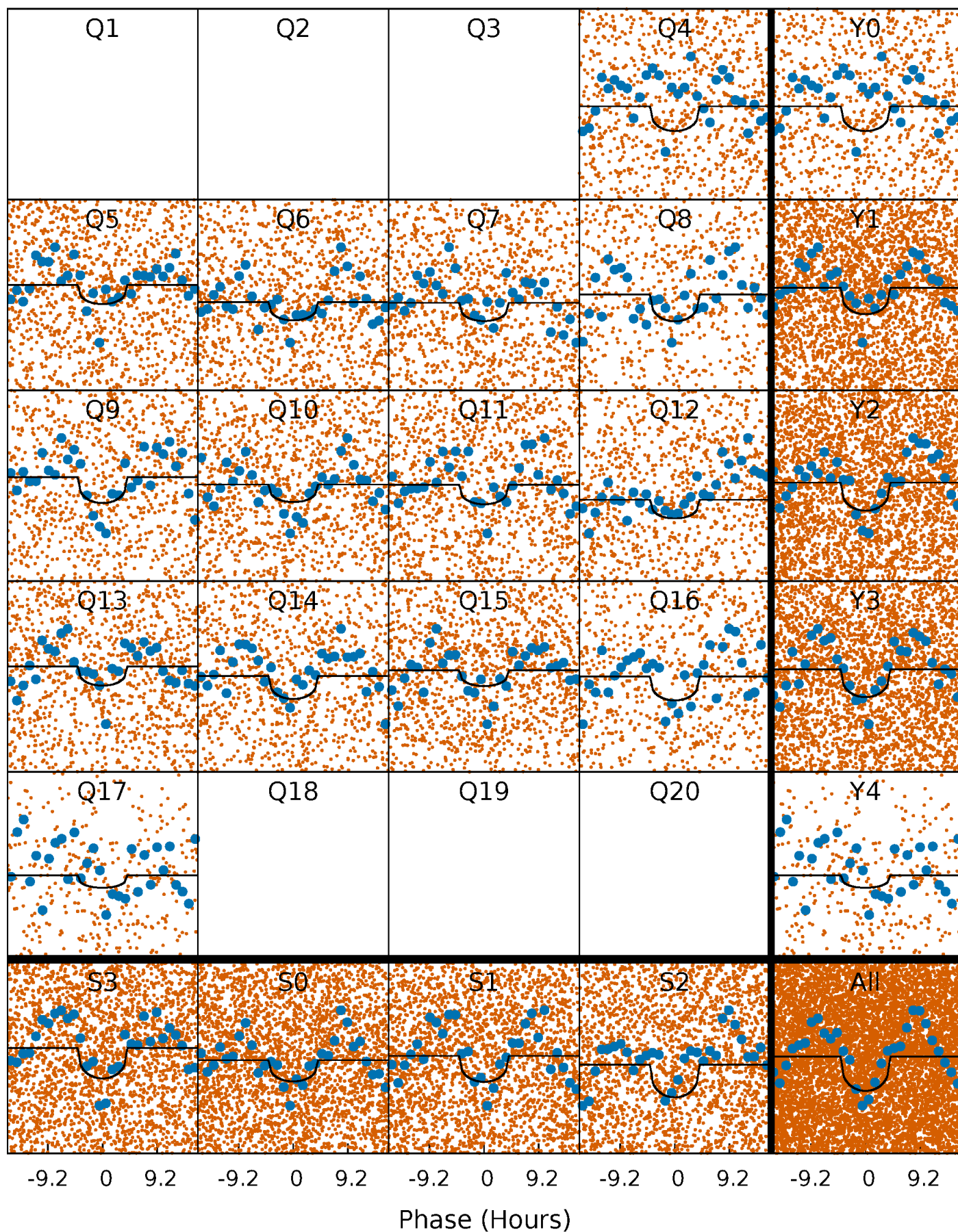
PDC Quarter-Phased Transit Curves

TCE 007222939-02 P= 2.016495 Days $T_0=132.067777$ (BKJD)



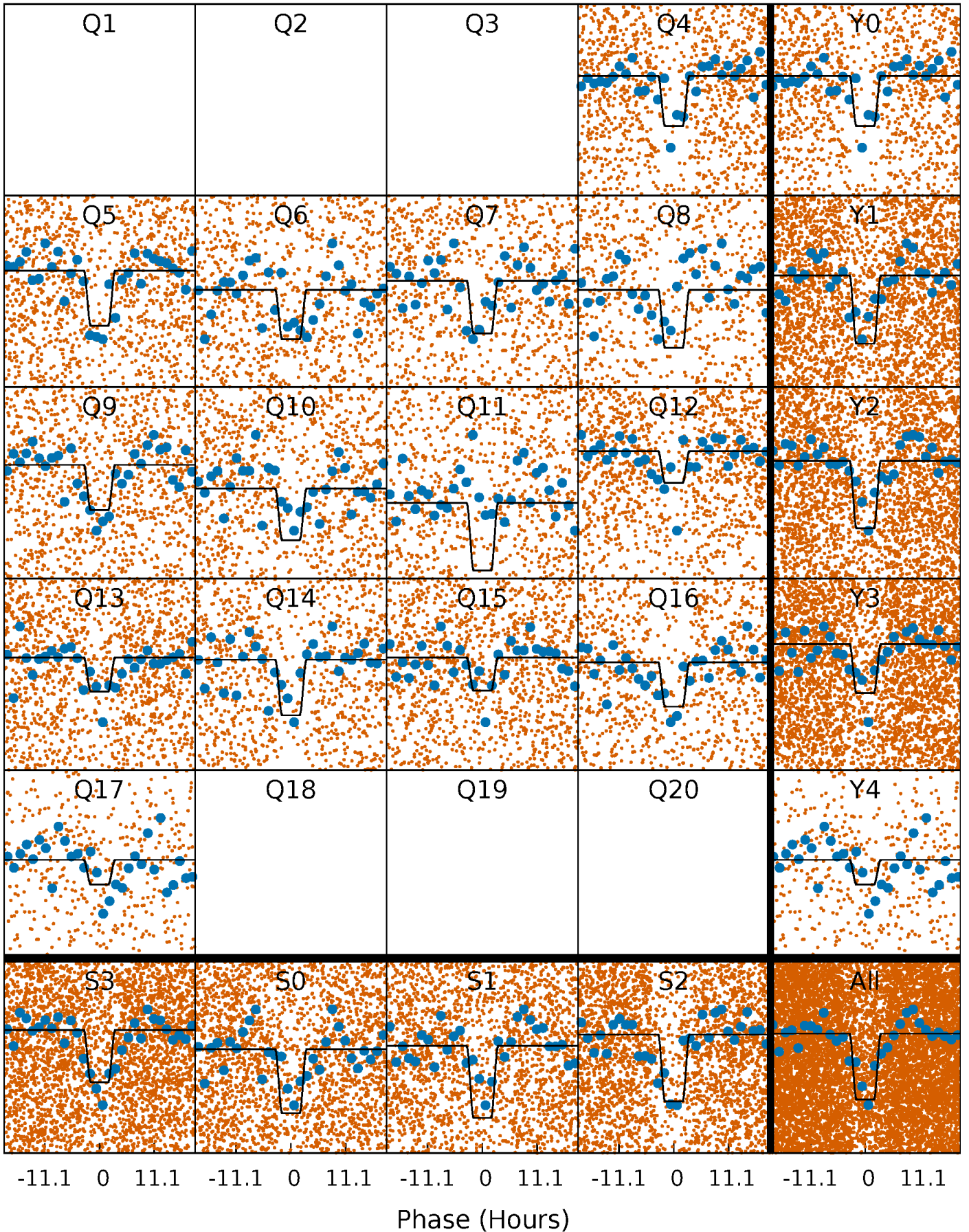
DV Quarter-Phased Transit Curves

TCE 007222939-02 P= 2.016495 Days $T_0=132.067777$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

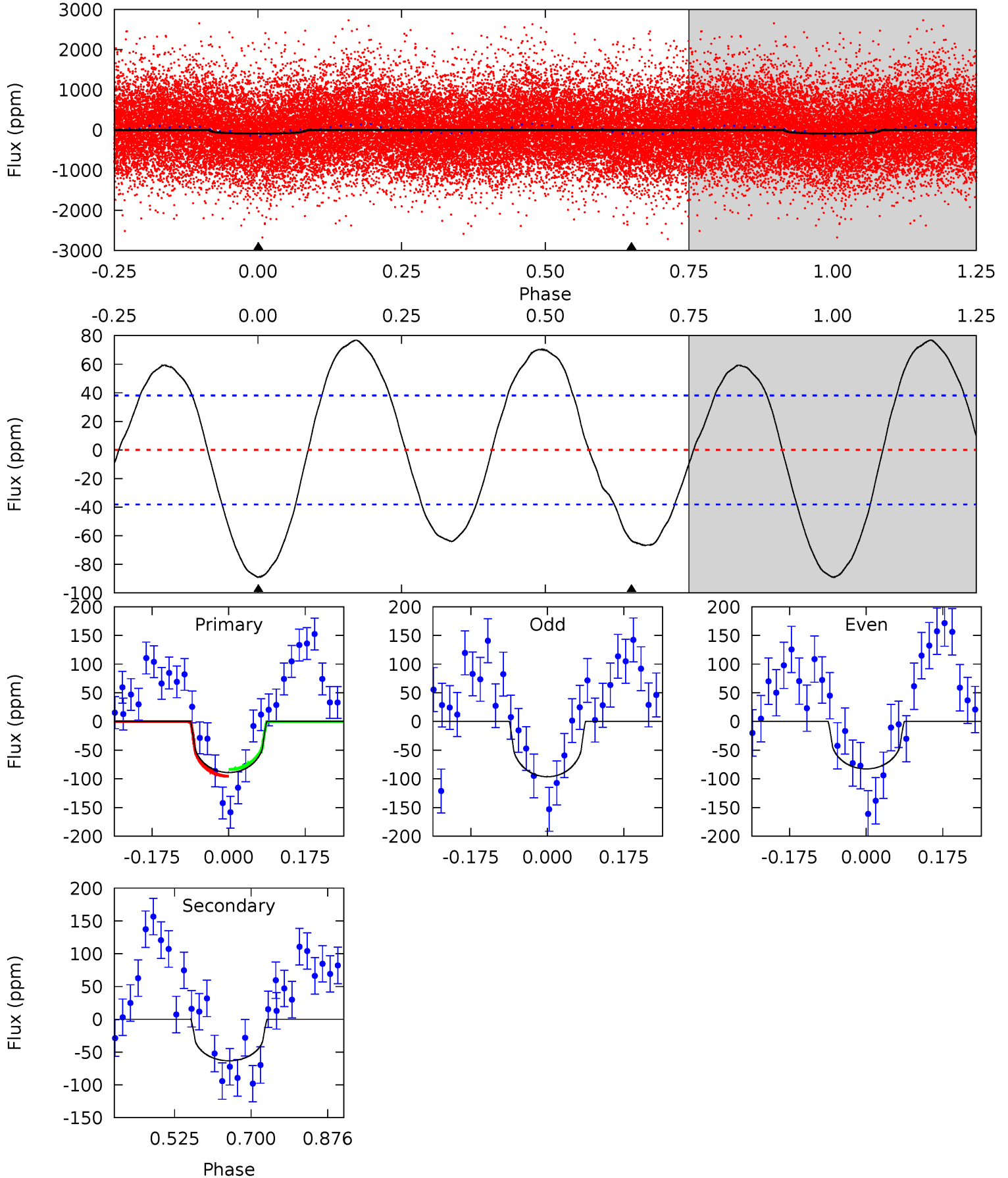
TCE 007222939-02 P= 2.016474 Days $T_0=132.063914$ (BKJD)



DV Model-Shift Uniqueness Test

007222939-02, P = 2.016495 Days, E = 132.067777 Days

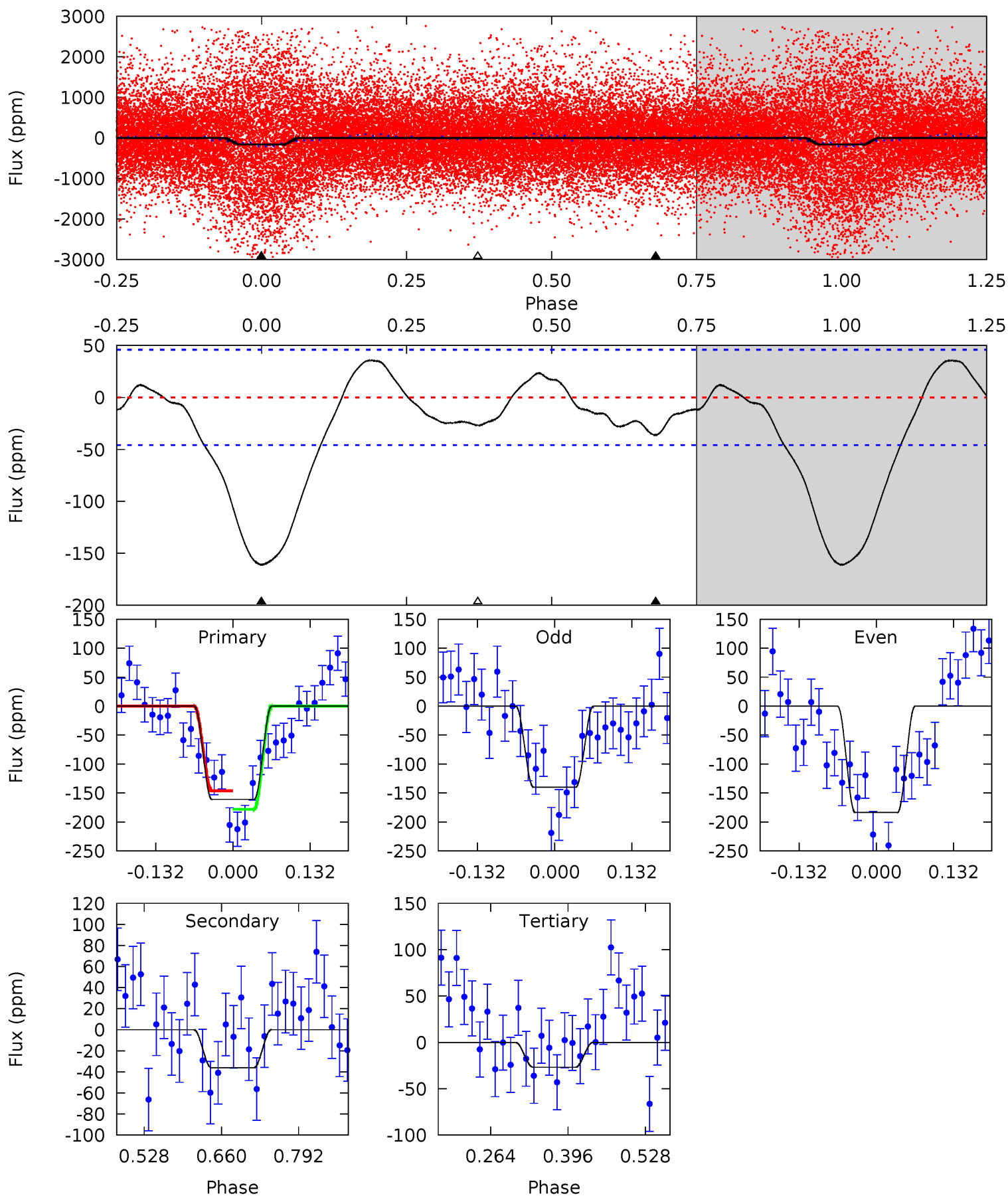
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	7.38	0	0	4.45	1.36	5.54	10.4	10.4	7.38	7.38	0.80	0.67	0.46	0.69



Alt Model-Shift Uniqueness Test

007222939-02, P = 2.016474 Days, E = 132.063914 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.8	3.55	2.64	0	4.51	1.51	1.89	13.2	15.8	0.92	3.55	2.16	0.76	0.18	1.59



Stellar Parameters For KIC 007222939

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4867^{+175}_{-156}	$4.633^{+0.027}_{-0.063}$	$-0.120^{+0.300}_{-0.300}$	$0.691^{+0.082}_{-0.048}$	$0.773^{+0.060}_{-0.083}$	$3.297^{+0.438}_{-0.833}$
	+4%/-3%	+1%/-1%	+250%/-250%	+12%/-7%	+8%/-11%	+13%/-25%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007222939-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-63 ± 9	$1.08^{+0.88}_{-0.74}$	1499^{+55}_{-59}	3907^{+2517}_{-696}	24^{+214}_{-17}
Alt.	-36 ± 10	$1.30^{+0.88}_{-0.82}$	1497^{+64}_{-58}	3345^{+1471}_{-511}	$9.745^{+60.774}_{-6.501}$

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

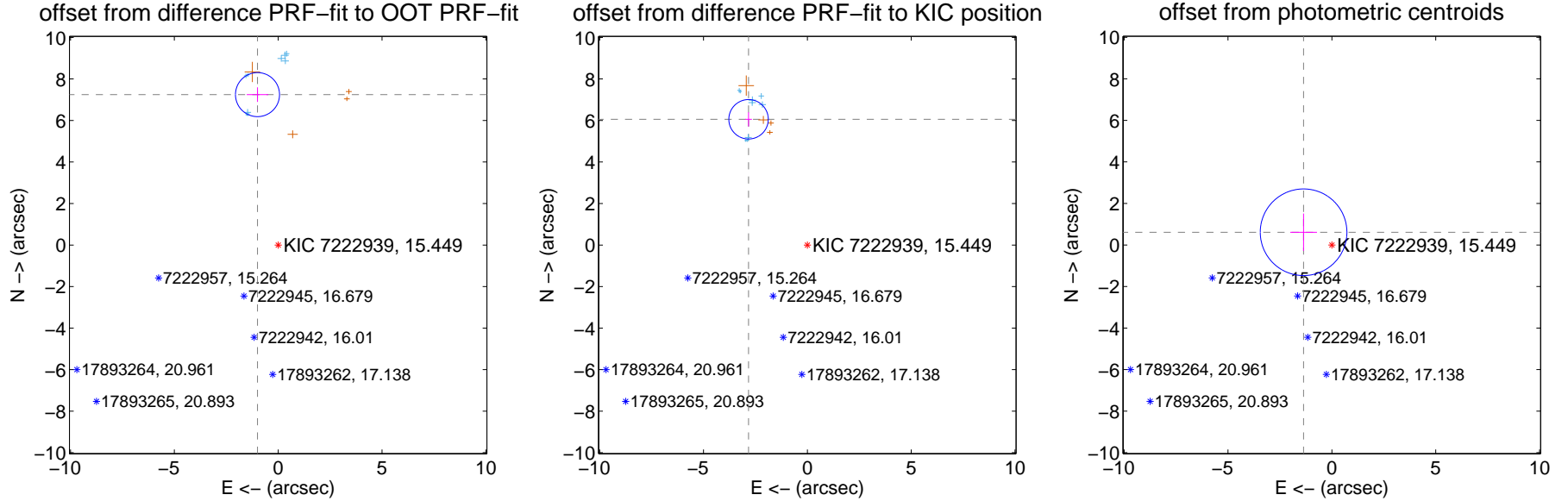
DV Centroid Data

Supplemental centroid analysis for 007222939-02. Kepler magnitude: 15.45. Transit SNR 6.99

There are 9 quarters with good PRF difference image offsets

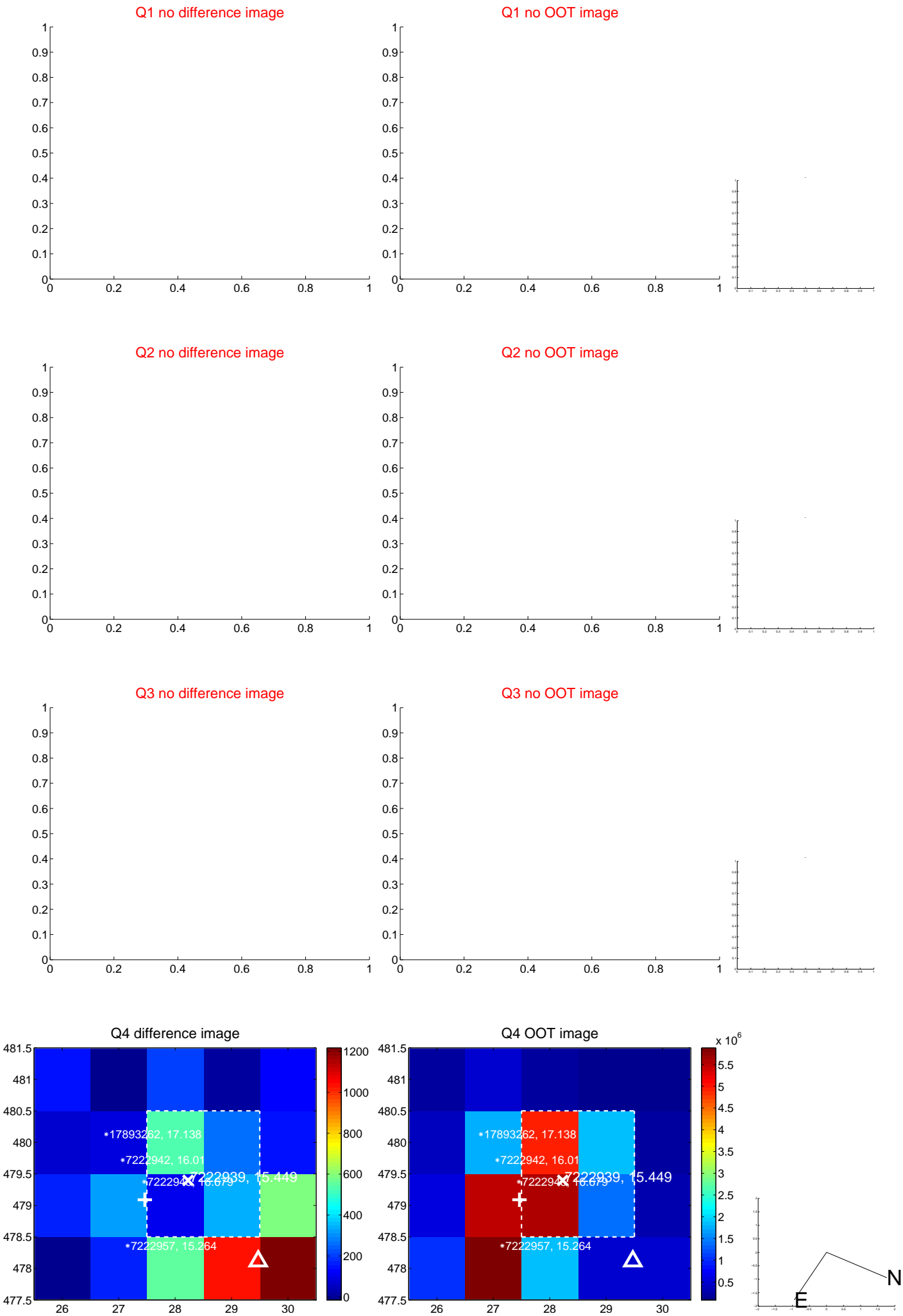
The OOT PRF centroid is offset from the target star catalog position by about 2.90 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	7.313 ± 0.353	20.69	0.996 ± 0.520	7.245 ± 0.350
PRF-fit source offset from KIC position	6.686 ± 0.317	21.12	2.831 ± 0.160	6.057 ± 0.341
photometric centroid source offset	1.49 ± 0.70	2.15	1.36 ± 0.64	0.61 ± 0.90

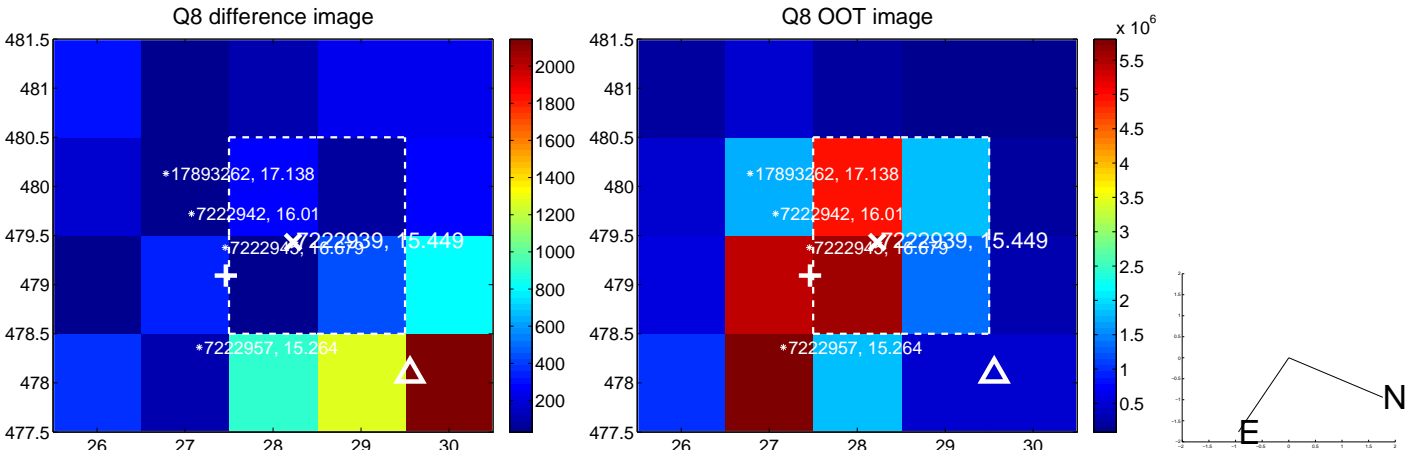
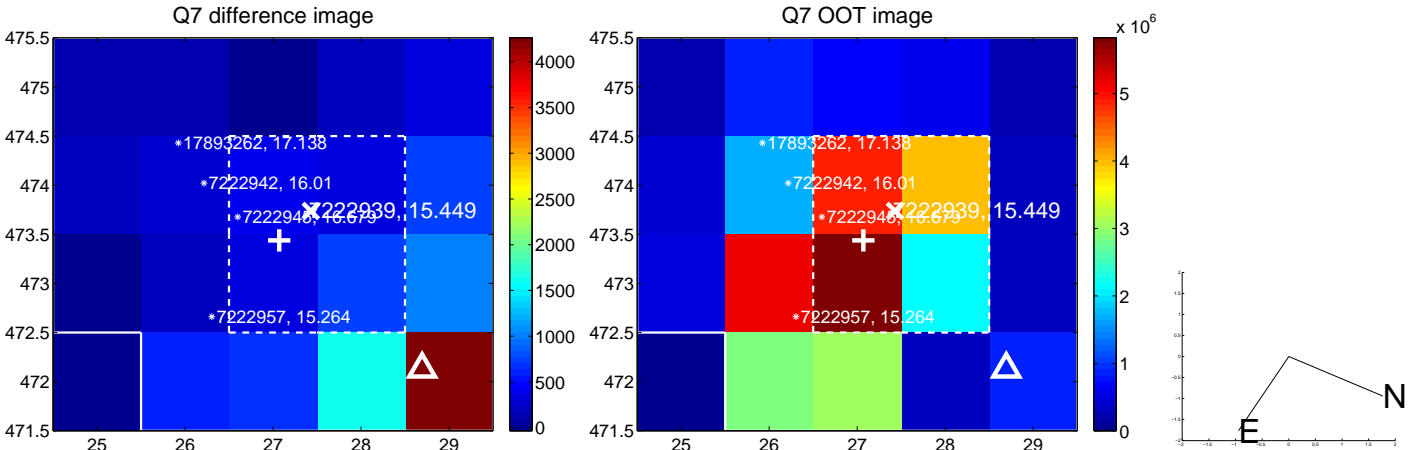
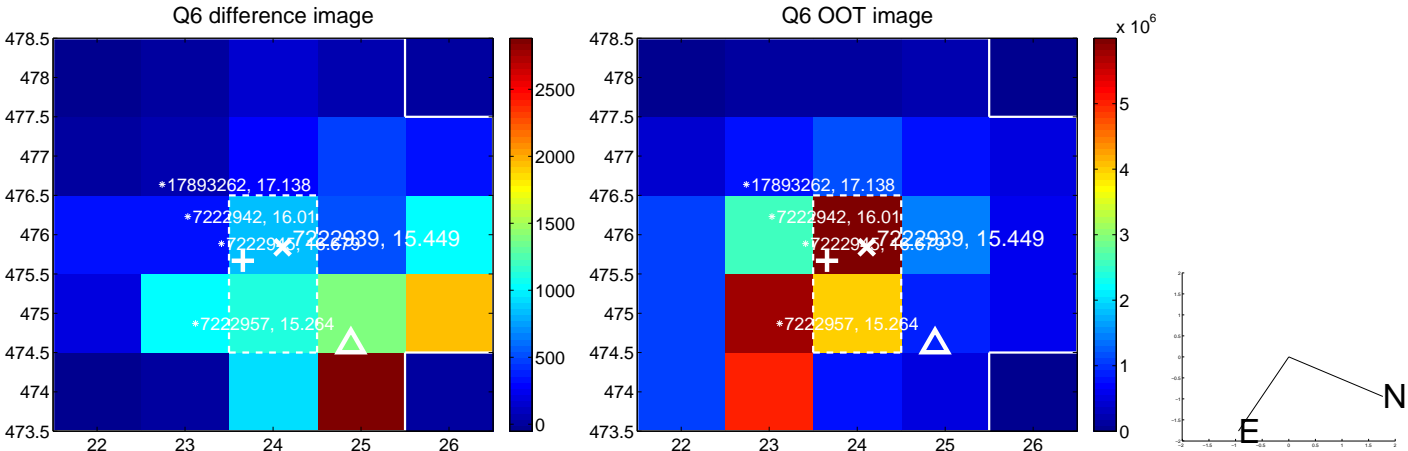
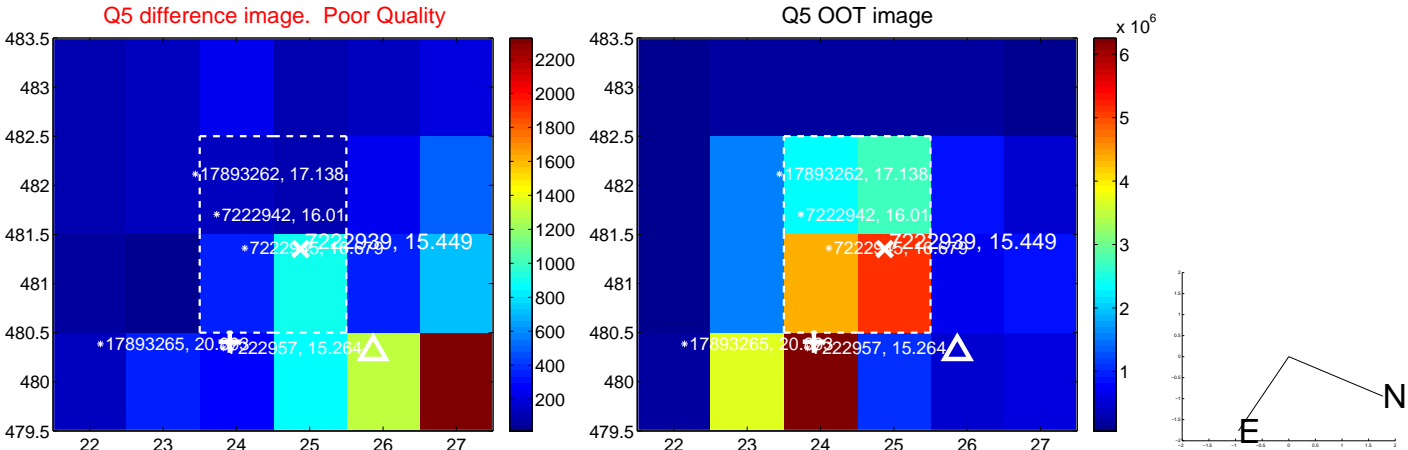


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

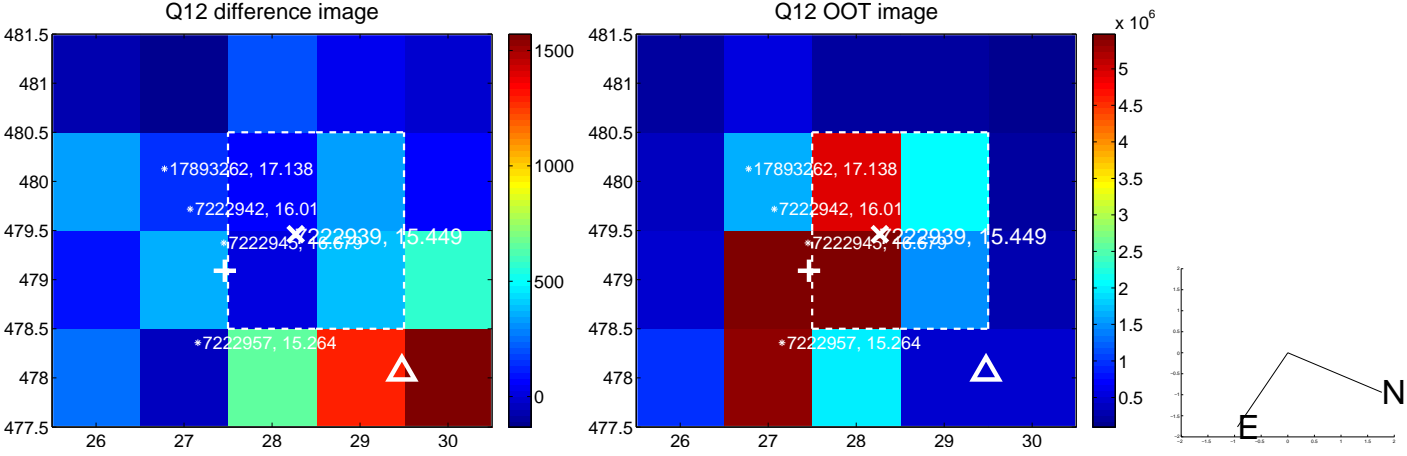
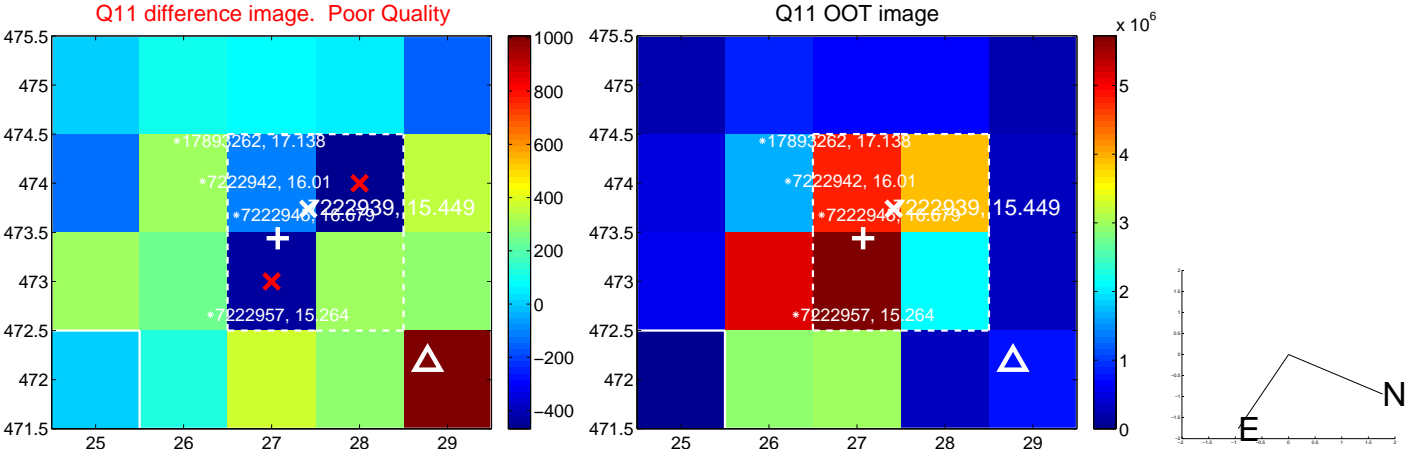
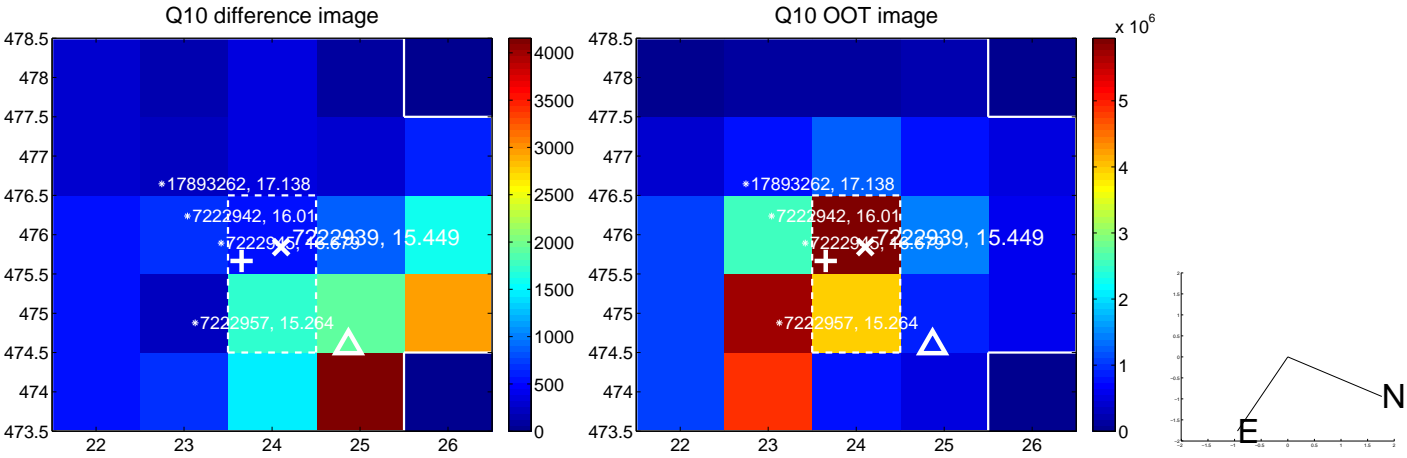
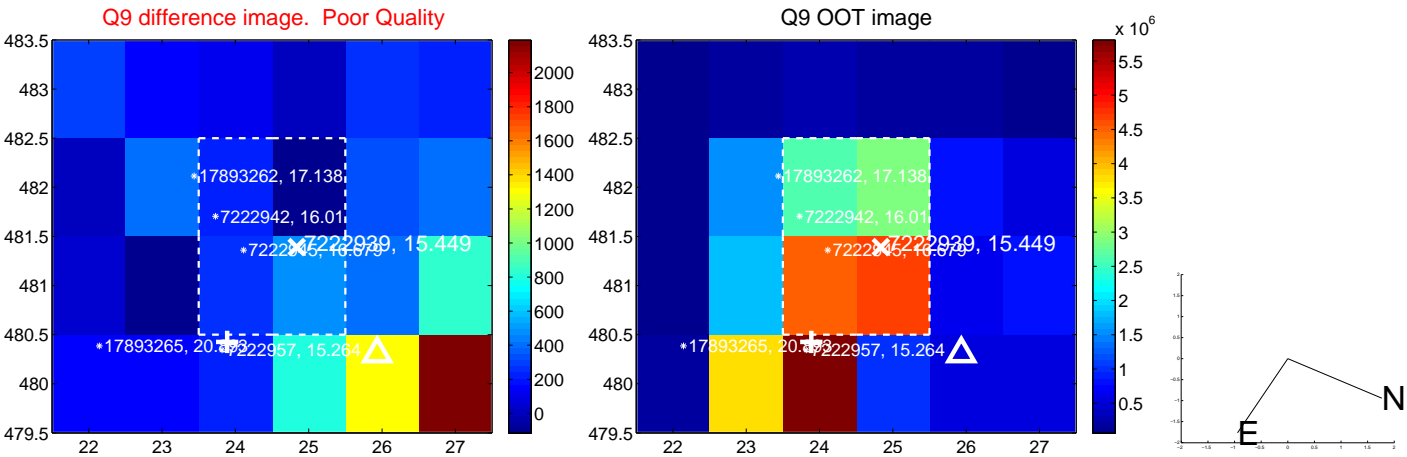
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



