

KIC 012509148

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})
012509148-01	OBS	No	2.414113	132.278837	13.3	11.599	9.6	7.7	3.14	6859	1.21	10833.99
012509148-02	OBS	No	2.413858	133.525548	17.8	12.738	12.4	12.8	3.14	6859	1.33	10835.51

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012509148-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
012509148-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

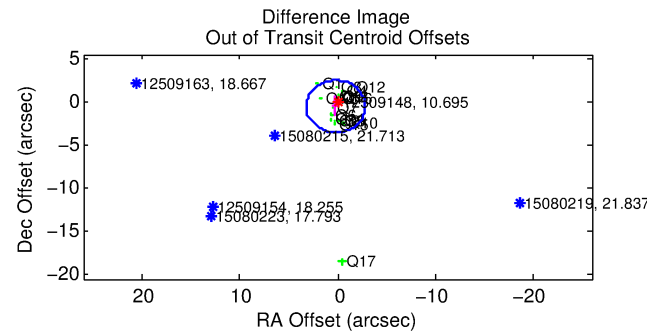
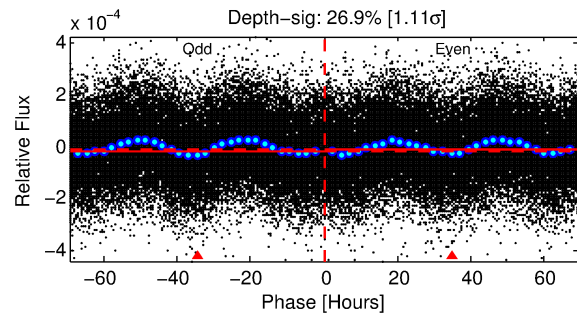
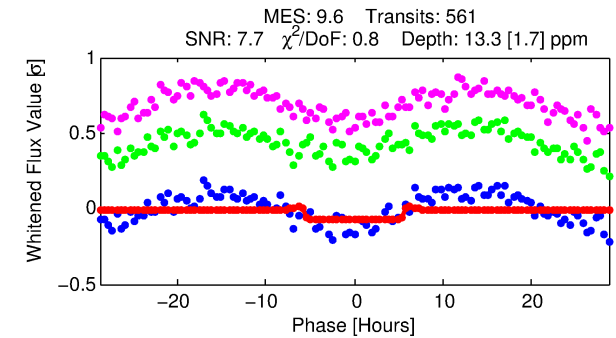
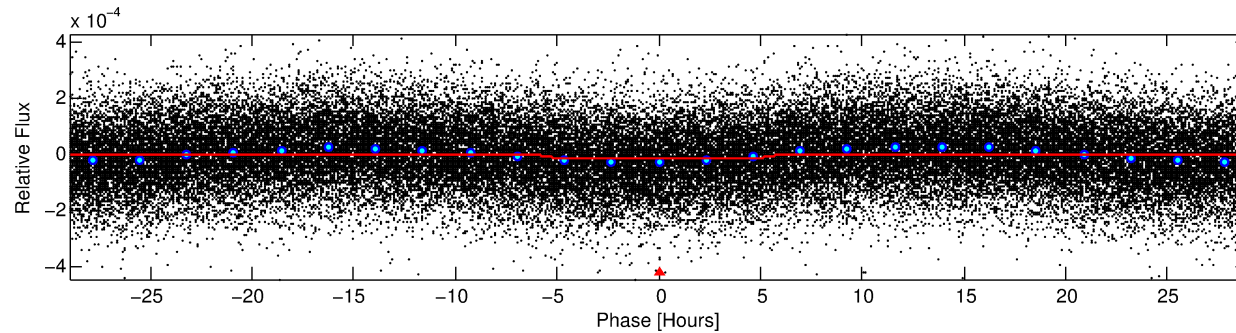
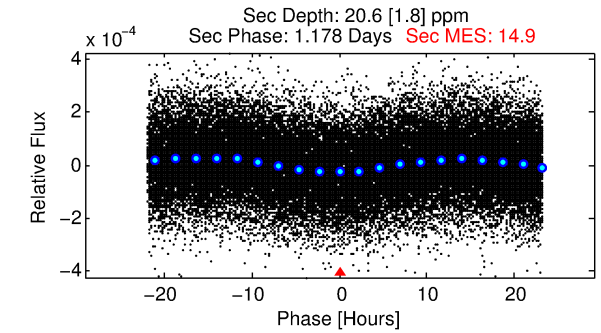
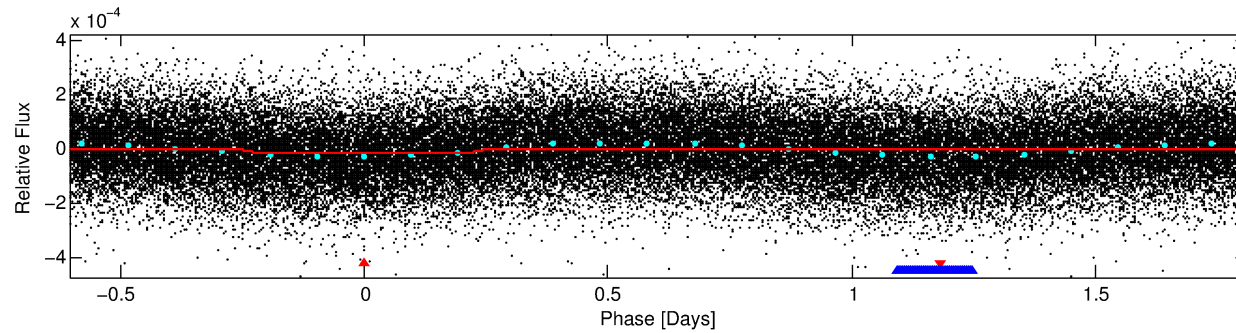
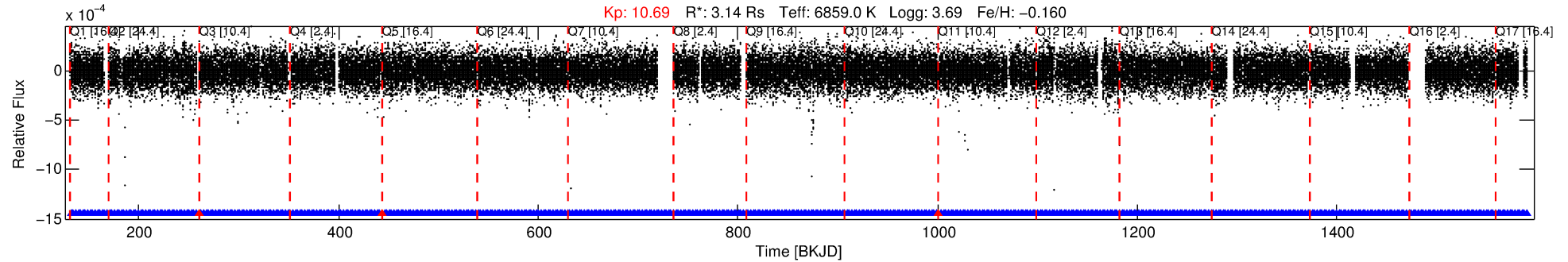
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012509148-01

No Significant Match Found

DV One-Page Summary

KIC: 12509148 Candidate: 1 of 2 Period: 2.414 d



DV Fit Results:

Period = 2.41411 [0.00004] d
Epoch = 132.2788 [0.0078] BKJD
Rp/R* = 0.0035 [0.0008]
a/R* = 1.46 [1.03]
b = 0.64 [1.23]
Seff = 10833.99 [5745.10]
Teq = 2601 [345] K
Rp = 1.21 [0.53] Re
a = 0.0425 [0.0142] AU
Ag = 13.98 [9.82] [1.32σ]
Teffp = 7778 [954] K [5.10σ]

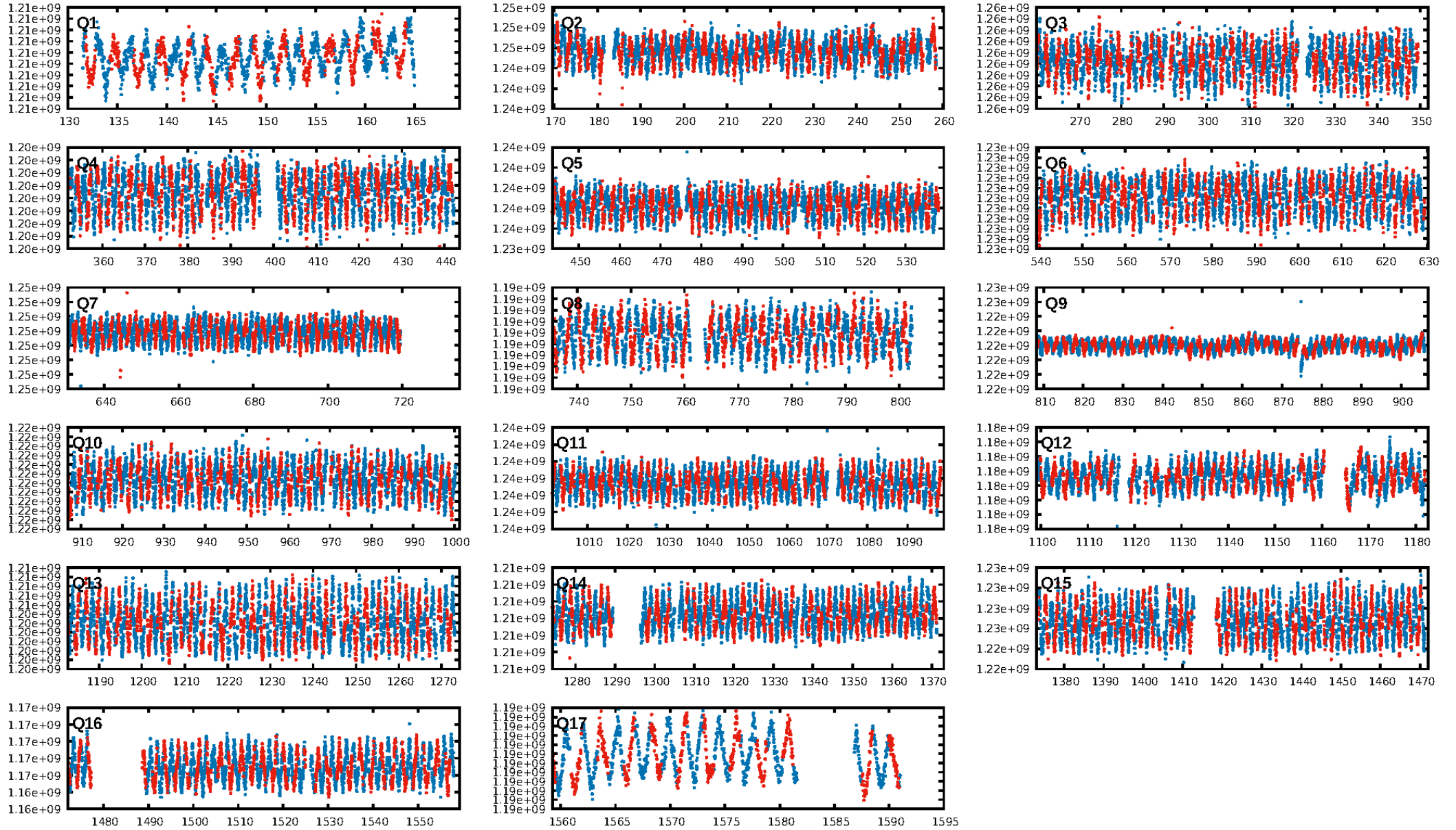
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 0.99 [532/535]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 1.411 arcsec [1.26σ]
OotOffset-rm: 0.565 arcsec [0.56σ]
KicOffset-rm: 0.491 arcsec [0.48σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.88 [15/17]
DiffImageOverlap-fno: 0.88 [15/17]

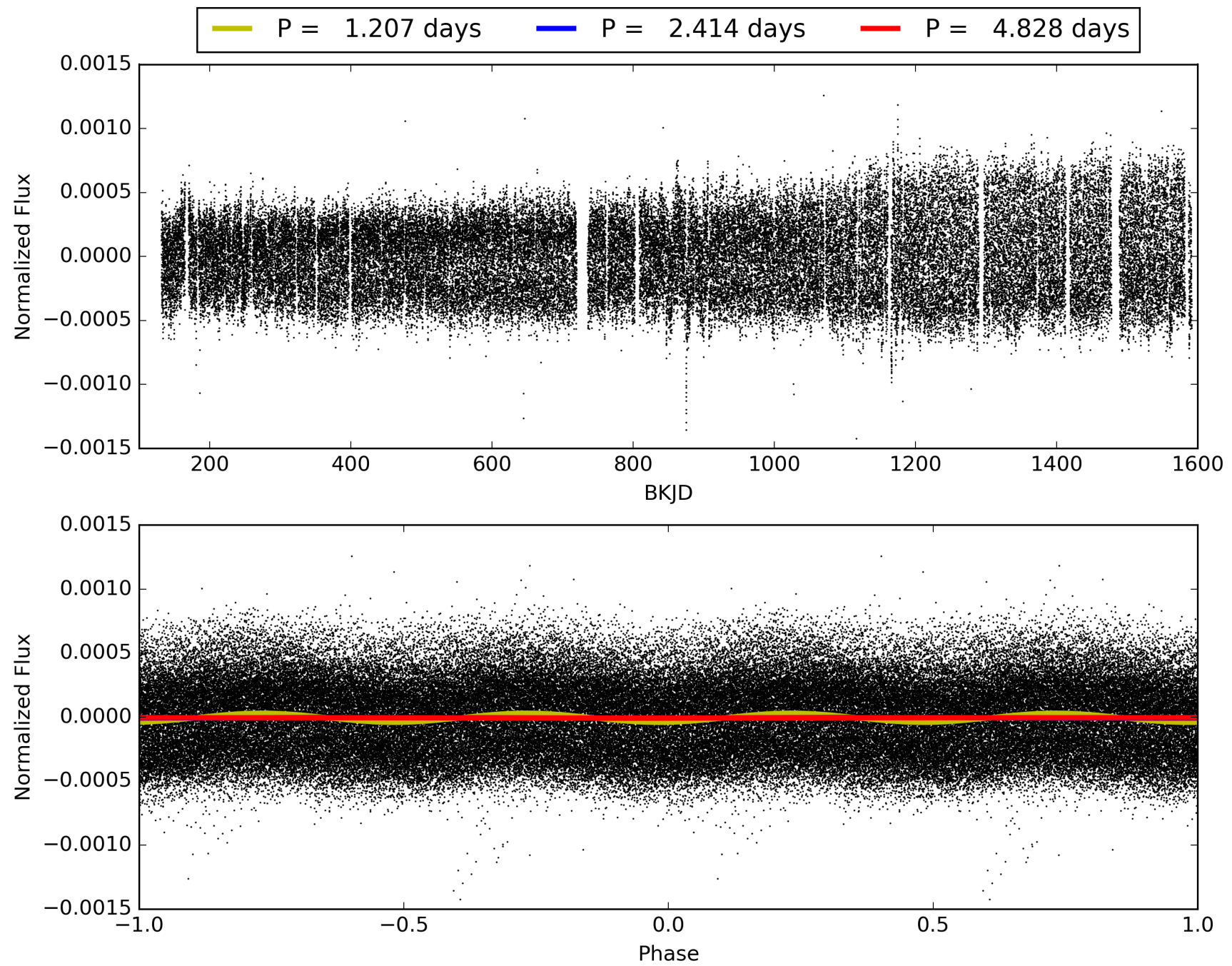
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 012509148-01, PDC Light Curves