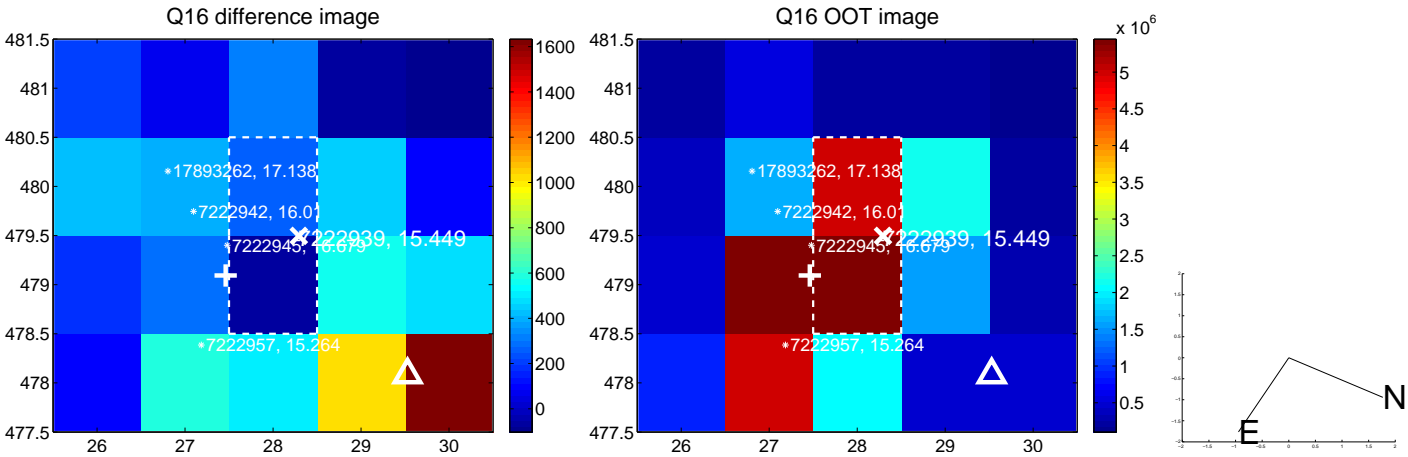
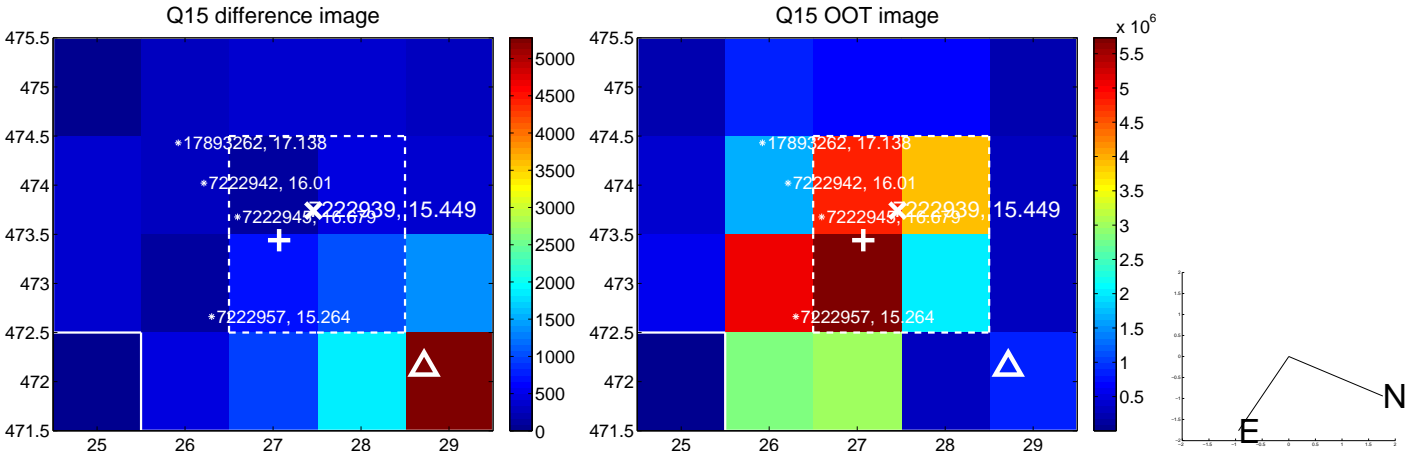
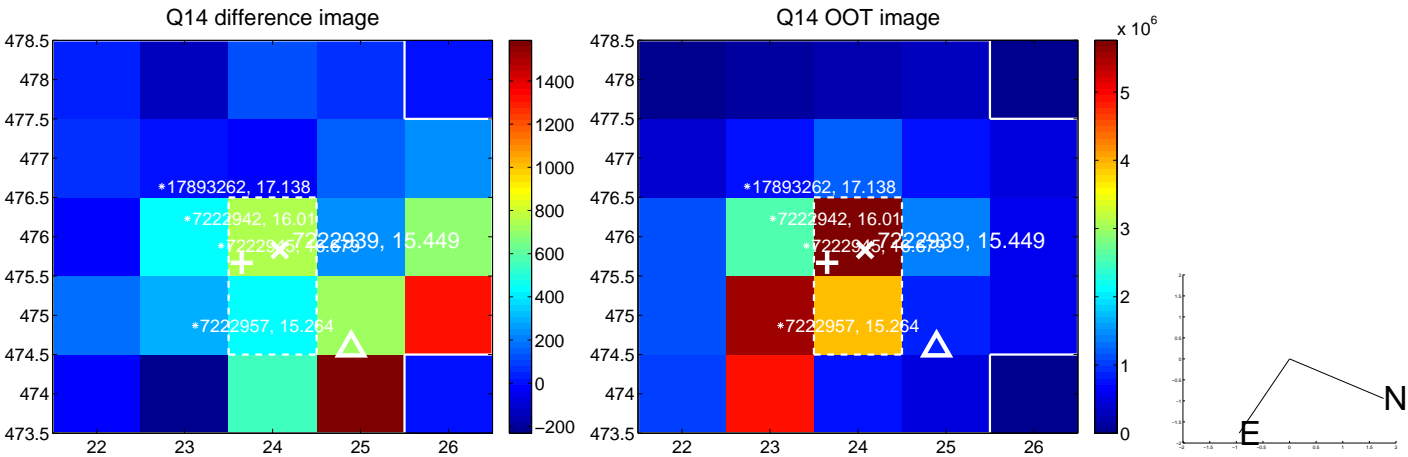
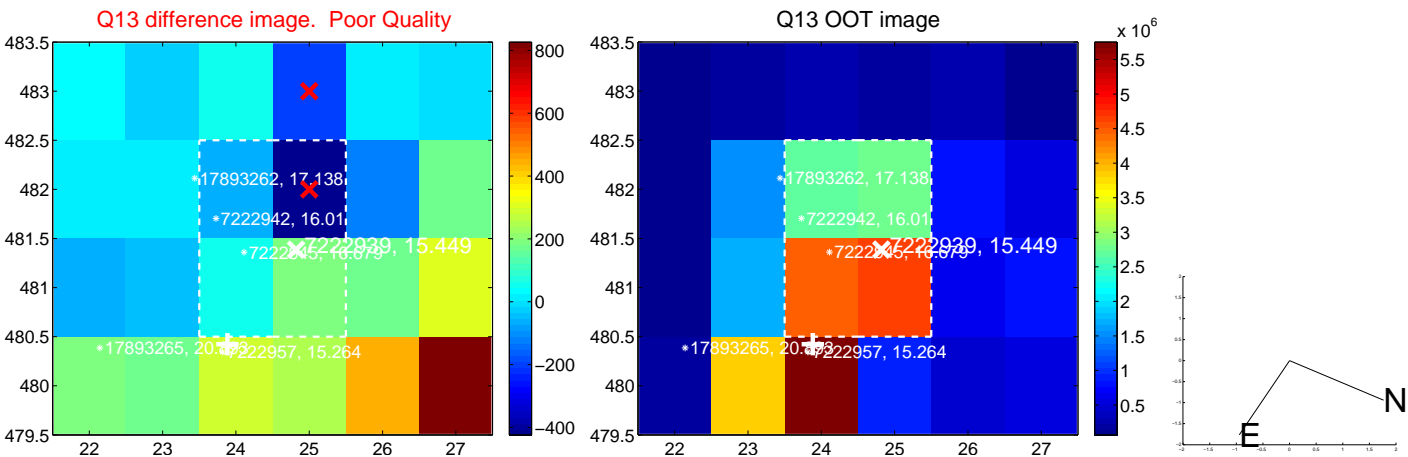
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



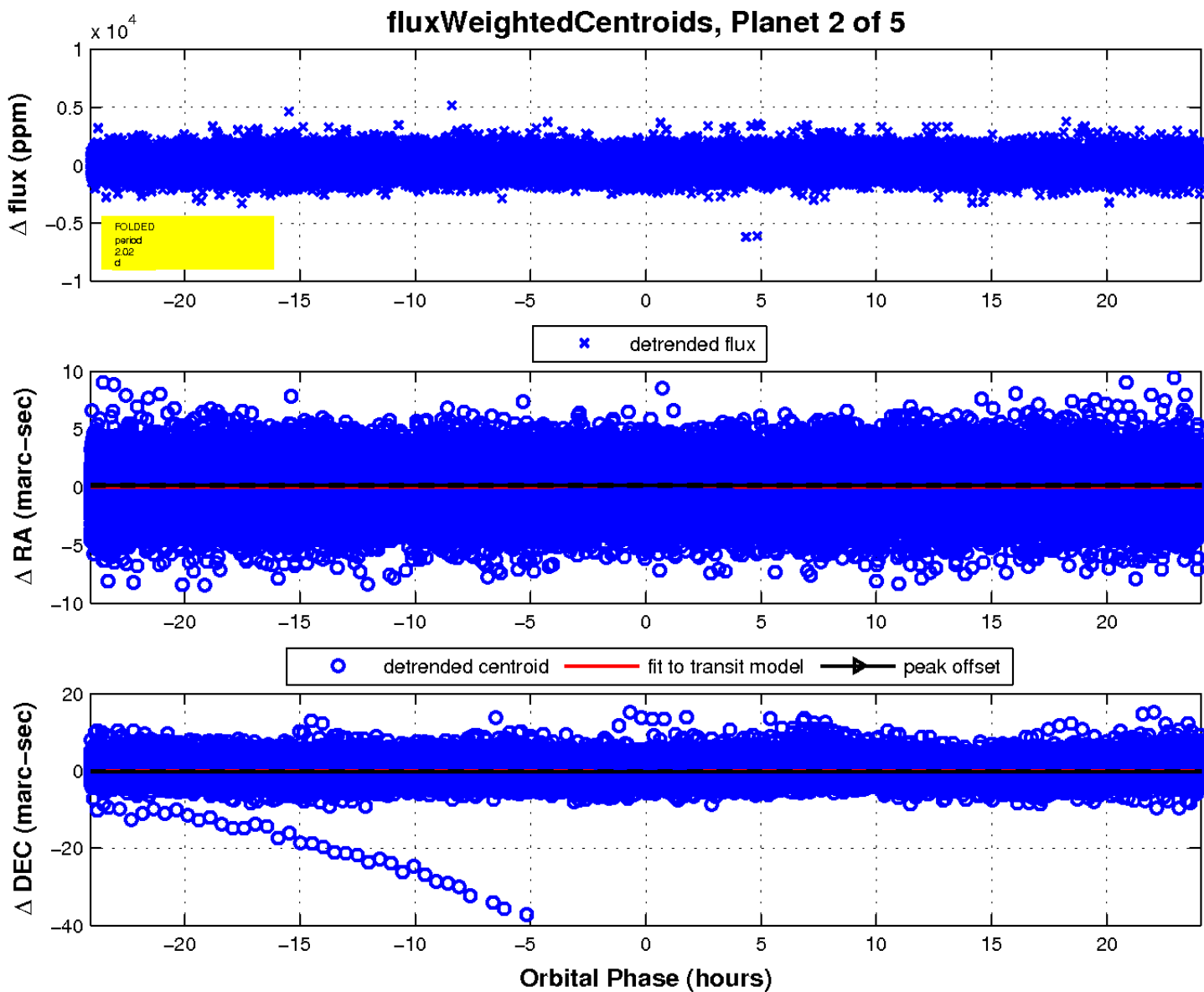
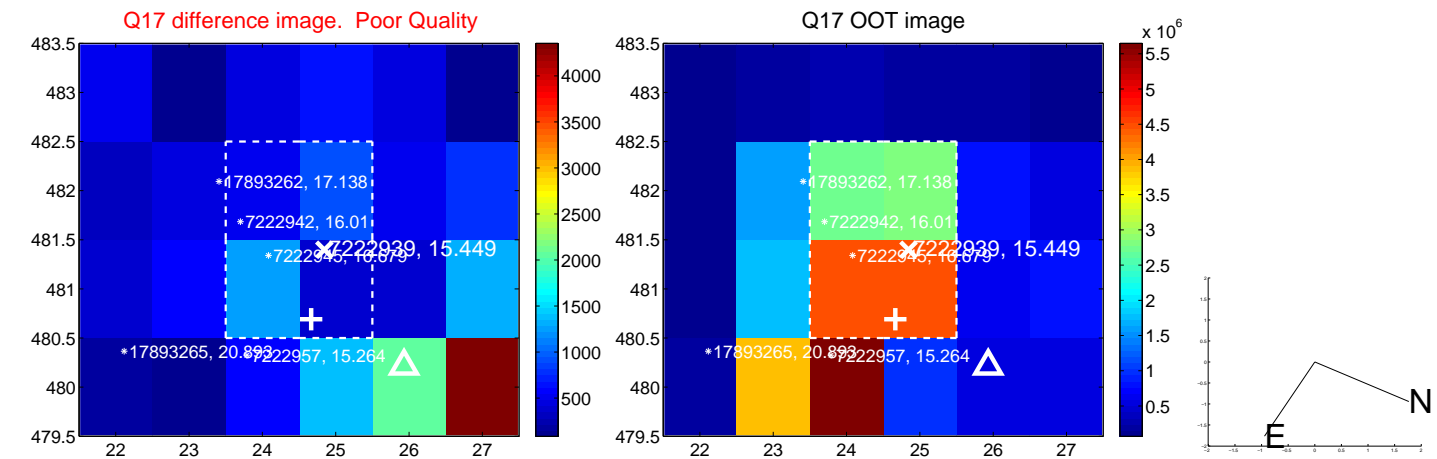
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



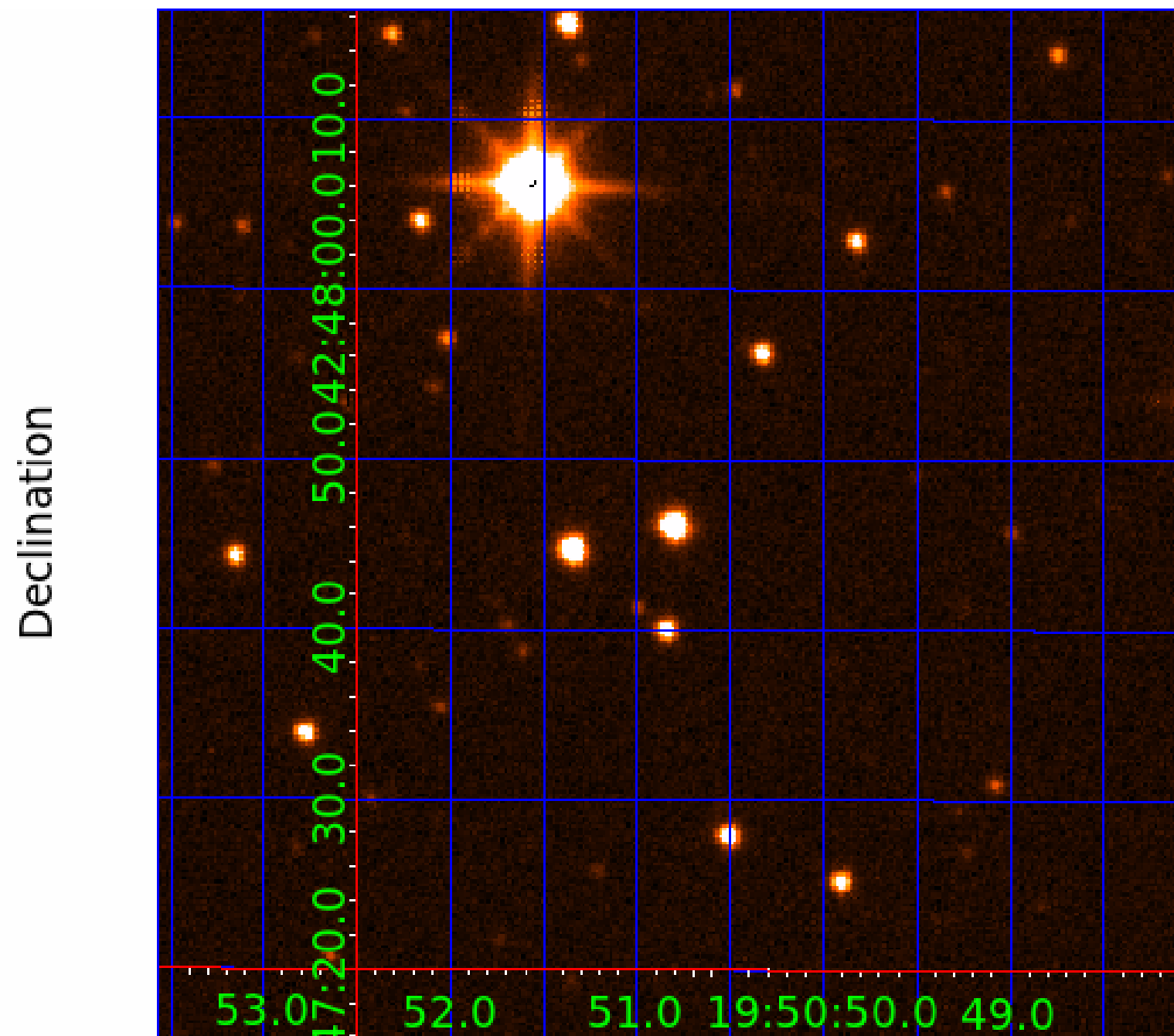
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 007222939

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})
007222939-01	OBS	No	1.116367	132.566683	117.0	3.371	8.8	9.4	0.69	4867	0.89	656.42
007222939-02	OBS	No	2.016495	132.067777	109.2	8.027	7.7	7.0	0.69	4867	0.70	298.40
007222939-03	OBS	No	110.130451	174.899450	1067.6	17.618	20.7	10.0	0.69	4867	2.70	1.44
007222939-04	OBS	No	99.492145	137.414305	1480.4	3.560	8.3	8.6	0.69	4867	2.94	1.65
007222939-05	OBS	No	490.041345	483.534823	1159.1	4.450	7.7	7.2	0.69	4867	2.49	0.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007222939-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
007222939-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
007222939-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007222939-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_RESOLVED_OFFSET
007222939-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

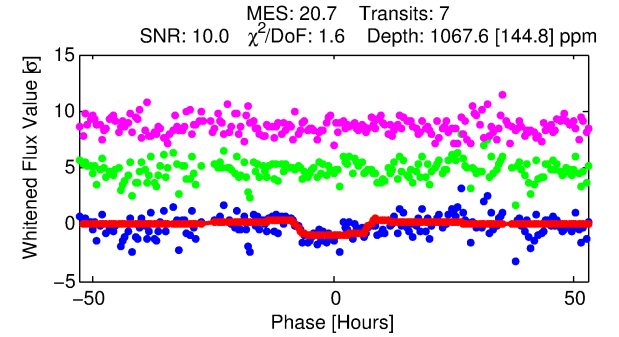
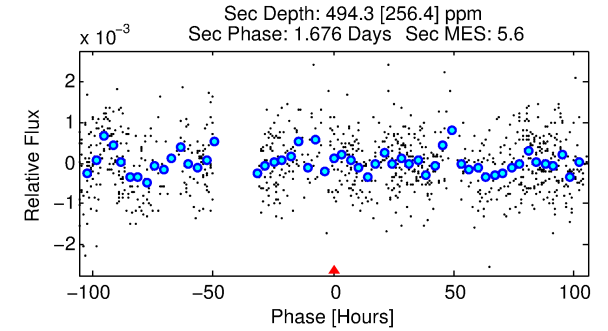
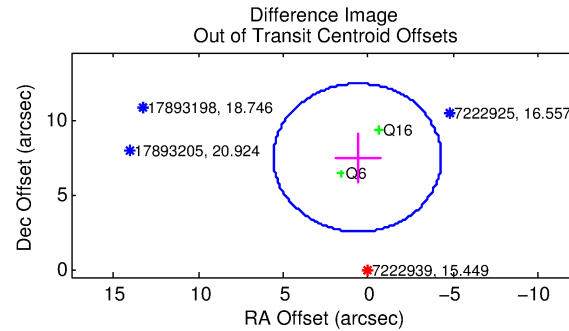
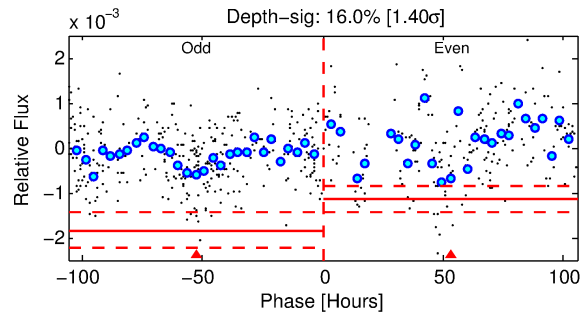
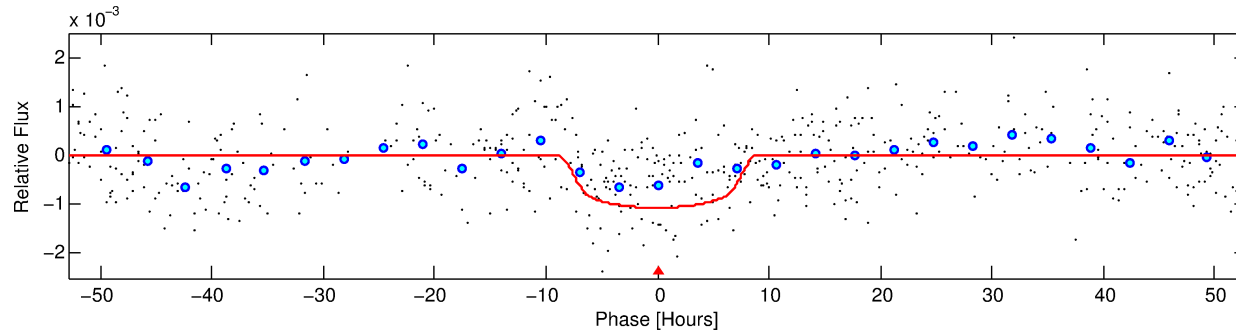
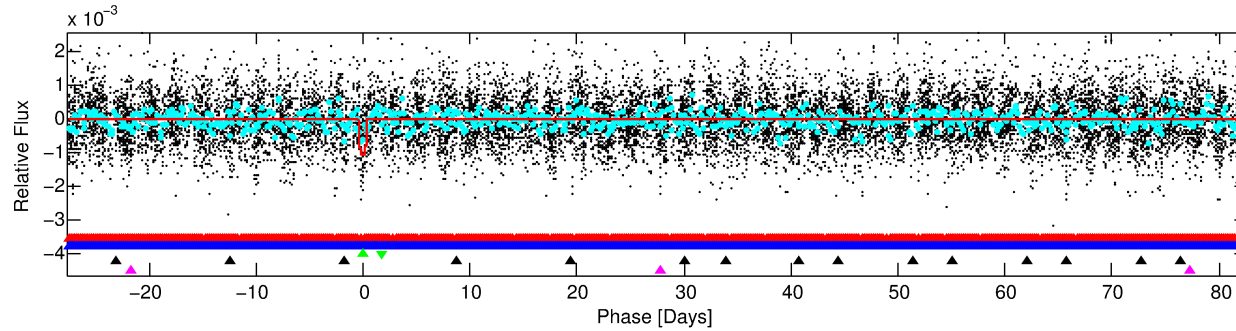
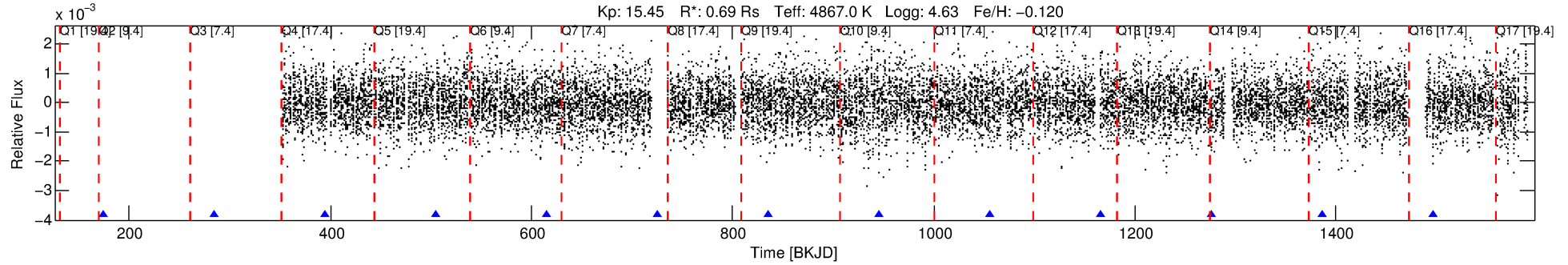
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007222939-03

No Significant Match Found

DV One-Page Summary

KIC: 7222939 Candidate: 3 of 5 Period: 110.130 d



DV Fit Results:

Period = 110.13045 [0.00575] d
Epoch = 174.8994 [0.0462] BKJD
Rp/R* = 0.0358 [0.0049]
a/R* = 26.15 [11.01]
b = 0.88 [0.11]
Seff = 1.44 [0.27]
Teq = 279 [13] K
Rp = 2.70 [0.49] Re
a = 0.4083 [0.0379] AU
Ag = 6233.87 [3744.95] [1.66 σ]
Teffp = 3838 [580] K [6.13 σ]

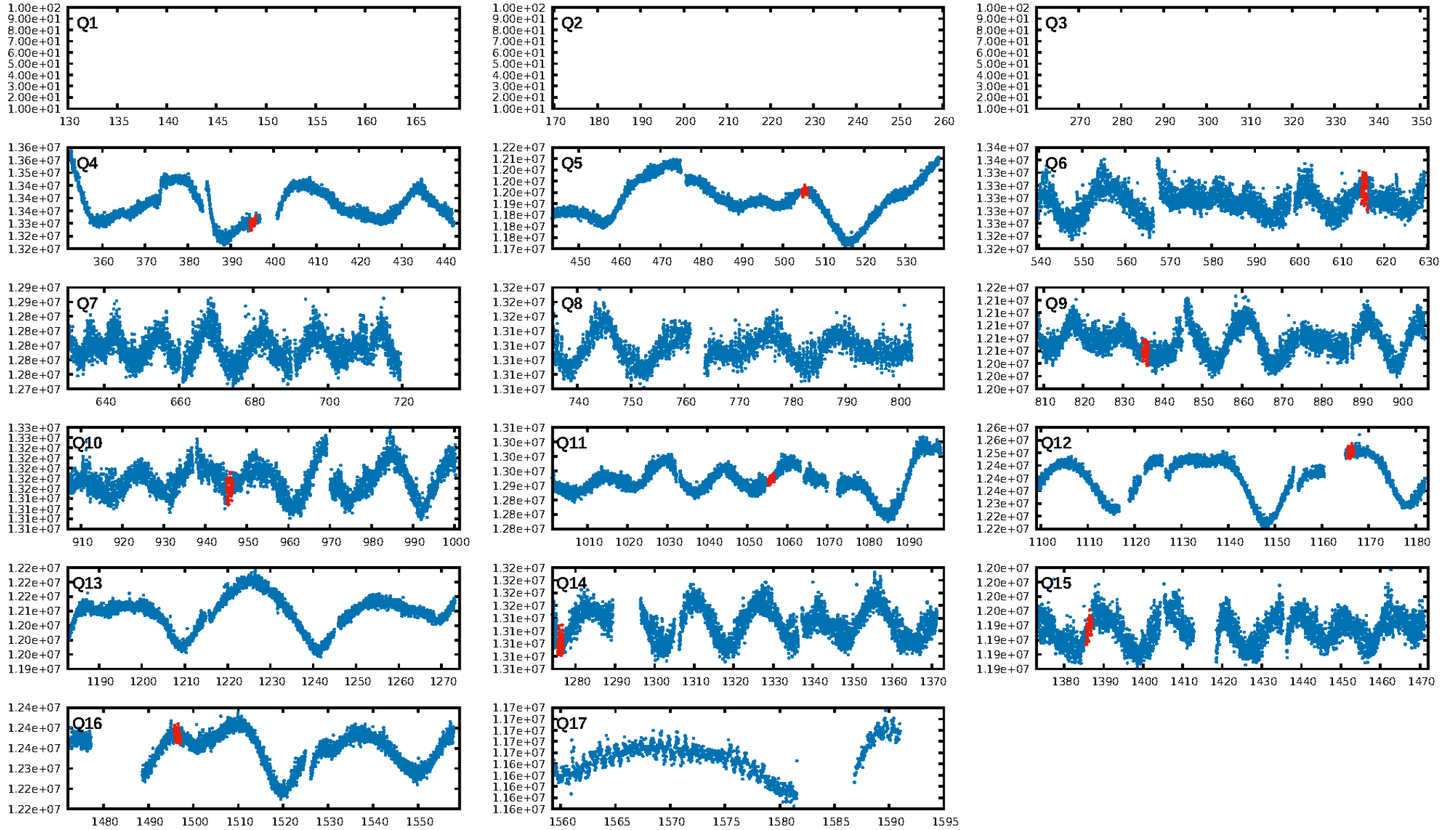
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.20 σ]
LongPeriod-sig: 100.0% [501.78 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.79e-39
RollingBand-fgt: 1.00 [7/7]
GhostDiagnostic-chr: 3.04
Centroid-sig: 95.9%
Centroid-so: 2.611 arcsec [5.39 σ]
OotOffset-rm: 7.494 arcsec [4.54 σ]
KicOffset-rm: 6.506 arcsec [6.31 σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 0.00 [0/2]
DiffImageOverlap-fno: 0.00 [0/6]

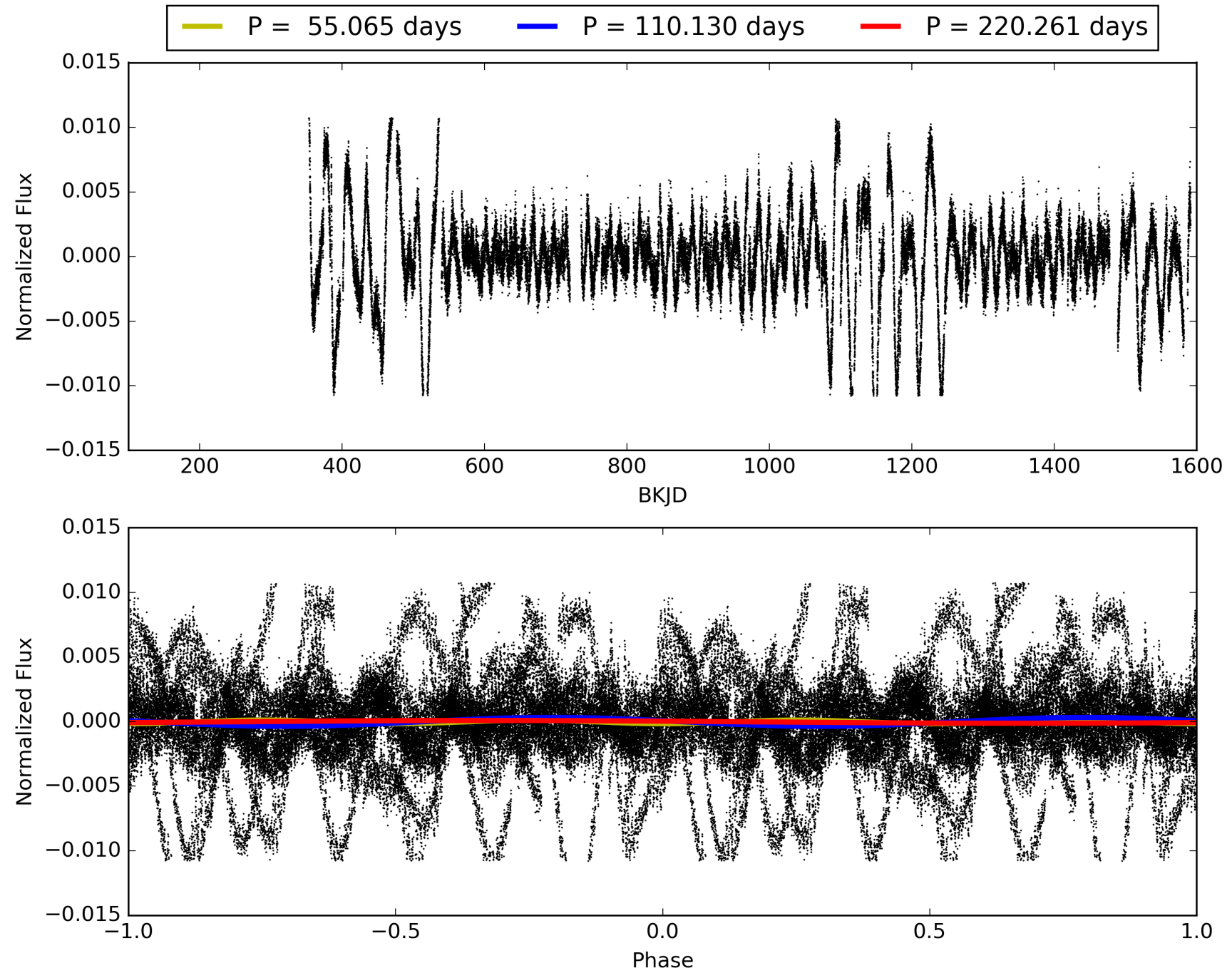
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:50:41 Z

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

TCE 007222939-03, PDC Light Curves

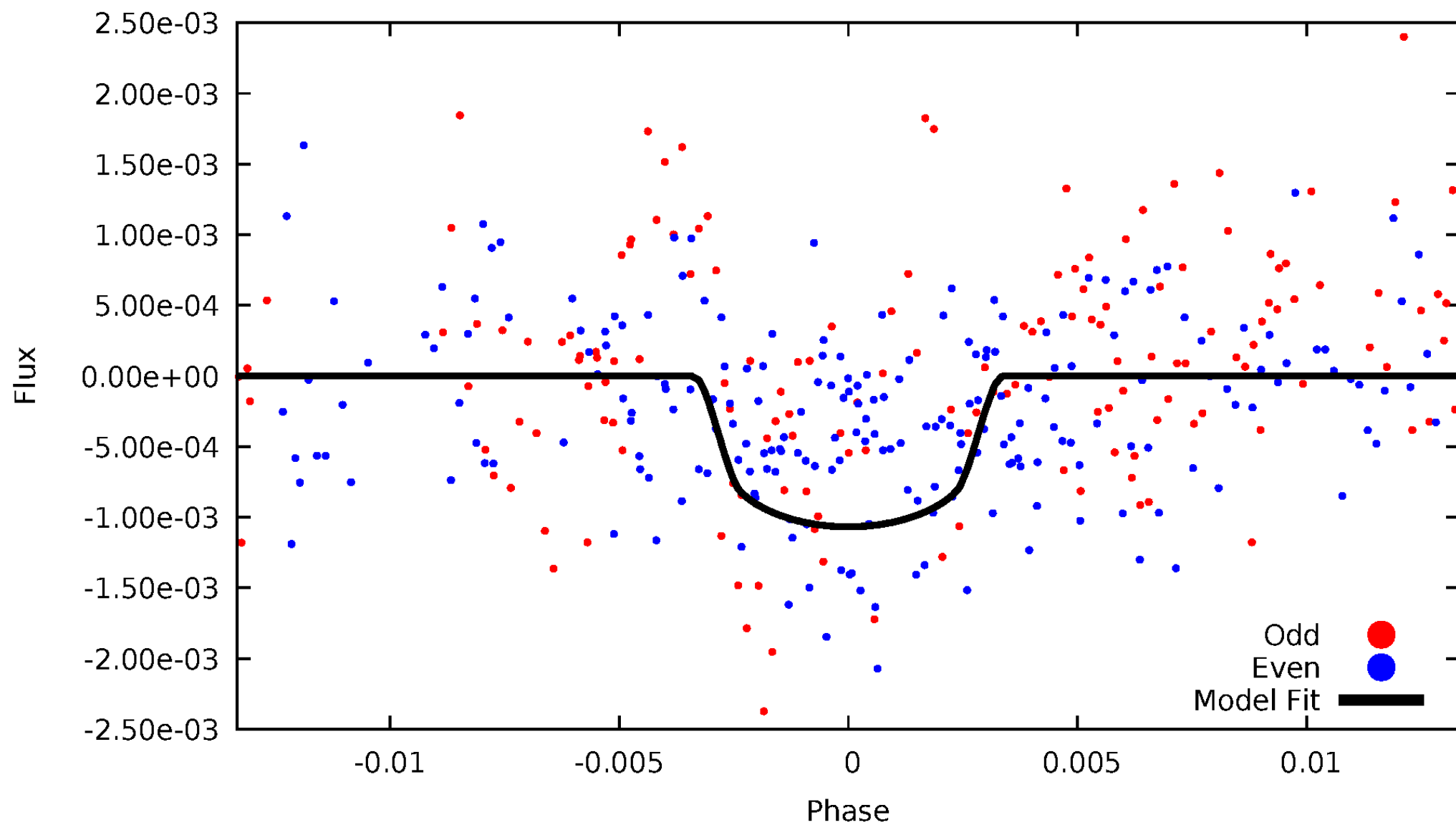


TCE 007222939-03



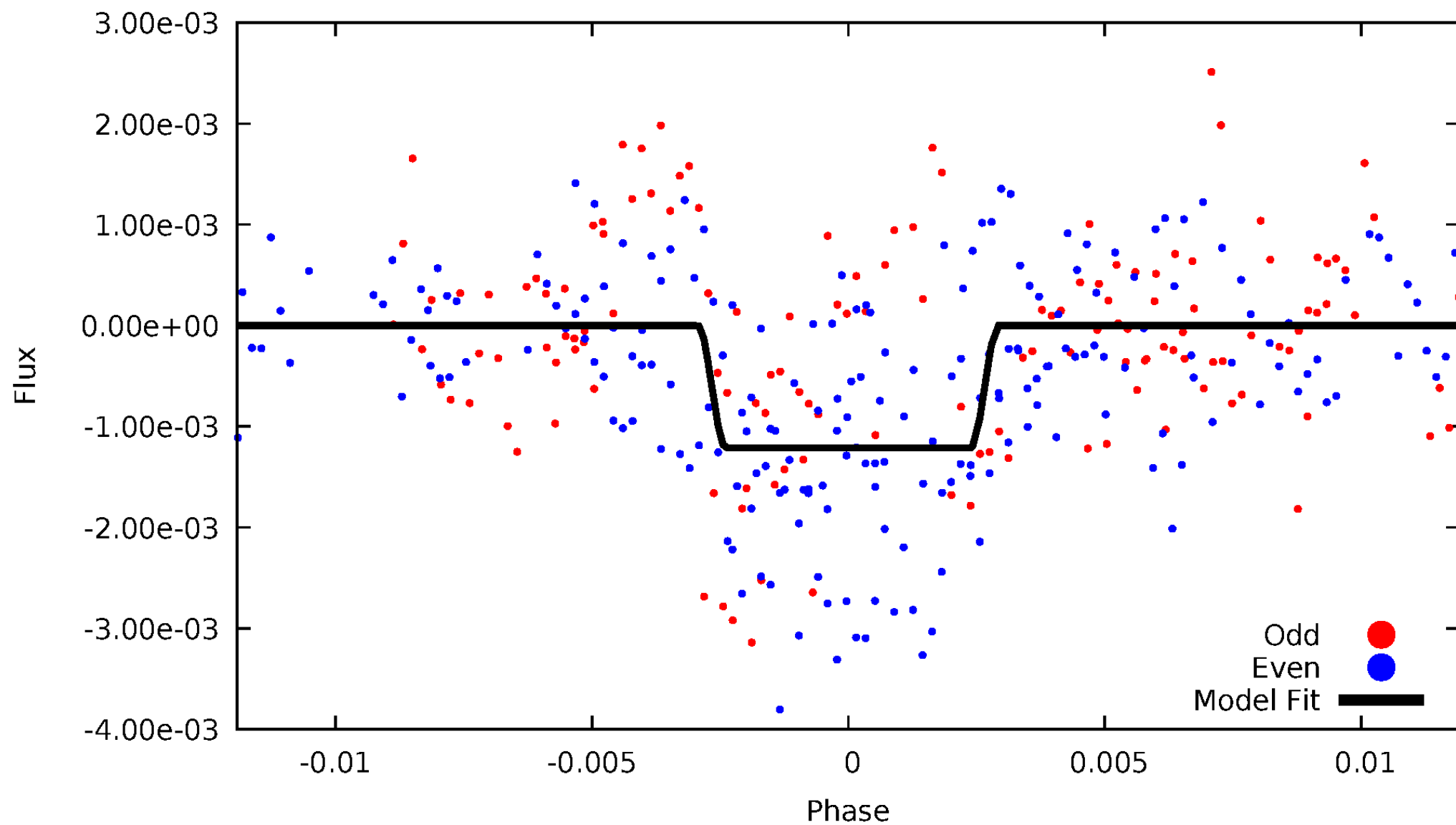
DV Odd/Even

TCE 007222939-03



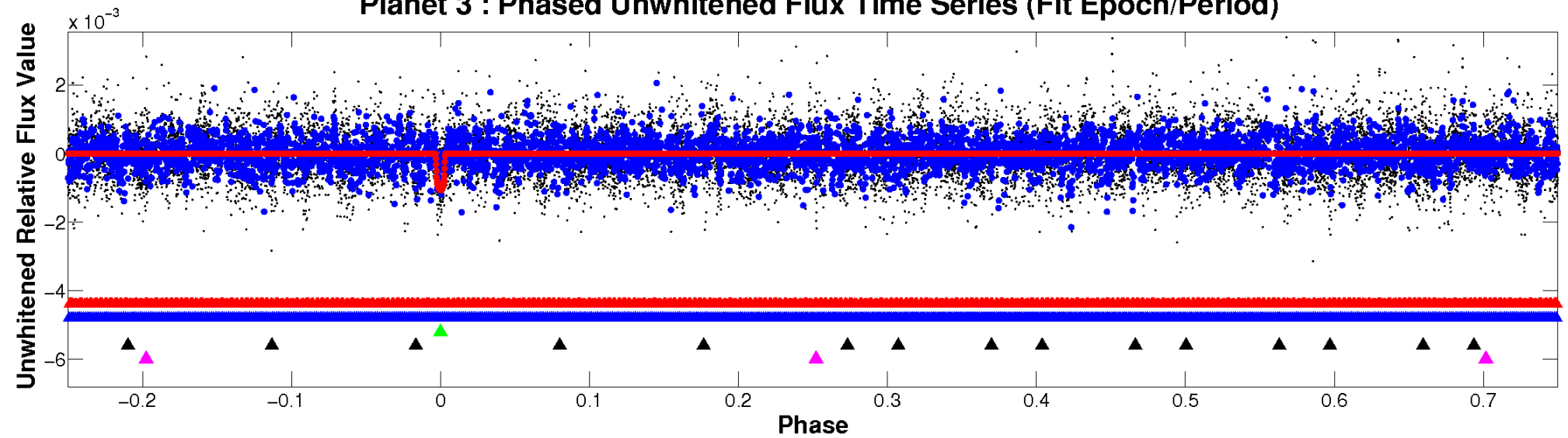
ALT Odd/Even

TCE 007222939-03

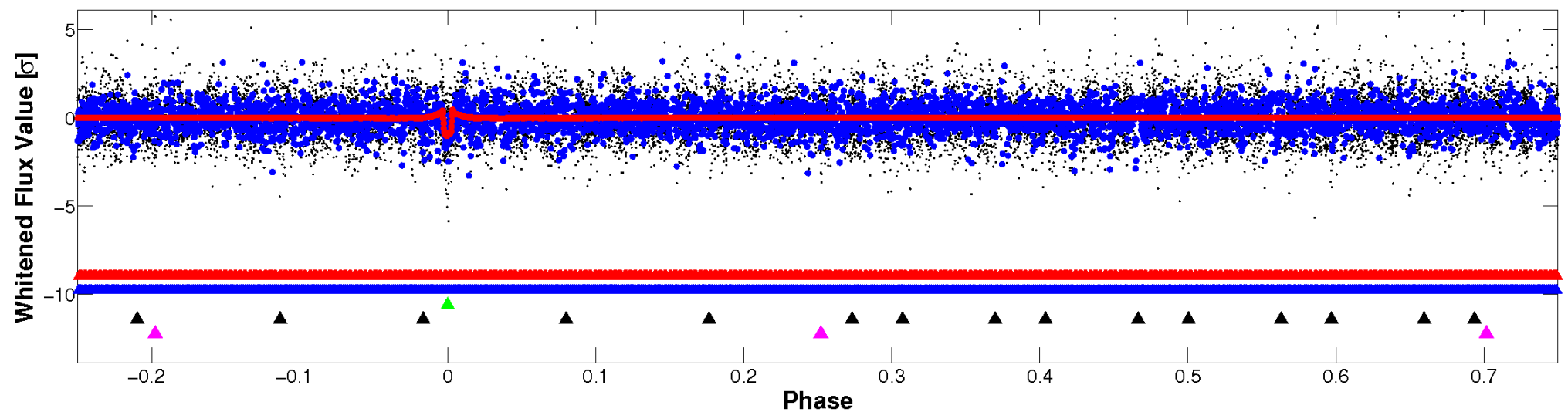


Non-Whitened Vs. Whitened Light Curve

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

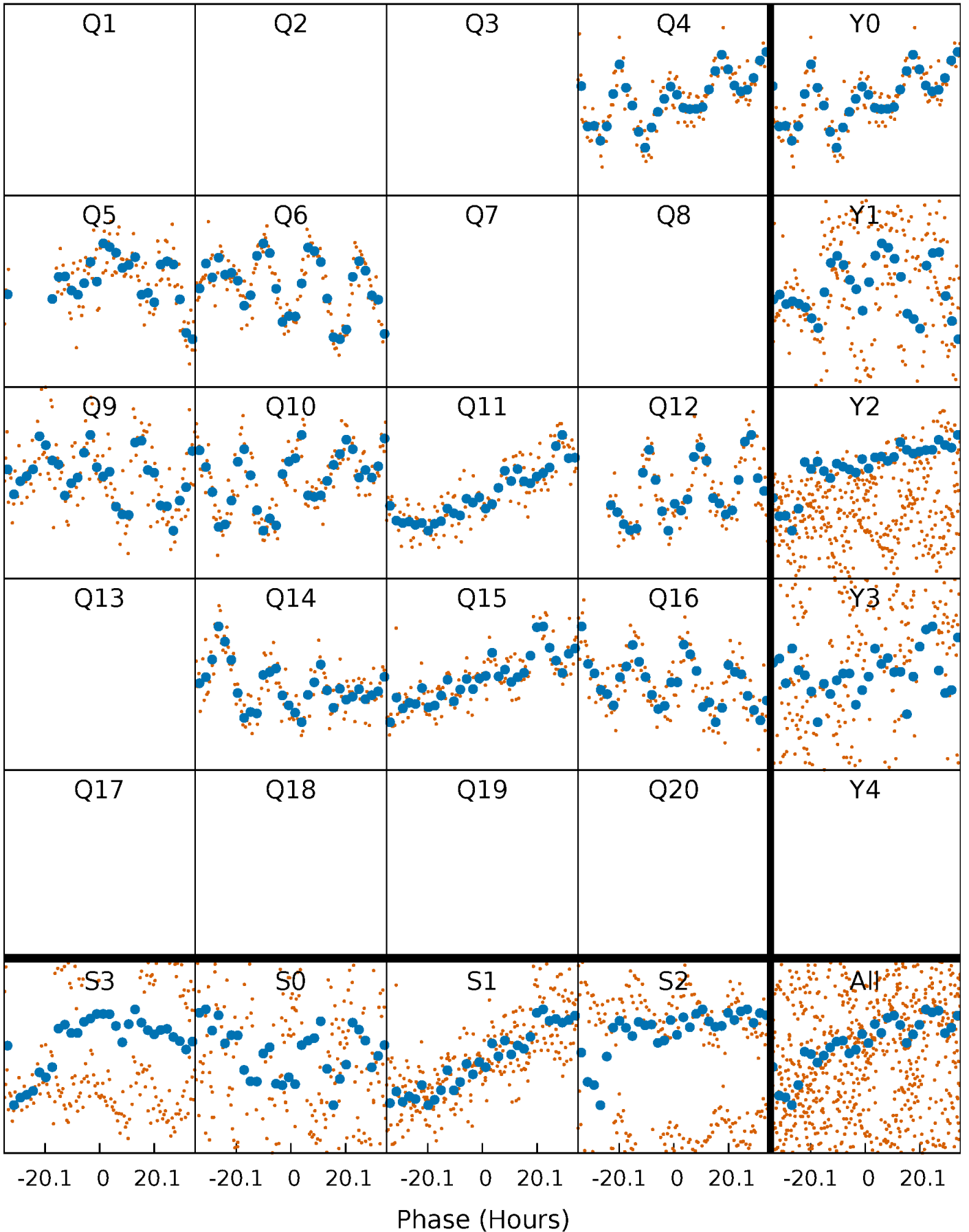


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



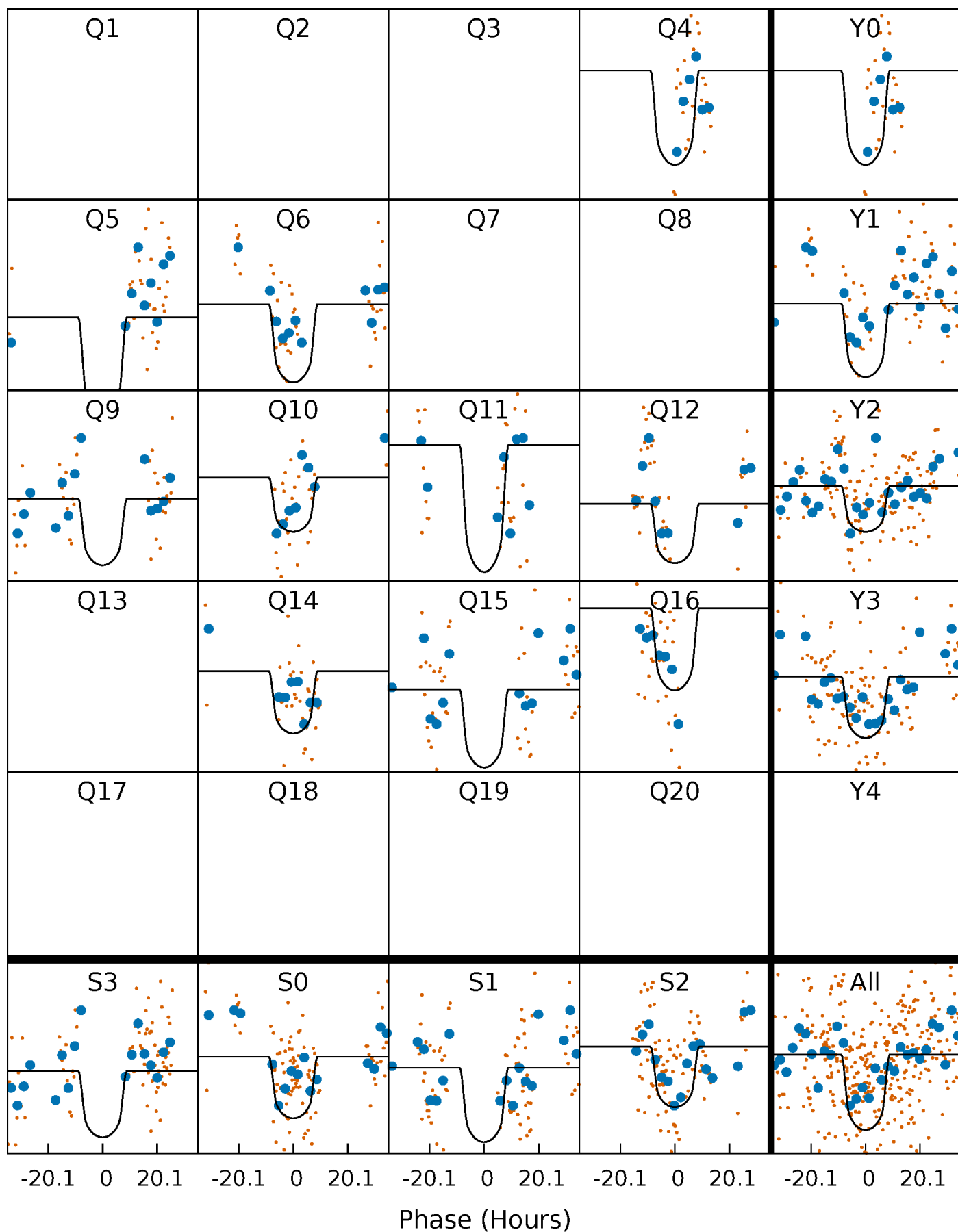
PDC Quarter-Phased Transit Curves

TCE 007222939-03 $P=110.130451$ Days $T_0=174.899450$ (BKJD)



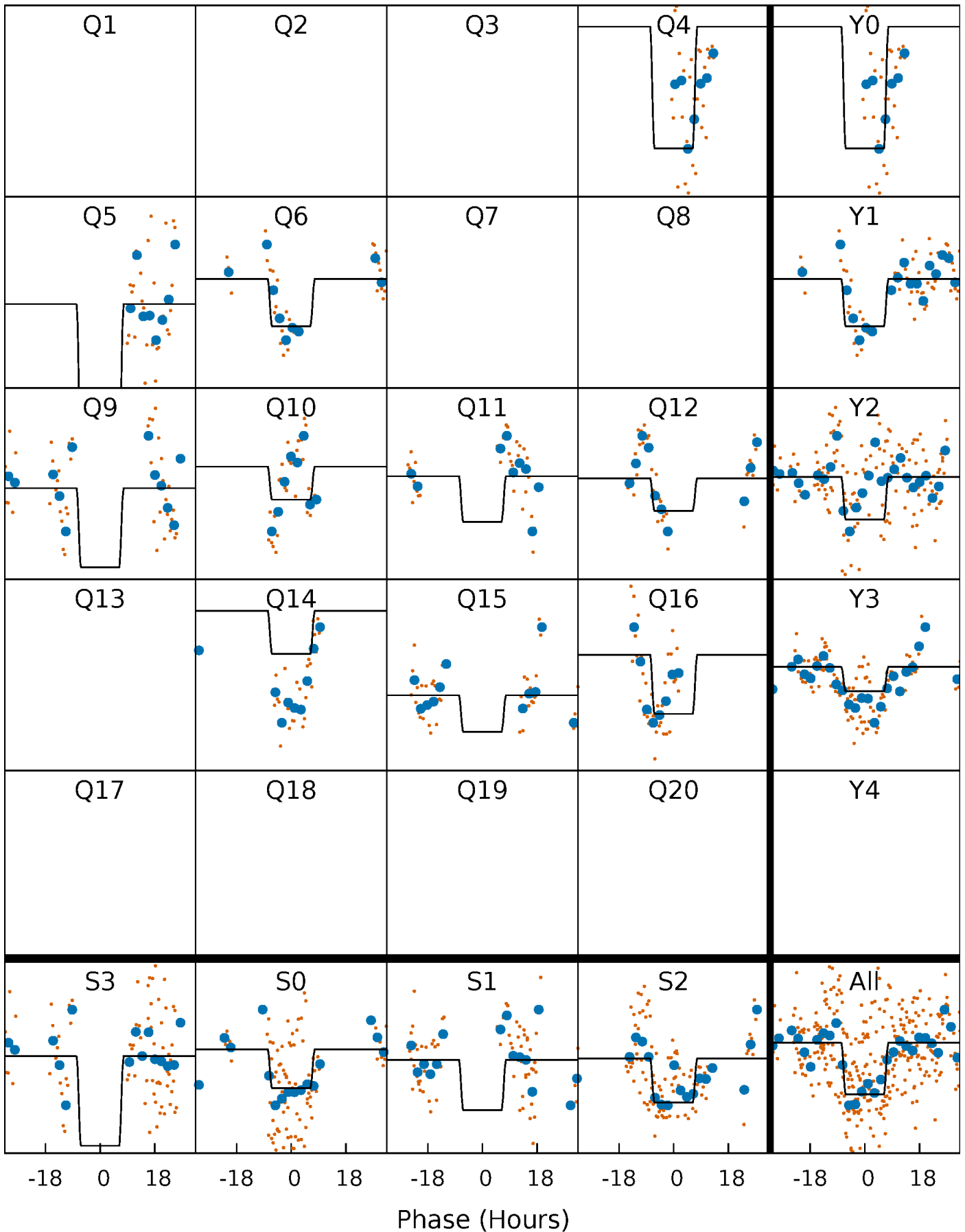
DV Quarter-Phased Transit Curves

TCE 007222939-03 $P=110.130451$ Days $T_0=174.899450$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

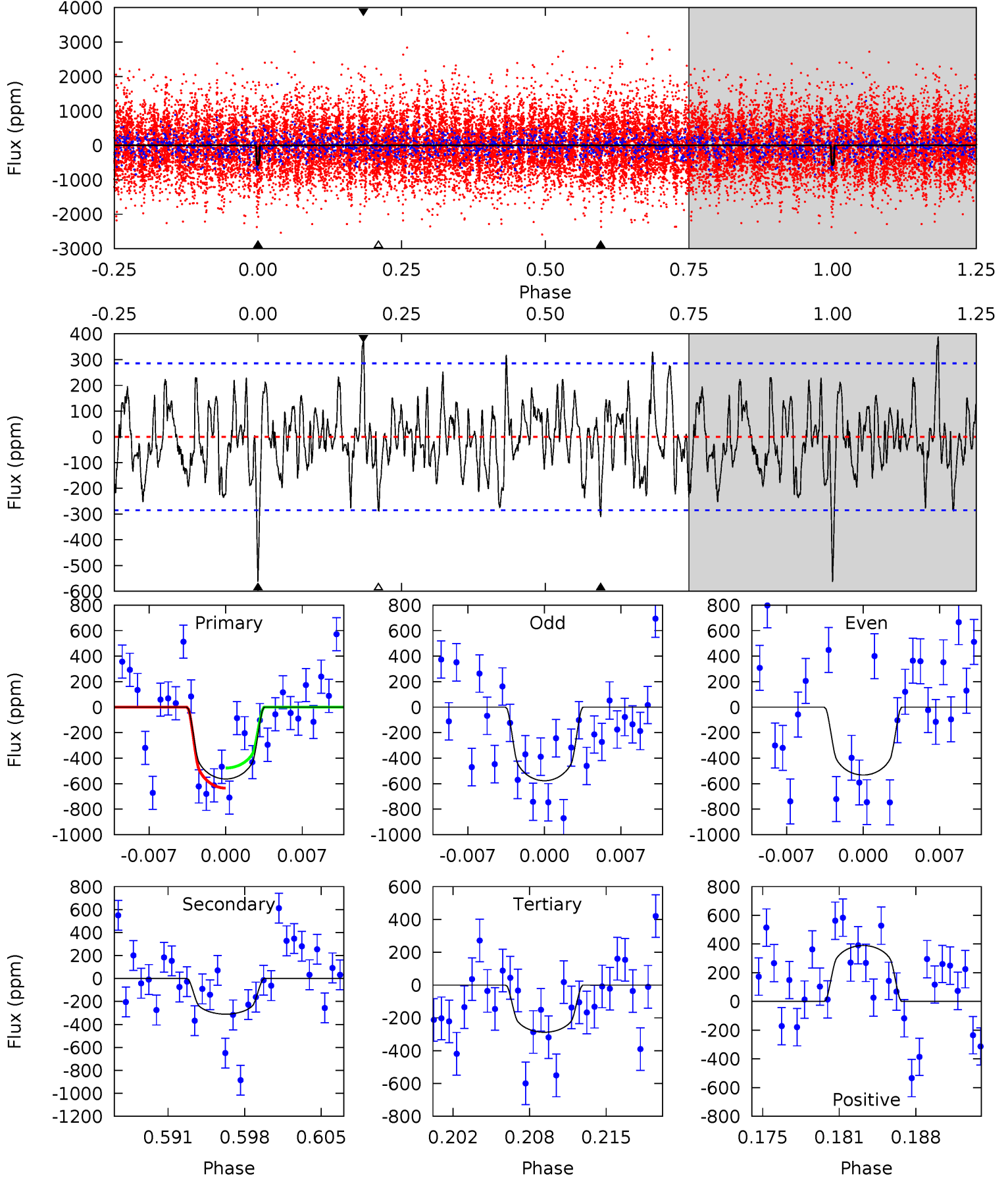
TCE 007222939-03 P=110.130077 Days $T_0=174.906439$ (BKJD)



DV Model-Shift Uniqueness Test

007222939-03, P = 110.130451 Days, E = 174.899450 Days

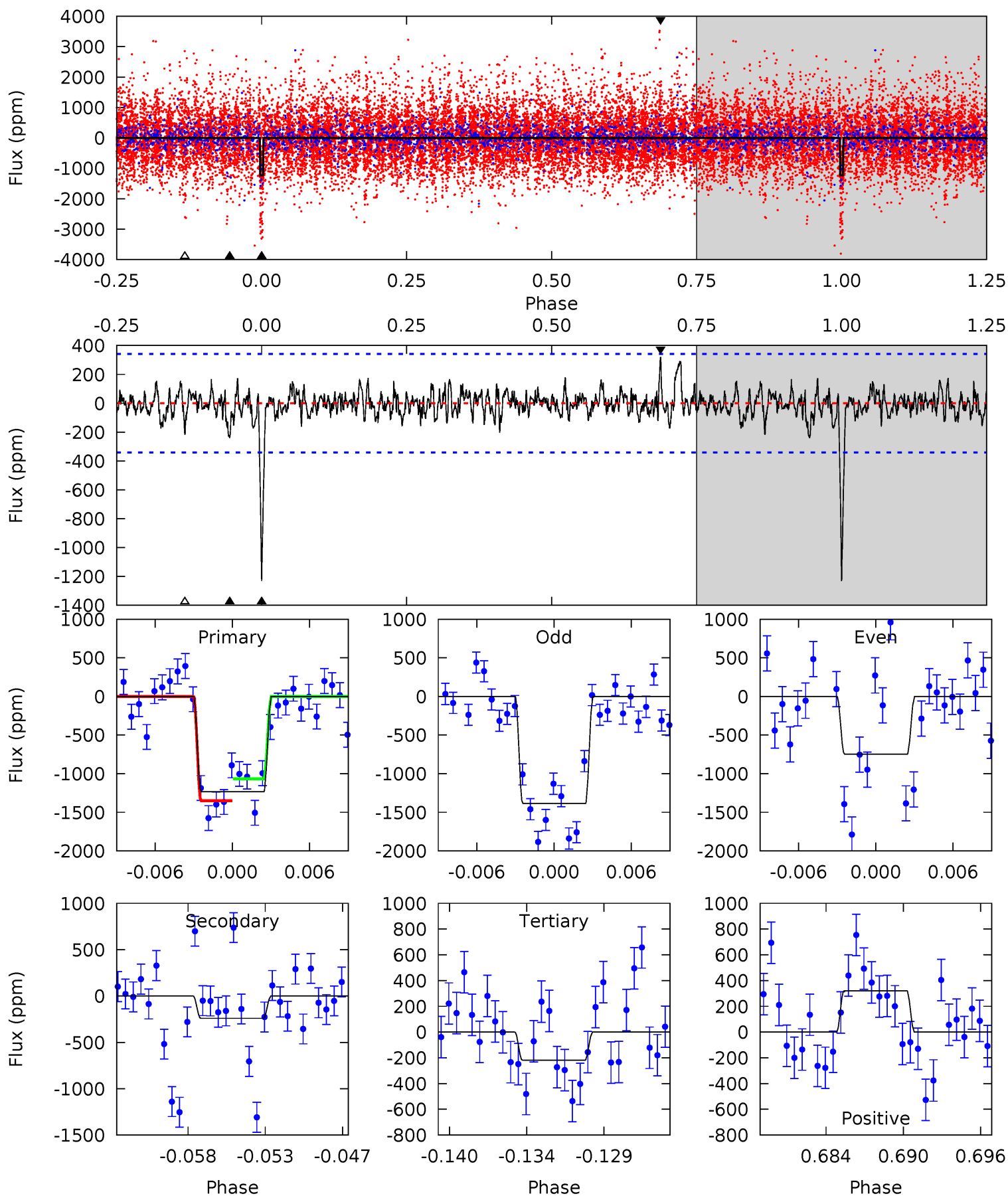
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	5.56	5.15	6.97	5.10	2.71	2.08	4.92	3.10	0.41	-1.41	0.37	1.10	0.41	1.41



Alt Model-Shift Uniqueness Test

007222939-03, P = 110.130077 Days, E = 174.906439 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.5	3.63	3.29	4.83	5.13	2.76	1.06	15.3	13.7	0.34	-1.20	4.48	0.97	0.21	2.10



Stellar Parameters For KIC 007222939

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4867^{+175}_{-156}	$4.633^{+0.027}_{-0.063}$	$-0.120^{+0.300}_{-0.300}$	$0.691^{+0.082}_{-0.048}$	$0.773^{+0.060}_{-0.083}$	$3.297^{+0.438}_{-0.833}$
	+4%/-3%	+1%/-1%	+250%/-250%	+12%/-7%	+8%/-11%	+13%/-25%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007222939-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-311 ± 56	$2.76^{+0.40}_{-0.39}$	393^{+16}_{-15}	3735^{+243}_{-206}	3784^{+1554}_{-1071}
Alt.	-241 ± 66	$2.68^{+0.40}_{-0.41}$	394^{+17}_{-14}	3626^{+265}_{-261}	3022^{+1554}_{-1044}

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

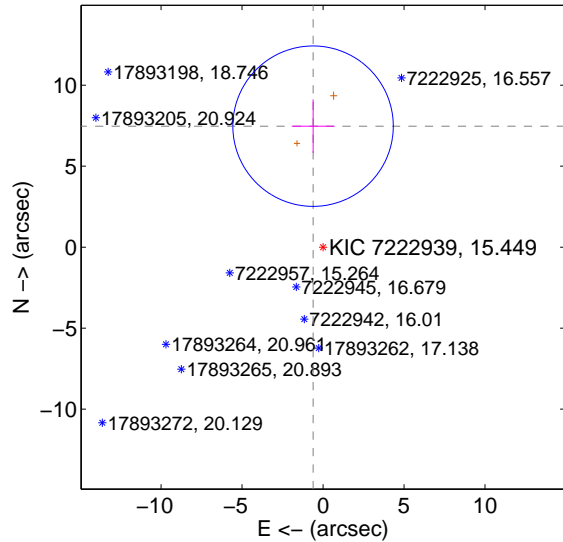
Supplemental centroid analysis for 007222939-03. Kepler magnitude: 15.45. Transit SNR 10.05

There are 0 quarters with good PRF difference image offsets

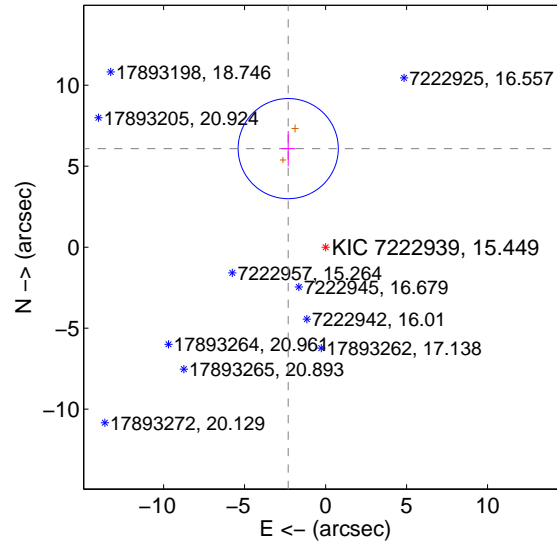
The OOT PRF centroid is offset from the target star catalog position by about 3.25 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	7.494 ± 1.650	4.54	0.615 ± 1.316	7.469 ± 1.652
PRF-fit source offset from KIC position	6.506 ± 1.030	6.31	2.306 ± 0.438	6.084 ± 1.089
photometric centroid source offset	2.61 ± 0.48	5.39	2.43 ± 0.47	-0.96 ± 0.56

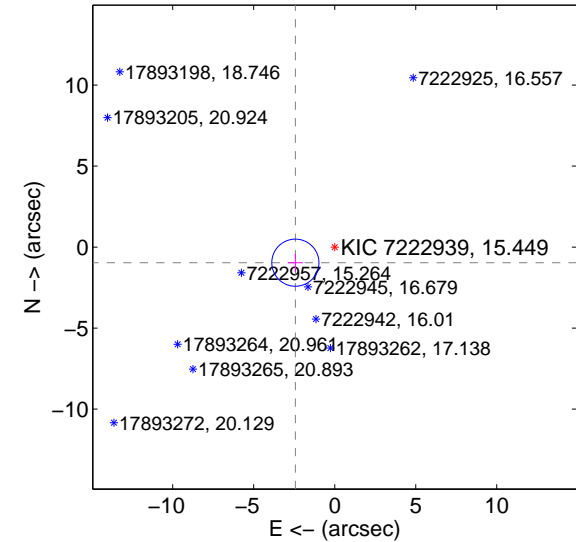
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

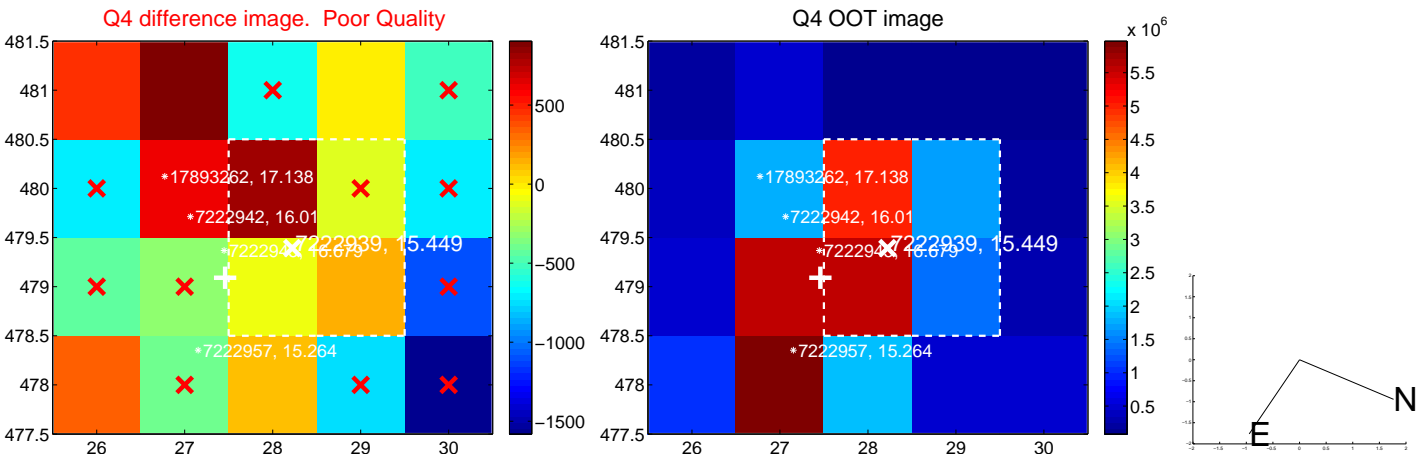
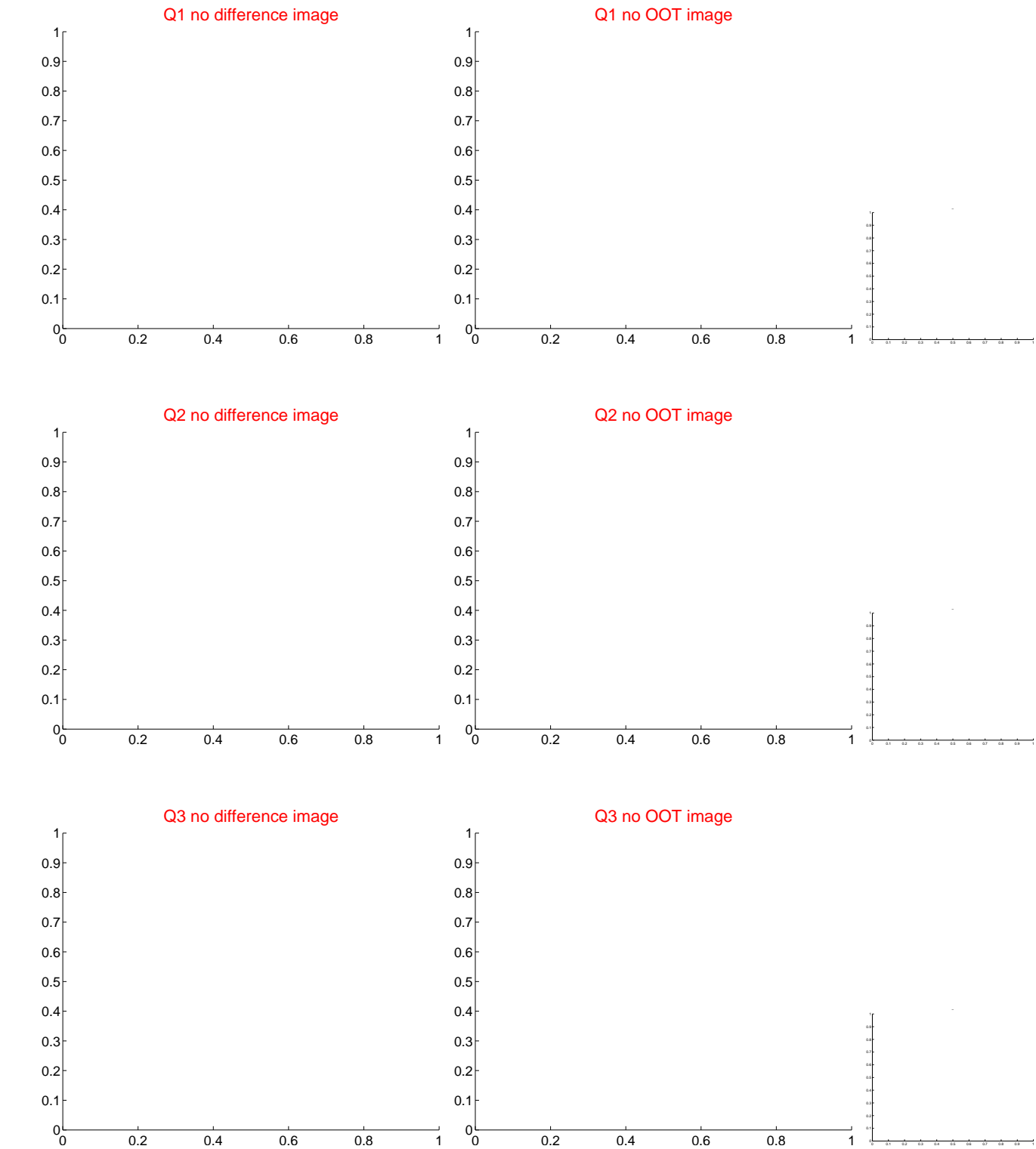


offset from photometric centroids



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.