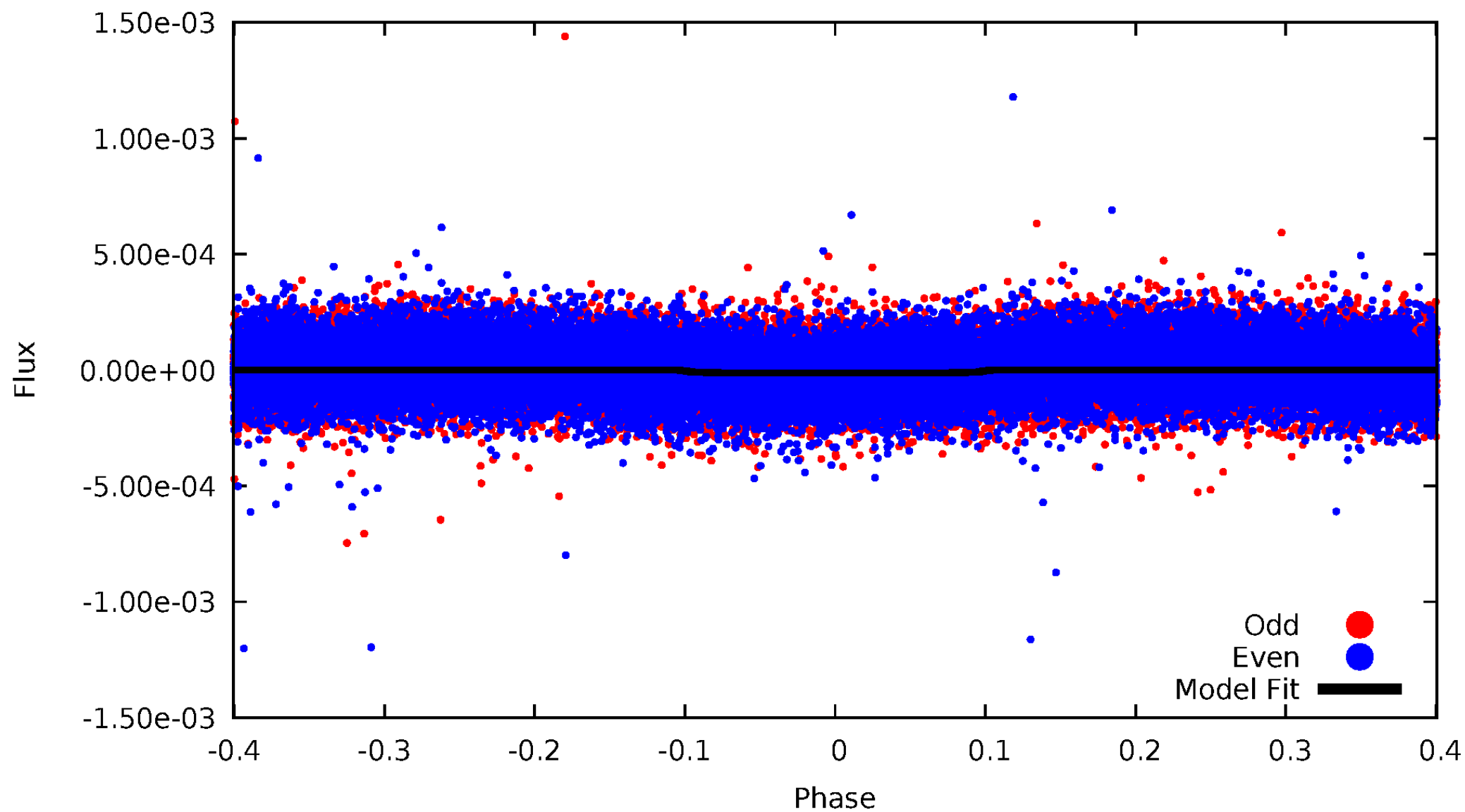


TCE 012509148-01



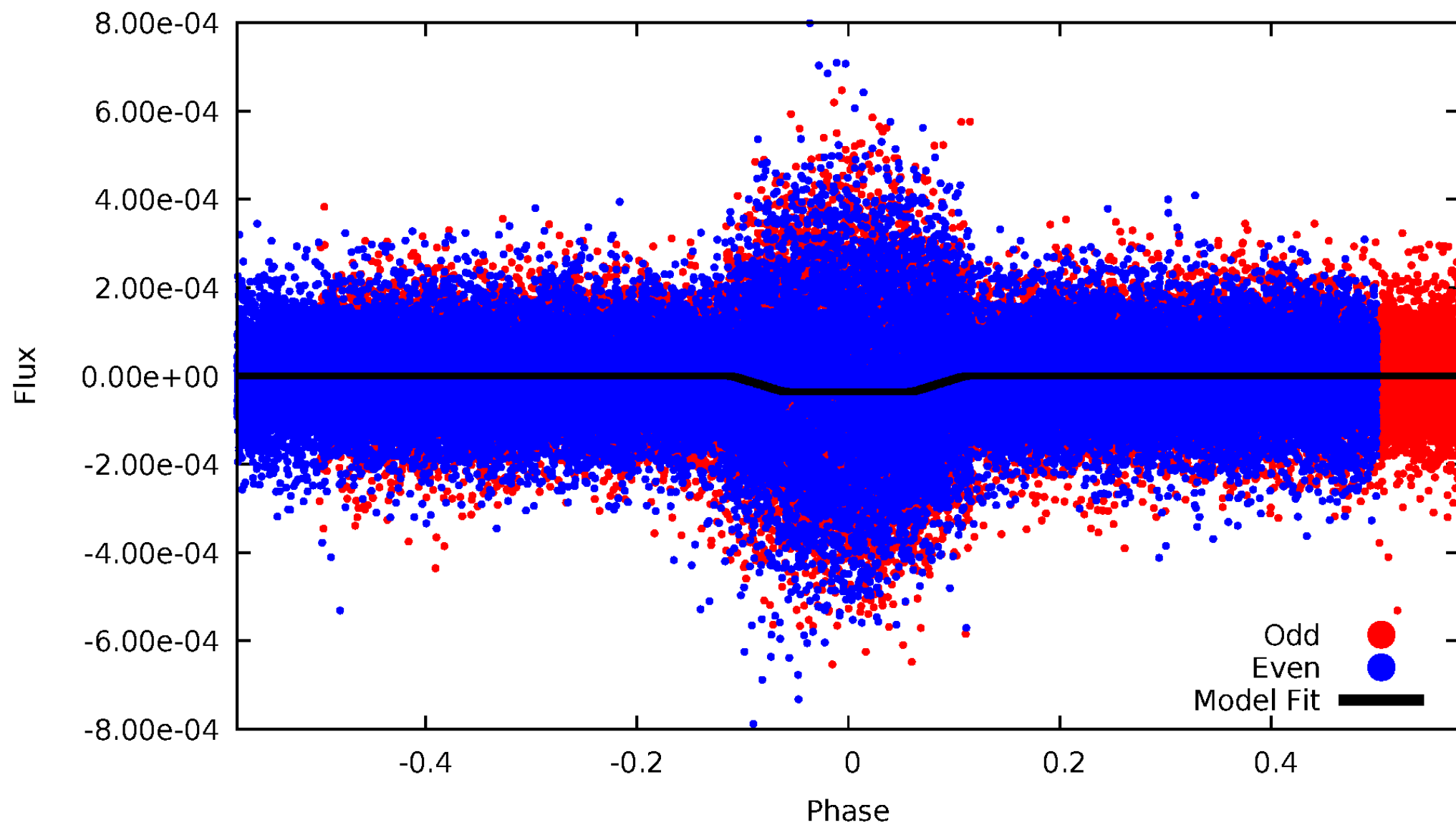
DV Odd/Even

TCE 012509148-01



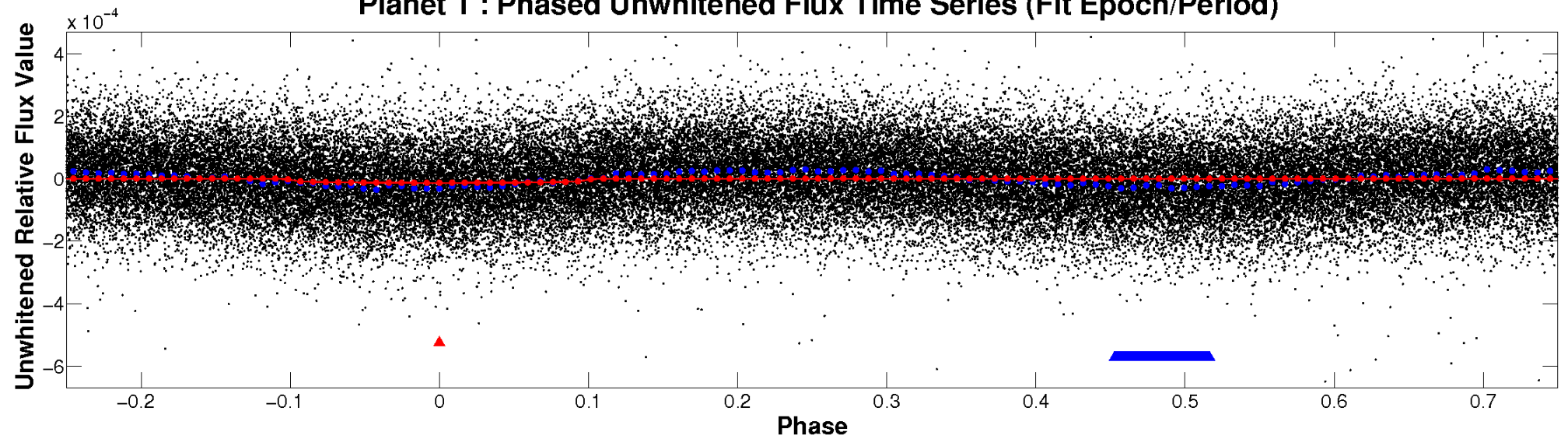
ALT Odd/Even

TCE 012509148-01

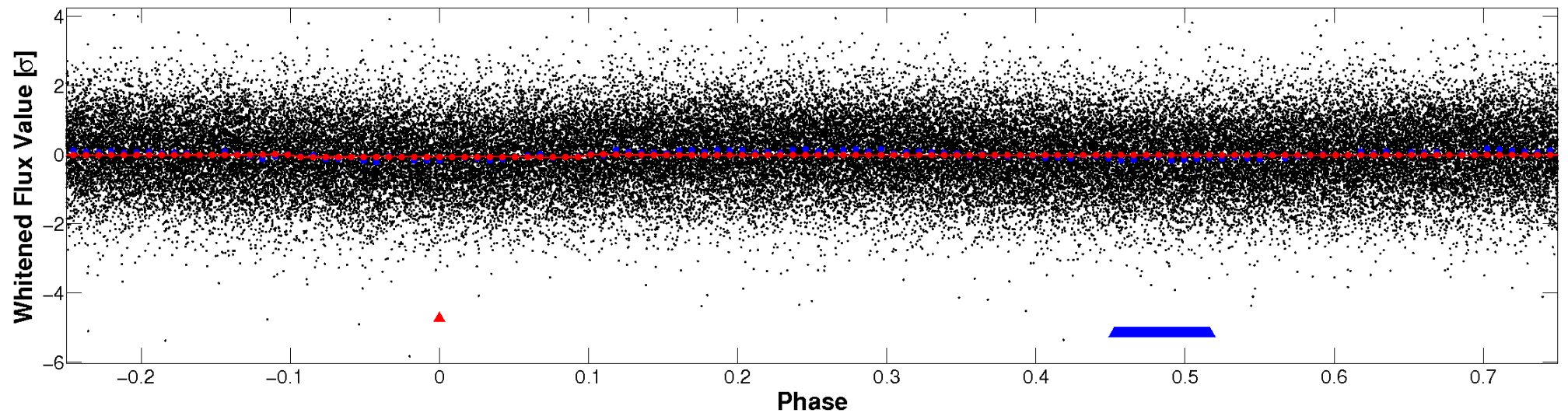


Non-Whitened Vs. Whitened Light Curve

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

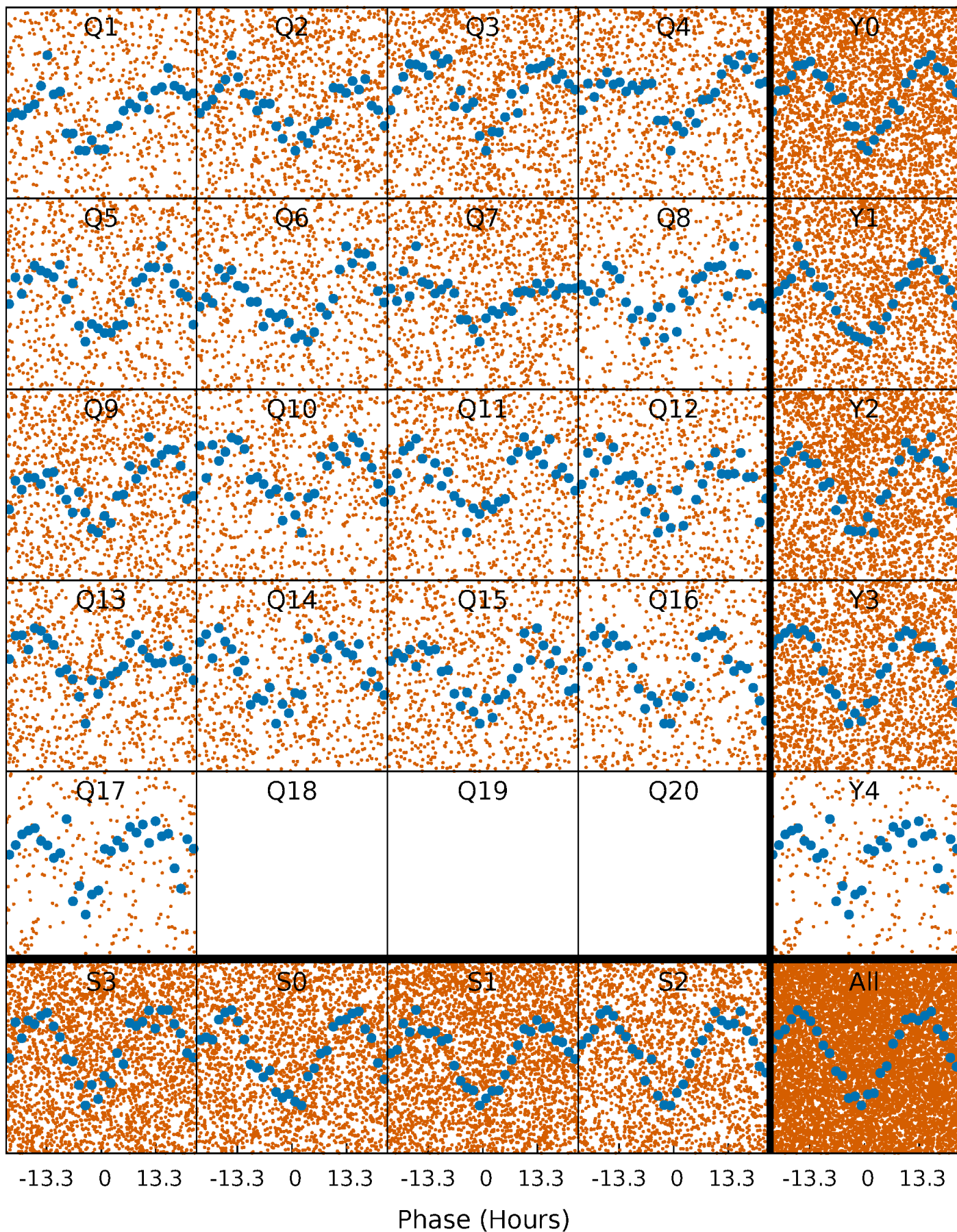


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



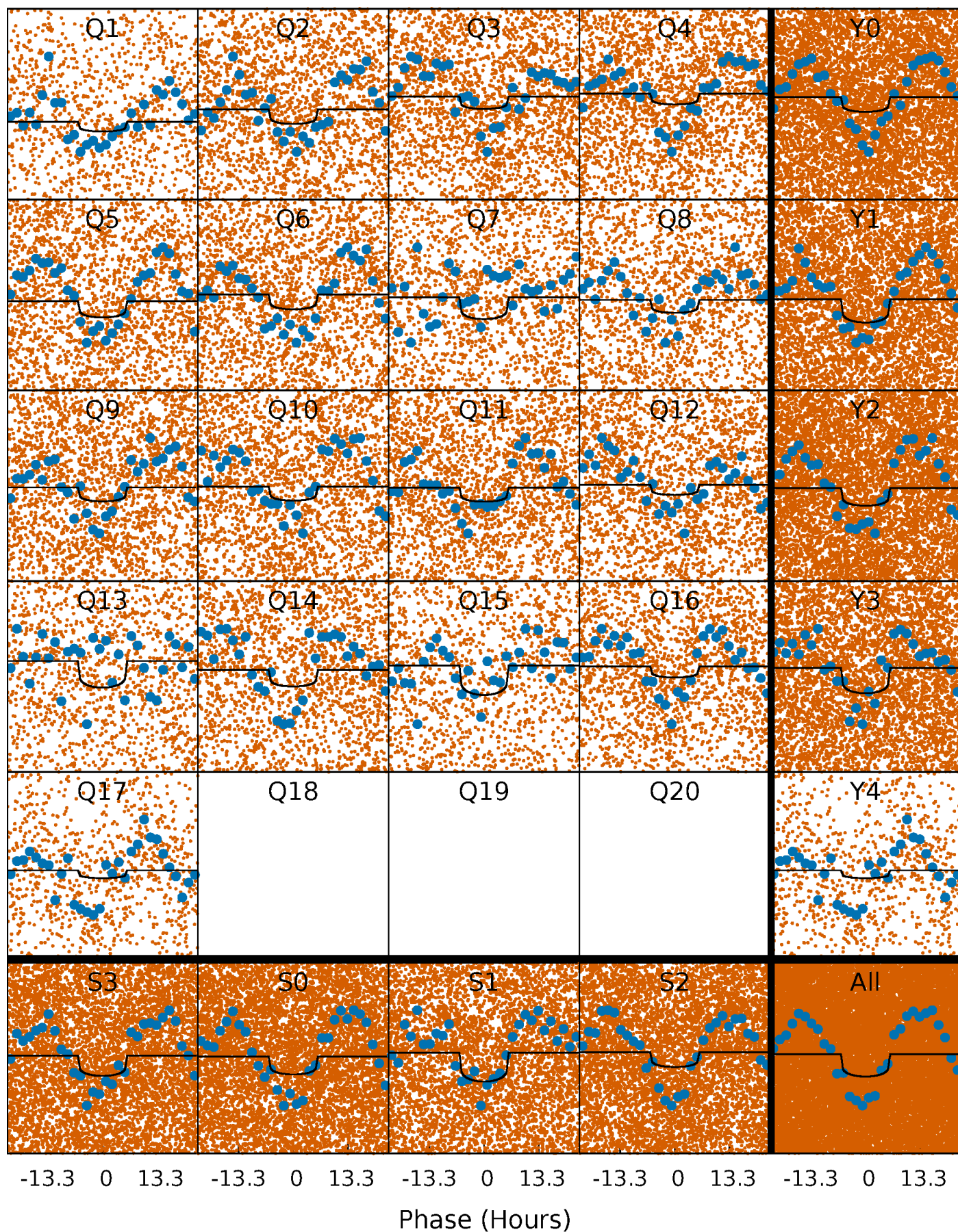
PDC Quarter-Phased Transit Curves

TCE 012509148-01 P= 2.414113 Days $T_0=132.278837$ (BKJD)