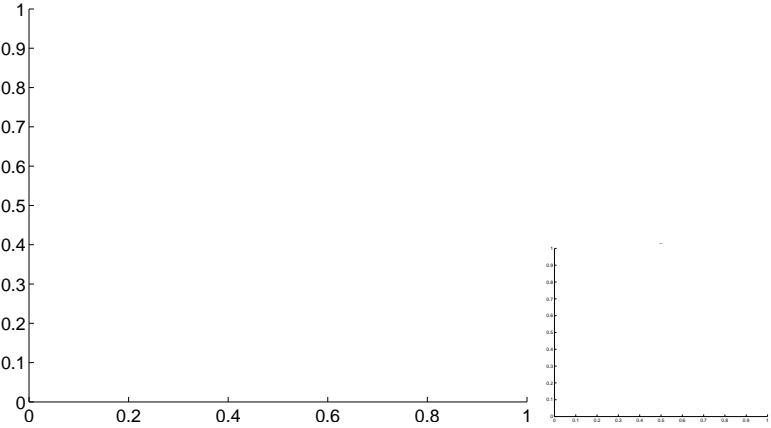


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

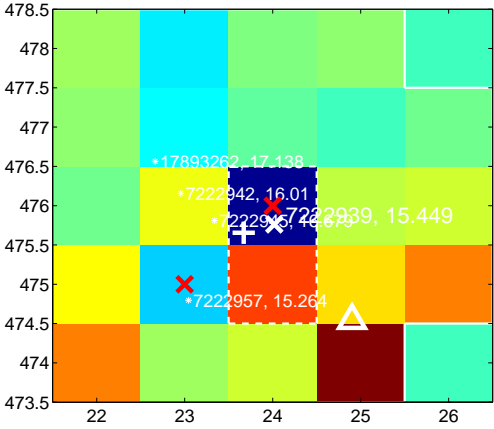
Q5 no difference image



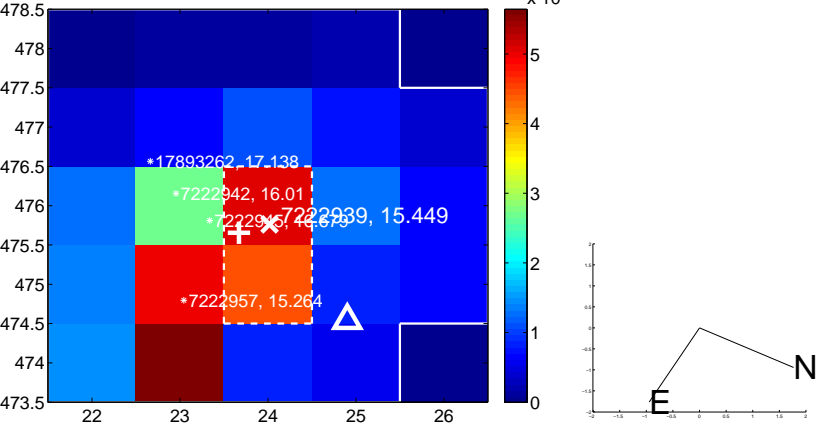
Q5 no OOT image



Q6 difference image. Poor Quality



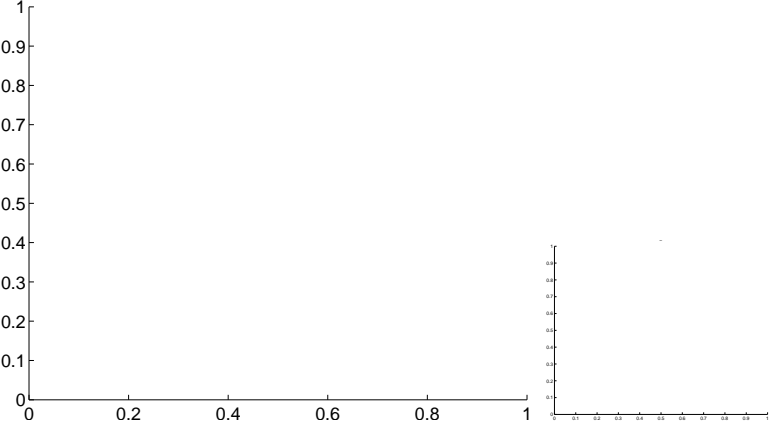
Q6 OOT image



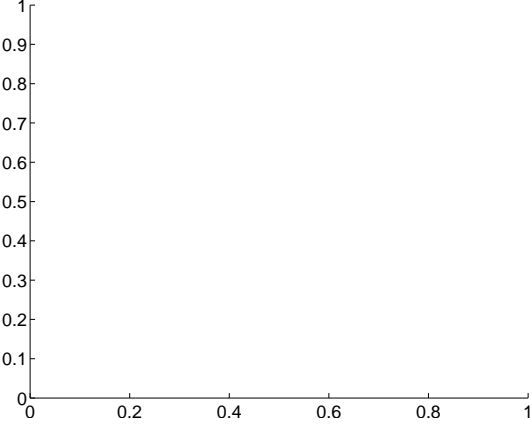
Q7 no difference image



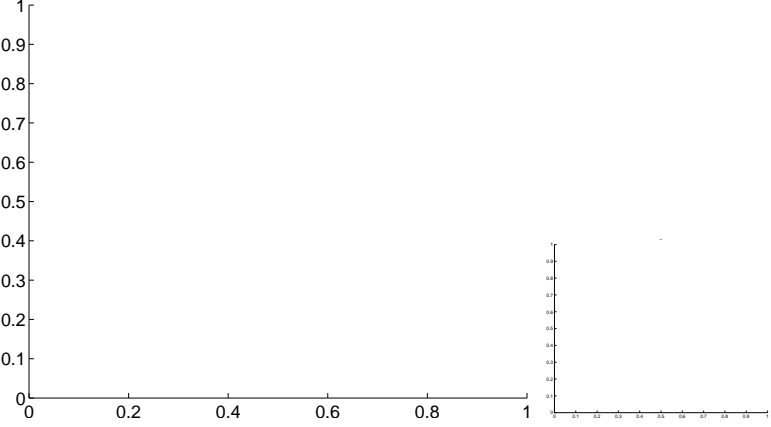
Q7 no OOT image



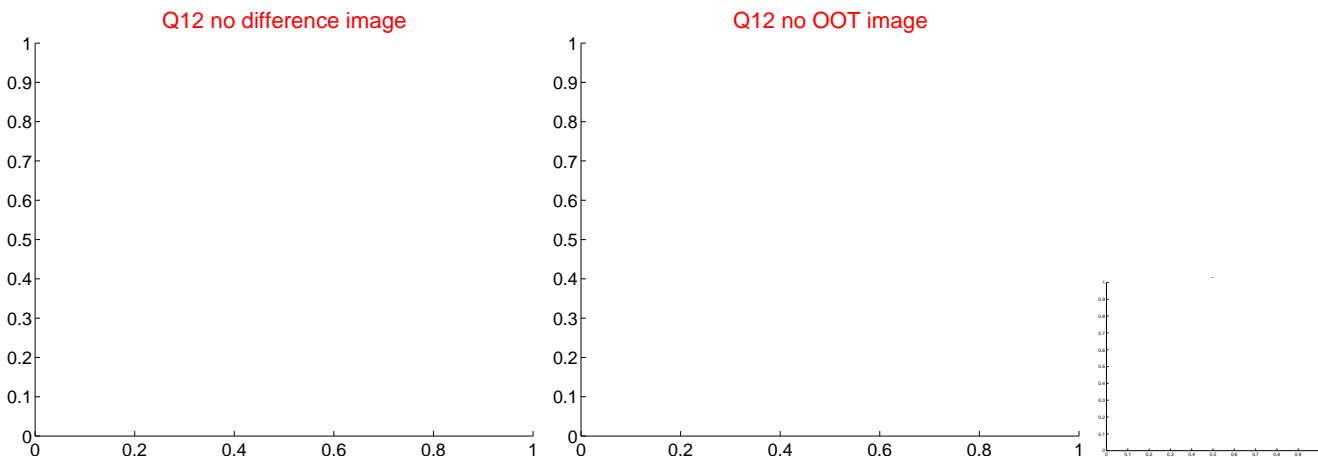
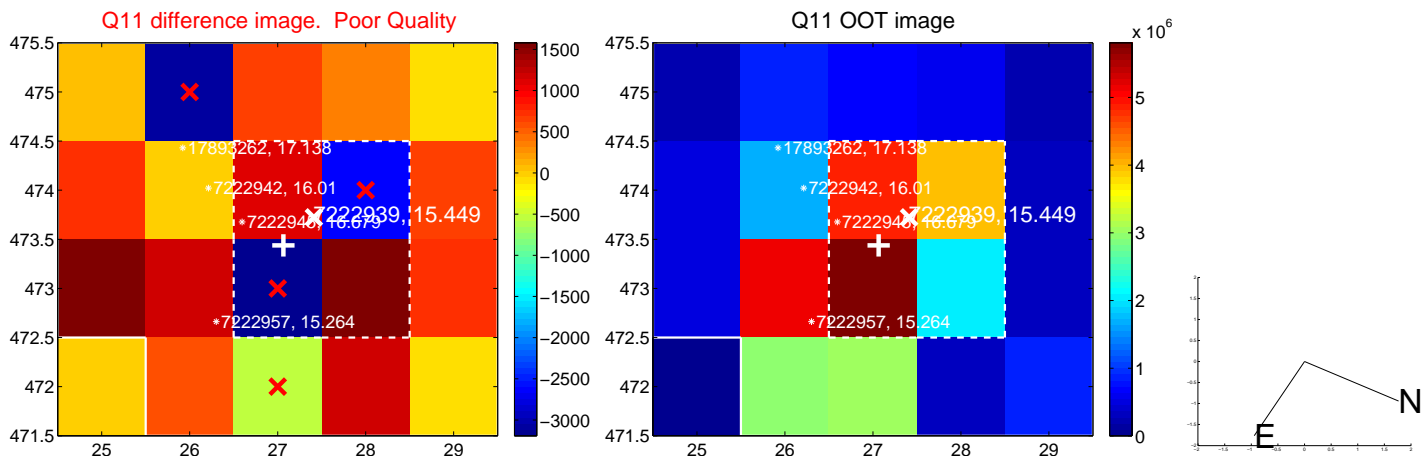
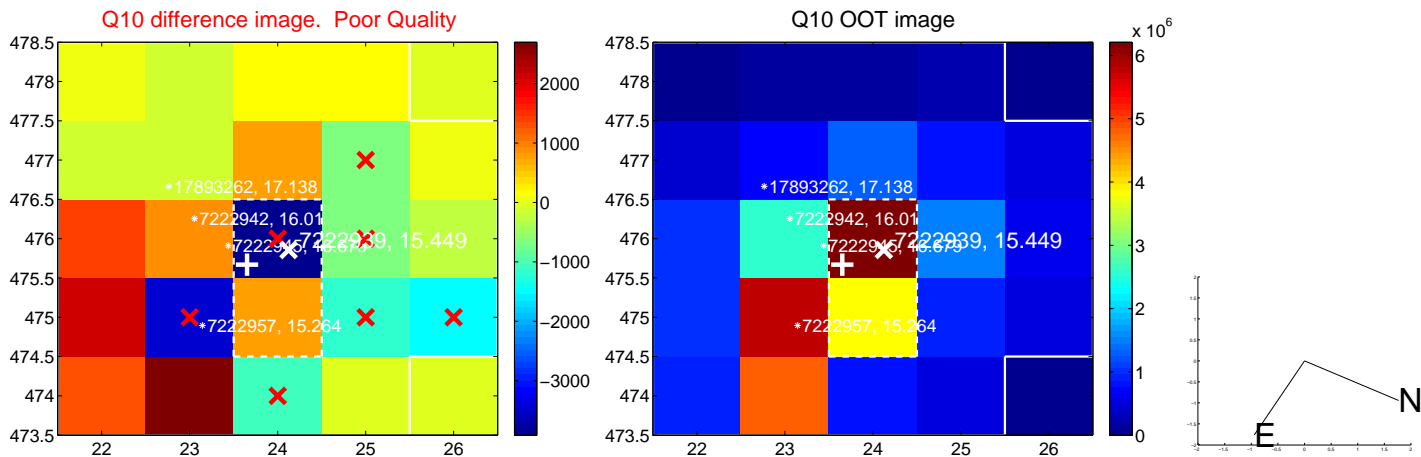
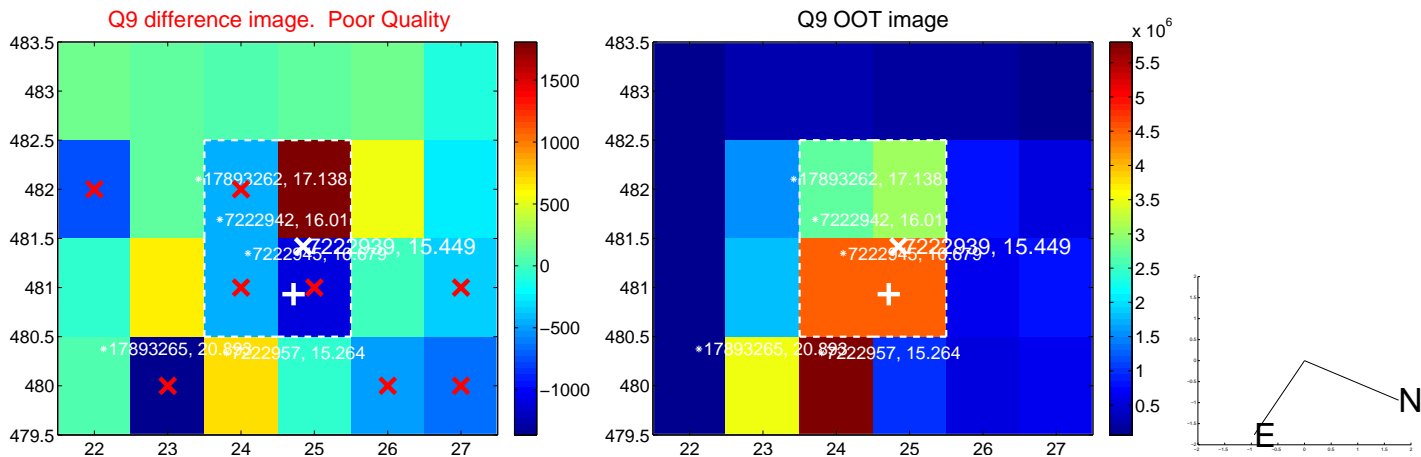
Q8 no difference image



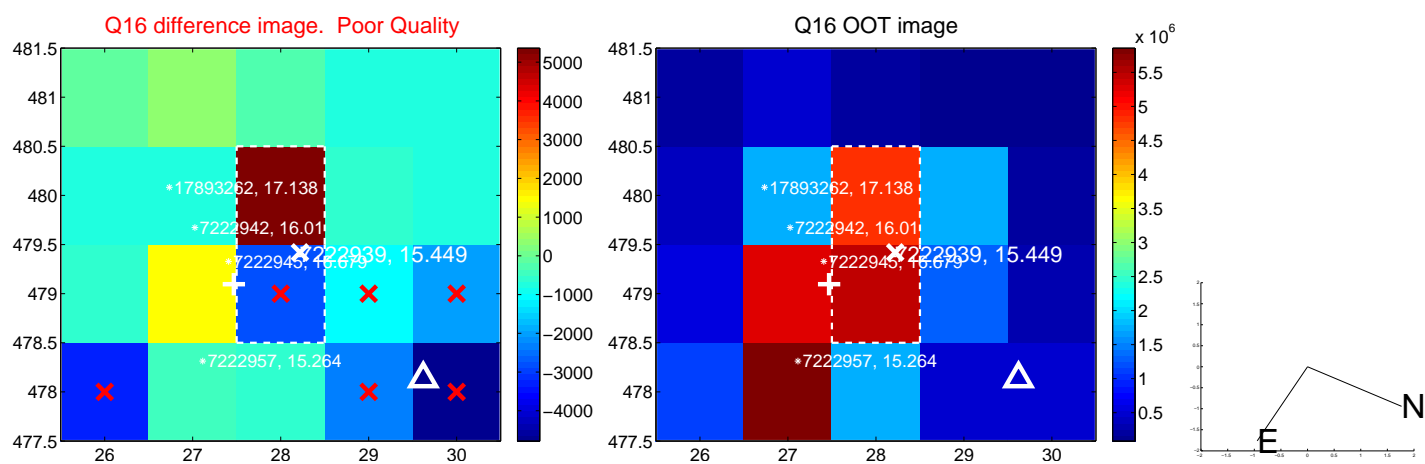
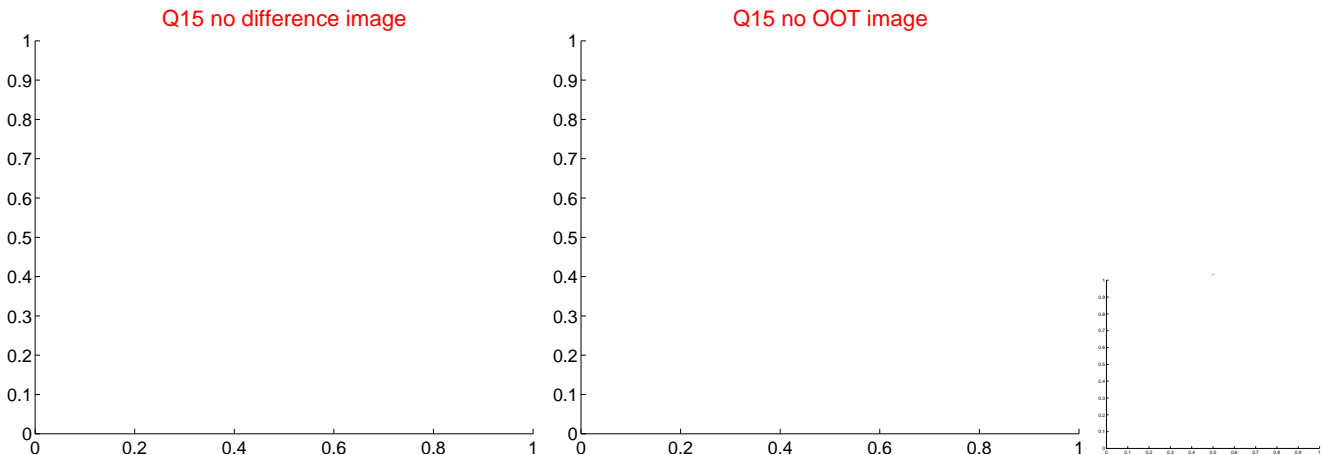
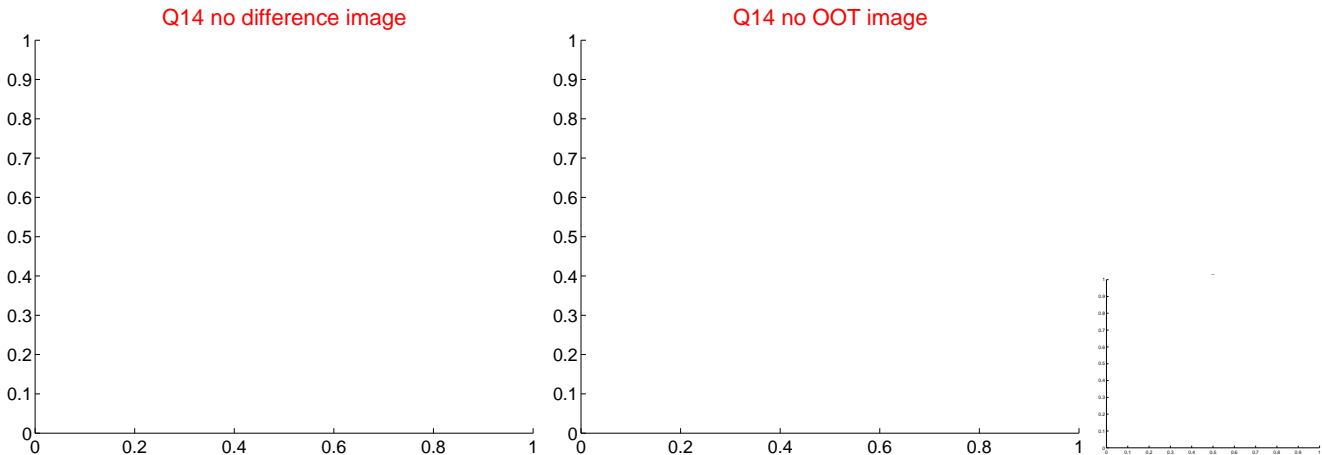
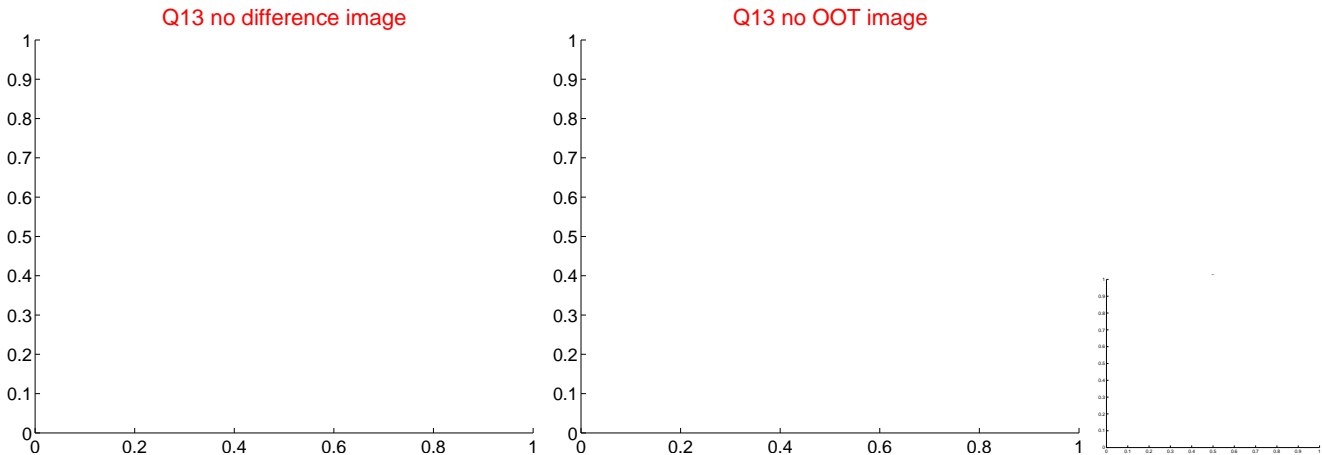
Q8 no OOT image



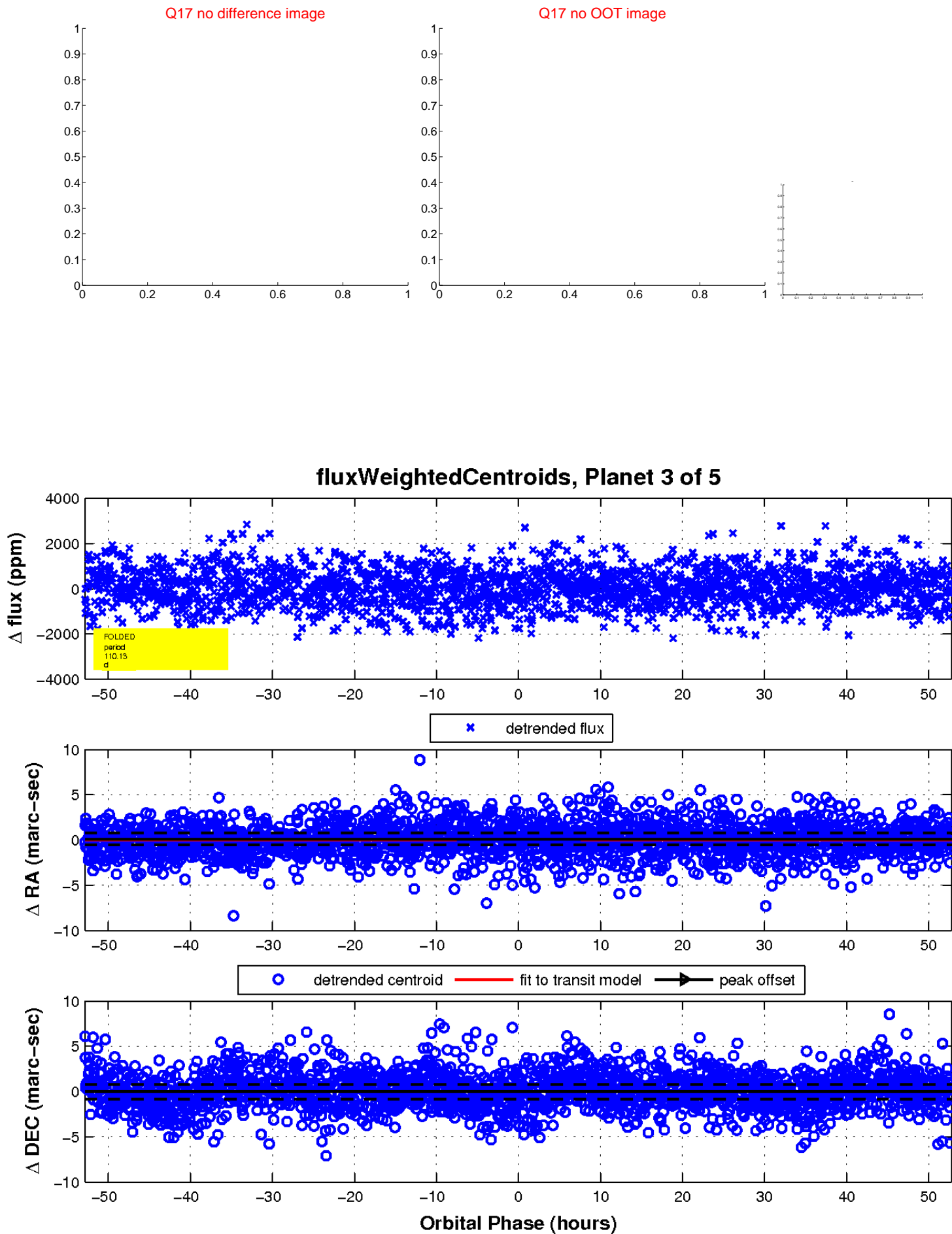
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



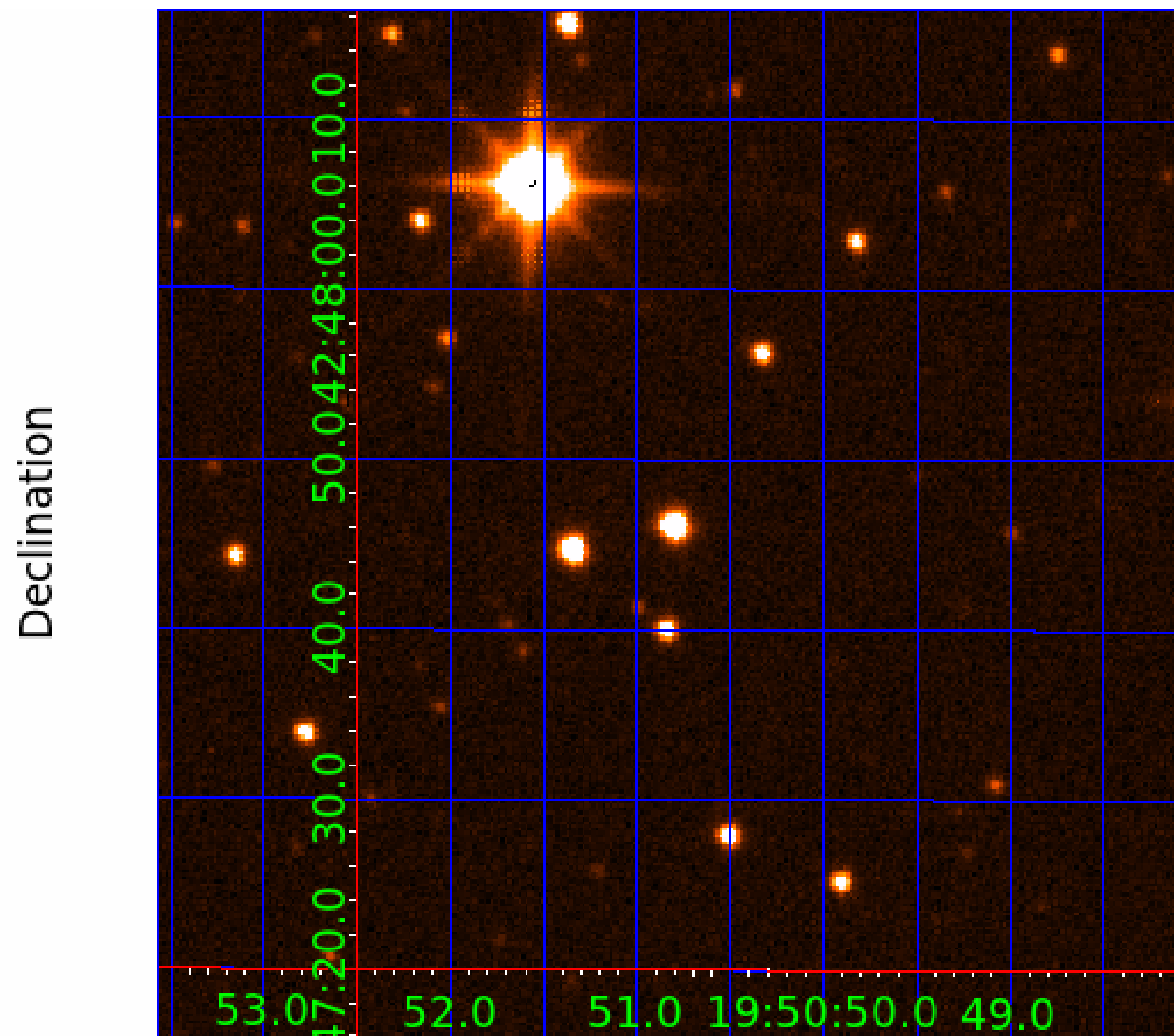
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



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



UKIRT Image



KIC 007222939

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})
007222939-01	OBS	No	1.116367	132.566683	117.0	3.371	8.8	9.4	0.69	4867	0.89	656.42
007222939-02	OBS	No	2.016495	132.067777	109.2	8.027	7.7	7.0	0.69	4867	0.70	298.40
007222939-03	OBS	No	110.130451	174.899450	1067.6	17.618	20.7	10.0	0.69	4867	2.70	1.44
007222939-04	OBS	No	99.492145	137.414305	1480.4	3.560	8.3	8.6	0.69	4867	2.94	1.65
007222939-05	OBS	No	490.041345	483.534823	1159.1	4.450	7.7	7.2	0.69	4867	2.49	0.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007222939-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
007222939-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
007222939-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007222939-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_RESOLVED_OFFSET
007222939-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

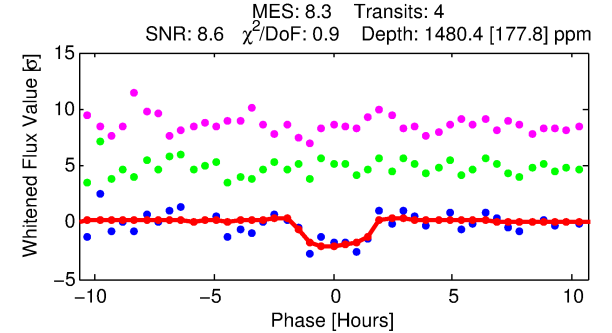
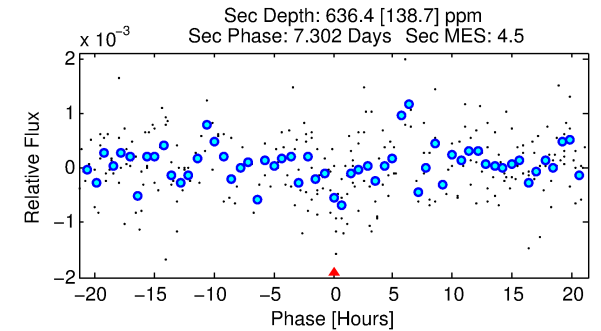
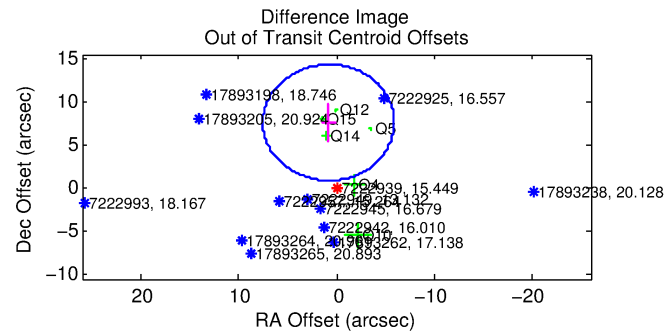
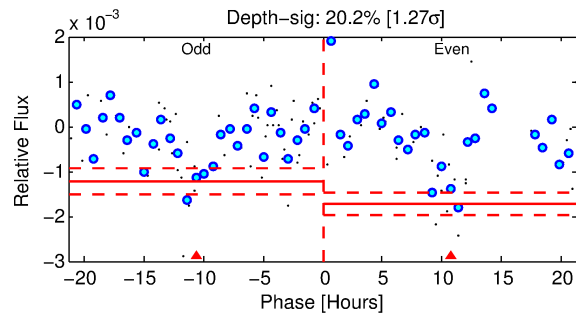
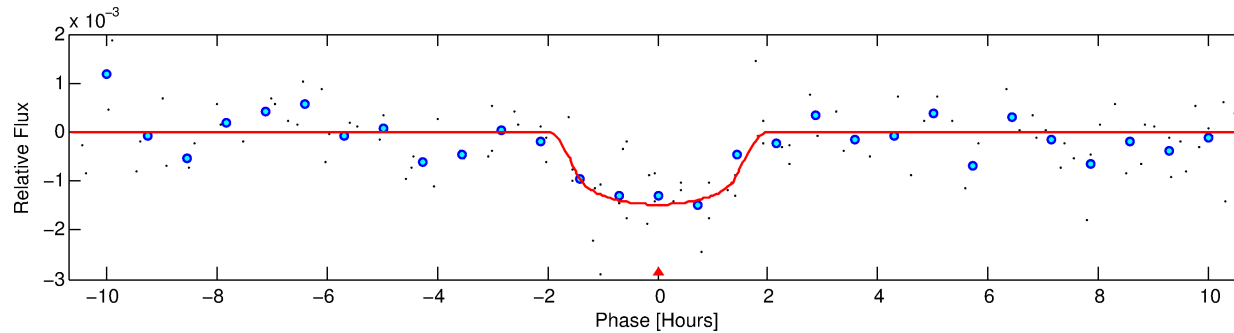
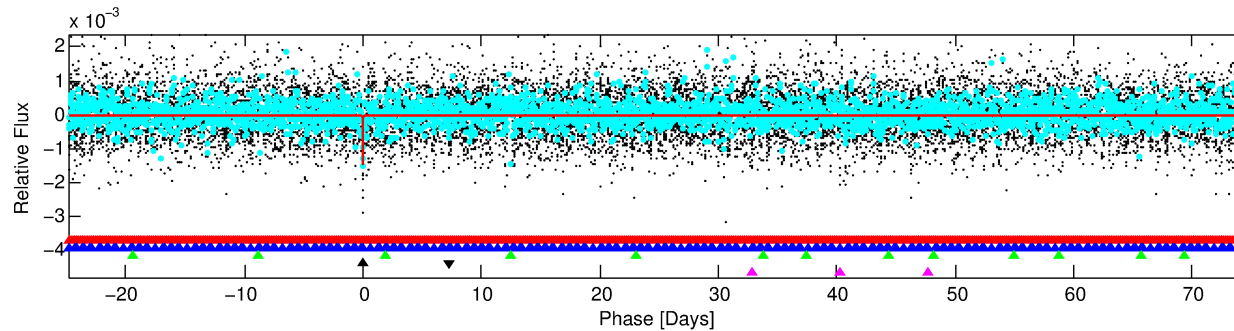
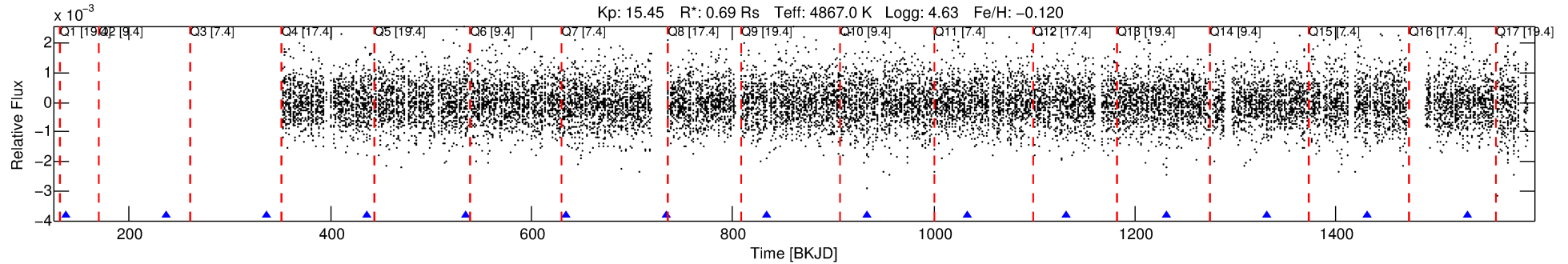
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007222939-04