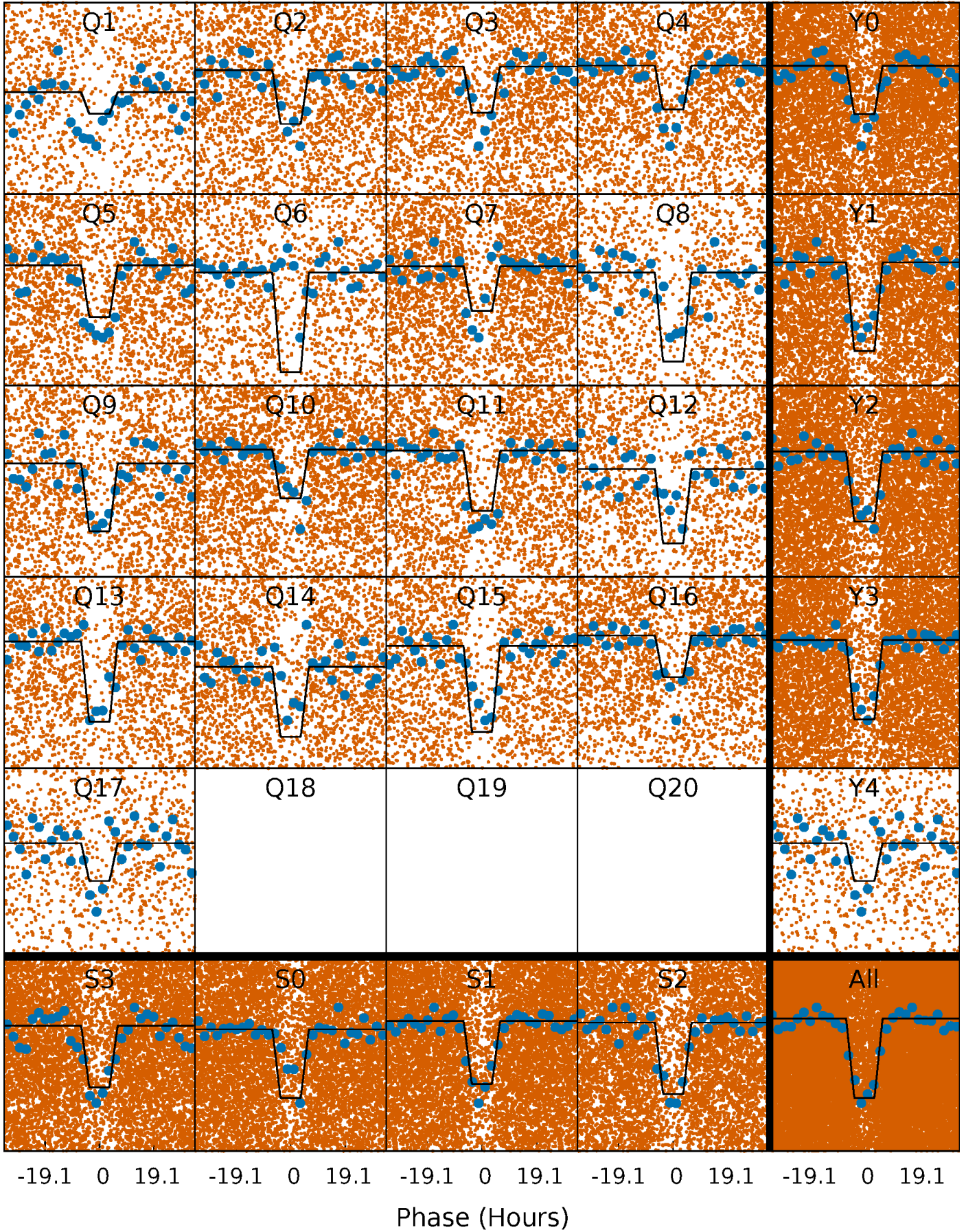
DV Quarter-Phased Transit Curves

TCE 012509148-01 P= 2.414113 Days $T_0=132.278837$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

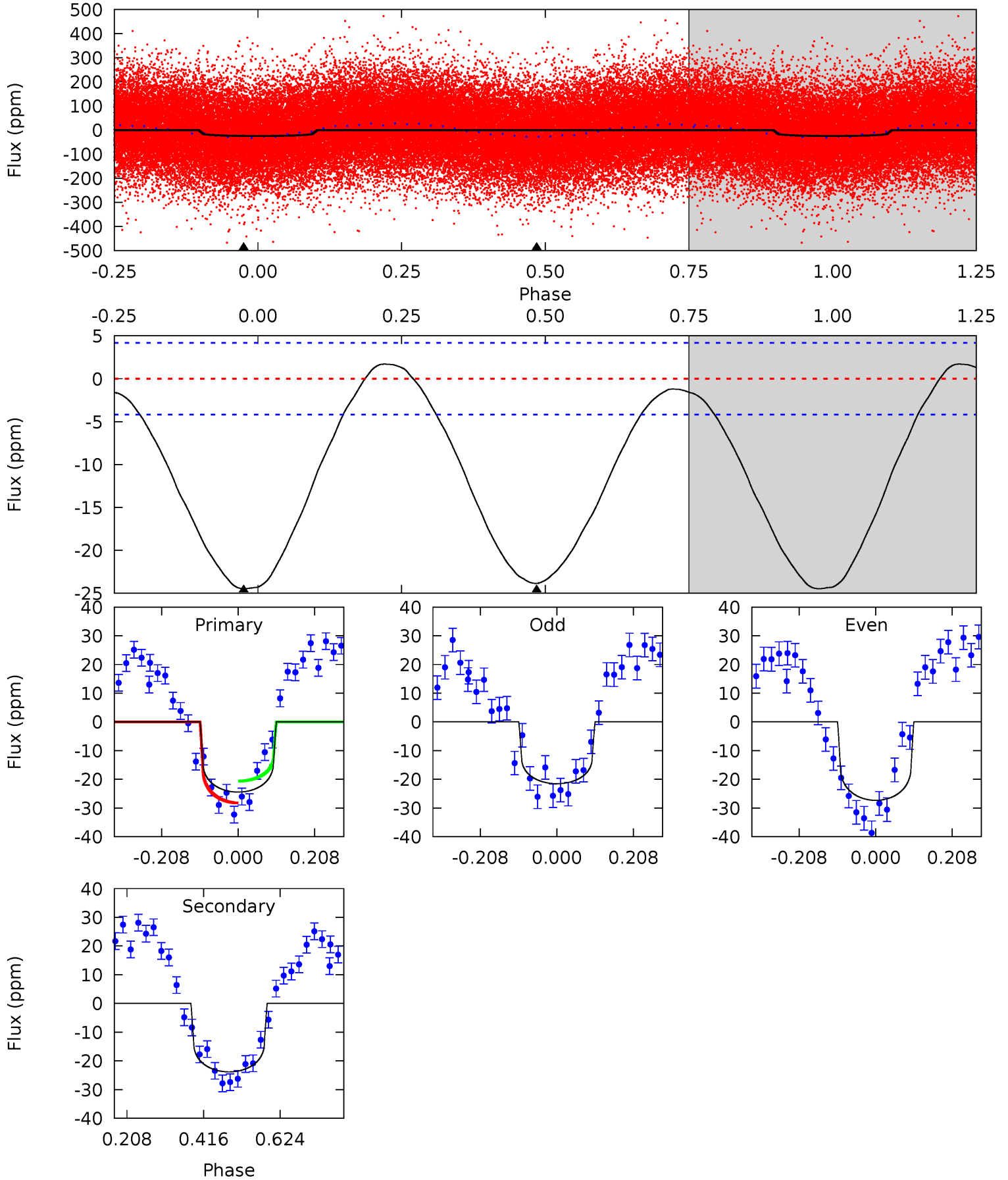
TCE 012509148-01 P= 2.413851 Days $T_0=132.349768$ (BKJD)



DV Model-Shift Uniqueness Test

012509148-01, P = 2.414113 Days, E = 129.864724 Days

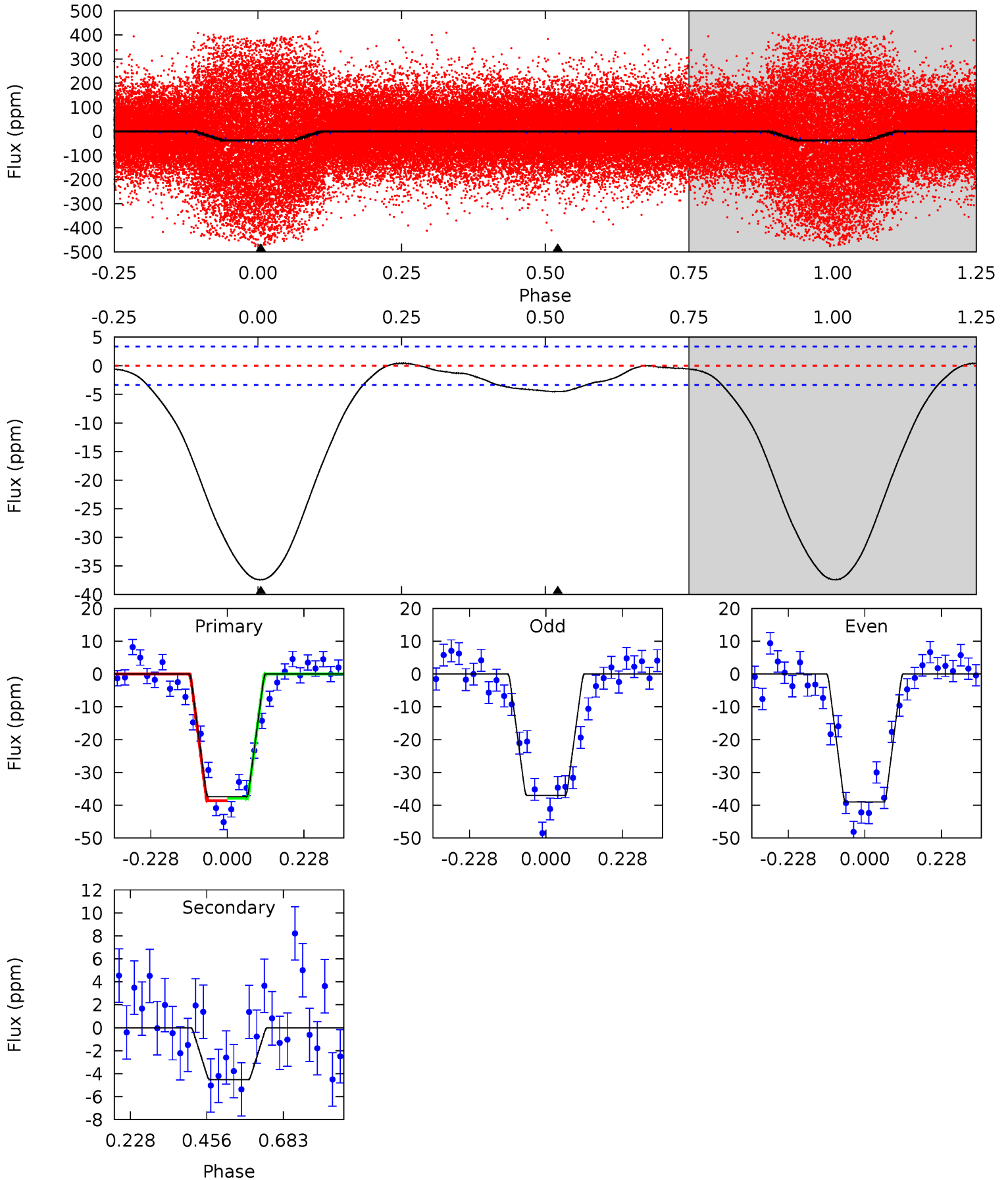
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.8	25.1	0	0	4.41	1.26	1.45	25.8	25.8	25.1	25.1	3.08	1.04	0.07	4.07



Alt Model-Shift Uniqueness Test

012509148-01, P = 2.413851 Days, E = 129.935917 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.0	5.92	0	0	4.39	1.21	0.70	49.0	49.0	5.92	5.92	1.33	0.85	0.01	0.52



Stellar Parameters For KIC 012509148

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+163}_{-204}	$3.688^{+0.296}_{-0.074}$	$-0.160^{+0.300}_{-0.250}$	$3.139^{+0.463}_{-1.159}$	$1.754^{+0.163}_{-0.353}$	$0.080^{+0.170}_{-0.020}$
	+2%/-3%	+8%/-2%	+188%/-156%	+15%/-37%	+9%/-20%	+213%/-25%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 012509148-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-24 ± 1	$1.12^{+0.32}_{-0.32}$	3553^{+193}_{-290}	8304^{+1658}_{-1077}	19^{+18}_{-7}
Alt.	-5 ± 1	$1.91^{+0.39}_{-0.42}$	3549^{+199}_{-285}	4087^{+362}_{-332}	$1.220^{+0.738}_{-0.403}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

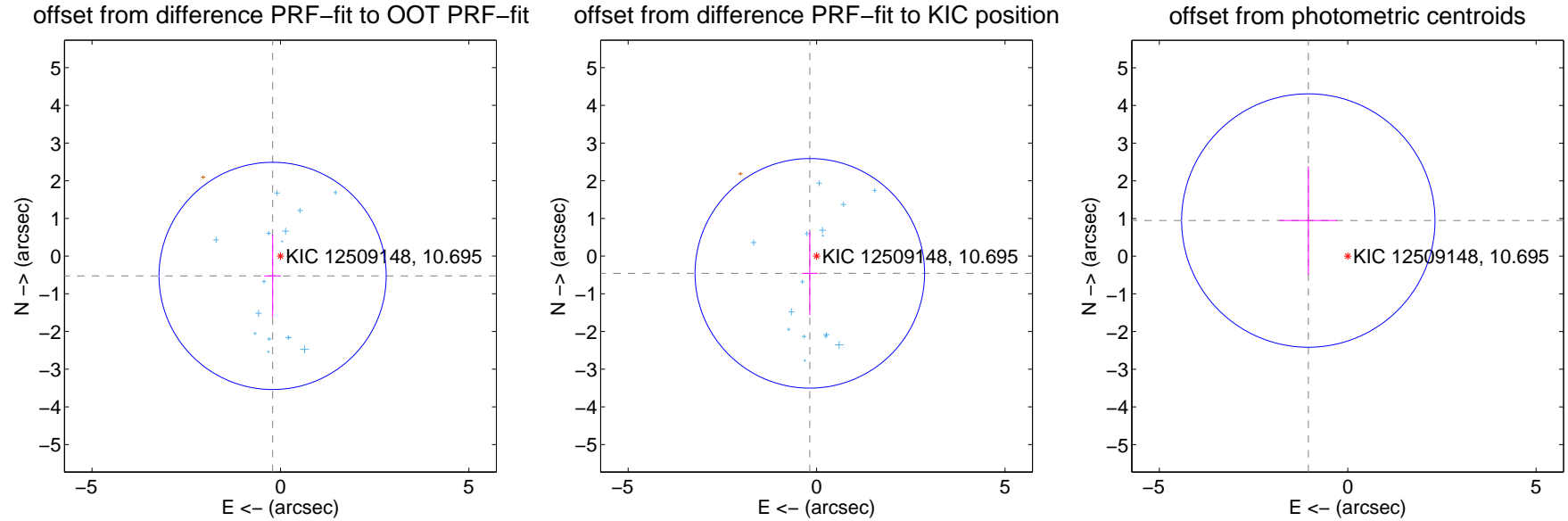
DV Centroid Data

Supplemental centroid analysis for 012509148-01. **Kepler magnitude: 10.70.** Transit SNR 7.75