No Significant Match Found

DV One-Page Summary

KIC: 7222939 Candidate: 4 of 5 Period: 99.492 d



DV Fit Results:

Period = 99.49214 [0.00128] d
Epoch = 137.4143 [0.0112] BKJD
Rp/R* = 0.0390 [0.0334]
a/R* = 148.17 [434.21]
b = 0.77 [1.57]
Seff = 1.65 [0.31]
Teq = 289 [14] K
Rp = 2.94 [2.54] Re
a = 0.3815 [0.0354] AU
Ag = 5906.80 [10242.94] [0.58 σ]
Teffp = 3917 [1699] K [2.13 σ]

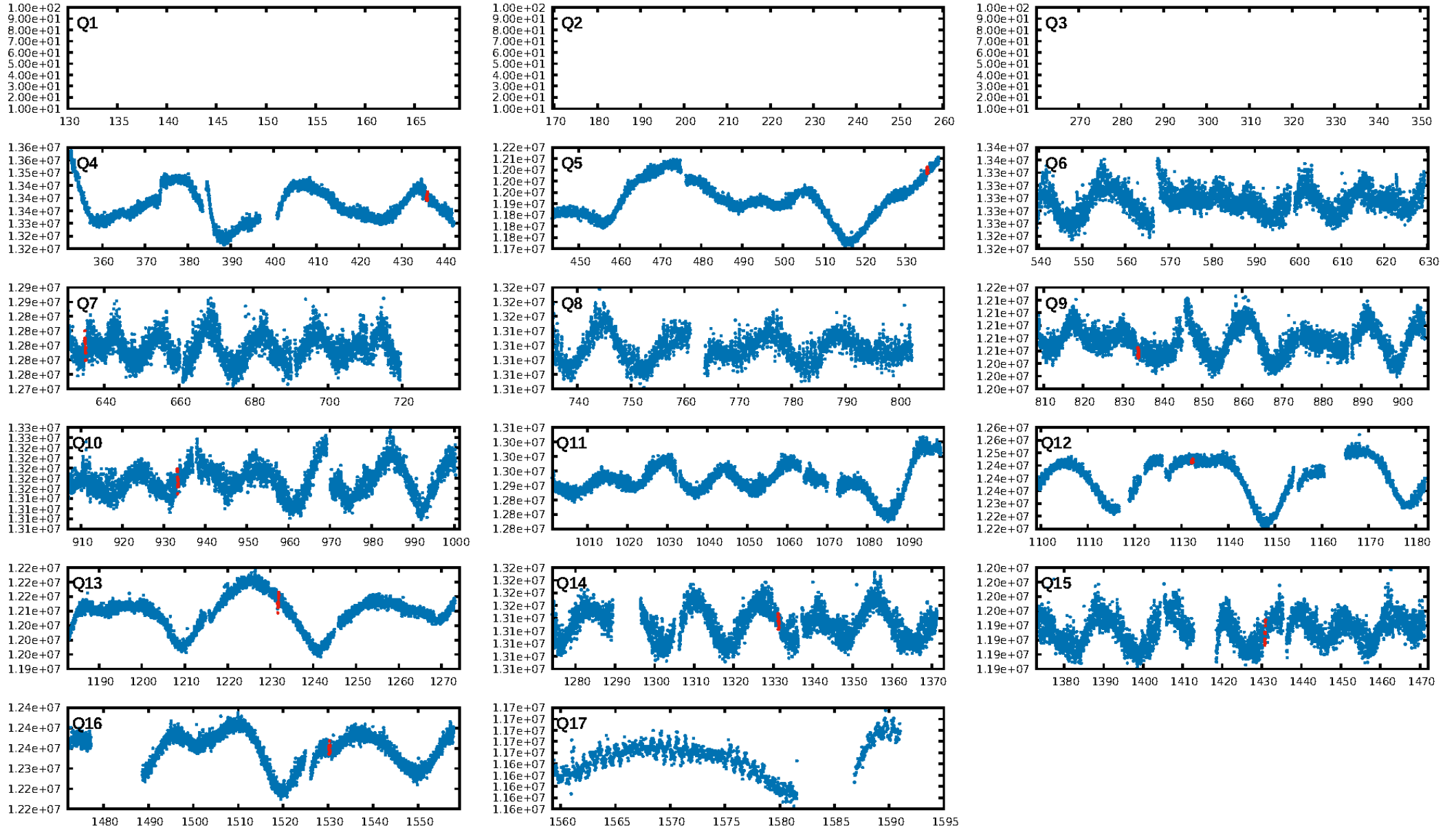
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [266.42 σ]
LongPeriod-sig: 100.0% [14.20 σ]
ModelChiSquare2-sig: 8.4%
ModelChiSquareGof-sig: 98.7%
Bootstrap-pfa: 2.68e-11
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -14.85
Centroid-sig: 55.3%
Centroid-so: 2.478 arcsec [5.42 σ]
OotOffset-rm: 7.650 arcsec [3.42 σ]
KicOffset-rm: 6.664 arcsec [3.18 σ]
OotOffset-st: 2/1/2/1 [6]
KicOffset-st: 2/1/2/1 [6]
DiffImageQuality-fgm: 0.33 [2/6]
DiffImageOverlap-fno: 0.00 [0/9]

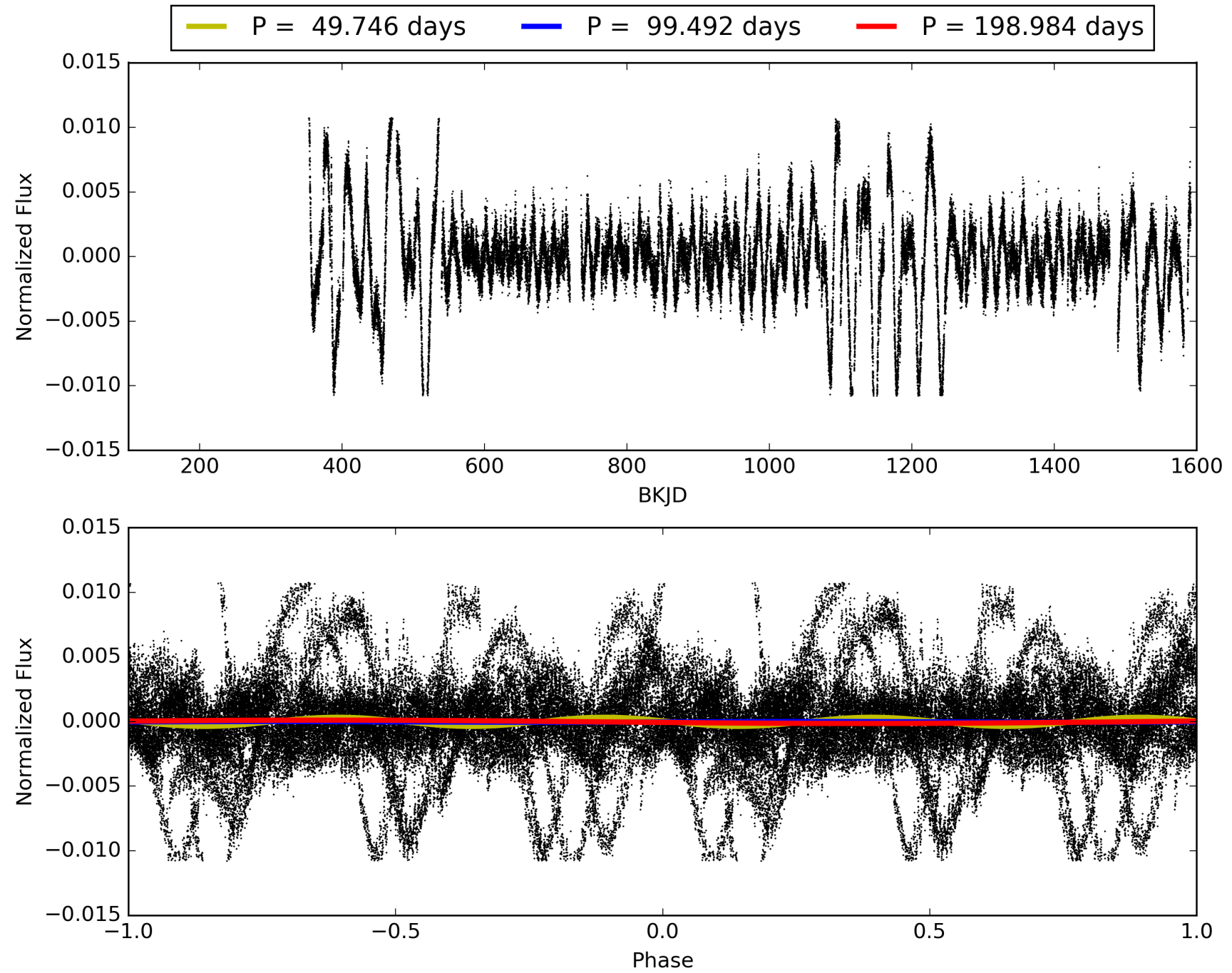
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:50:46 Z

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

TCE 007222939-04, PDC Light Curves

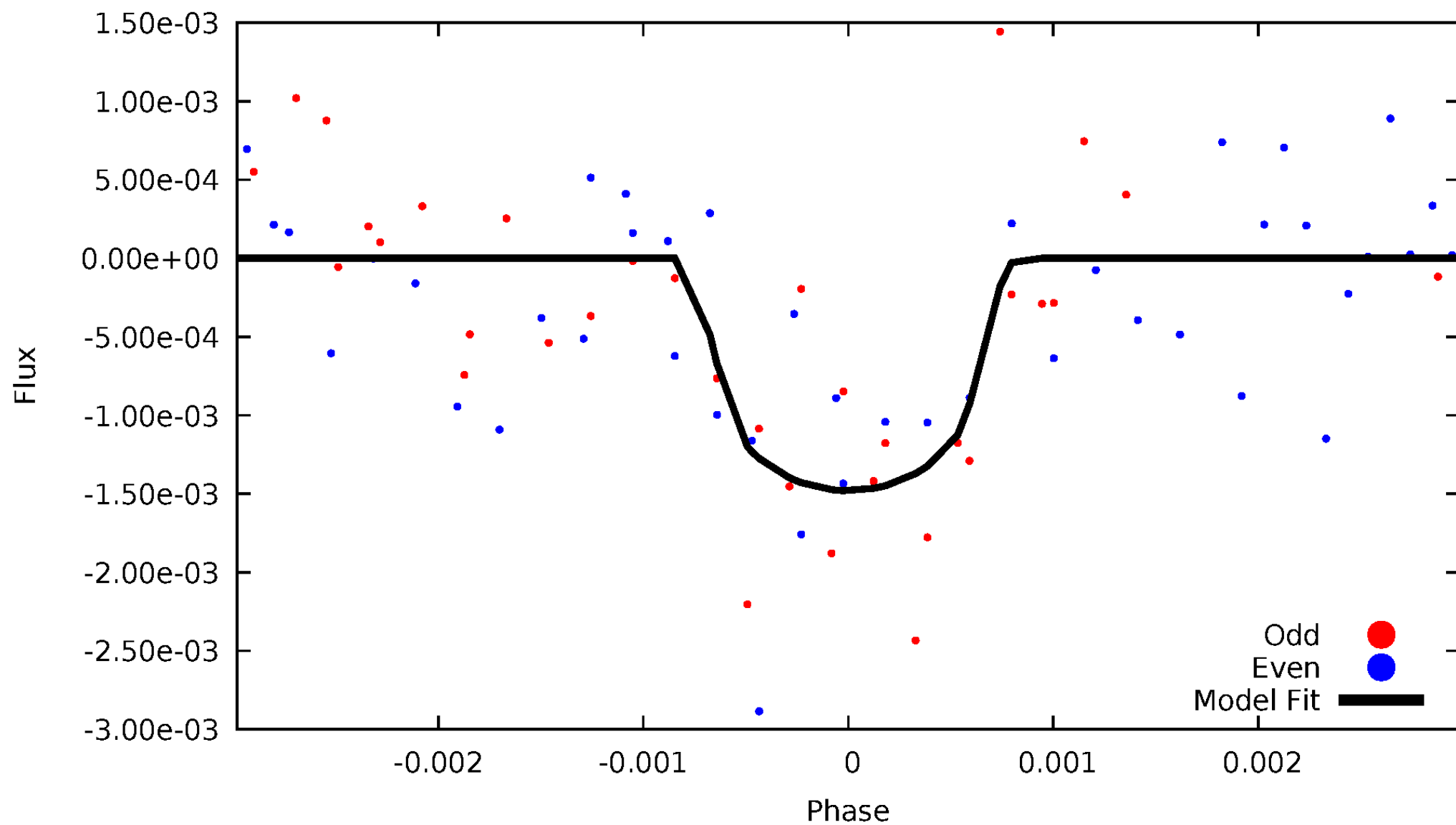


TCE 007222939-04



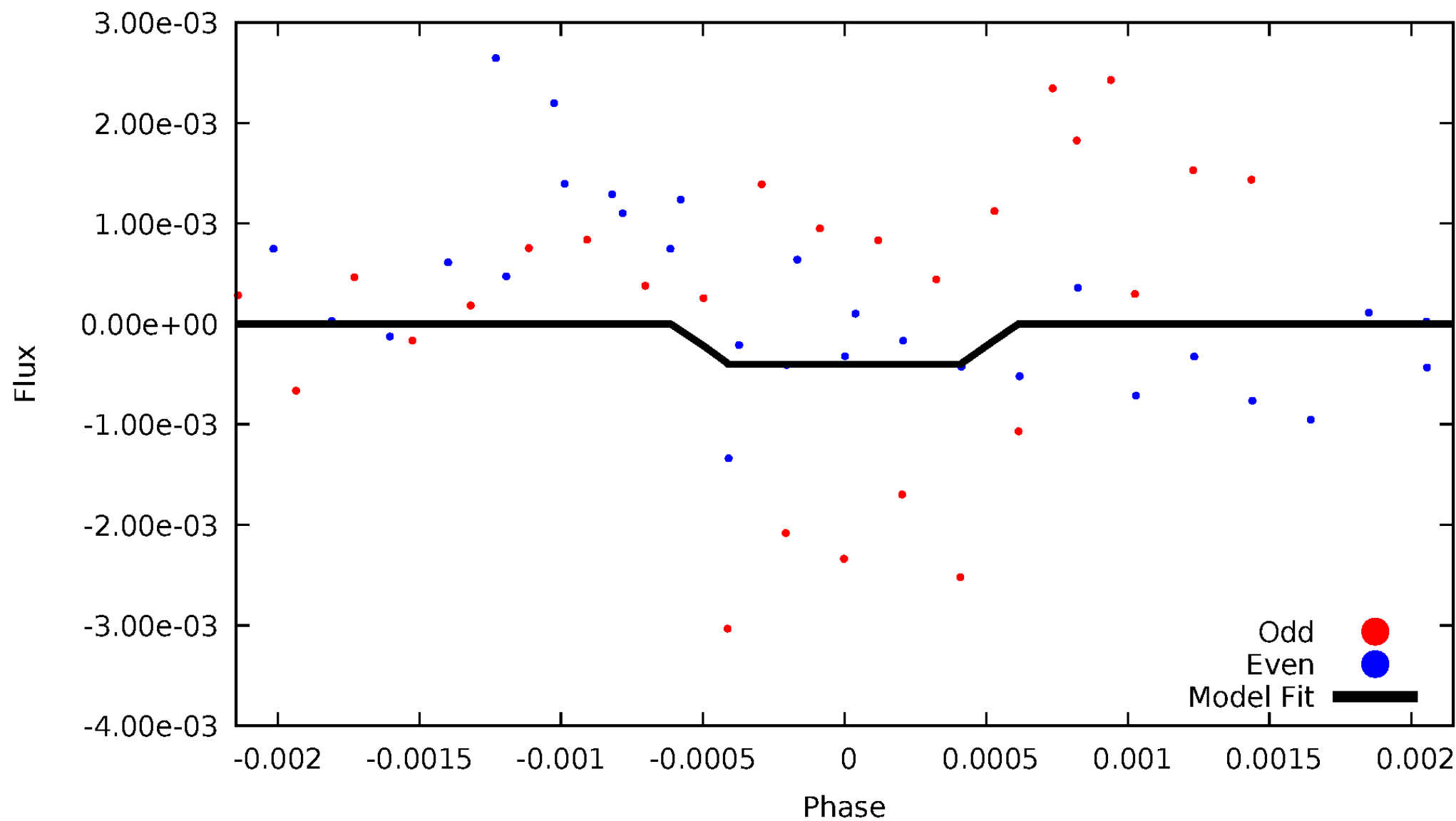
DV Odd/Even

TCE 007222939-04



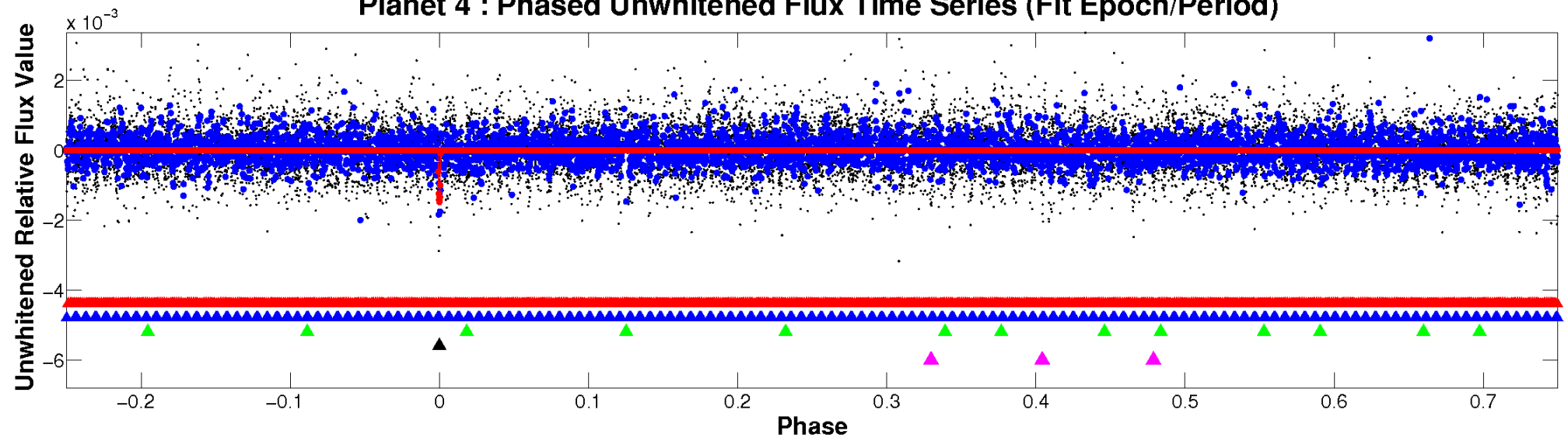
ALT Odd/Even

TCE 007222939-04

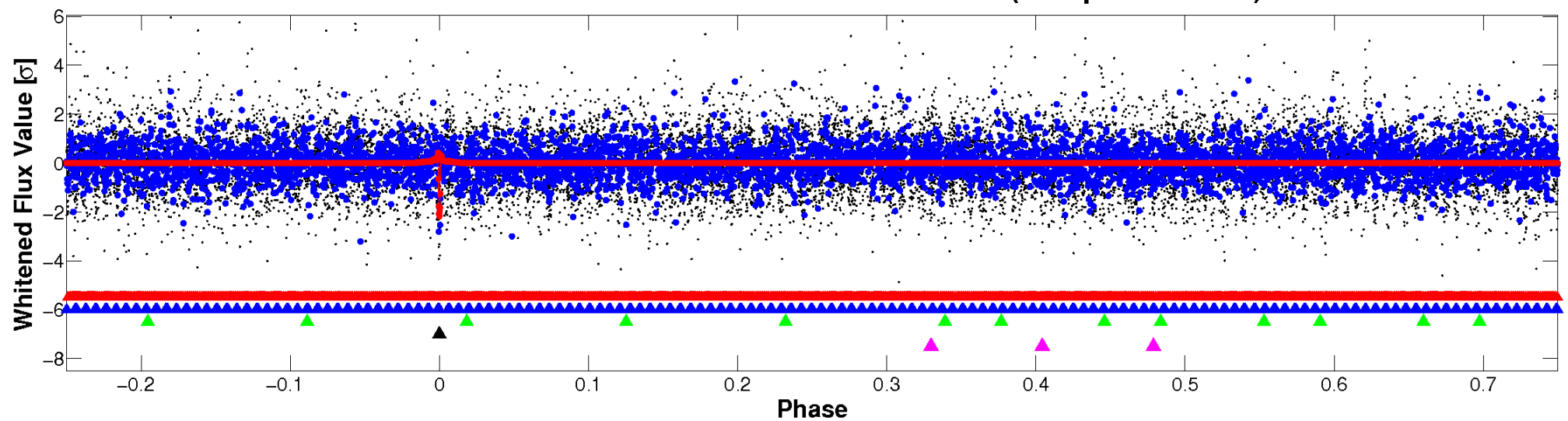


Non-Whitened Vs. Whitened Light Curve

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

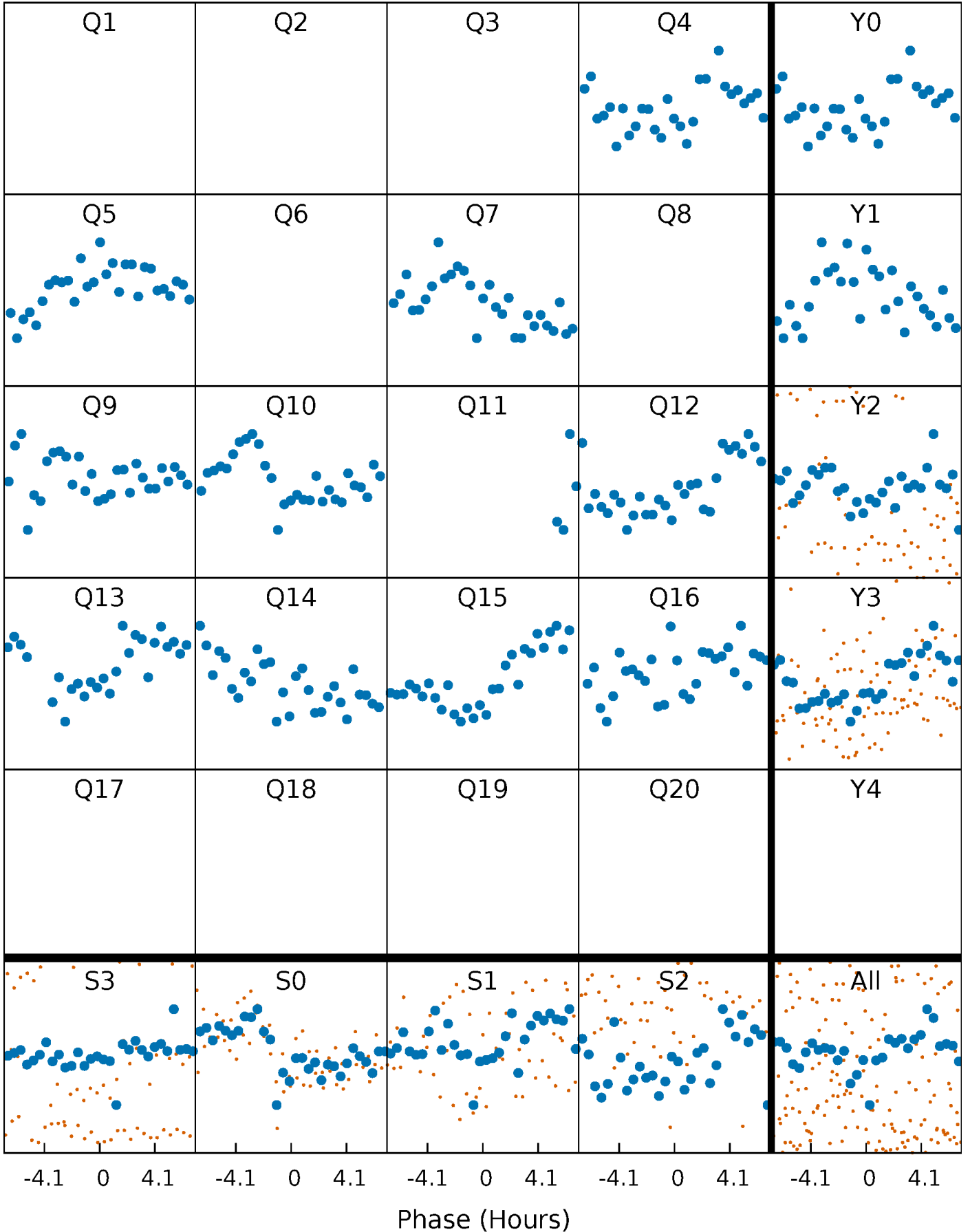


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



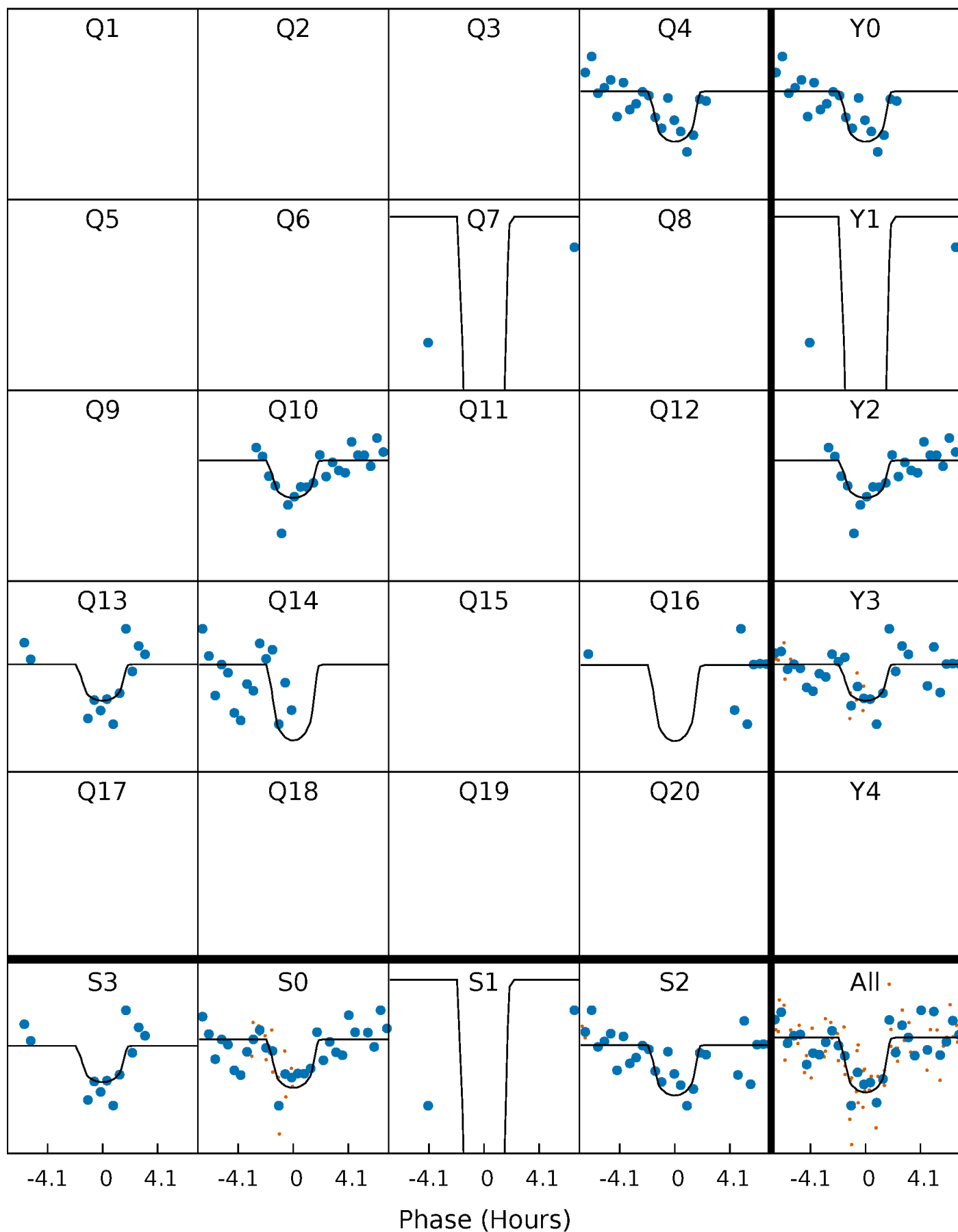
PDC Quarter-Phased Transit Curves

TCE 007222939-04 P= 99.492145 Days $T_0=137.414305$ (BKJD)



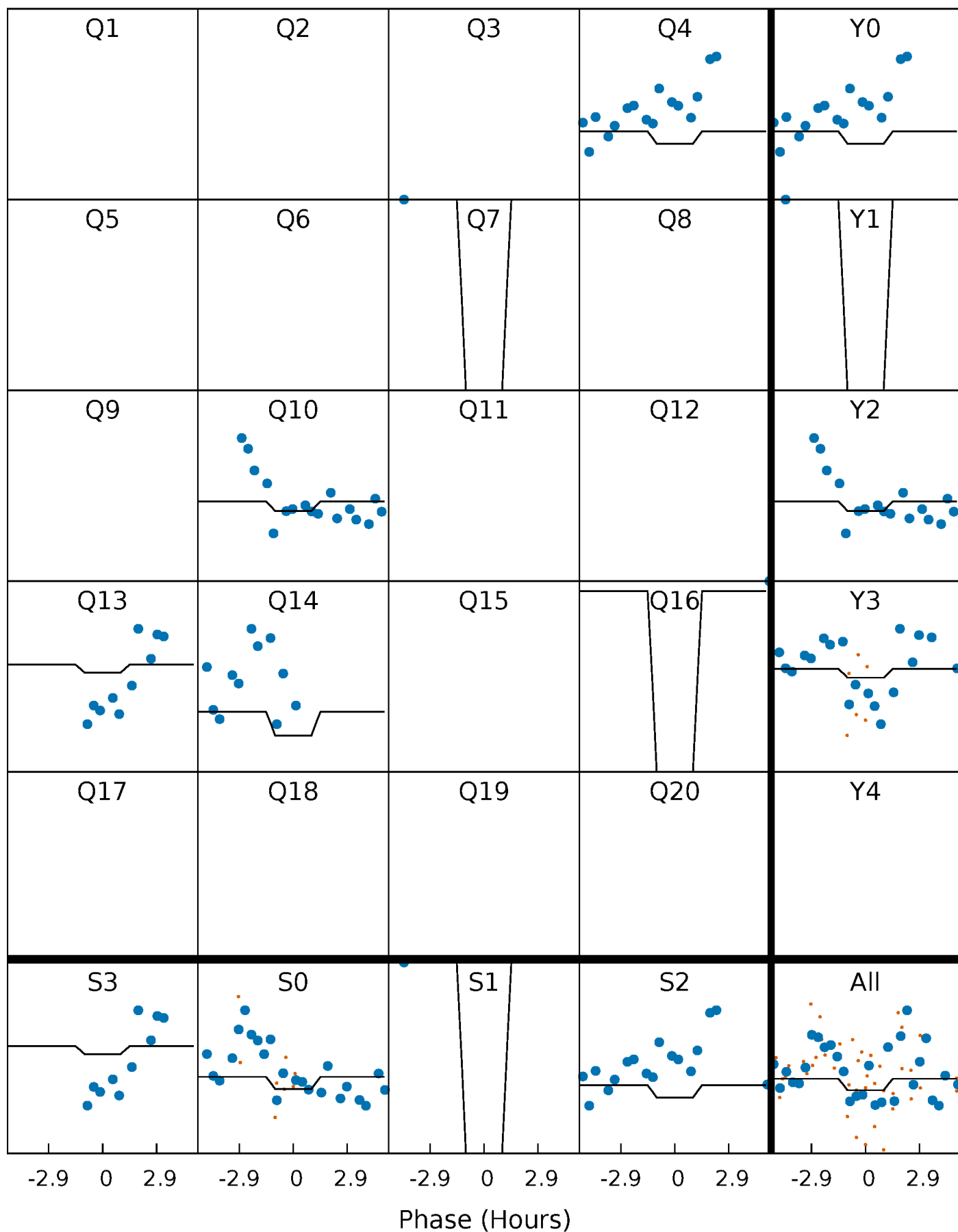
DV Quarter-Phased Transit Curves

TCE 007222939-04 P= 99.492145 Days $T_0=137.414305$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

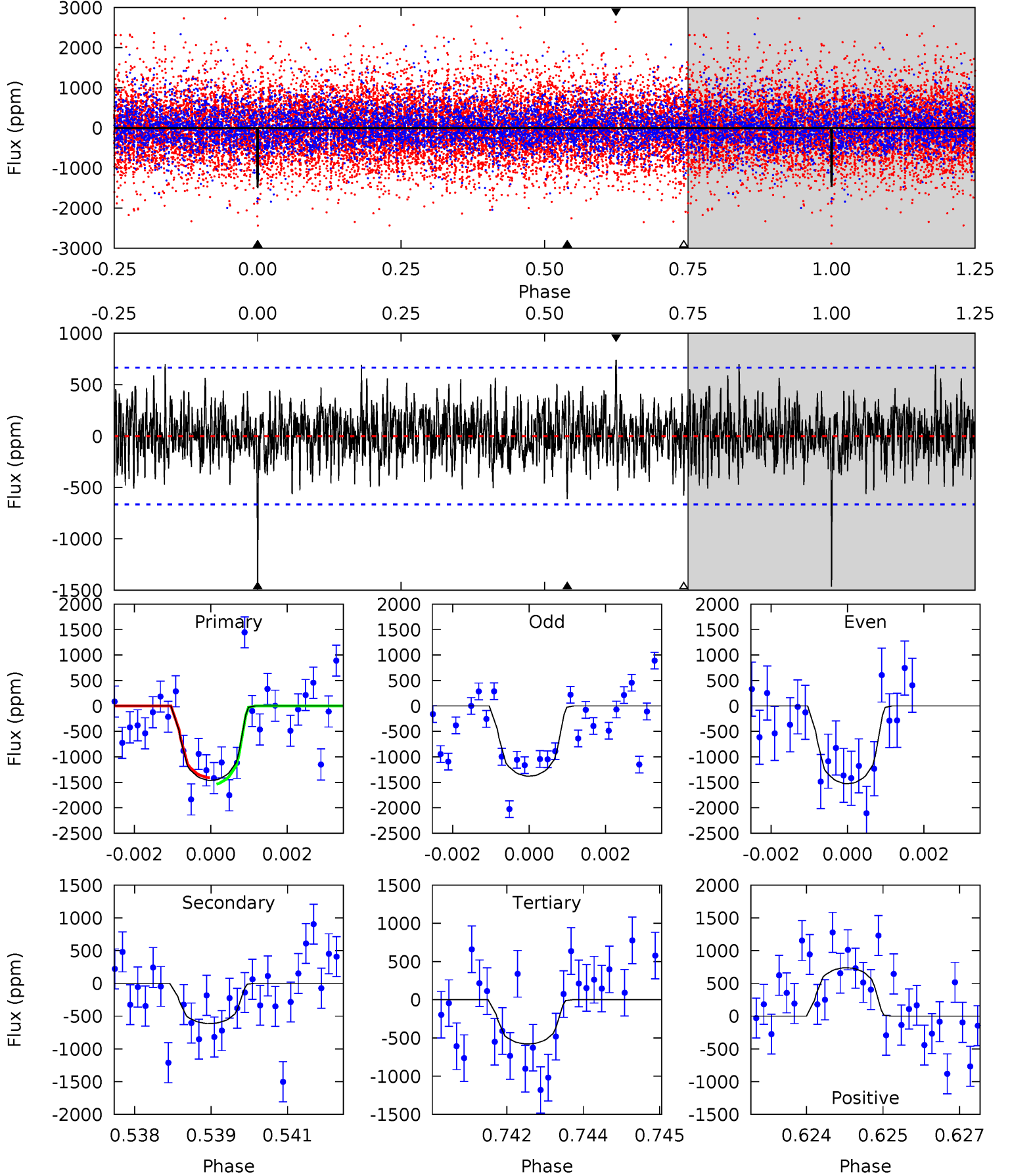
TCE 007222939-04 P= 99.490378 Days $T_0=137.425810$ (BKJD)



DV Model-Shift Uniqueness Test

007222939-04, P = 99.492145 Days, E = 137.414305 Days

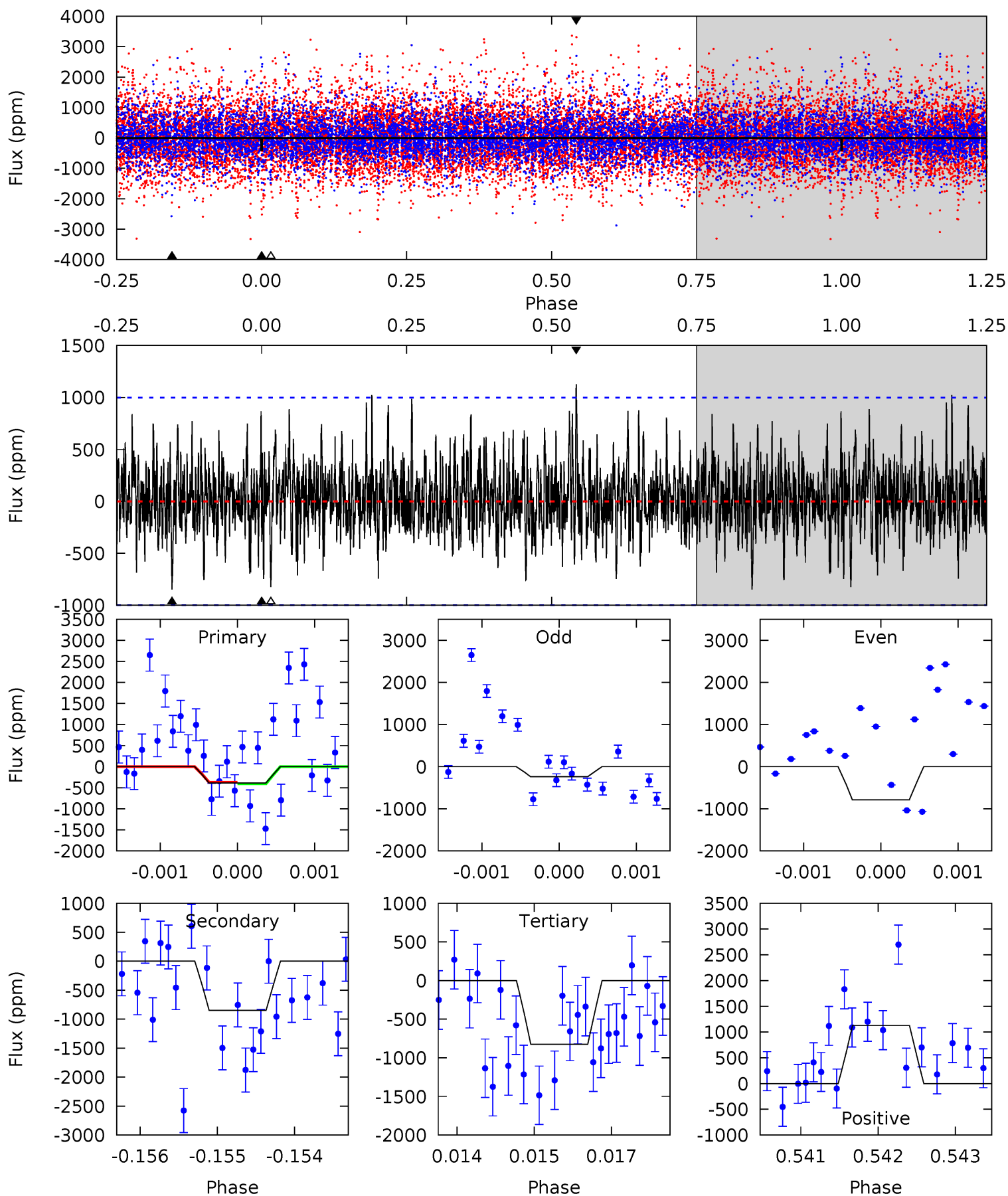
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.8	4.95	4.67	5.96	5.36	3.15	1.54	7.13	5.84	0.28	-1.01	0.59	0.96	0.34	0.51



Alt Model-Shift Uniqueness Test

007222939-04, P = 99.490378 Days, E = 137.425810 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.10	4.60	4.49	6.13	5.43	3.26	1.38	-2.38	-4.02	0.12	-1.52	1.51	2.90	0.57	0.10



Stellar Parameters For KIC 007222939

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4867^{+175}_{-156}	$4.633^{+0.027}_{-0.063}$	$-0.120^{+0.300}_{-0.300}$	$0.691^{+0.082}_{-0.048}$	$0.773^{+0.060}_{-0.083}$	$3.297^{+0.438}_{-0.833}$
	+4%/-3%	+1%/-1%	+250%/-250%	+12%/-7%	+8%/-11%	+13%/-25%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007222939-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-613 ± 124	$3.48^{+2.27}_{-2.10}$	408^{+17}_{-17}	3869^{+1782}_{-601}	3985^{+20276}_{-2556}
Alt.	-846 ± 184	$2.43^{+2.44}_{-1.63}$	408^{+16}_{-16}	4690^{+3687}_{-1026}	$11345^{+101408}_{-8439}$

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

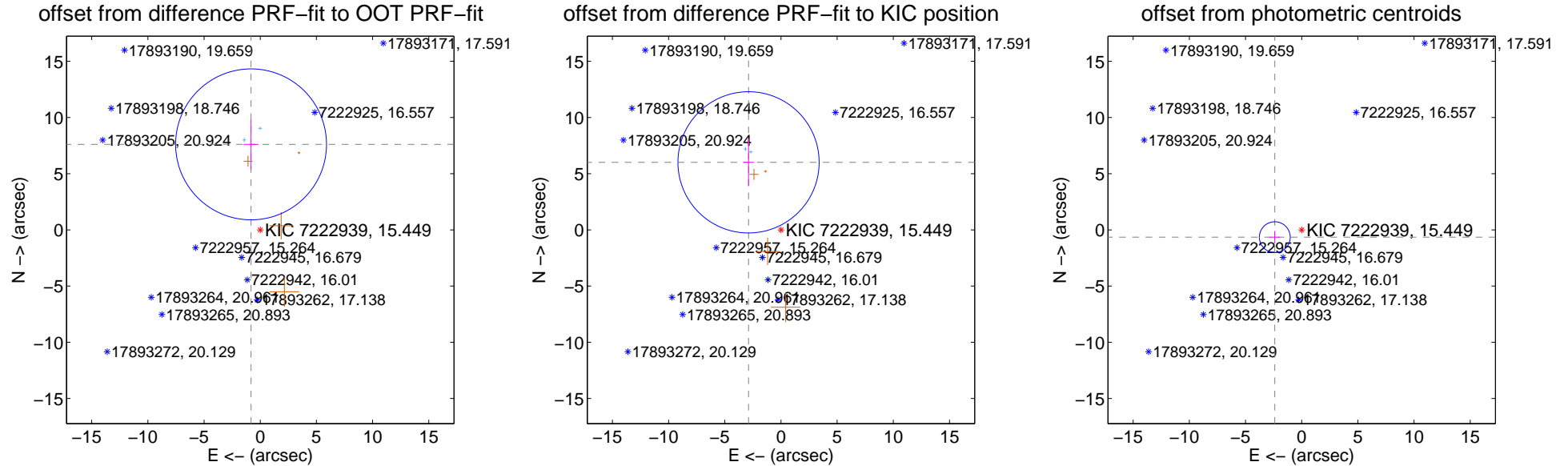
DV Centroid Data

Supplemental centroid analysis for 007222939-04. Kepler magnitude: 15.45. Transit SNR 8.60

There are 2 quarters with good PRF difference image offsets

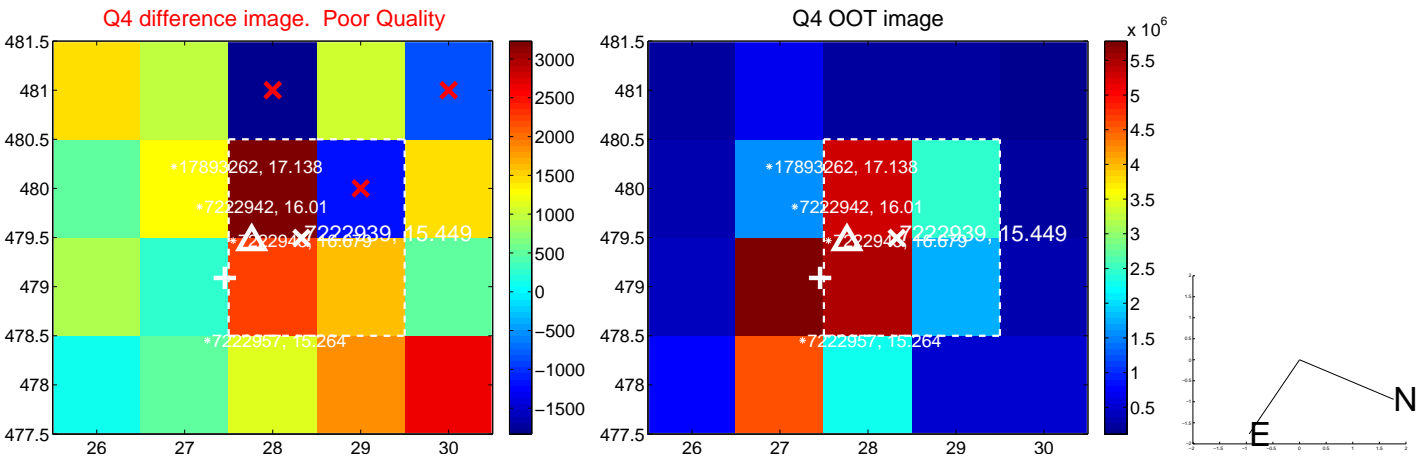
The direct PRF centroid is offset from the target star catalog position by about 1.93 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	7.650 \pm 2.238	3.42	0.818 \pm 0.662	7.606 \pm 2.220
PRF-fit source offset from KIC position	6.664 \pm 2.094	3.18	2.886 \pm 0.485	6.007 \pm 2.106
photometric centroid source offset	2.48 \pm 0.46	5.42	2.39 \pm 0.45	-0.65 \pm 0.56

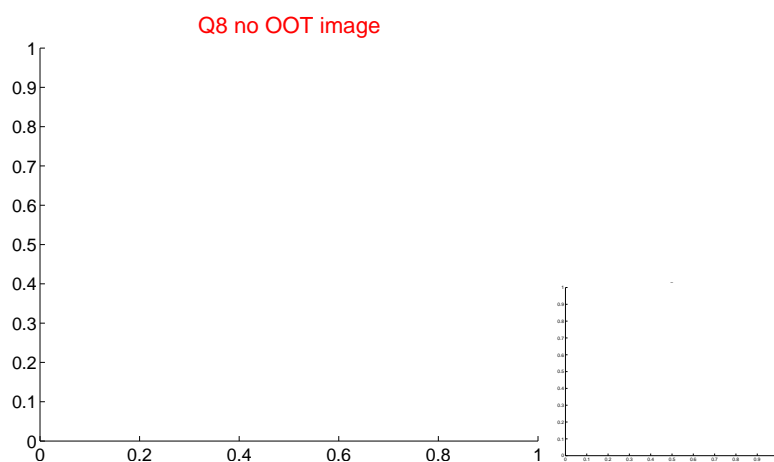
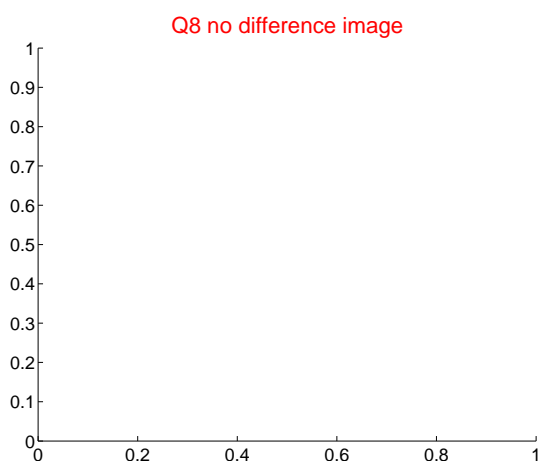
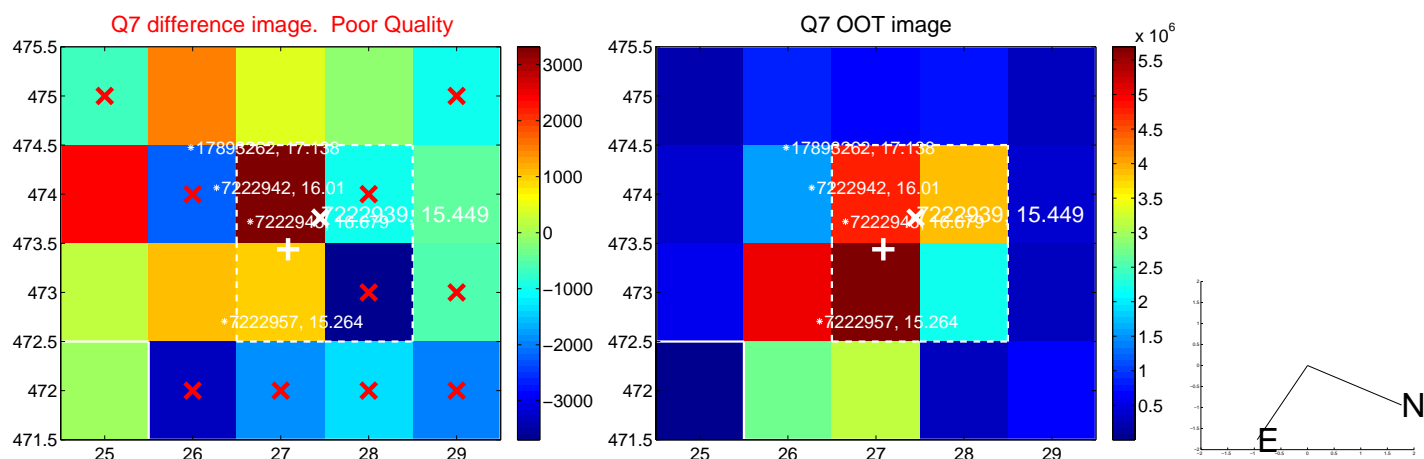
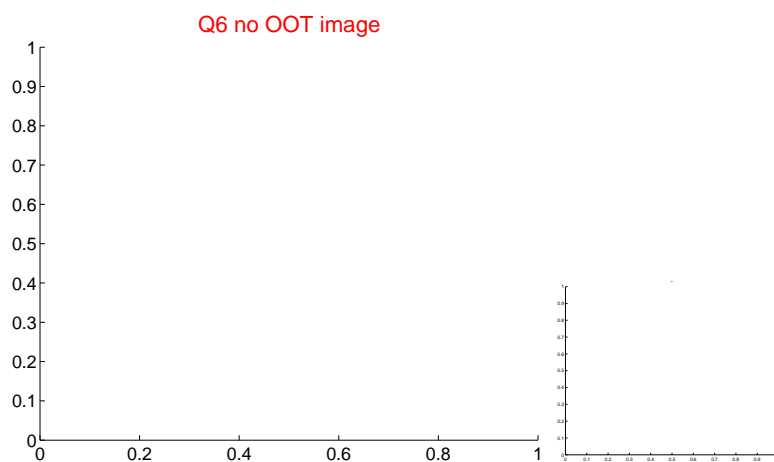
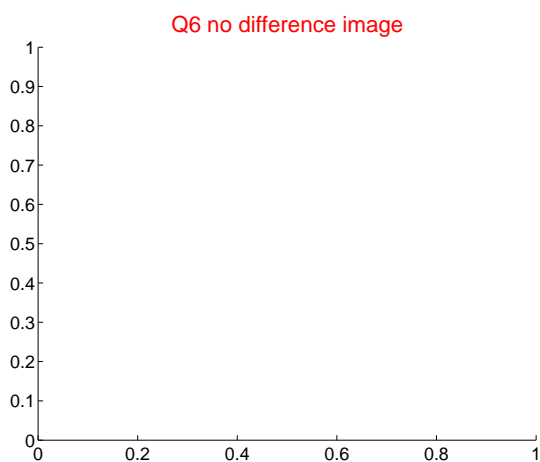
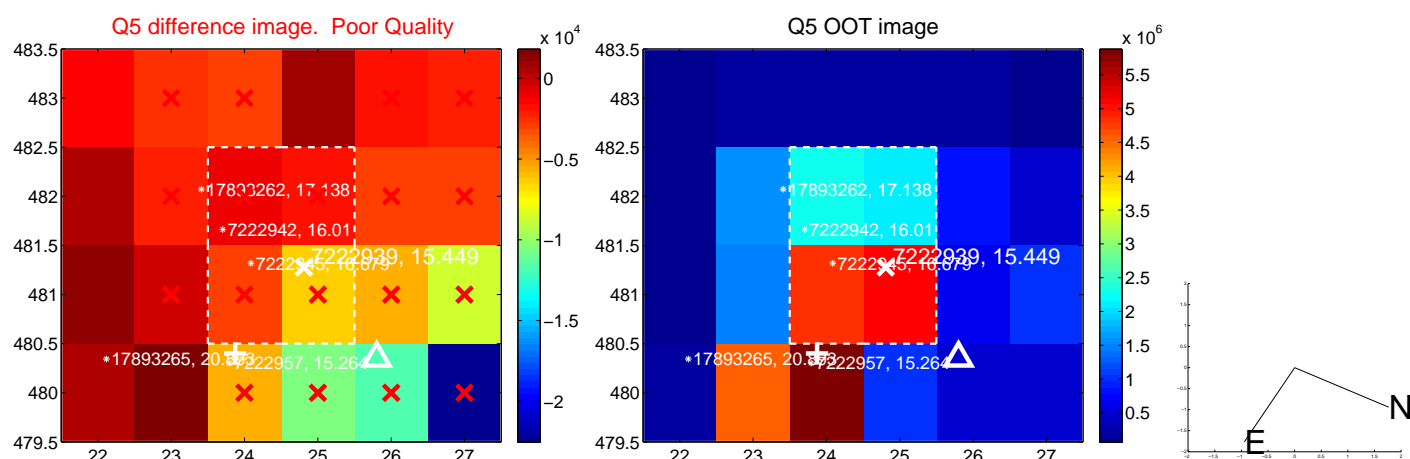


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

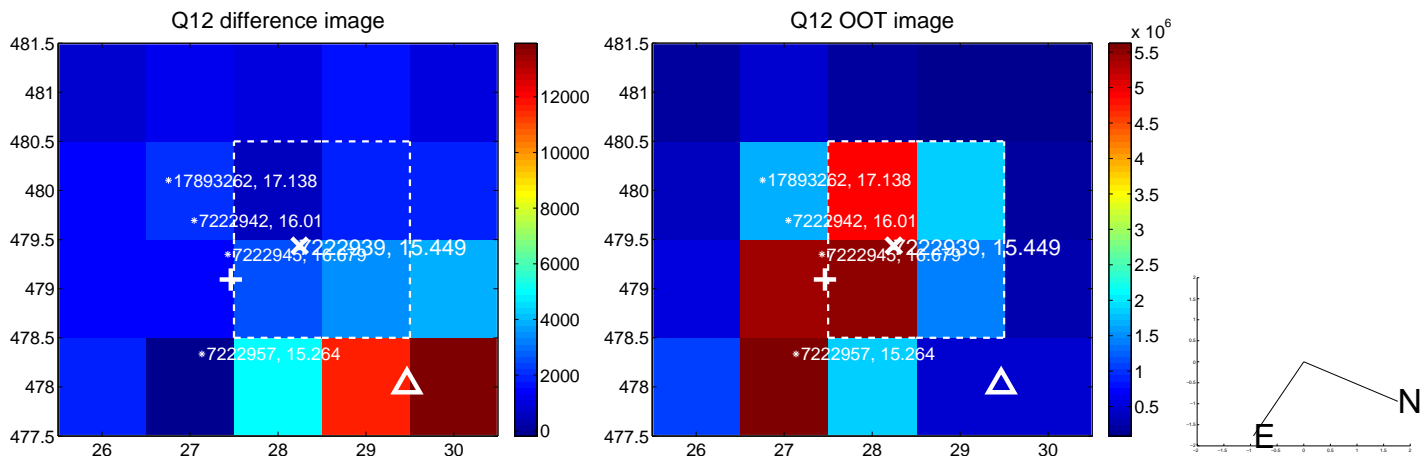
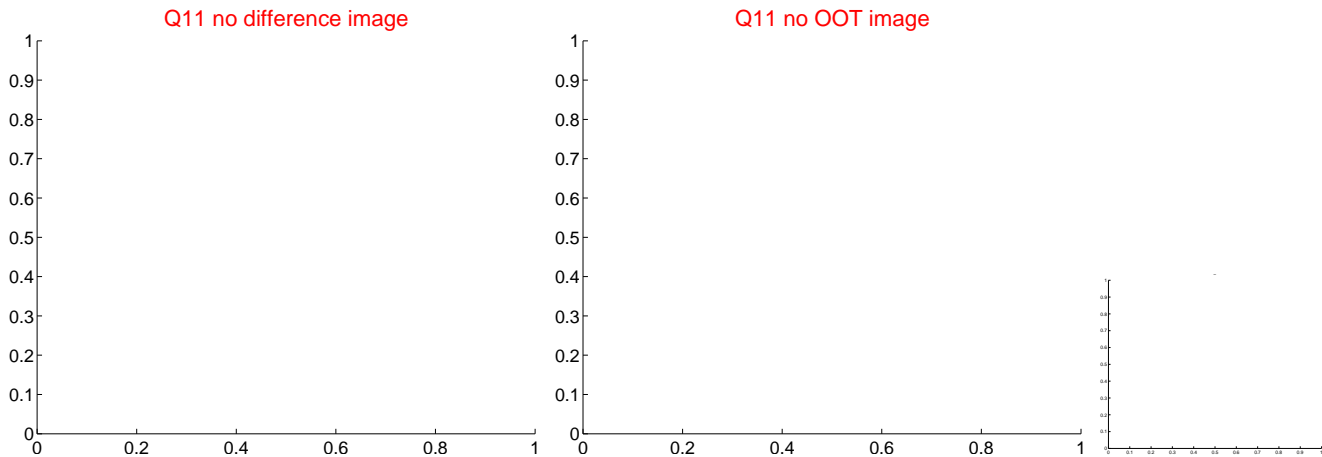
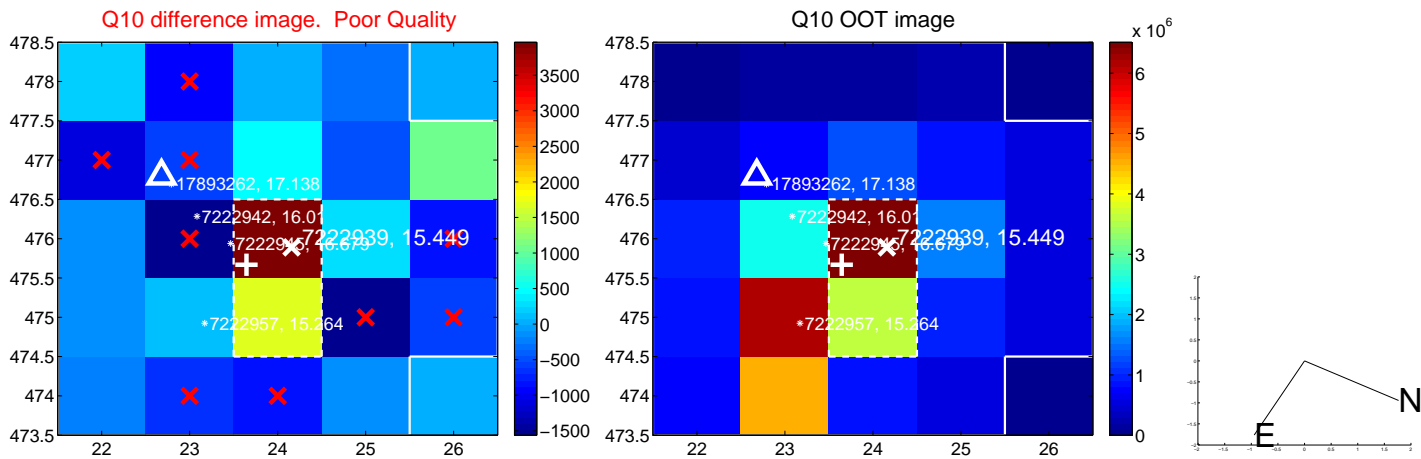
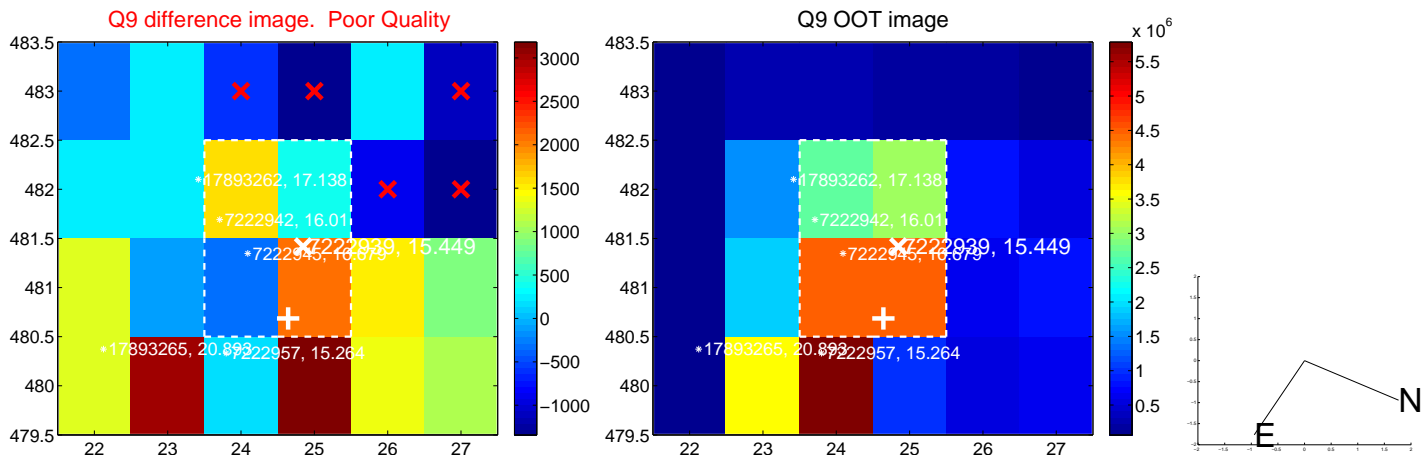
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



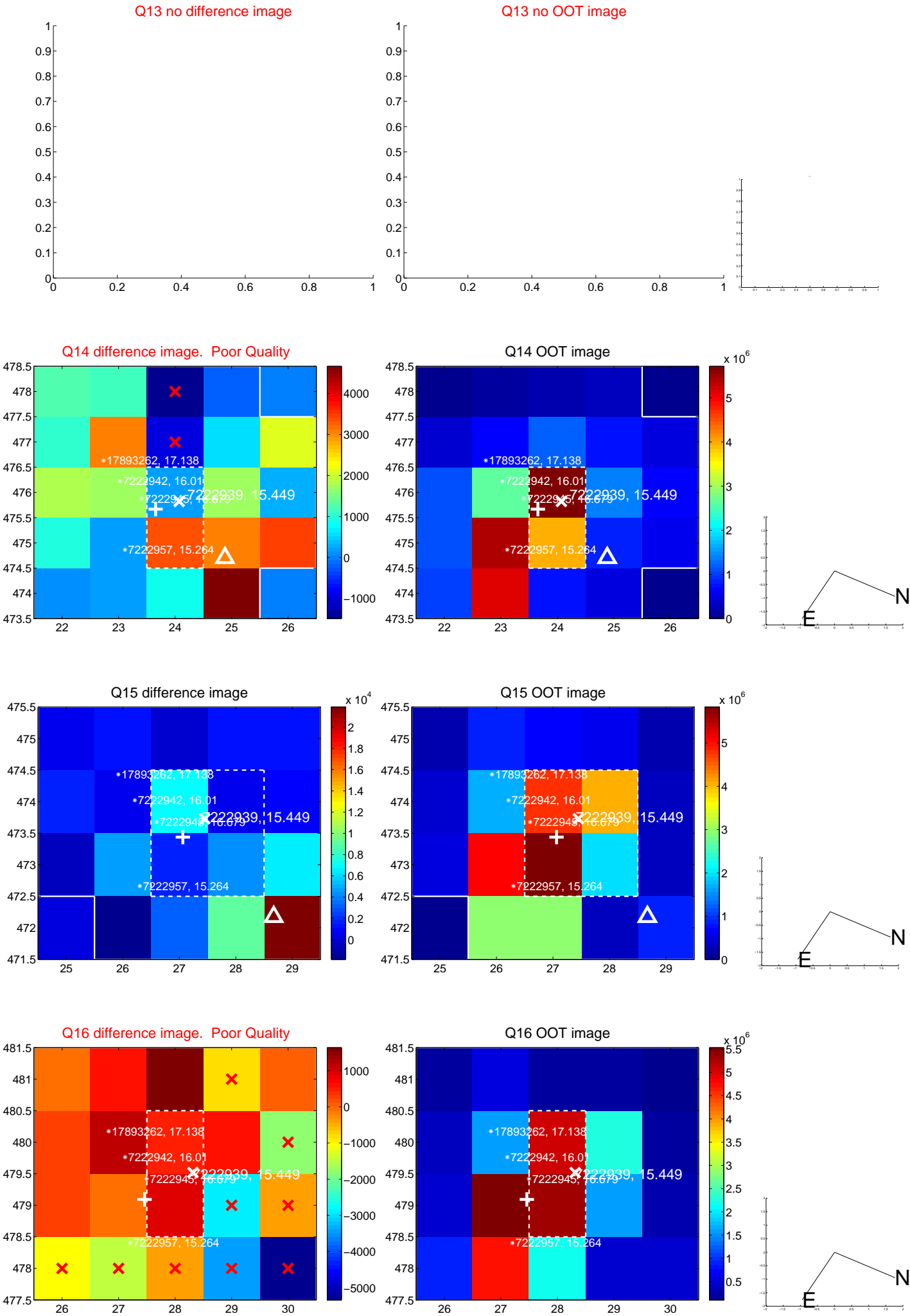
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



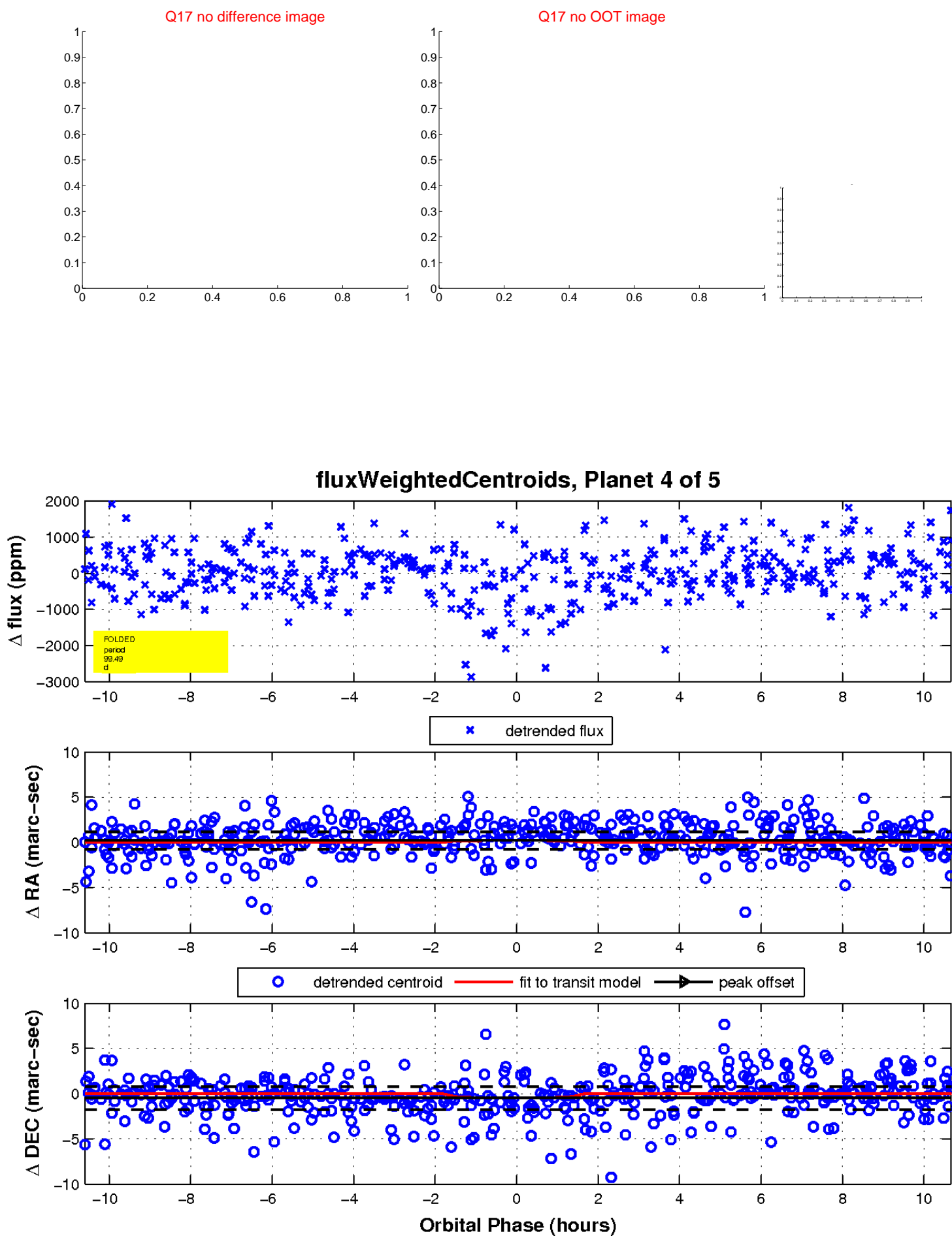
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



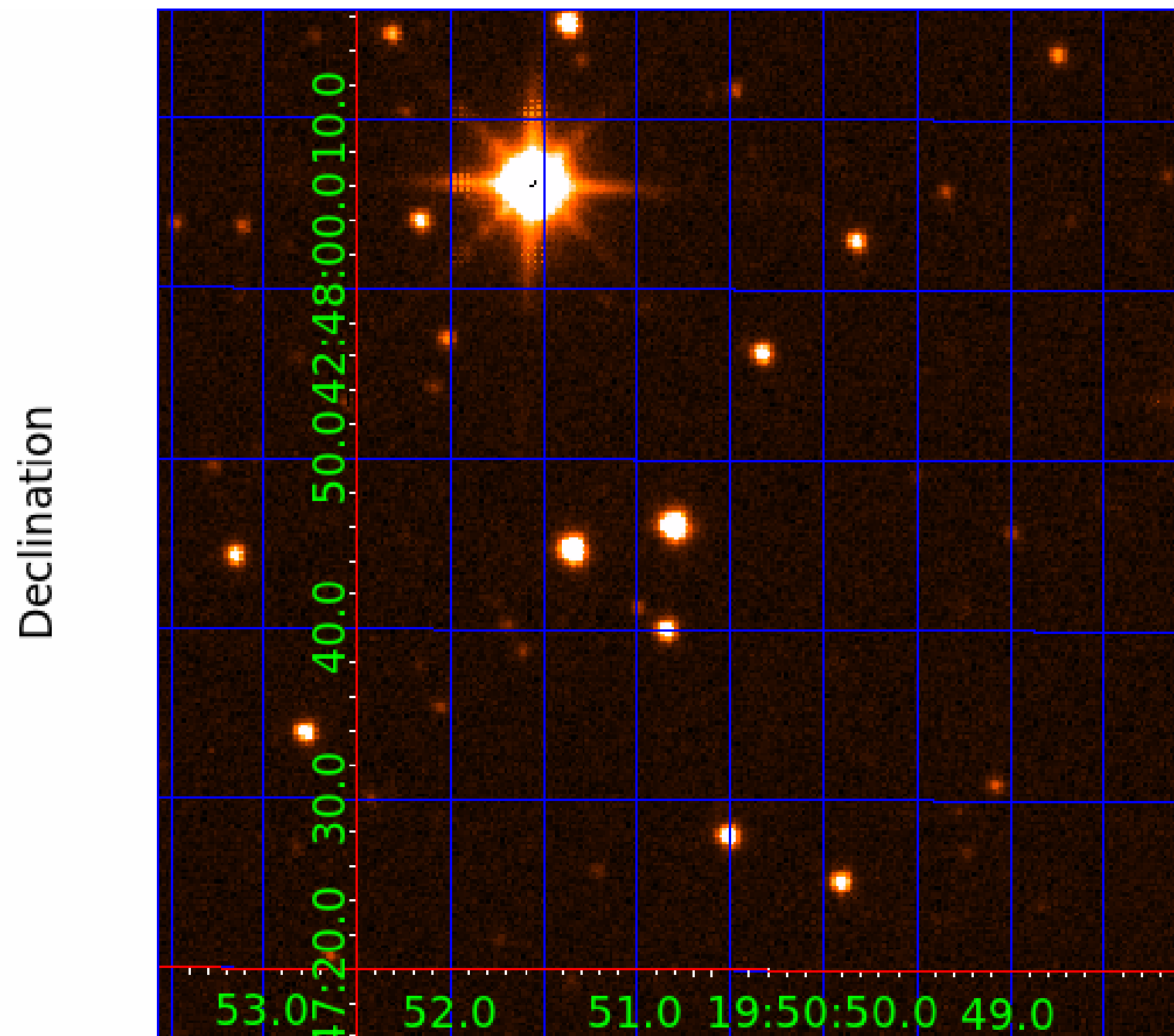
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 007222939

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})
007222939-01	OBS	No	1.116367	132.566683	117.0	3.371	8.8	9.4	0.69	4867	0.89	656.42
007222939-02	OBS	No	2.016495	132.067777	109.2	8.027	7.7	7.0	0.69	4867	0.70	298.40
007222939-03	OBS	No	110.130451	174.899450	1067.6	17.618	20.7	10.0	0.69	4867	2.70	1.44
007222939-04	OBS	No	99.492145	137.414305	1480.4	3.560	8.3	8.6	0.69	4867	2.94	1.65
007222939-05	OBS	No	490.041345	483.534823	1159.1	4.450	7.7	7.2	0.69	4867	2.49	0.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007222939-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
007222939-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST
007222939-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
007222939-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_RESOLVED_OFFSET
007222939-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