There are 15 quarters with good PRF difference image offsets

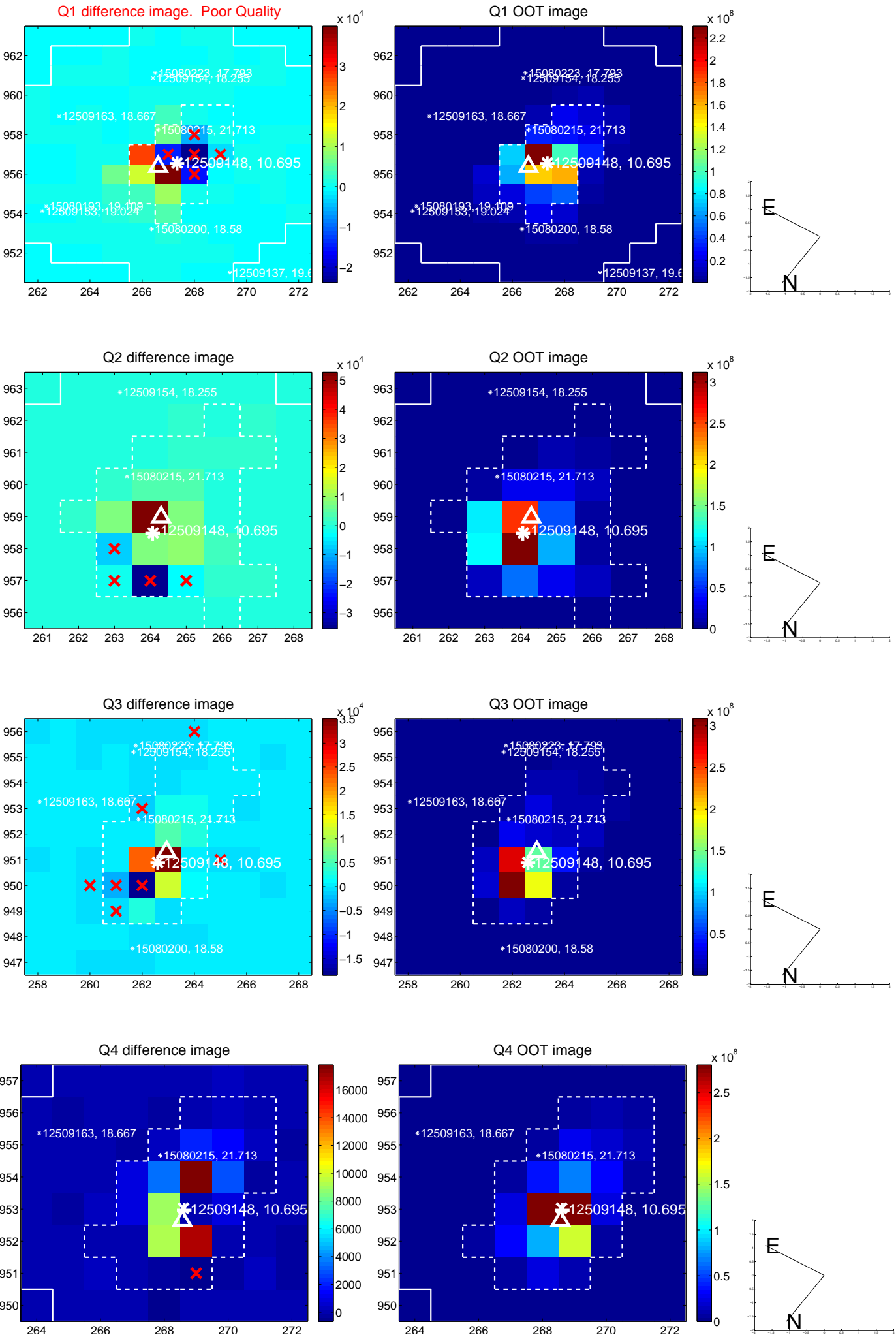
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.565 ± 1.005	0.56	0.208 ± 0.223	-0.525 ± 1.097
PRF-fit source offset from KIC position	0.491 ± 1.015	0.48	0.179 ± 0.207	-0.457 ± 1.107
photometric centroid source offset	1.41 ± 1.12	1.26	1.05 ± 0.77	0.95 ± 1.44

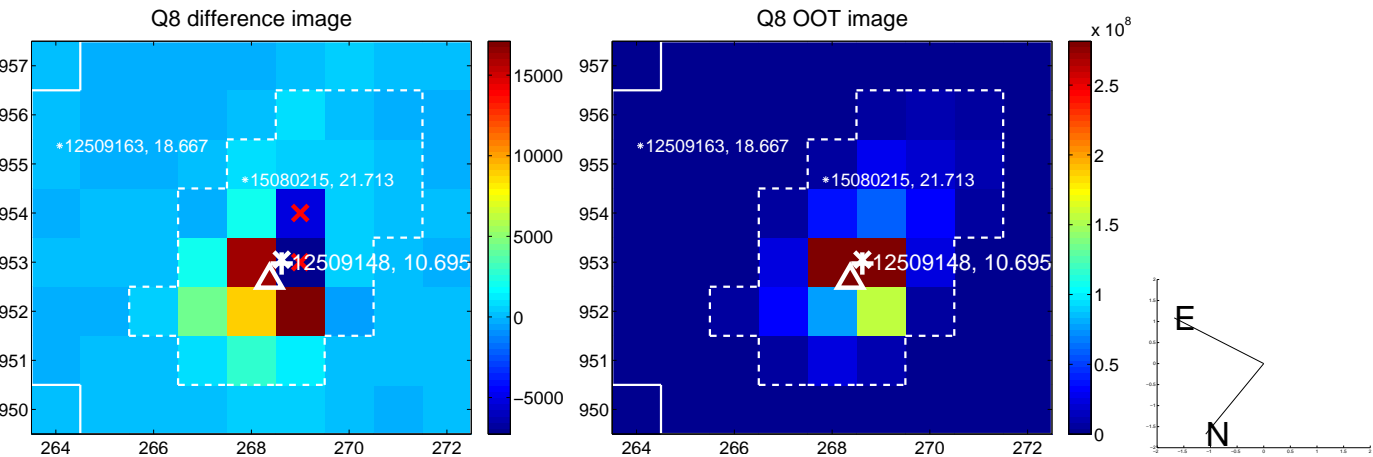
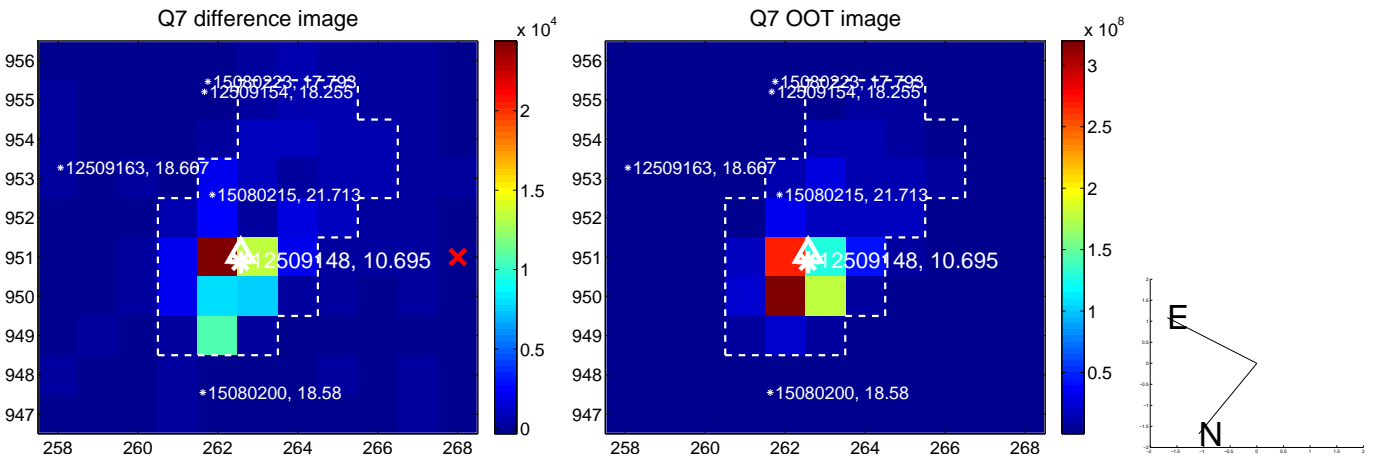
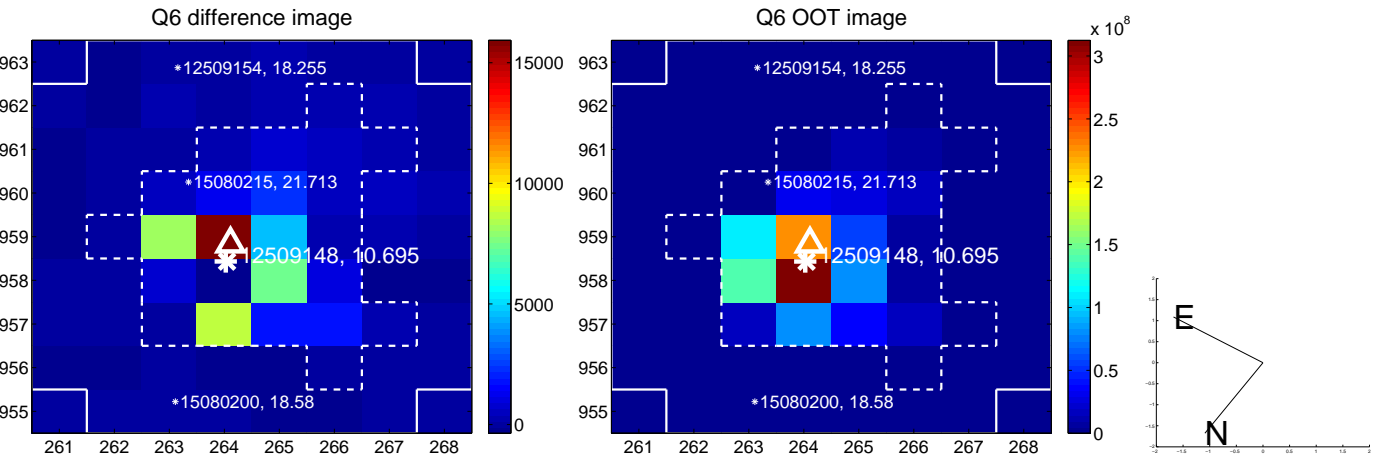
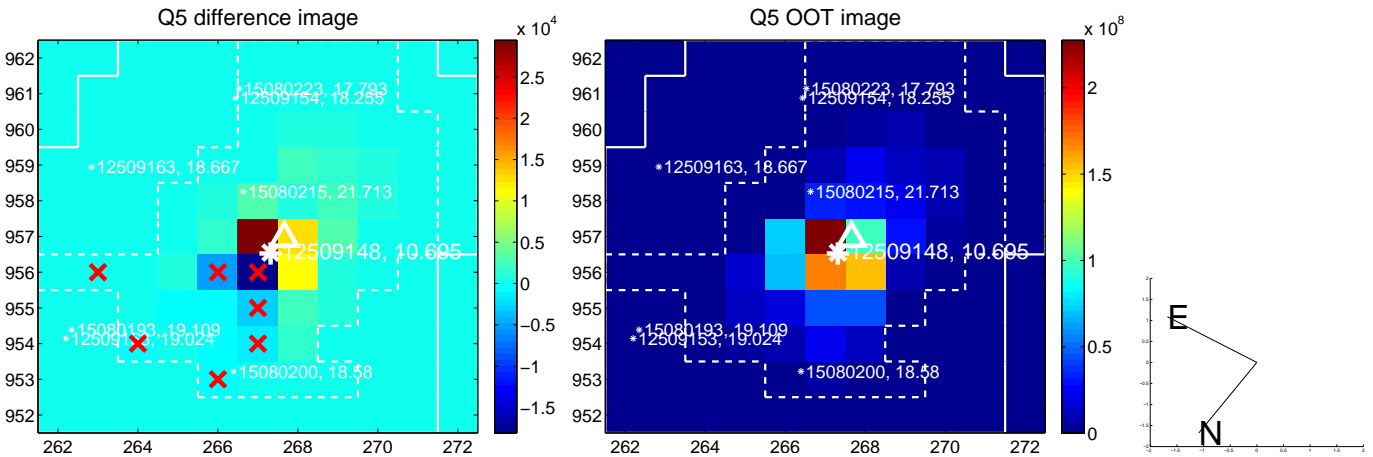


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

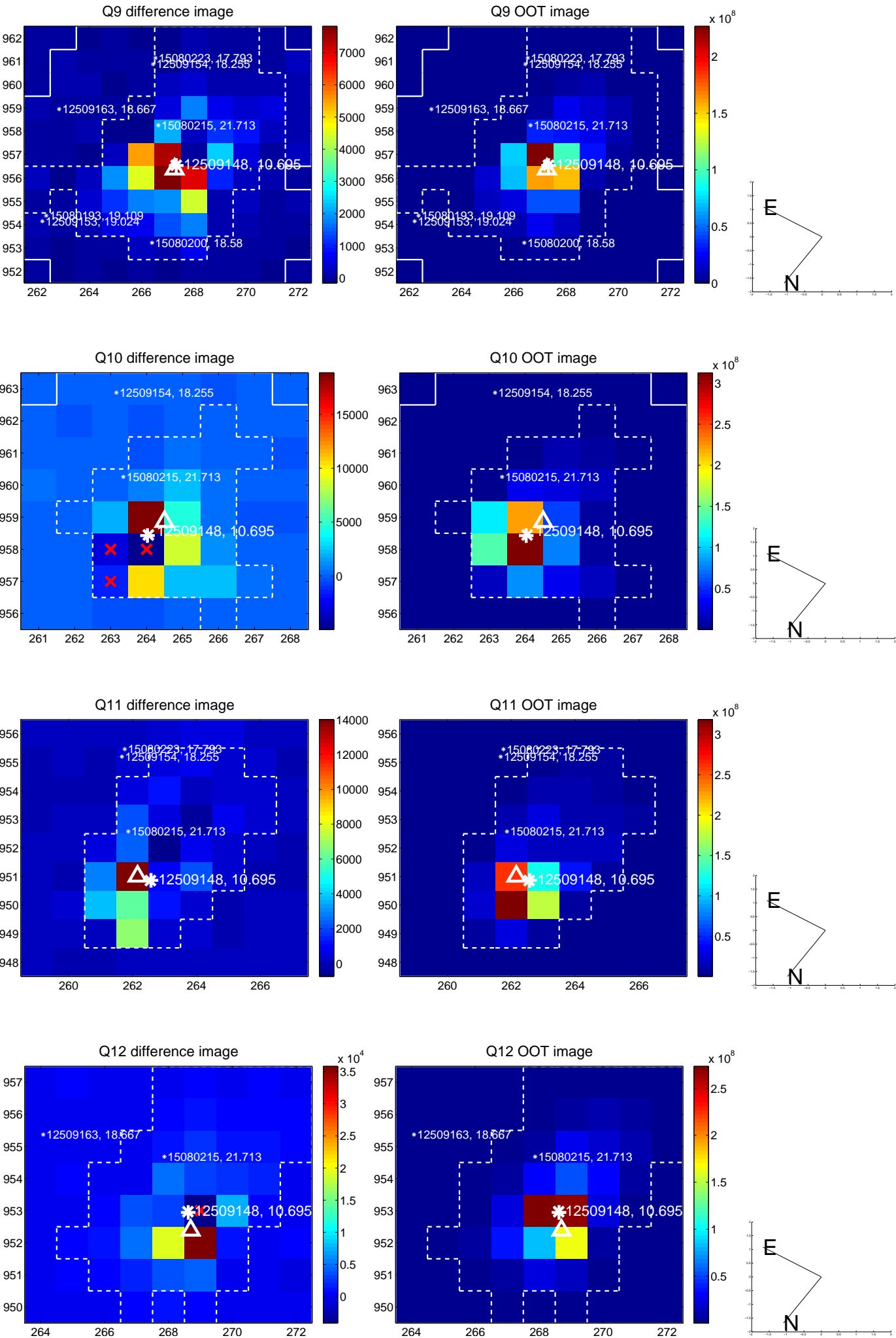
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



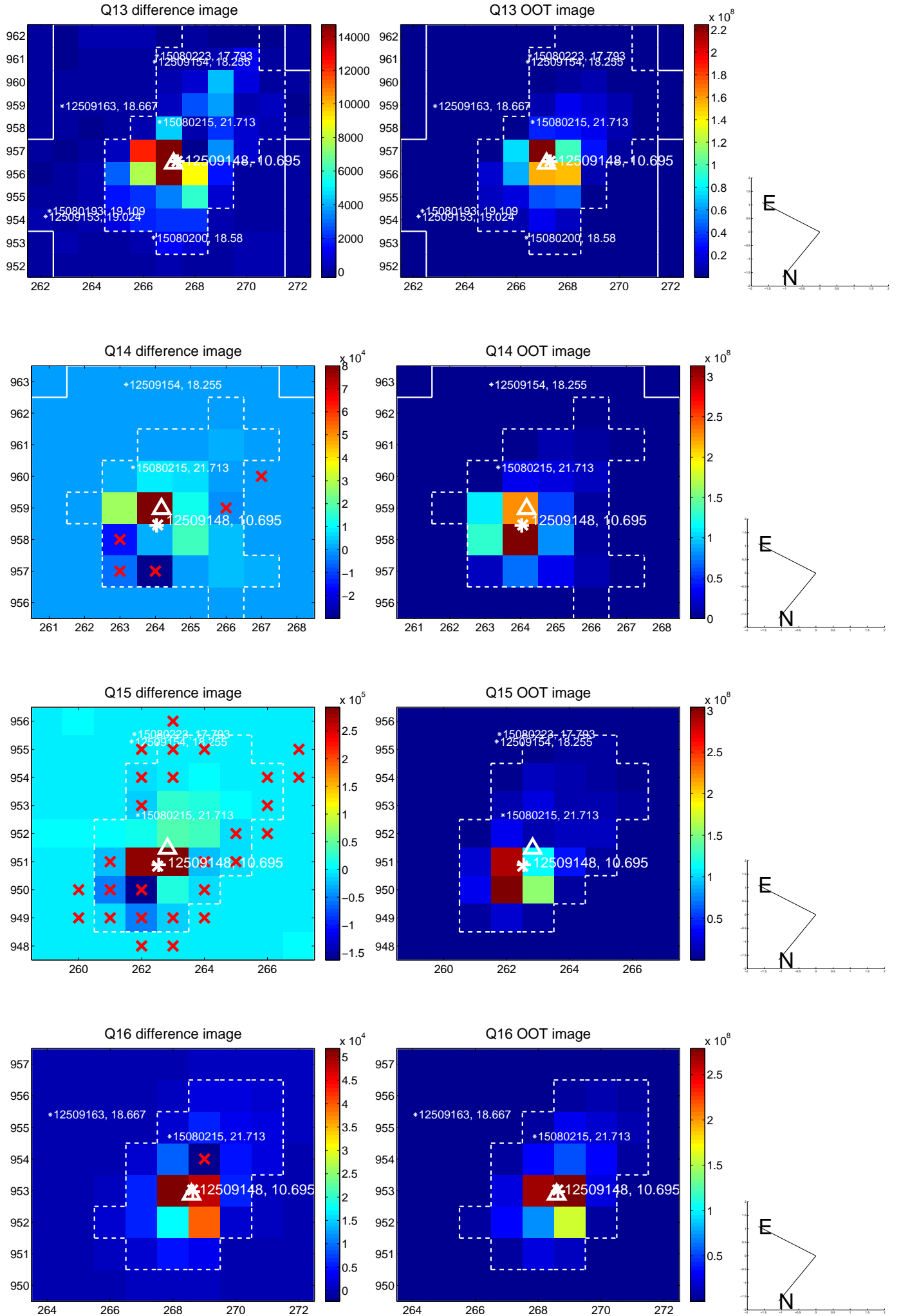
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



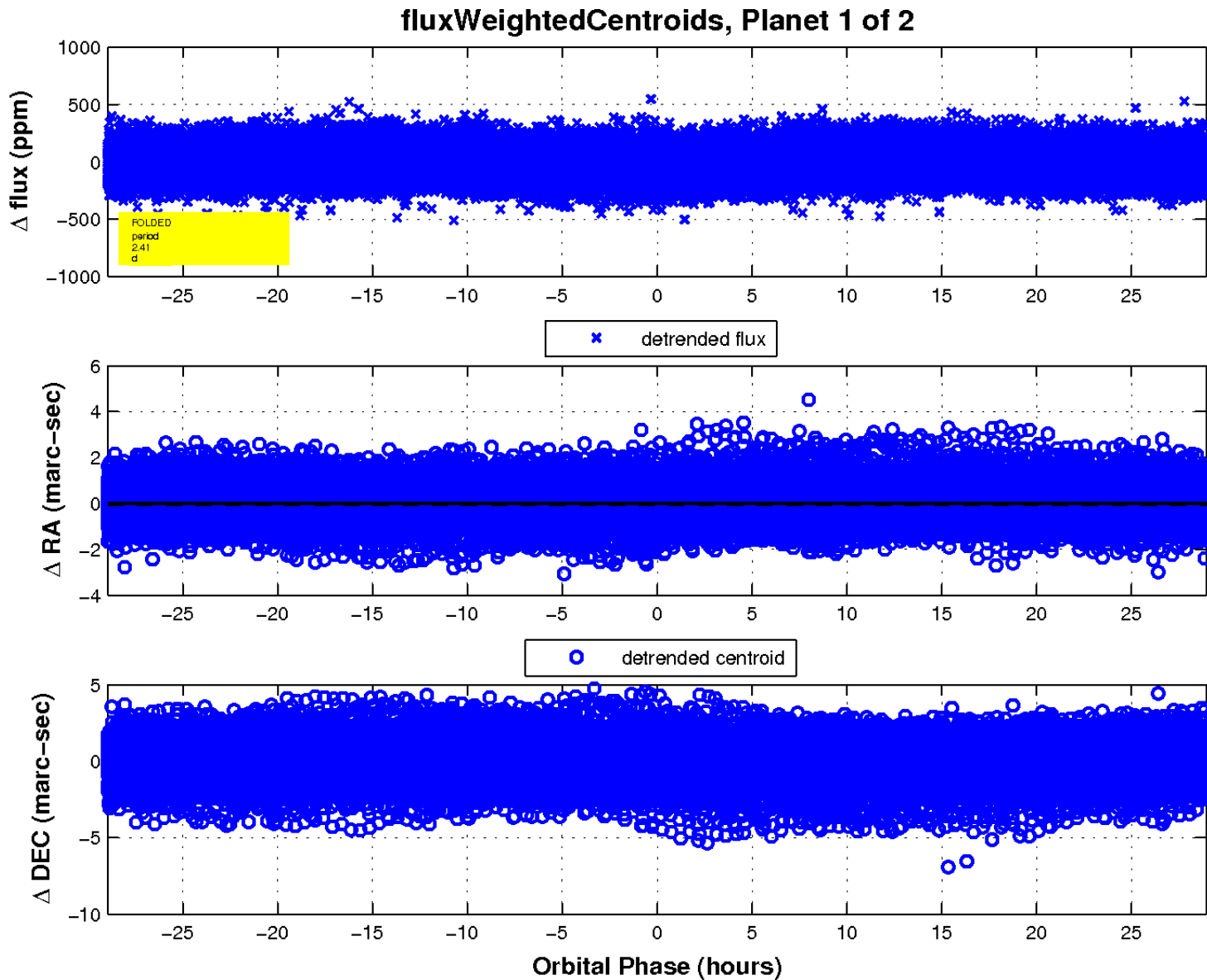
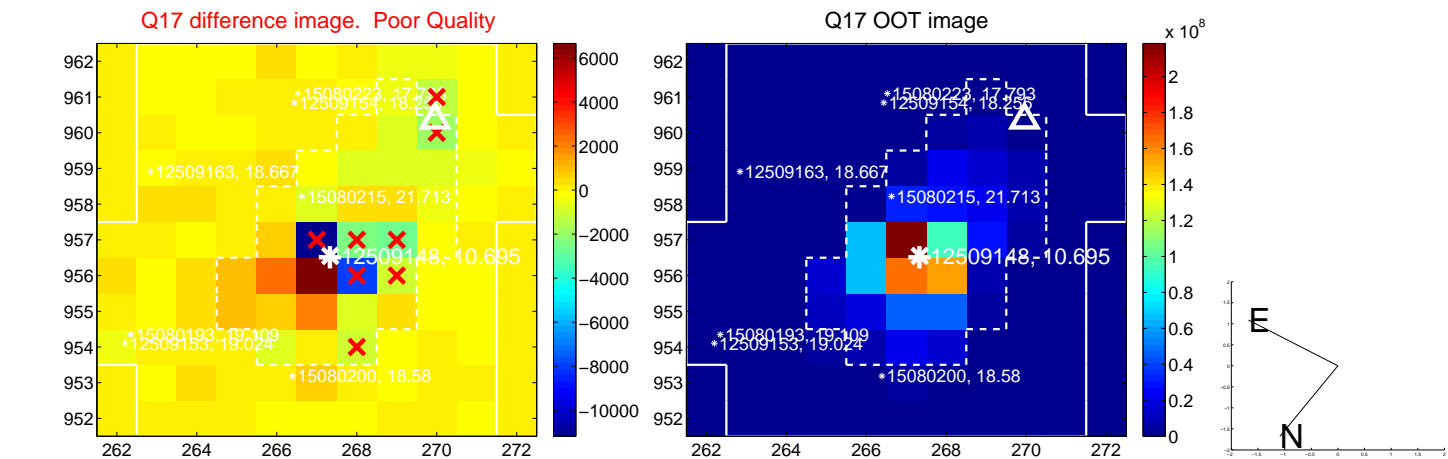
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



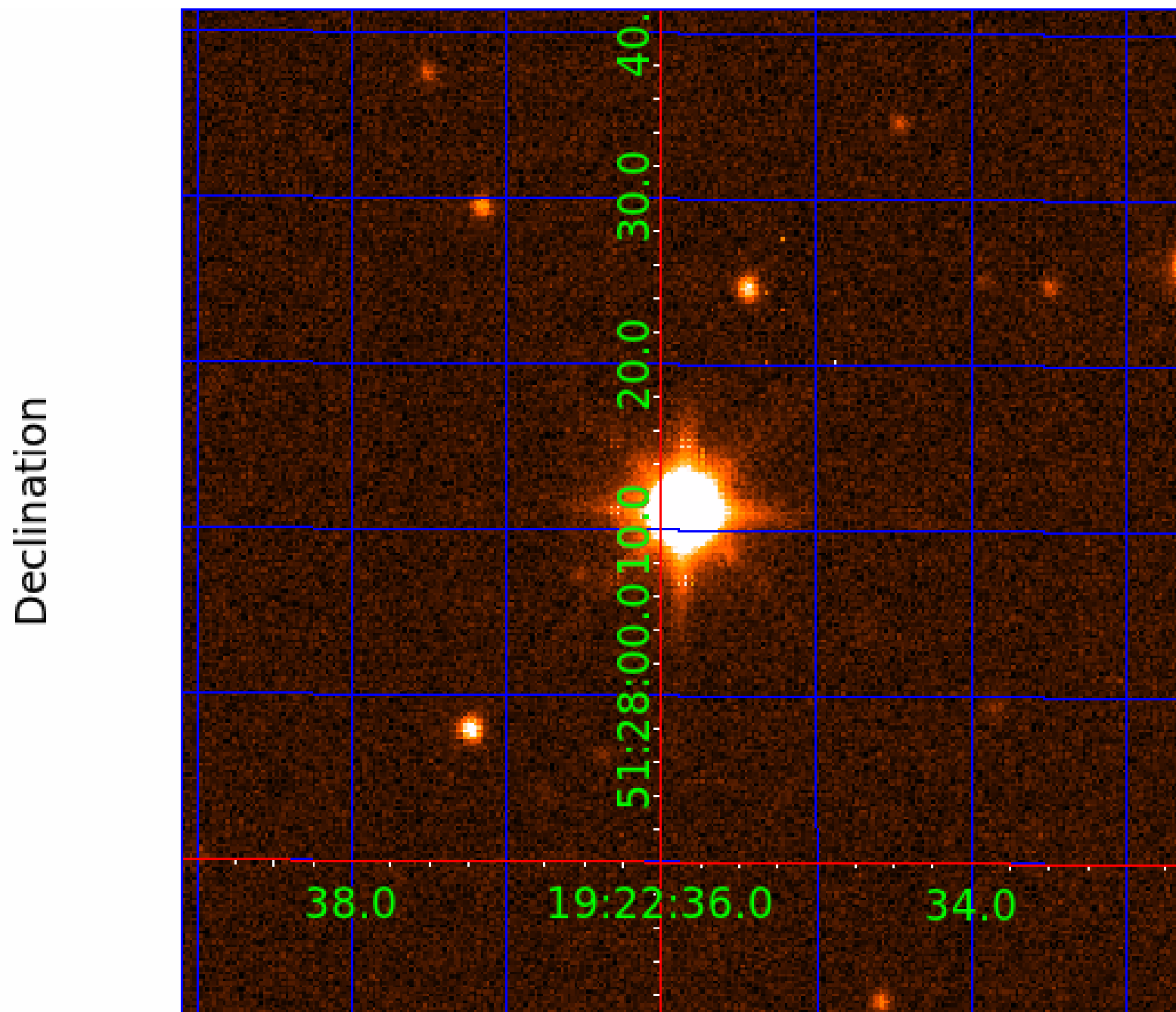
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 012509148

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})
012509148-01	OBS	No	2.414113	132.278837	13.3	11.599	9.6	7.7	3.14	6859	1.21	10833.99
012509148-02	OBS	No	2.413858	133.525548	17.8	12.738	12.4	12.8	3.14	6859	1.33	10835.51

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012509148-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
012509148-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