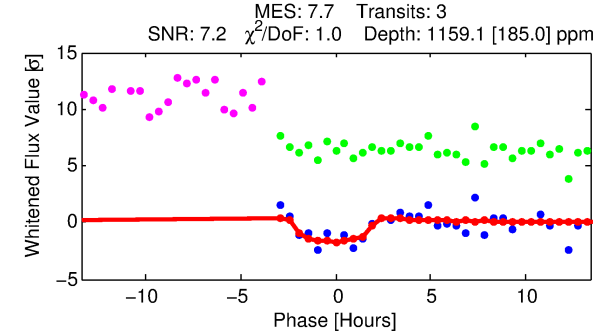
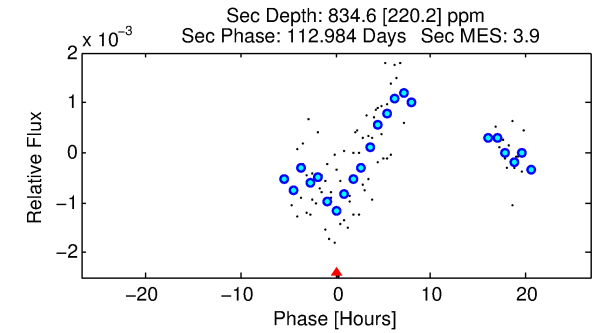
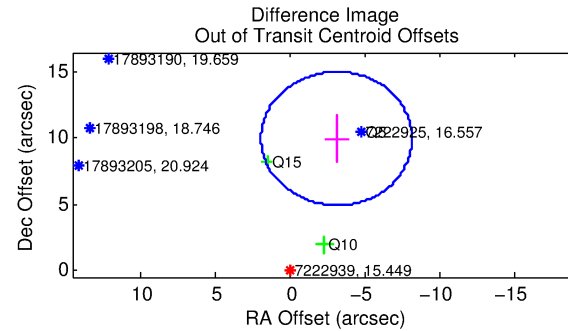
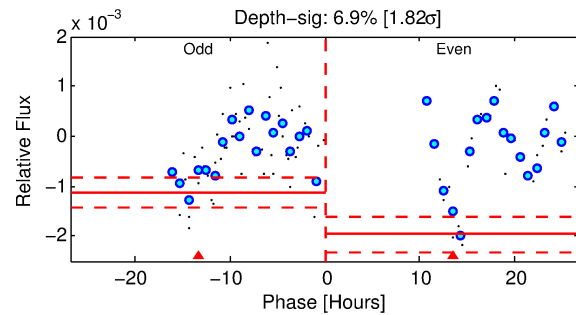
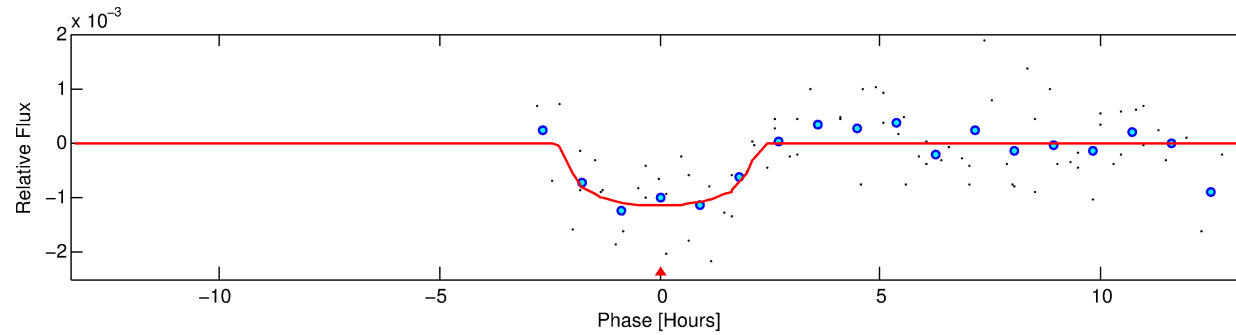
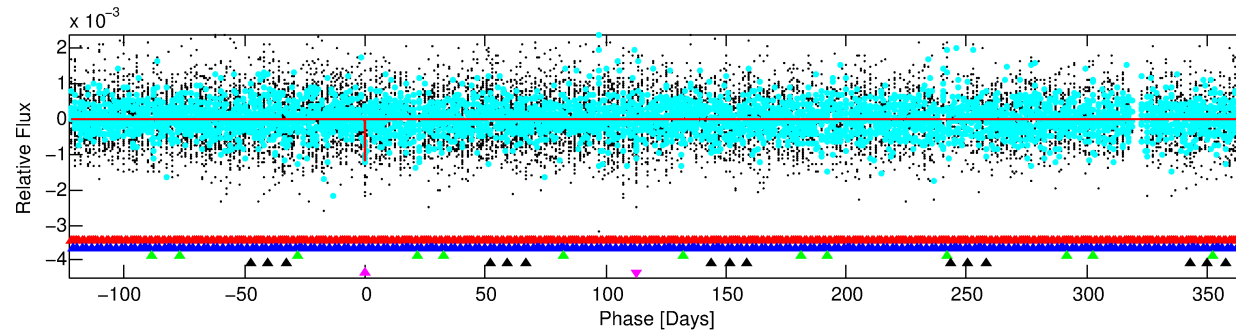
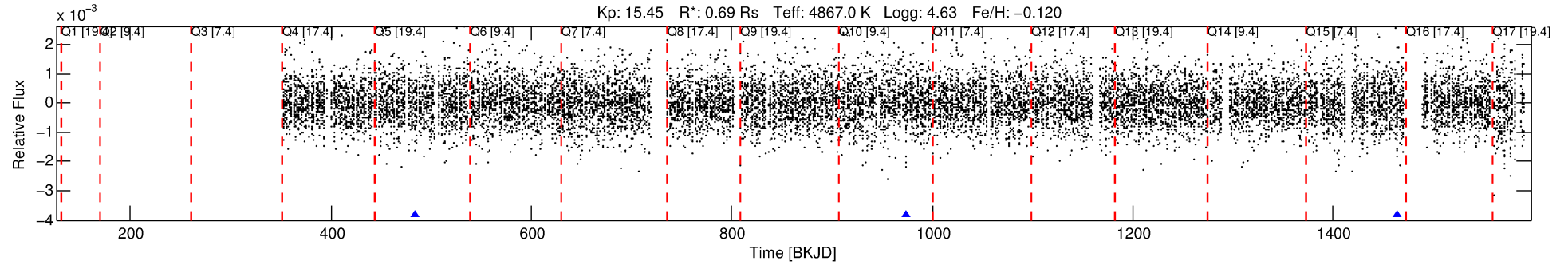
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 007222939-05

No Significant Match Found

DV One-Page Summary

KIC: 7222939 Candidate: 5 of 5 Period: 490.041 d



DV Fit Results:

Period = 490.04135 [0.00844] d
Epoch = 483.5348 [0.0108] BKJD
Rp/R* = 0.0330 [0.0662]
a/R* = 654.26 [4390.56]
b = 0.68 [5.44]
Seff = 0.20 [0.04]
Teq = 170 [8] K
Rp = 2.49 [5.00] Re
a = 1.1045 [0.1024] AU
Ag = 90331.80 [362917.14] [0.25 σ]
Teff = 4552 [4573] K [0.96 σ]

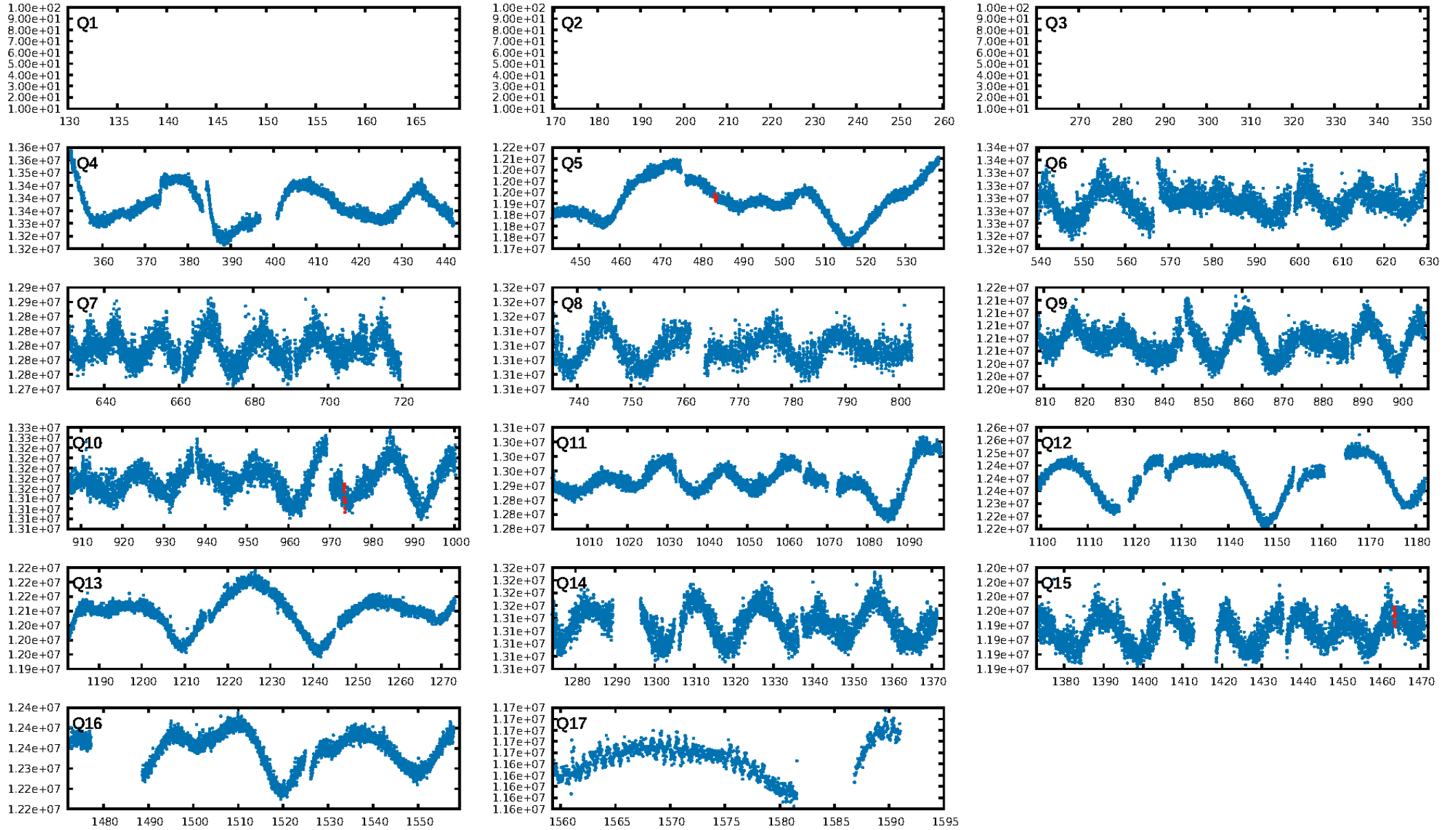
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [501.78 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 41.0%
ModelChiSquareGof-sig: 91.6%
Bootstrap-pfa: 1.97e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.8691
Centroid-sig: 75.8%
Centroid-so: 3.282 arcsec [3.32 σ]
OotOffset-rm: 10.459 arcsec [6.21 σ]
KicOffset-rm: 8.528 arcsec [3.47 σ]
OotOffset-st: 1/1/0/1 [3]
KicOffset-st: 1/1/0/1 [3]
DiffImageQuality-fgm: 0.33 [1/3]
DiffImageOverlap-fno: 0.00 [0/3]

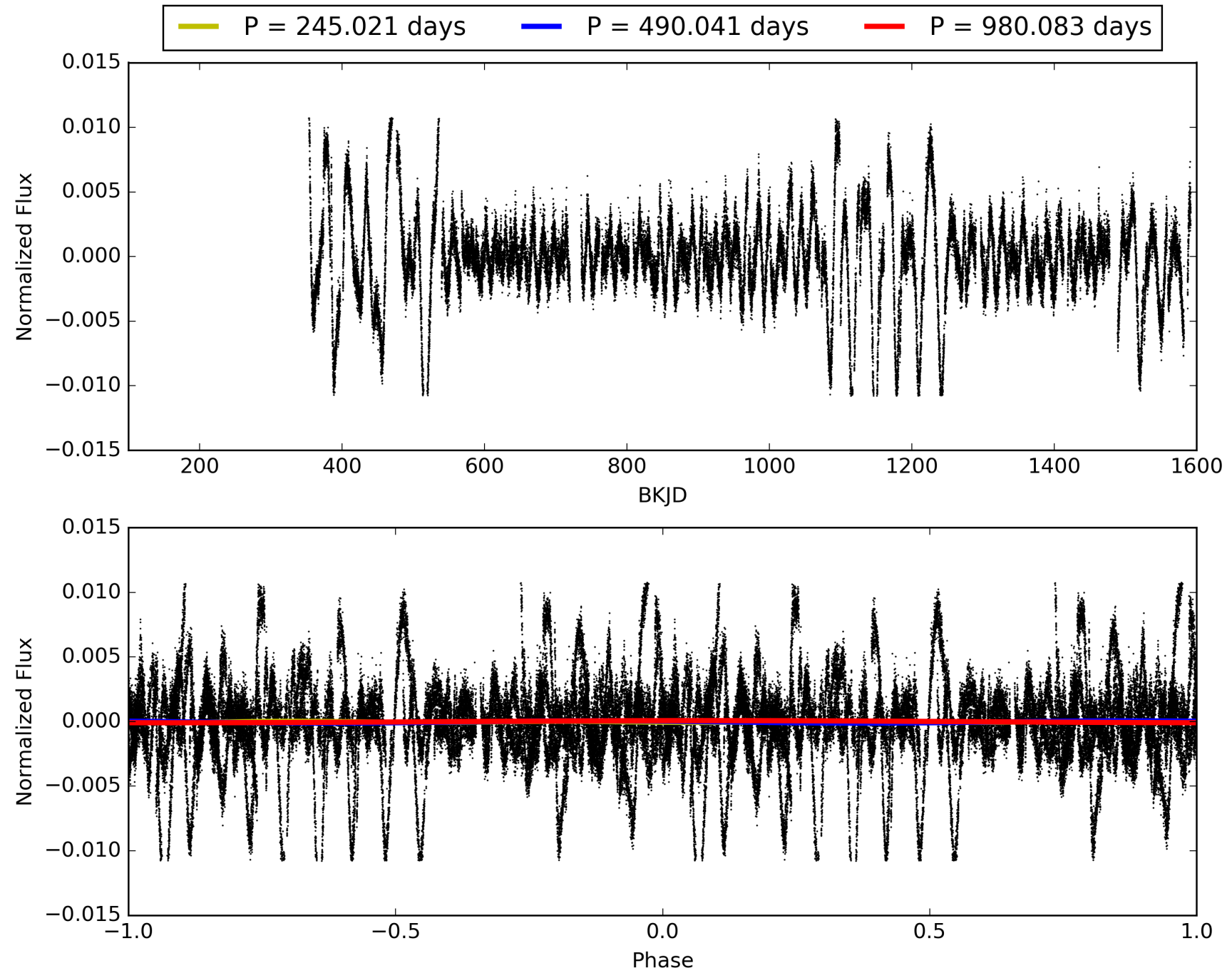
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:50:53 Z

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

TCE 007222939-05, PDC Light Curves

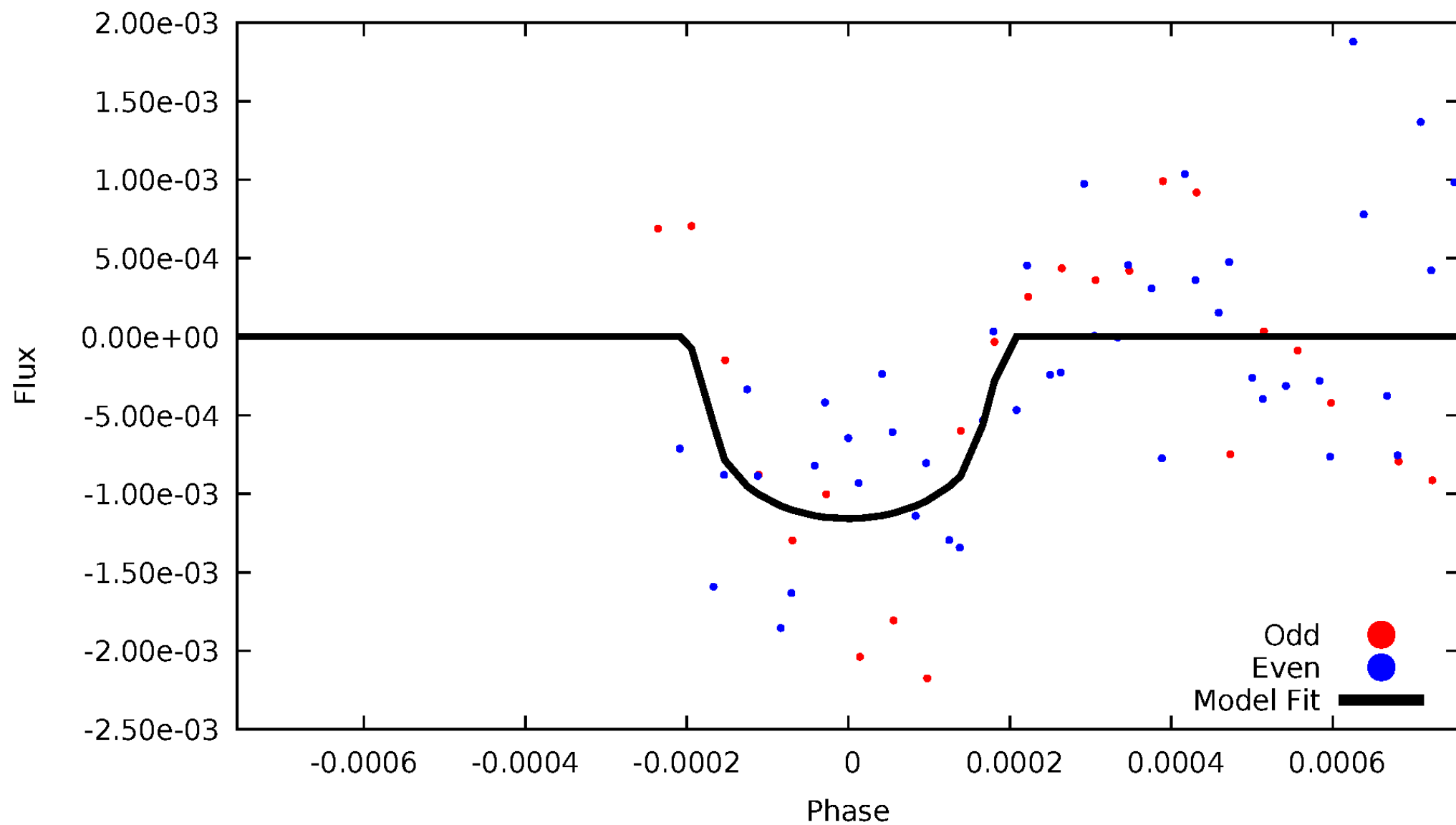


TCE 007222939-05



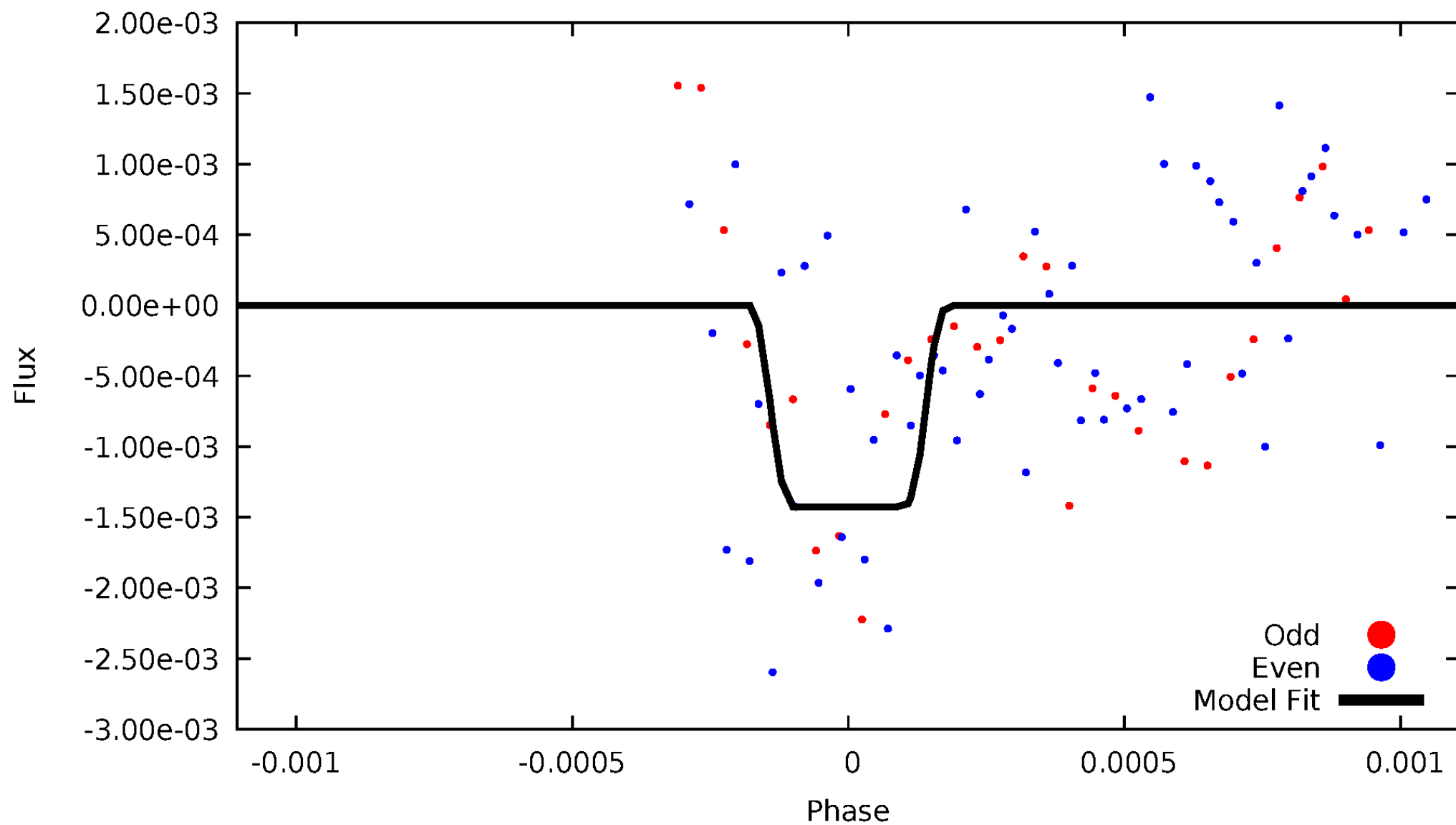
DV Odd/Even

TCE 007222939-05



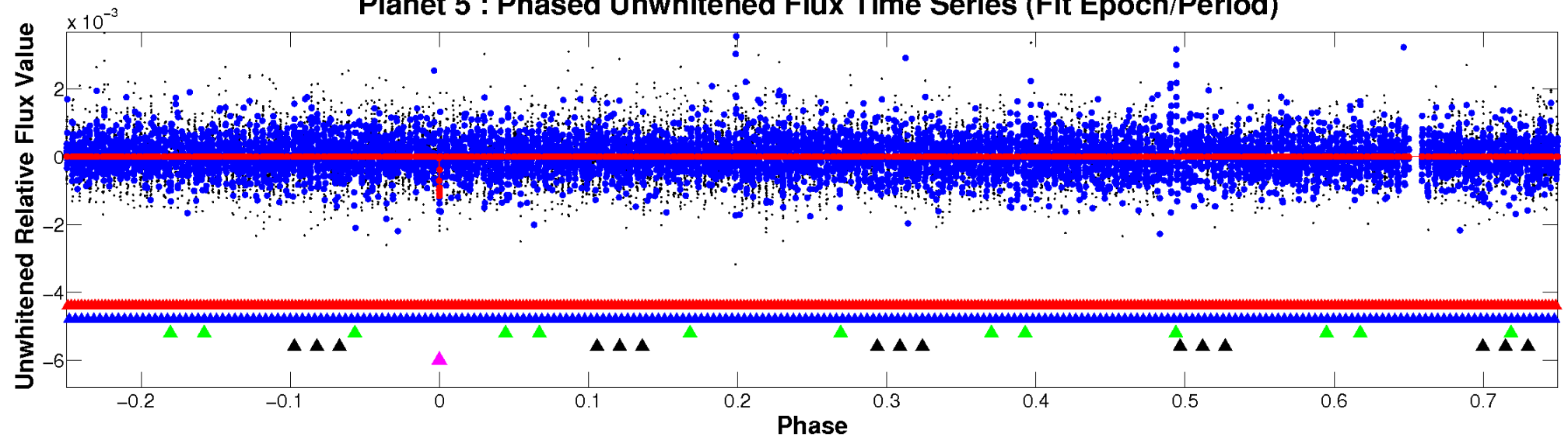
ALT Odd/Even

TCE 007222939-05

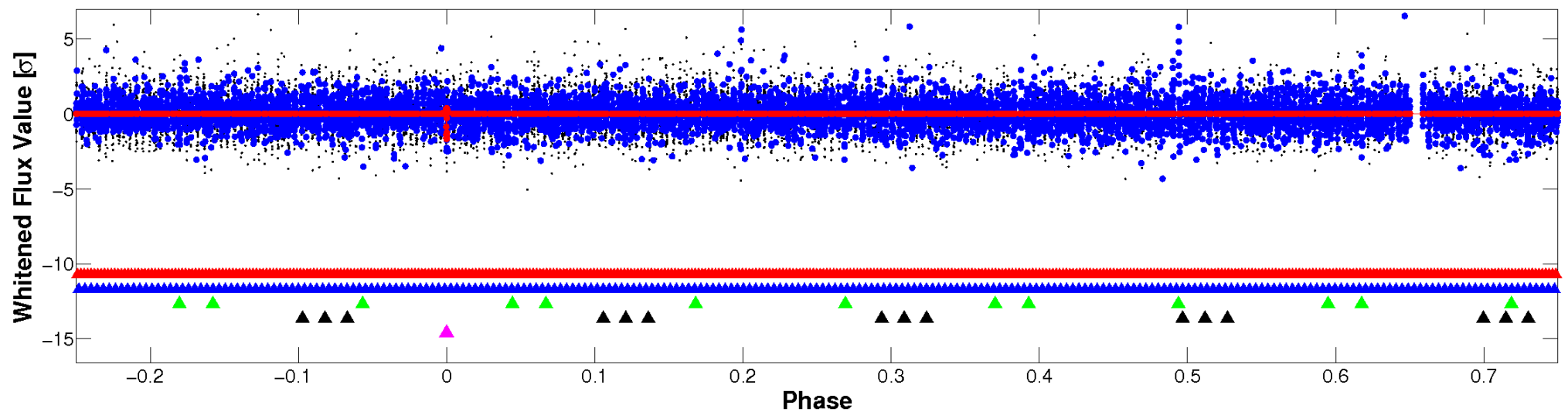


Non-Whitened Vs. Whitened Light Curve

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

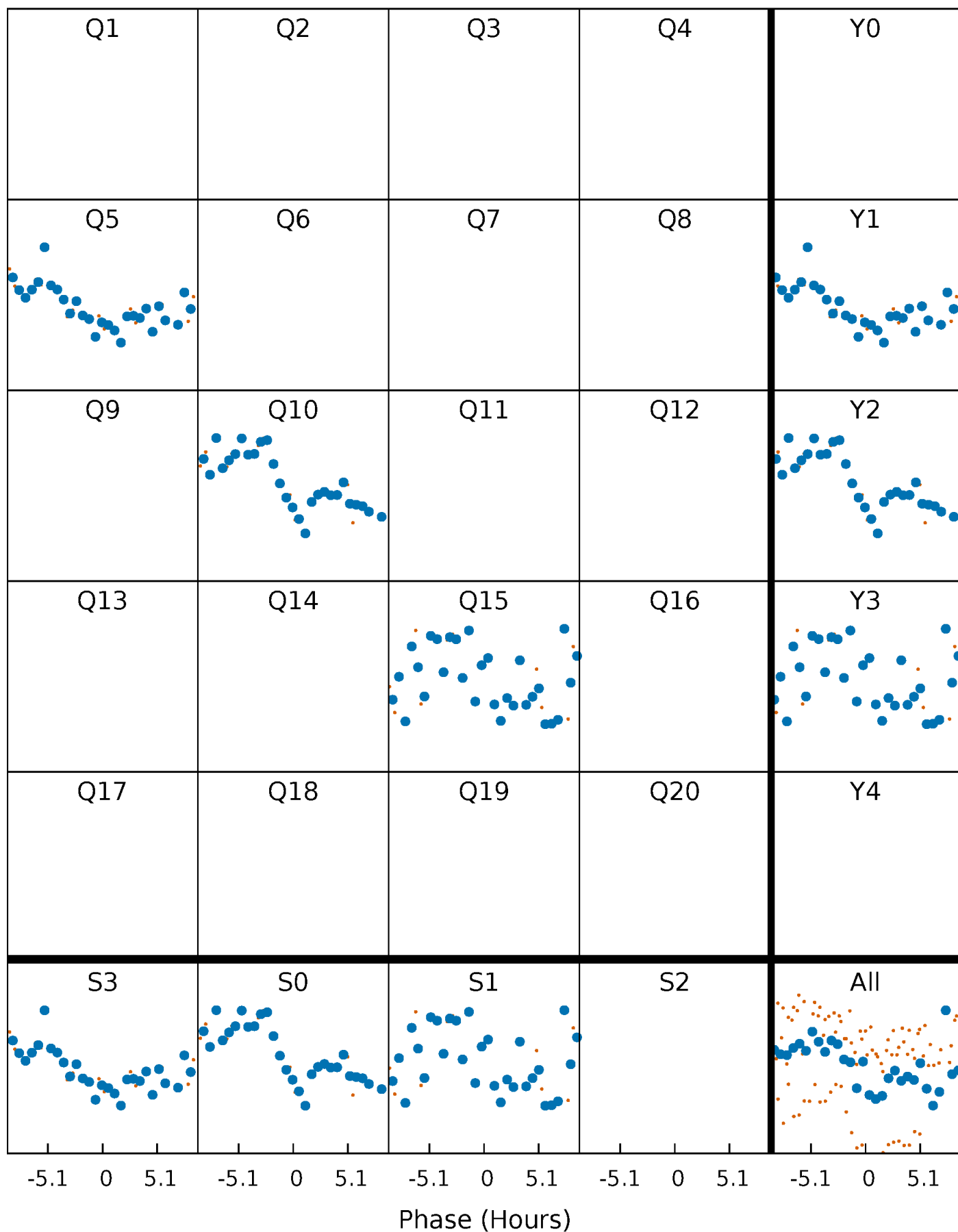


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



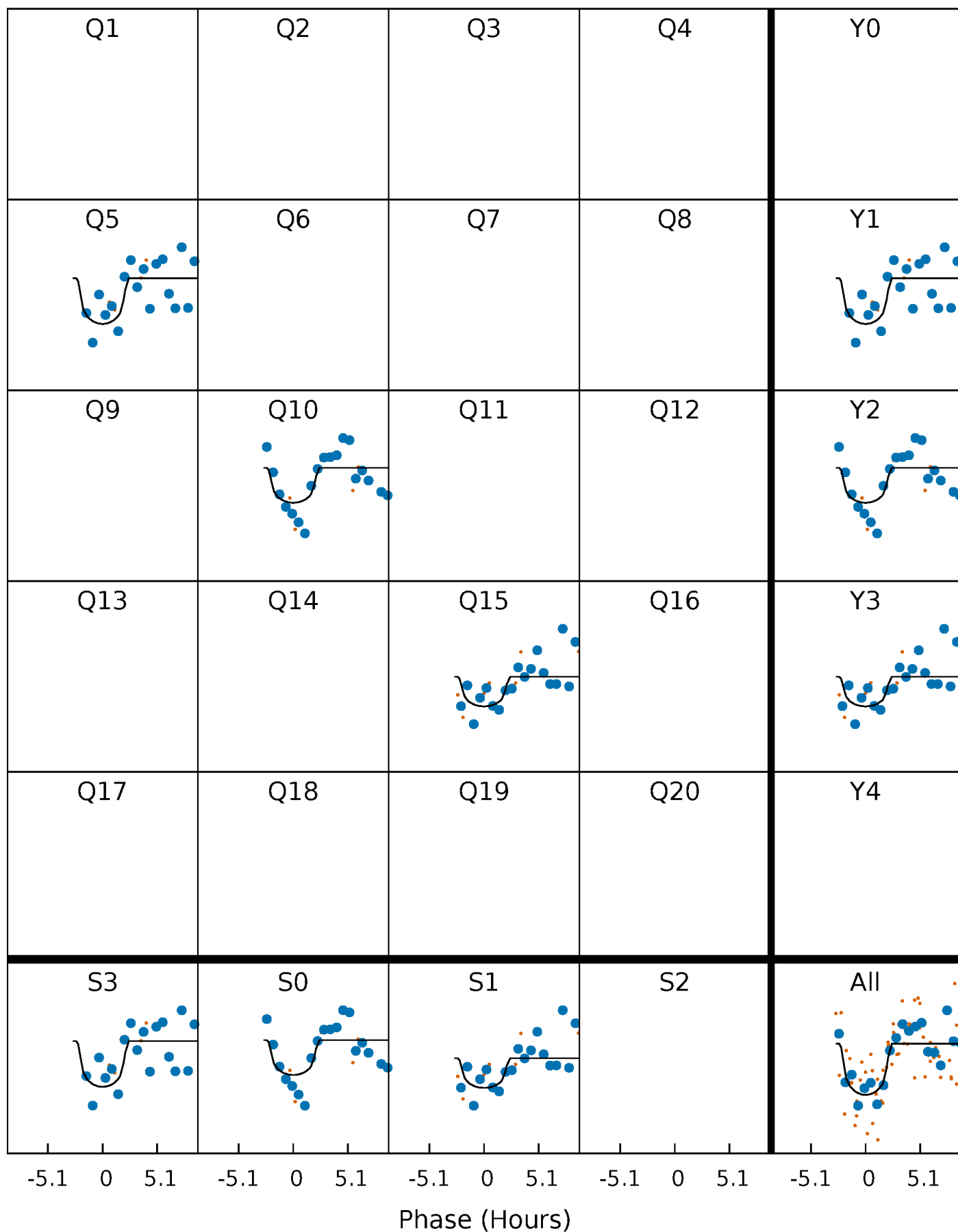
PDC Quarter-Phased Transit Curves

TCE 007222939-05 $P=490.041345$ Days $T_0=483.534823$ (BKJD)



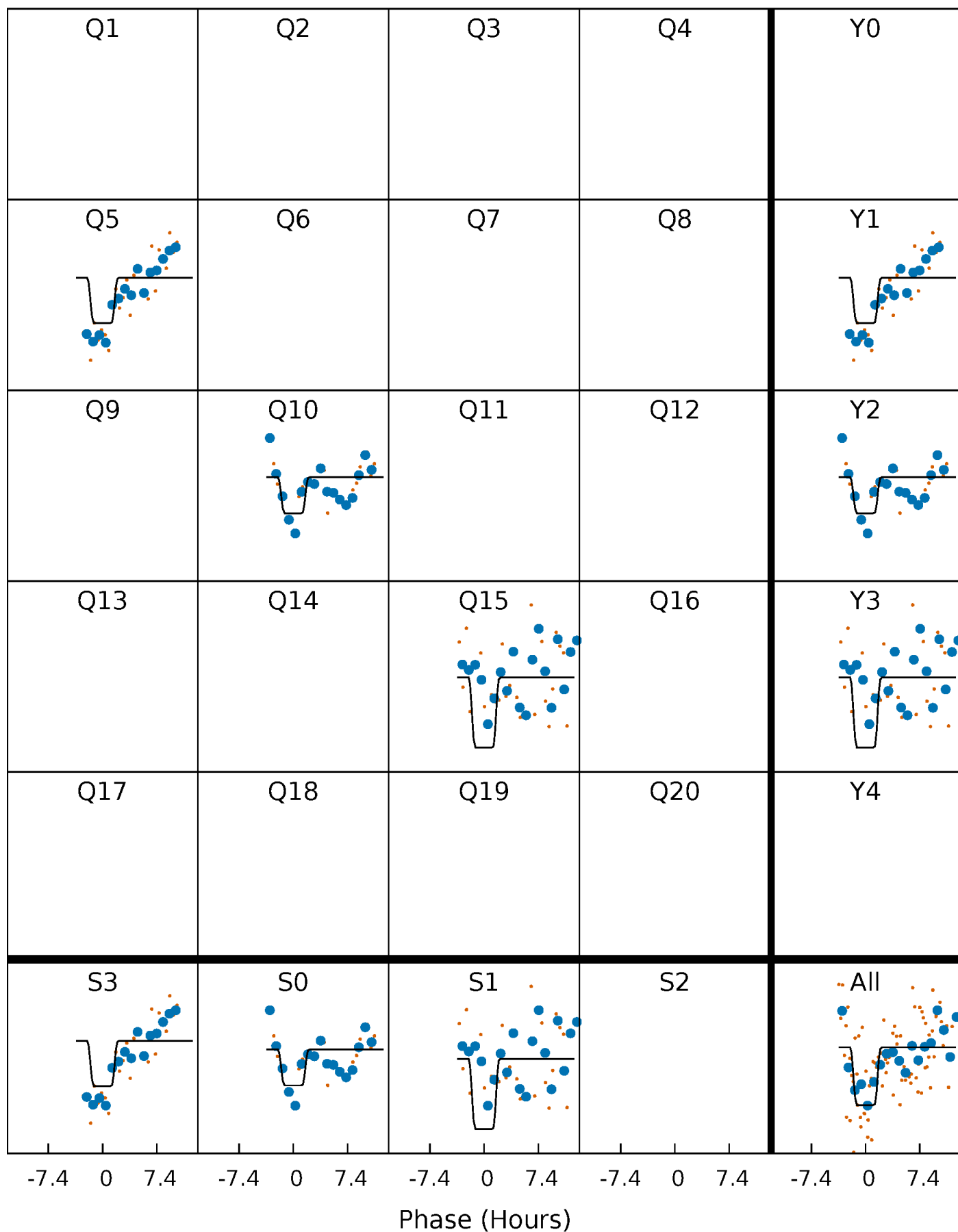
DV Quarter-Phased Transit Curves

TCE 007222939-05 $P=490.041345$ Days $T_0=483.534823$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