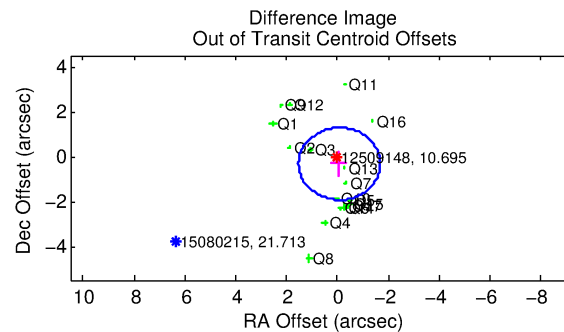
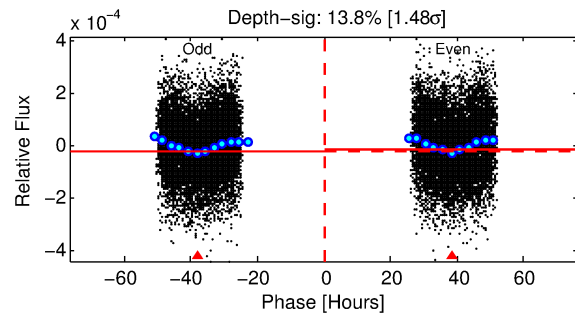
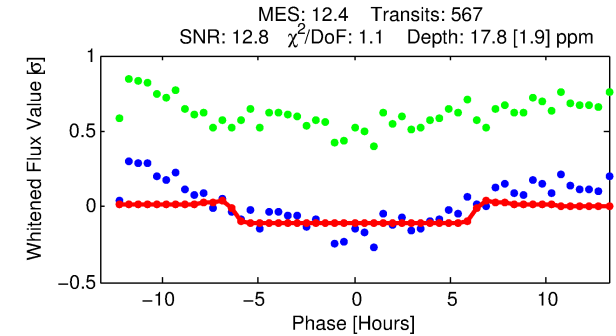
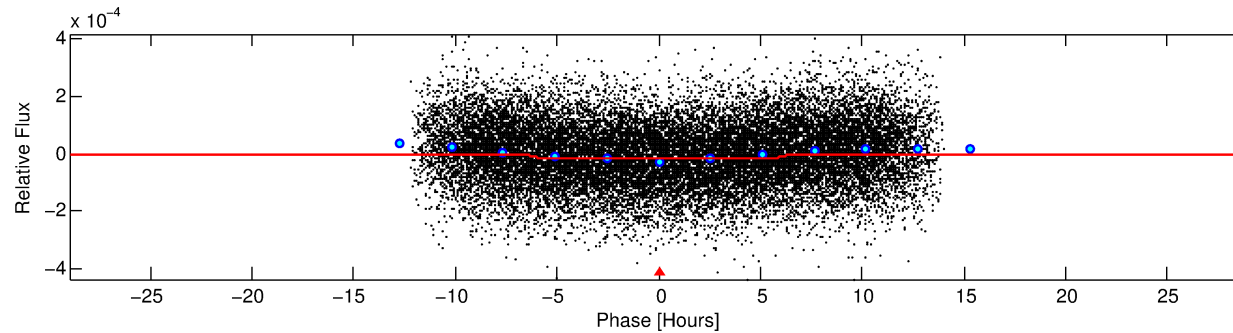
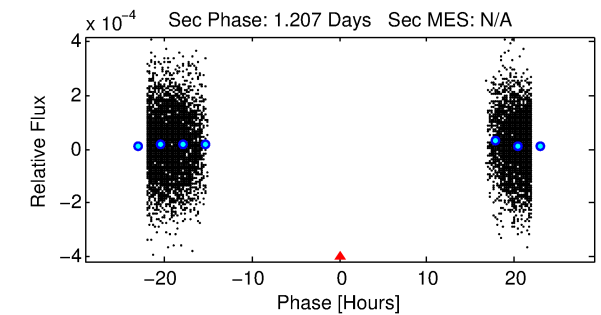
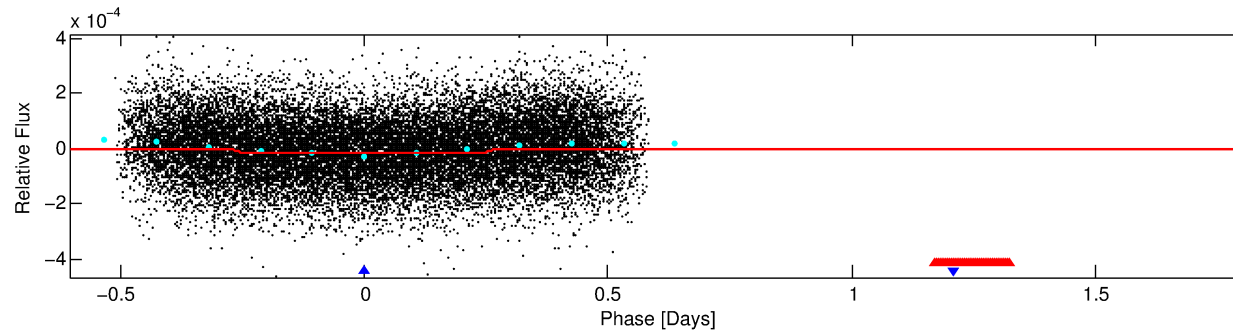
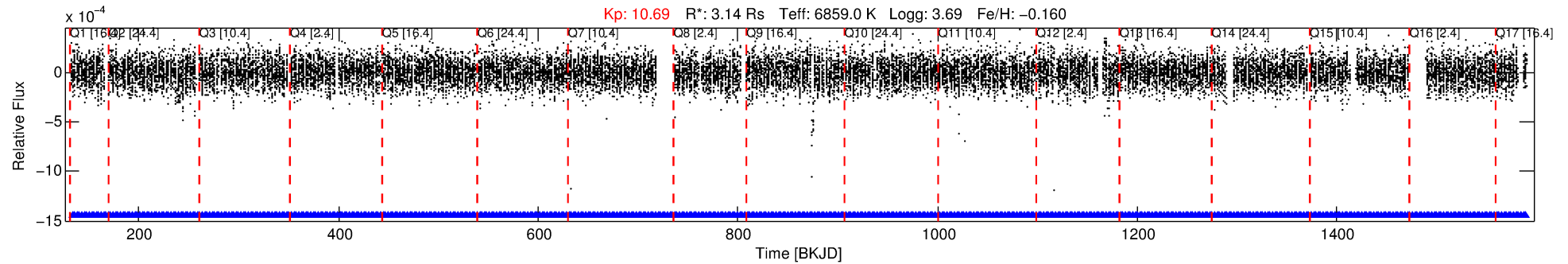
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012509148-02

No Significant Match Found

DV One-Page Summary

KIC: 12509148 Candidate: 2 of 2 Period: 2.414 d



DV Fit Results:

Period = 2.41386 [0.00003] d
Epoch = 133.5255 [0.0064] BKJD
 R_p/R^* = 0.0039 [0.0023]
 a/R^* = 1.58 [3.12]
 b = 0.04 [87.63]
 Seff = 10835.51 [5745.90]
 T_{eq} = 2602 [345] K
 R_p = 1.33 [0.93] R_e
 a = 0.0425 [0.0142] AU

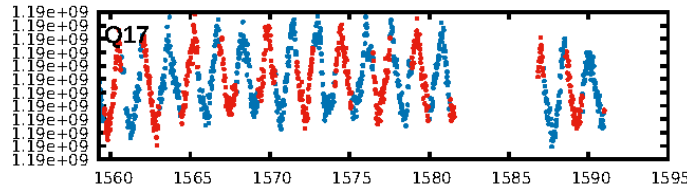
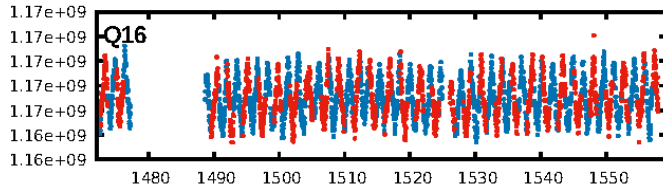
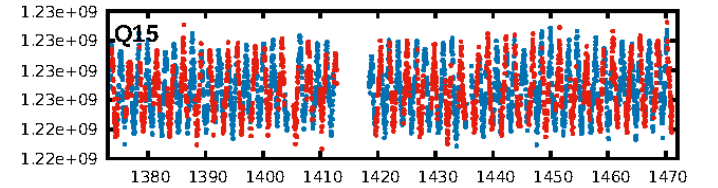
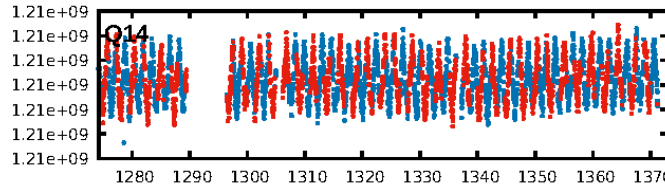
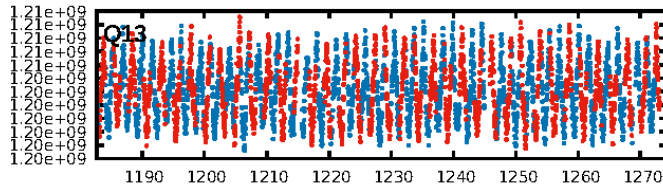
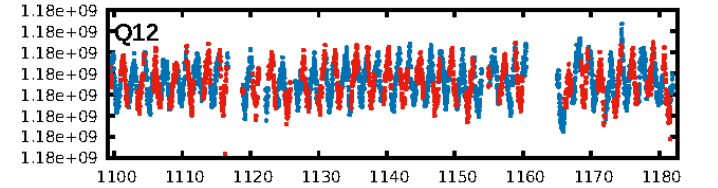
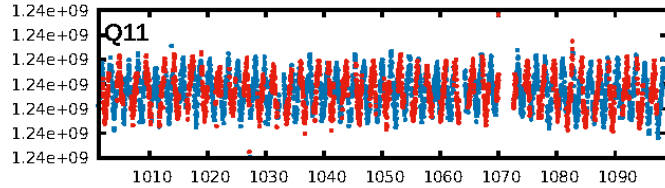
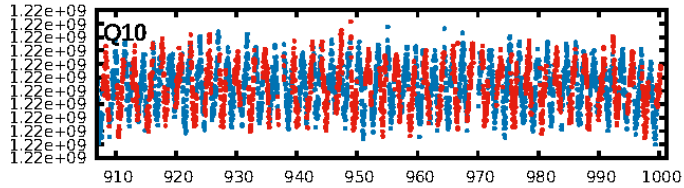
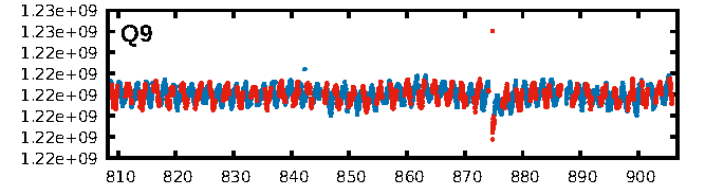
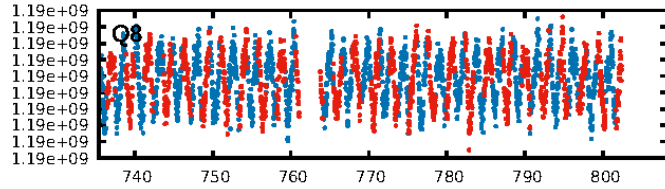
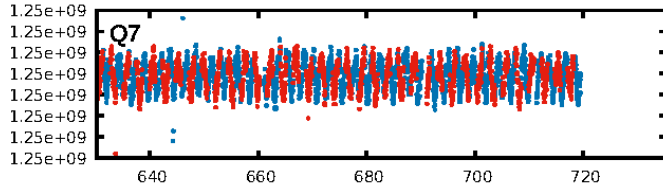
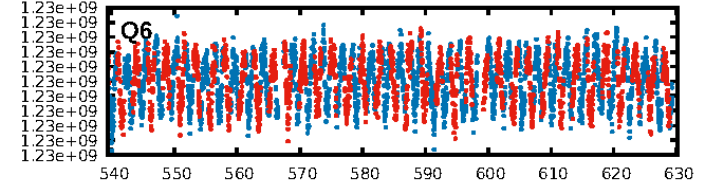
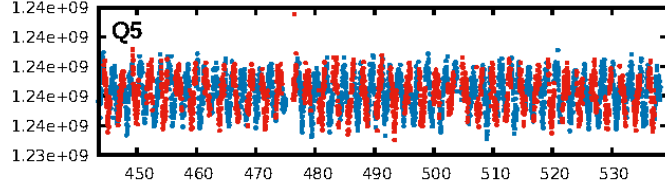
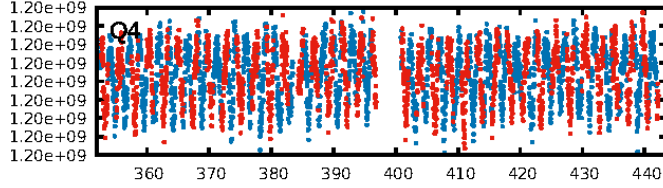
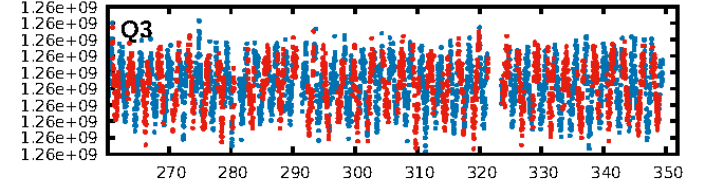
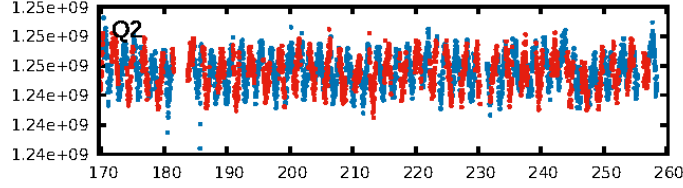
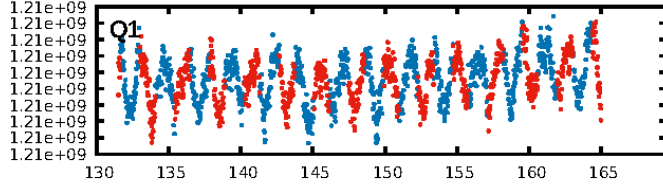
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [541/541]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: 1.842 arcsec [3.18σ]
OotOffset-rm: 0.338 arcsec [0.63σ]
KicOffset-rm: 0.384 arcsec [0.86σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.76 [13/17]
DiffImageOverlap-fno: 0.59 [10/17]

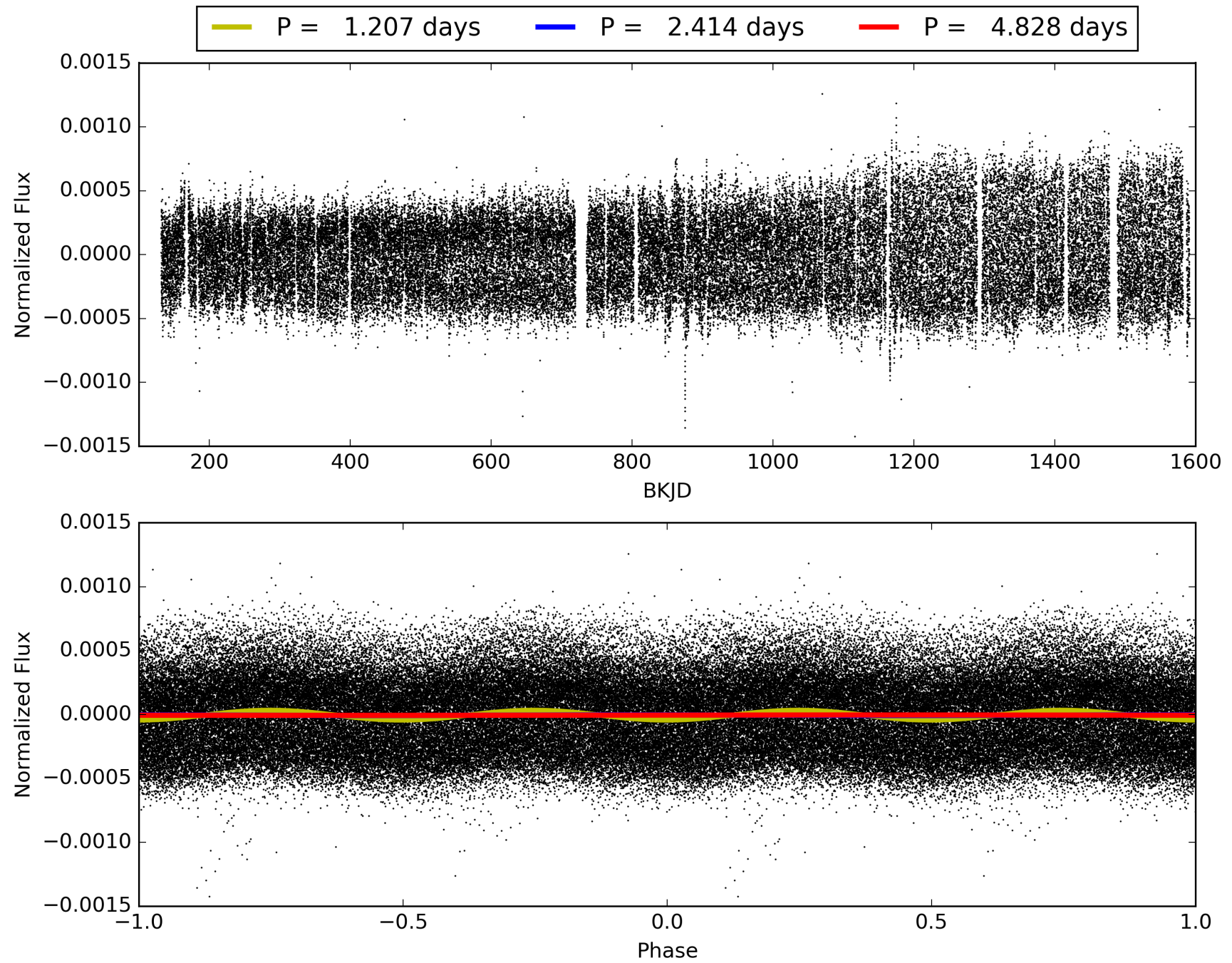
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:36:09 Z

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

TCE 012509148-02, PDC Light Curves

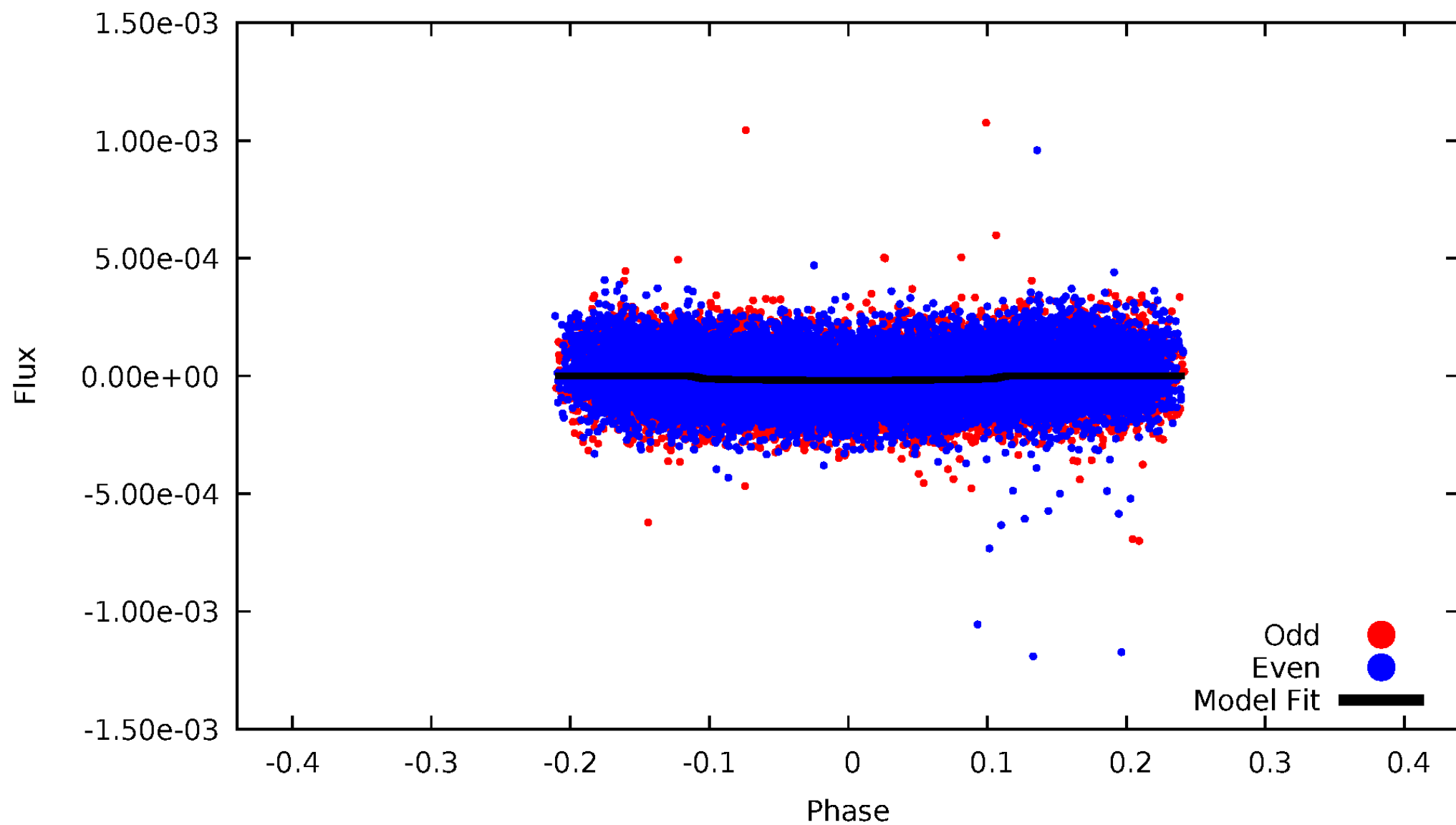


TCE 012509148-02



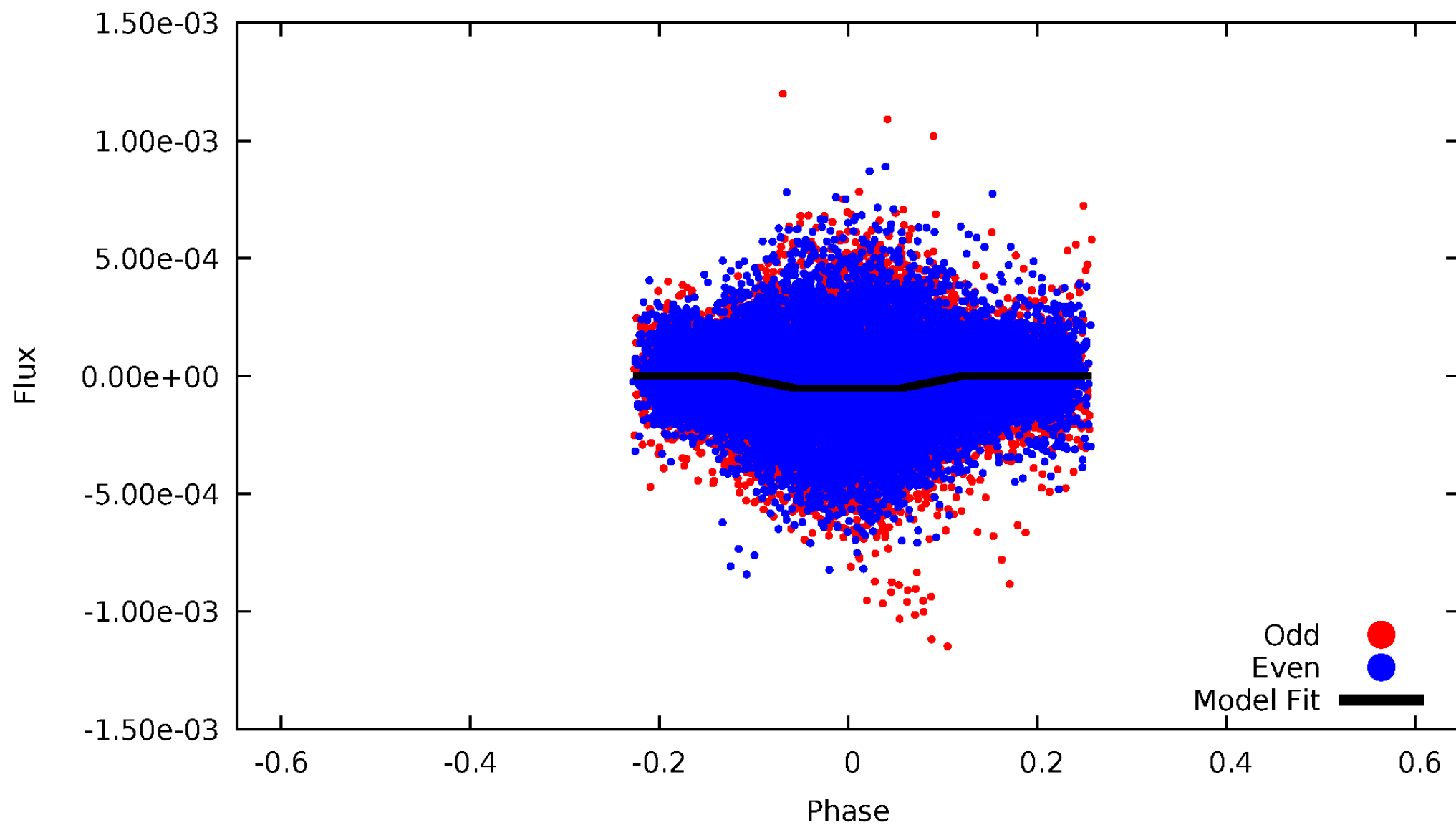
DV Odd/Even

TCE 012509148-02



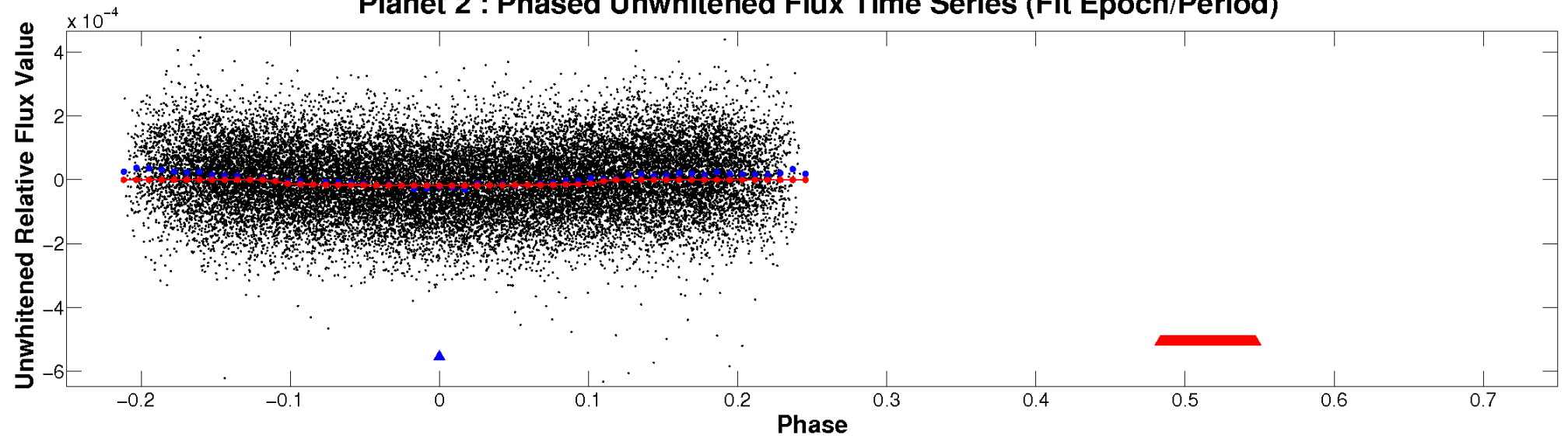
ALT Odd/Even

TCE 012509148-02

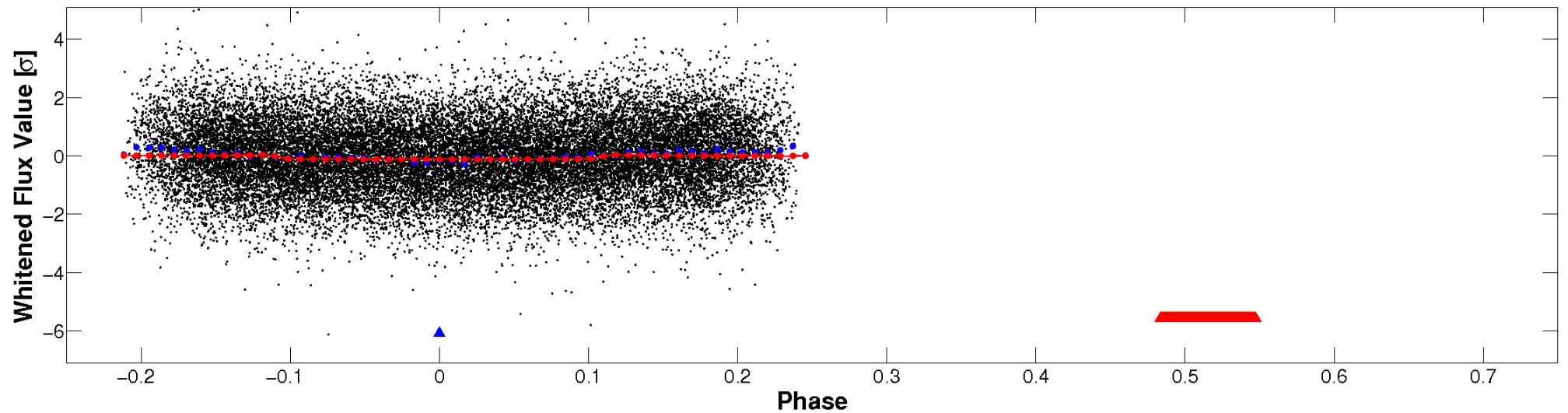


Non-Whitened Vs. Whitened Light Curve

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

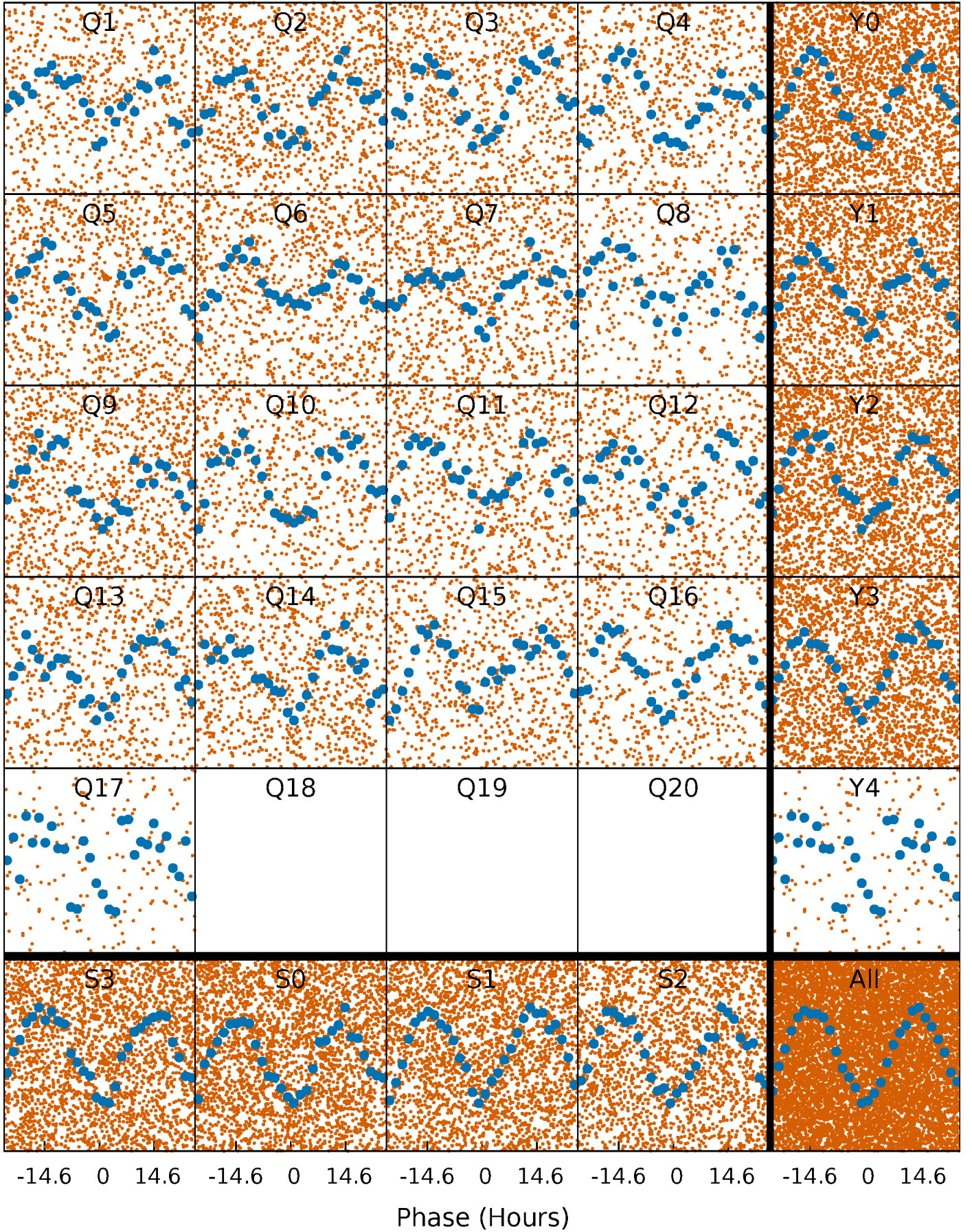


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



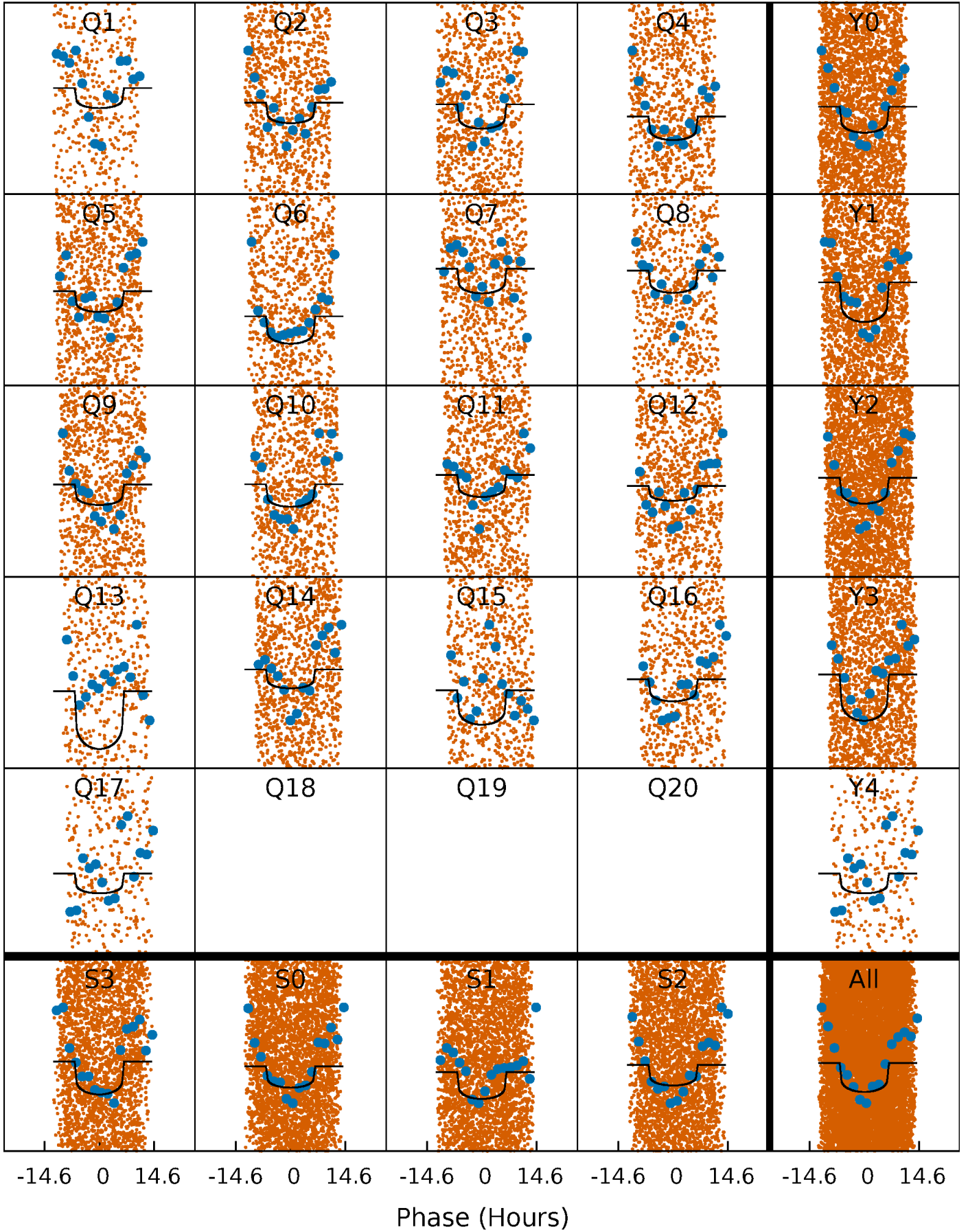
PDC Quarter-Phased Transit Curves

TCE 012509148-02 P= 2.413858 Days $T_0=133.525548$ (BKJD)



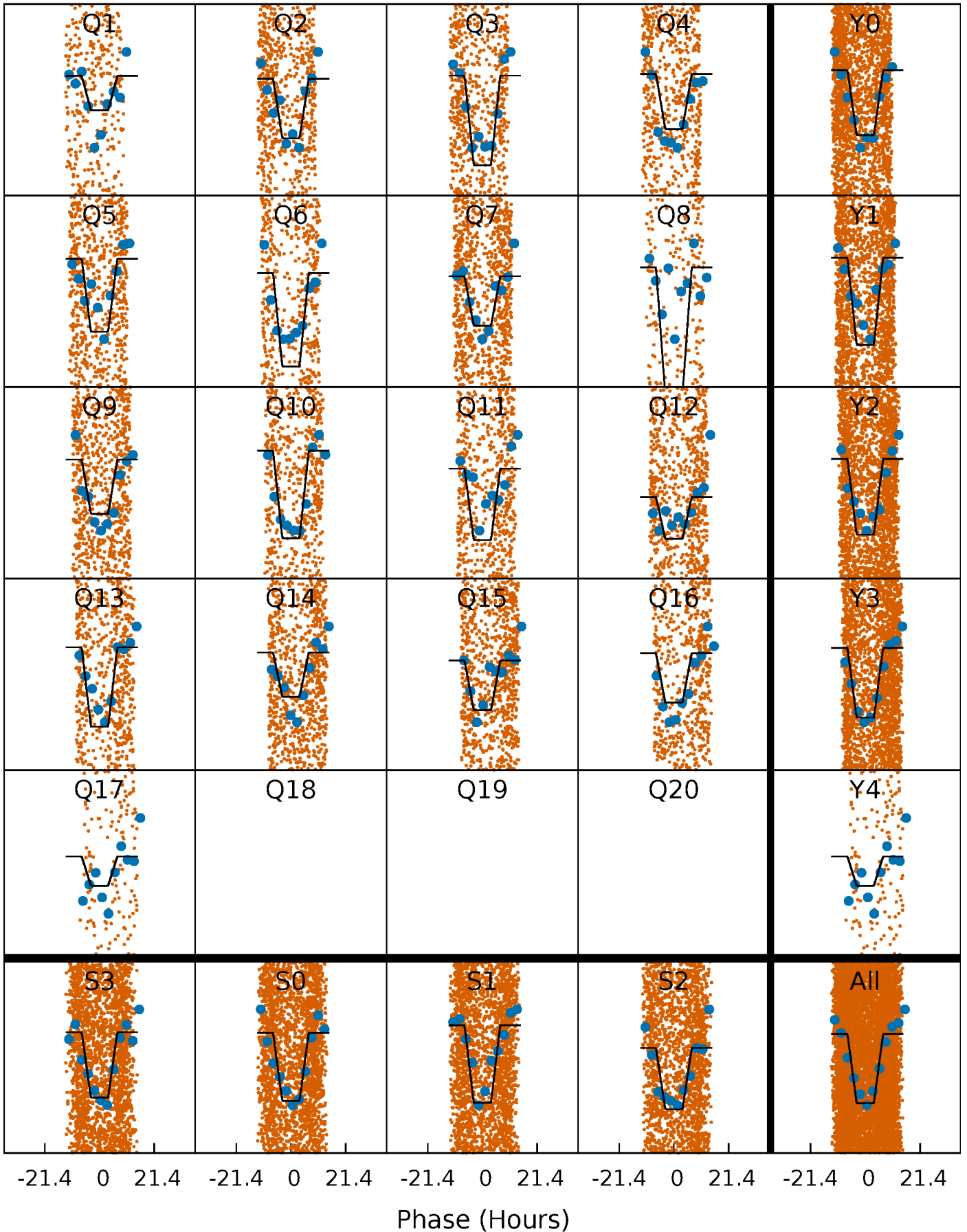
DV Quarter-Phased Transit Curves

TCE 012509148-02 P= 2.413858 Days $T_0=133.525548$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

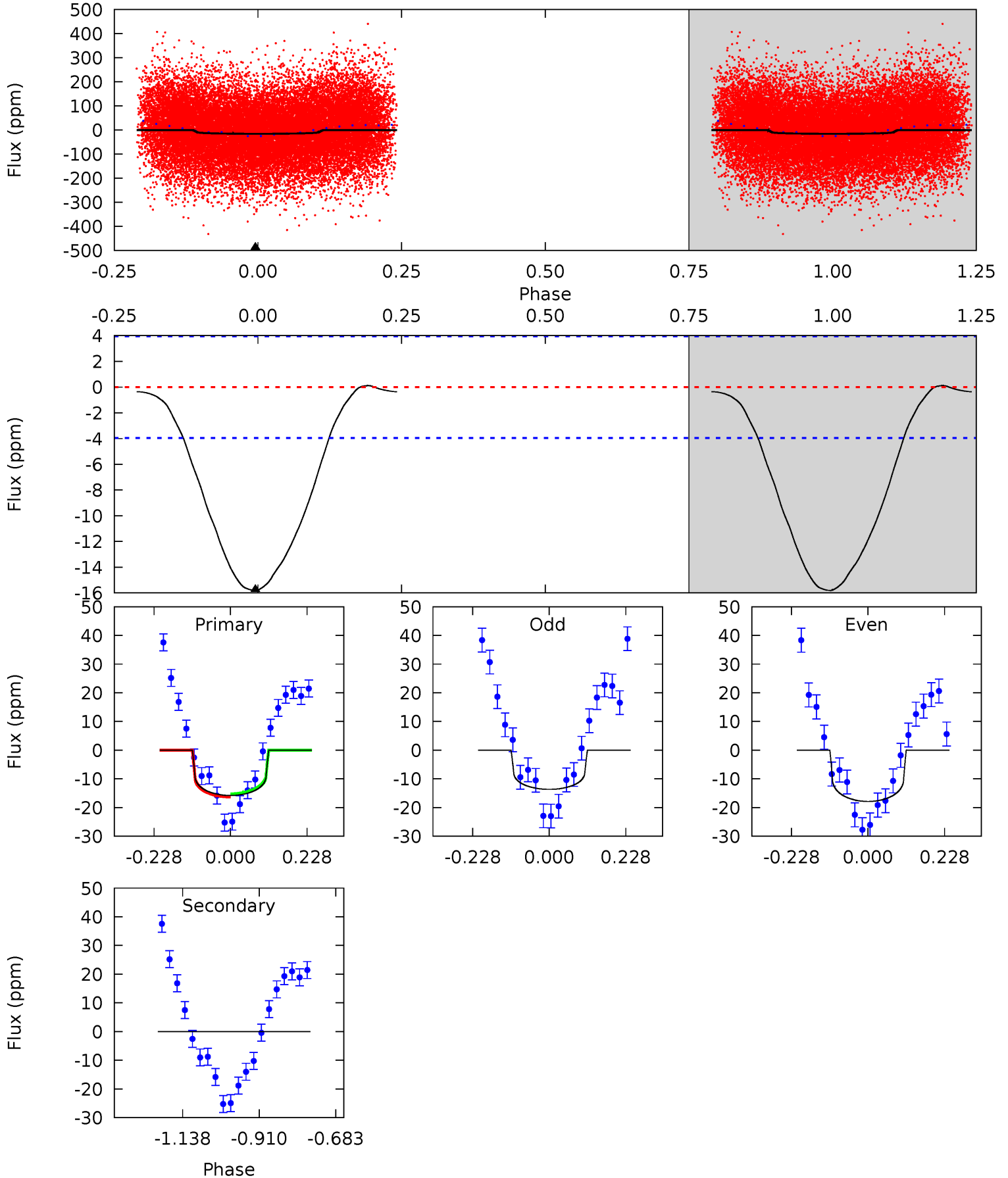
TCE 012509148-02 $P = 2.413727$ Days $T_0 = 133.565880$ (BKJD)



DV Model-Shift Uniqueness Test