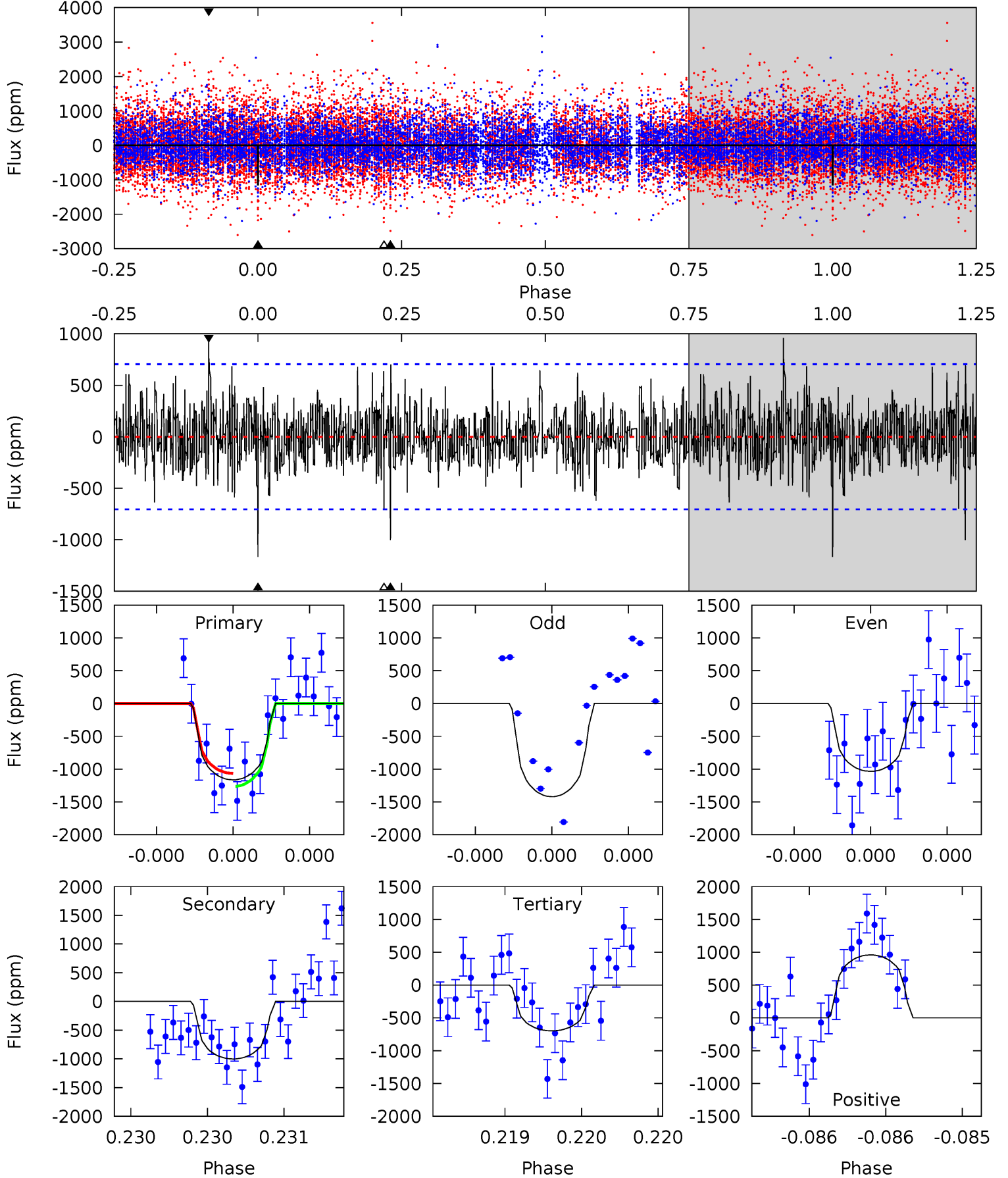
TCE 007222939-05 P=490.044447 Days $T_0=483.567394$ (BKJD)



DV Model-Shift Uniqueness Test

007222939-05, P = 490.041345 Days, E = 483.534823 Days

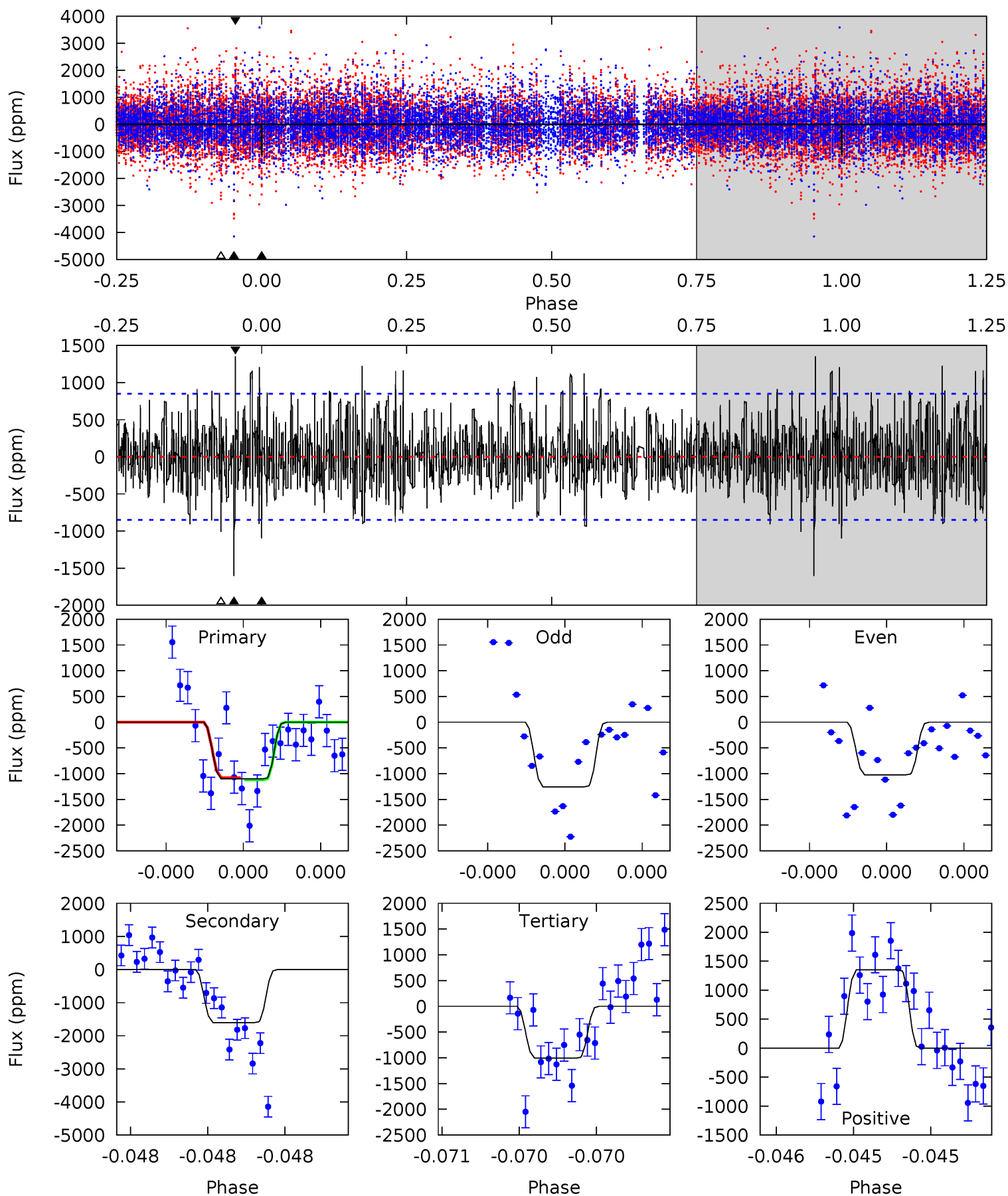
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.29	8.00	5.57	7.66	5.62	3.56	1.60	3.72	1.63	2.42	0.33	1.42	1.10	0.45	0.79



Alt Model-Shift Uniqueness Test

007222939-05, P = 490.044447 Days, E = 483.567394 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.29	10.6	6.68	8.97	5.64	3.58	2.11	0.61	-1.68	3.96	1.66	0.72	0.88	0.46	0.13



Stellar Parameters For KIC 007222939

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4867^{+175}_{-156}	$4.633^{+0.027}_{-0.063}$	$-0.120^{+0.300}_{-0.300}$	$0.691^{+0.082}_{-0.048}$	$0.773^{+0.060}_{-0.083}$	$3.297^{+0.438}_{-0.833}$
	+4%/-3%	+1%/-1%	+250%/-250%	+12%/-7%	+8%/-11%	+13%/-25%
Source	KIC0	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007222939-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-1002 ± 125	$4.53^{+4.25}_{-3.07}$	240^{+10}_{-10}	3899^{+2417}_{-798}	$34923^{+287049}_{-26229}$
Alt.	-1604 ± 151	$4.65^{+4.37}_{-2.98}$	240^{+10}_{-9}	4133^{+2342}_{-811}	$49651^{+329999}_{-36545}$

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

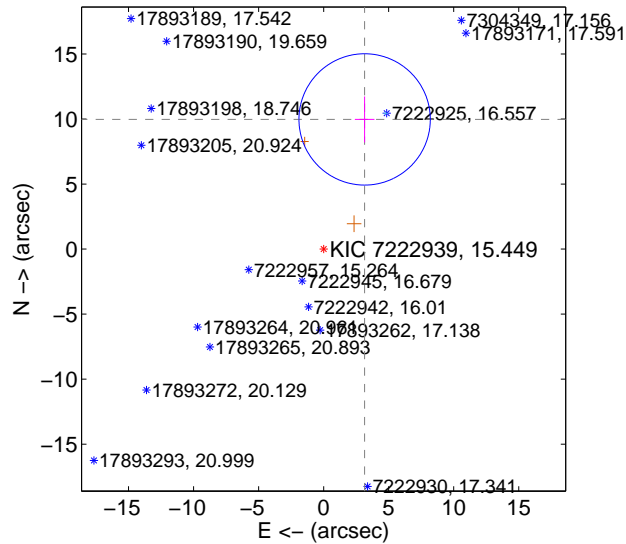
Supplemental centroid analysis for 007222939-05. Kepler magnitude: 15.45. Transit SNR 7.24

There are 1 quarters with good PRF difference image offsets

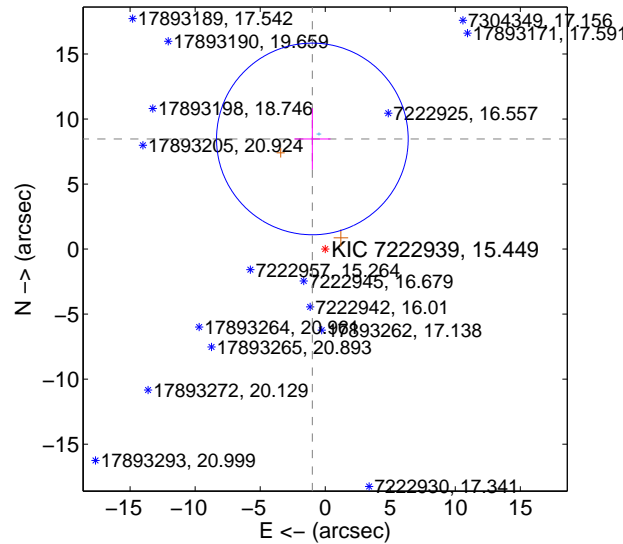
The OOT PRF centroid is offset from the target star catalog position by about 2.15 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	10.459 ± 1.683	6.21	-3.152 ± 0.754	9.973 ± 1.767
PRF-fit source offset from KIC position	8.528 ± 2.456	3.47	0.988 ± 1.399	8.471 ± 2.365
photometric centroid source offset	3.28 ± 0.99	3.32	3.11 ± 0.93	-1.04 ± 1.42

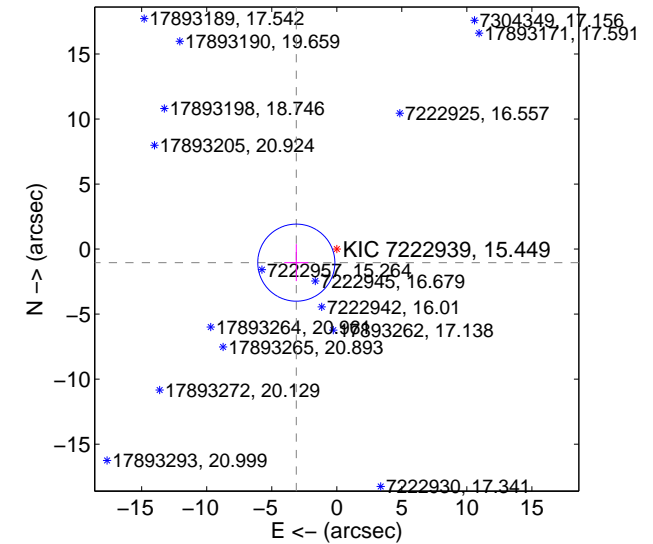
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

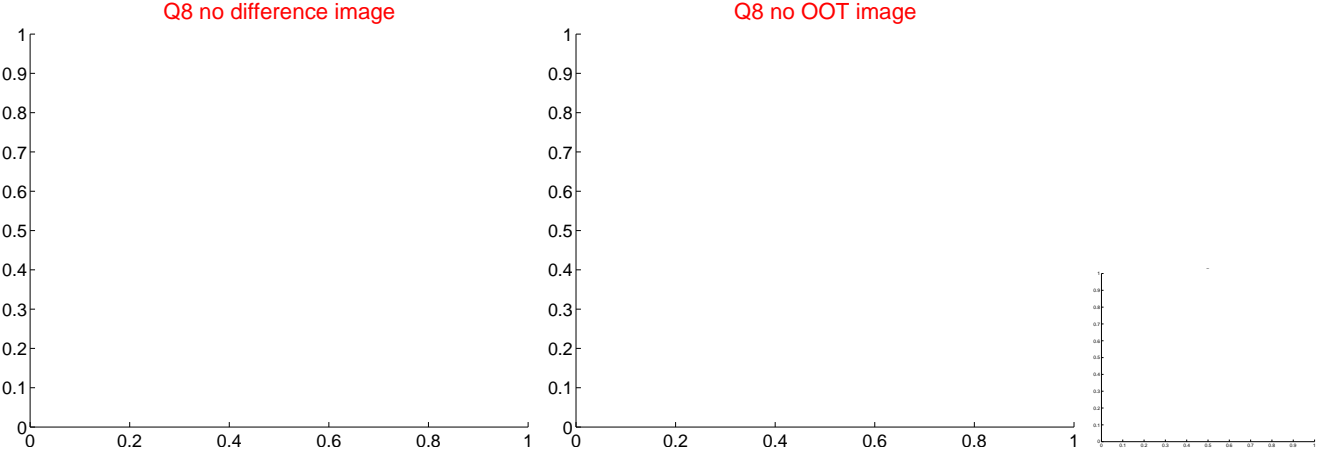
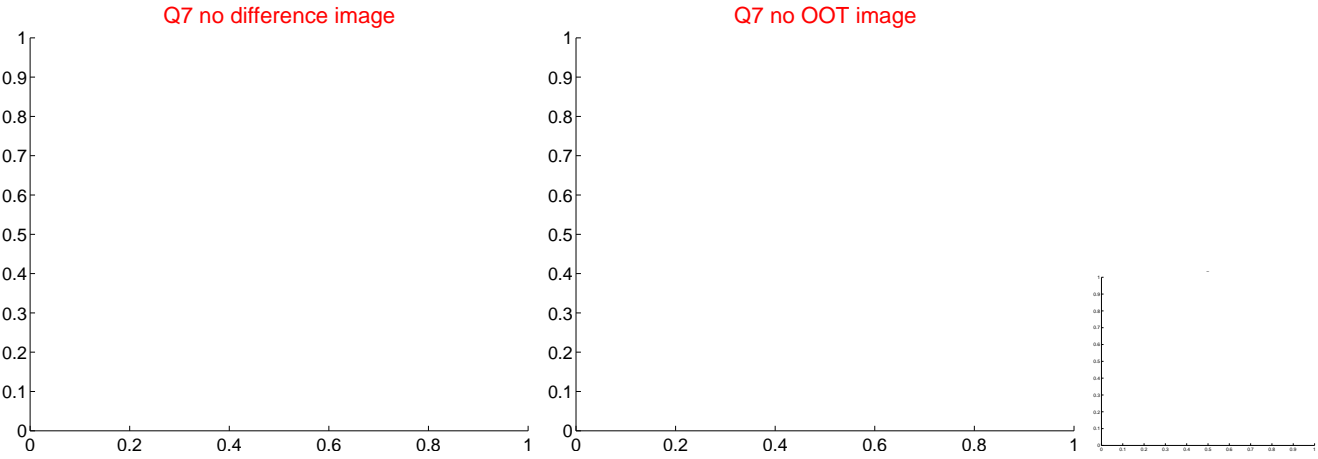
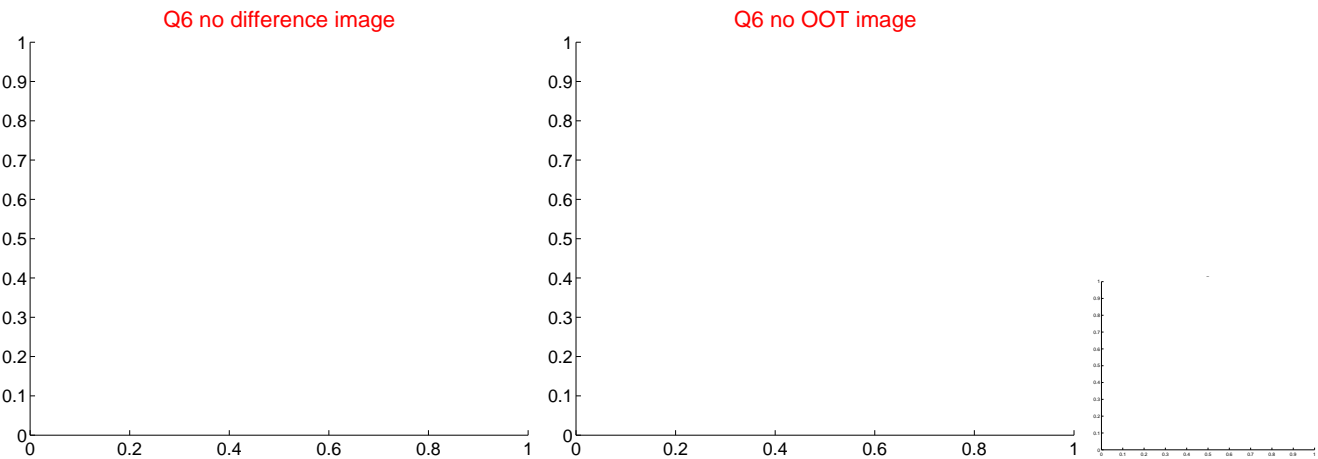
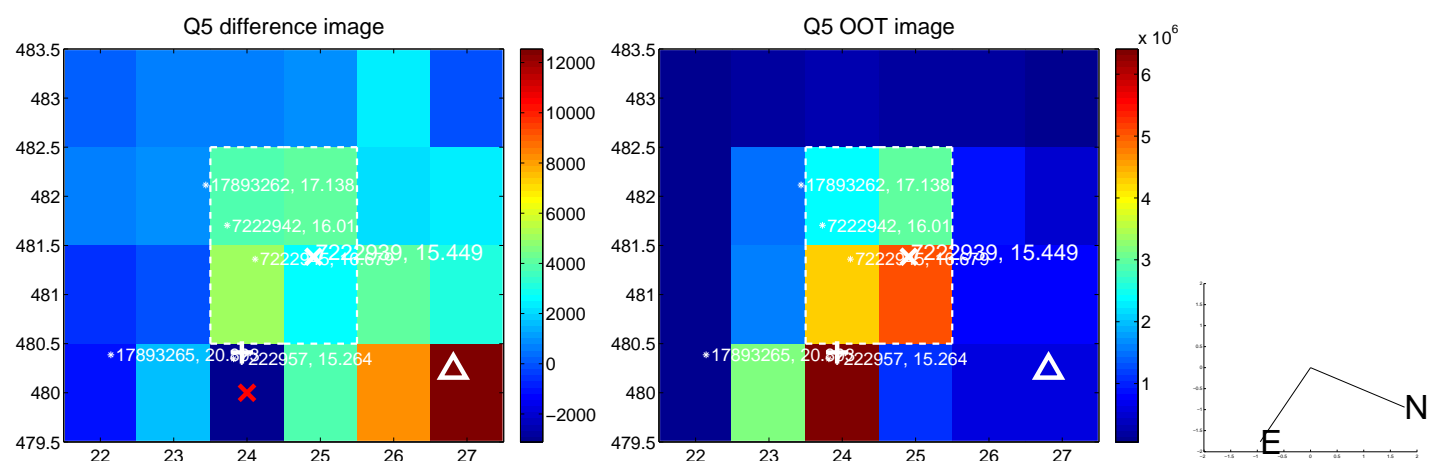


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

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



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

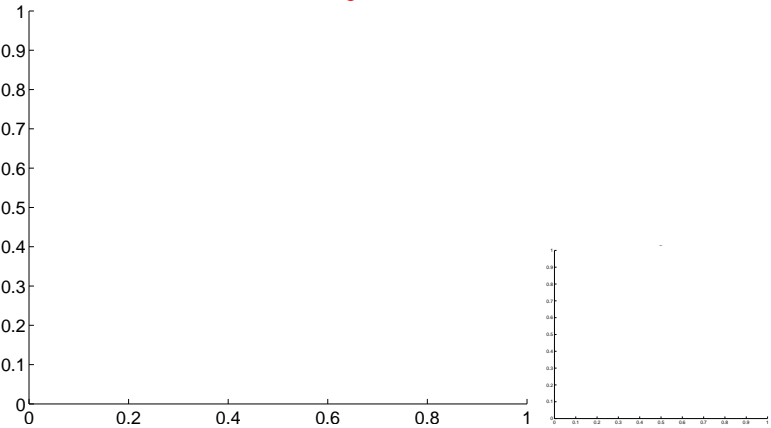


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

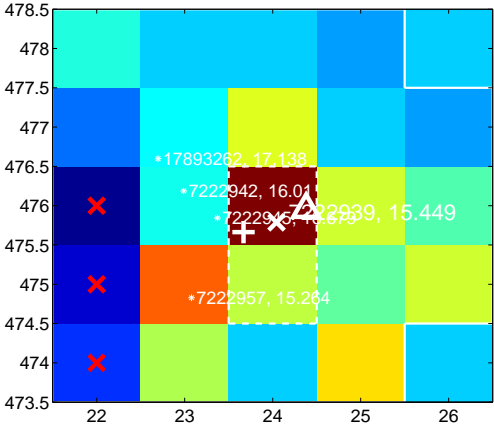
Q9 no difference image



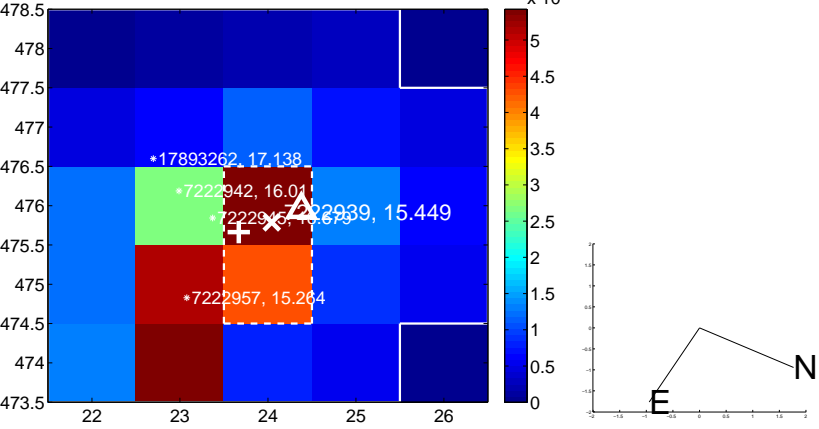
Q9 no OOT image



Q10 difference image. Poor Quality



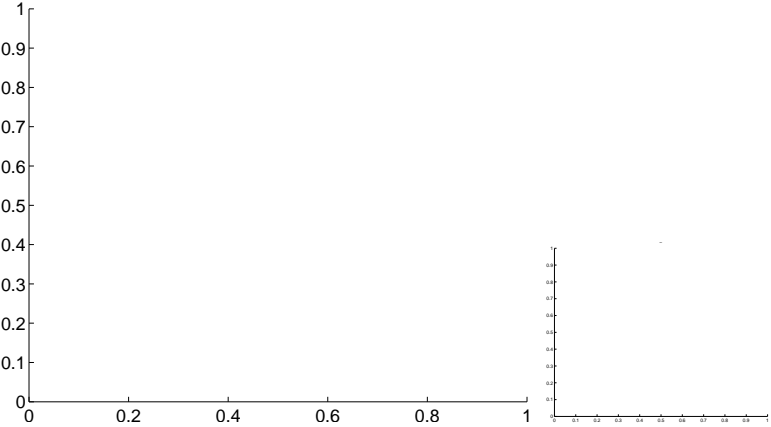
Q10 OOT image



Q11 no difference image



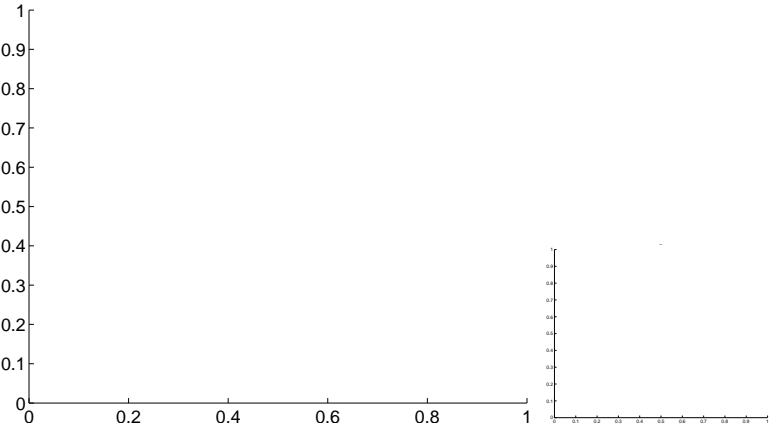
Q11 no OOT image



Q12 no difference image

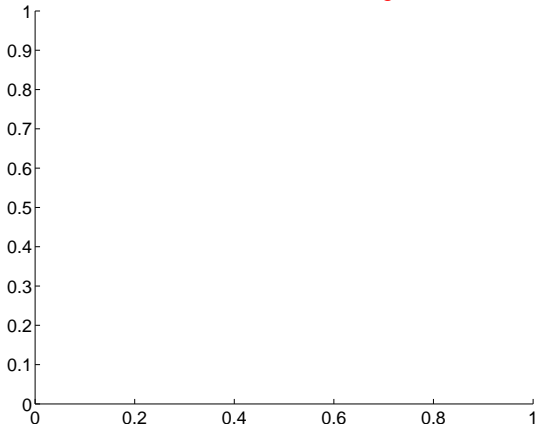


Q12 no OOT image

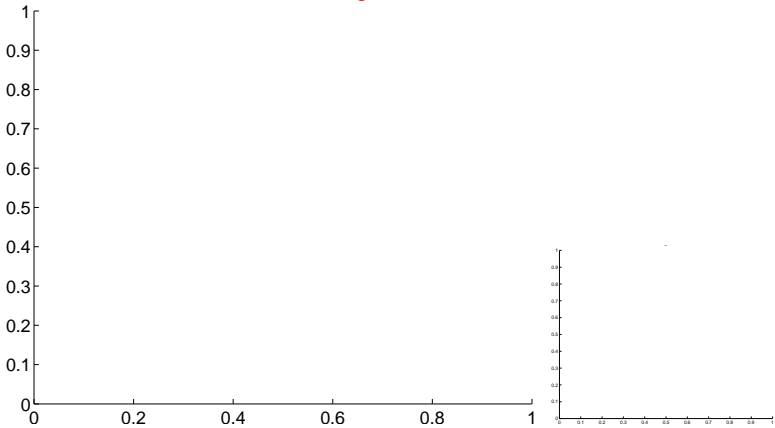


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

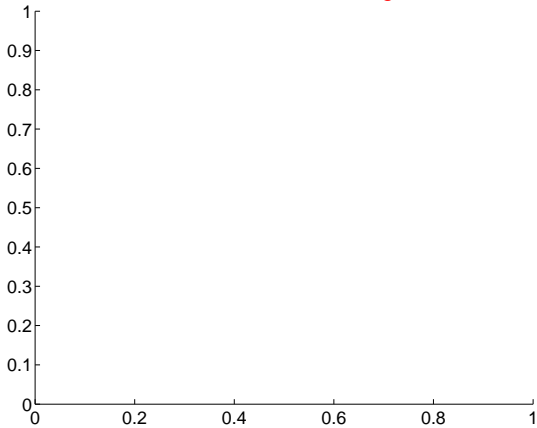
Q13 no difference image



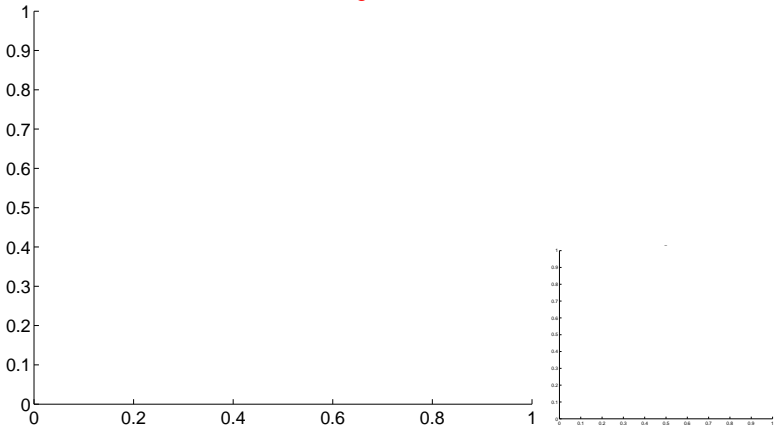
Q13 no OOT image



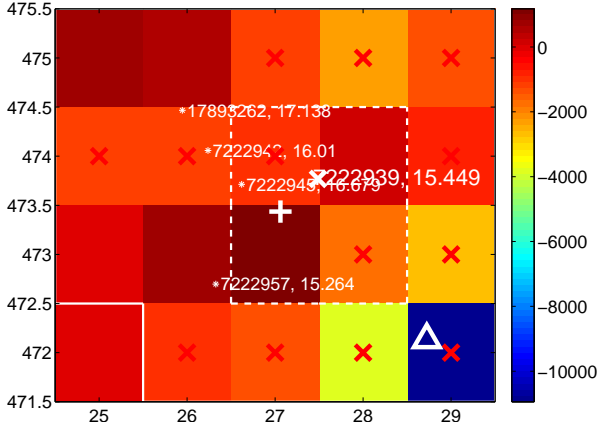
Q14 no difference image



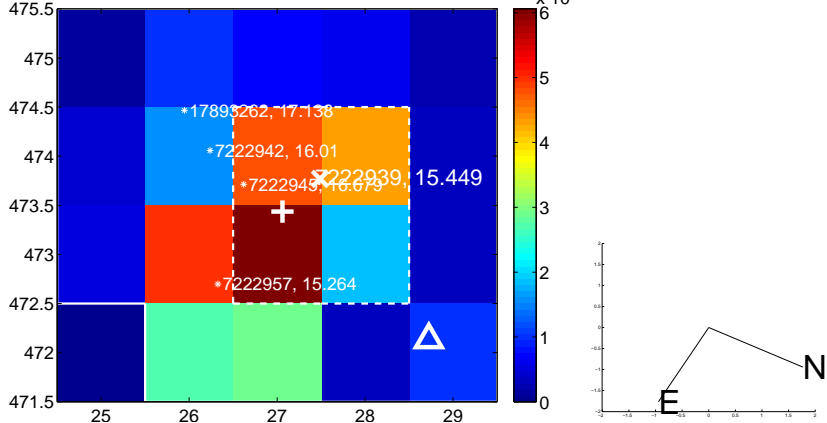
Q14 no OOT image



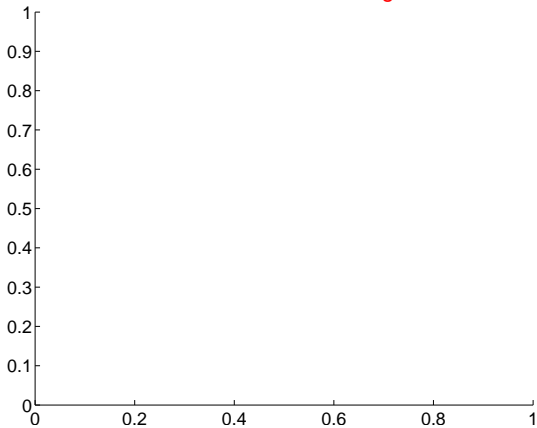
Q15 difference image. Poor Quality



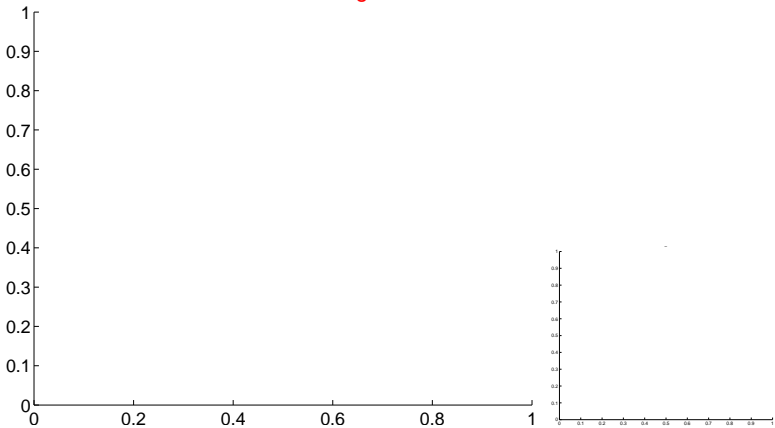
Q15 OOT image



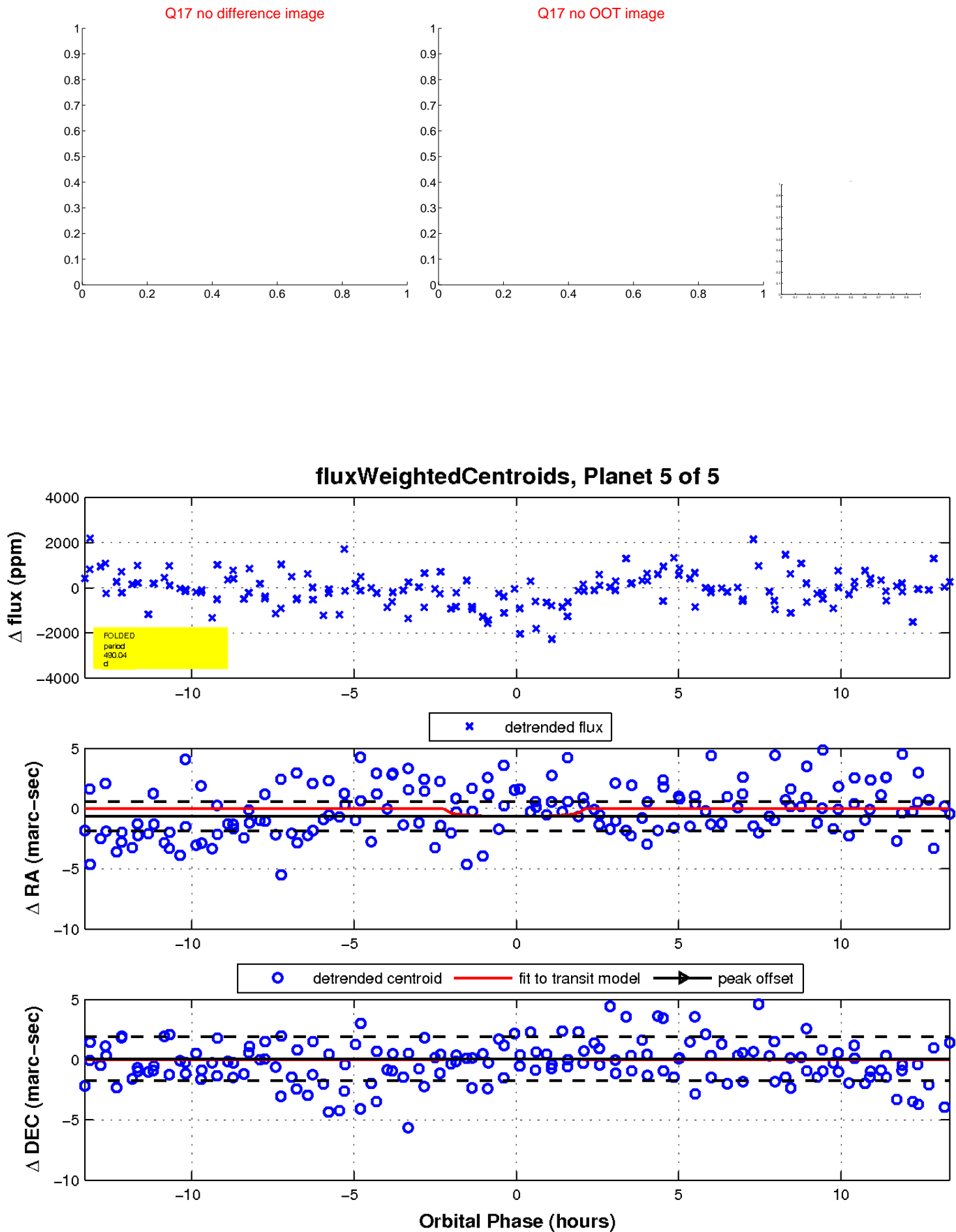
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