012509148-02, P = 2.413858 Days, E = 131.111690 Days

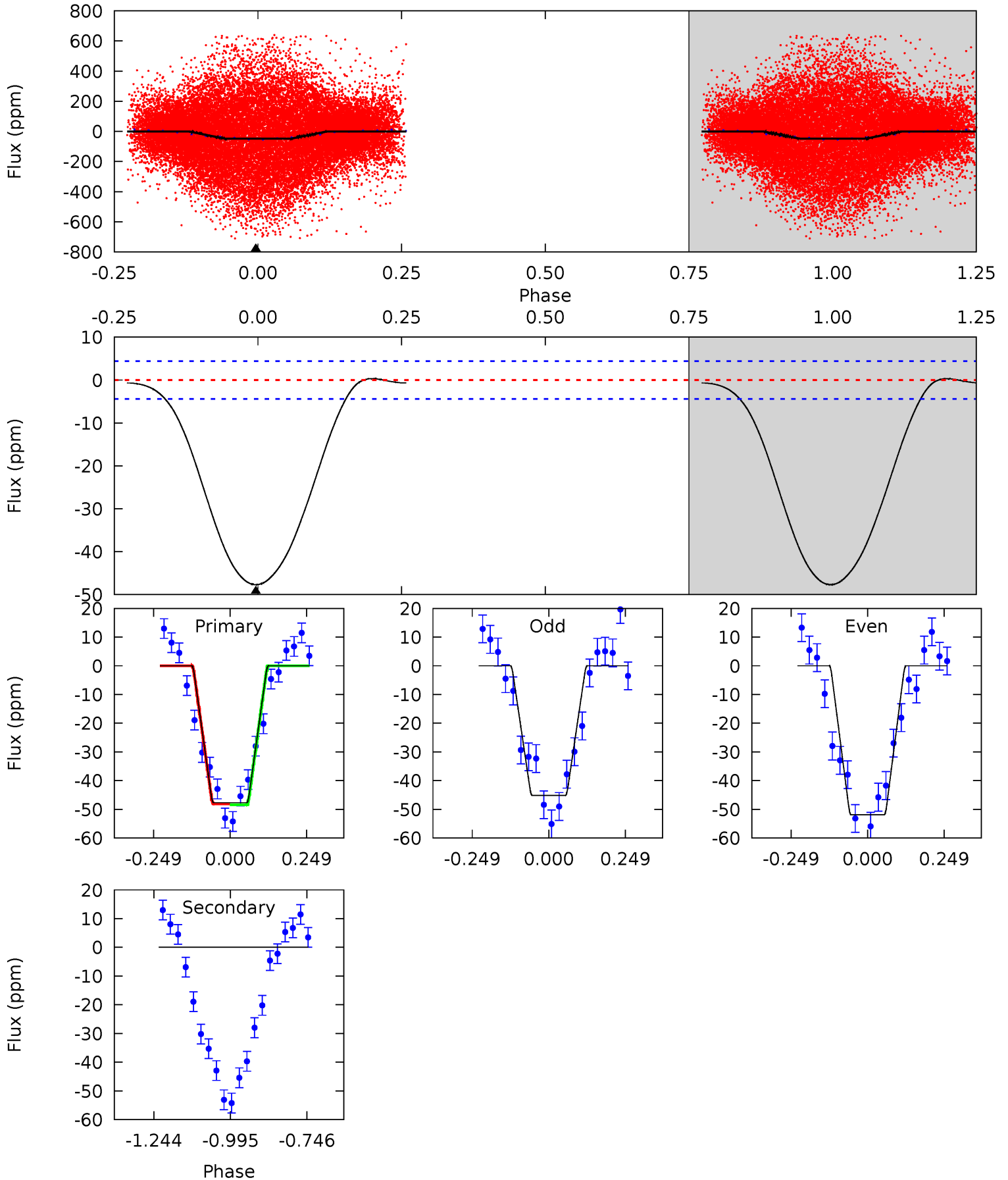
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.5	0	0	0	4.39	1.21	0.22	17.5	17.5	0	0	2.35	0.95	0.01	0.61



Alt Model-Shift Uniqueness Test

012509148-02, P = 2.413727 Days, E = 131.152153 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.5	0	0	0	4.37	1.15	0.58	47.5	47.5	0	0	3.35	1.51	0.01	0.12



Stellar Parameters For KIC 012509148

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+163}_{-204}	$3.688^{+0.296}_{-0.074}$	$-0.160^{+0.300}_{-0.250}$	$3.139^{+0.463}_{-1.159}$	$1.754^{+0.163}_{-0.353}$	$0.080^{+0.170}_{-0.020}$
	+2%/-3%	+8%/-2%	+188%/-156%	+15%/-37%	+9%/-20%	+213%/-25%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 012509148-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1	$1.28^{+0.81}_{-0.70}$	3544^{+215}_{-285}	-3420^{+7015}_{-780}	$-0.012^{+0.792}_{-0.726}$
Alt.	0 ± 1	$2.24^{+0.95}_{-0.80}$	3554^{+201}_{-304}	-3402^{+609}_{-325}	$0.001^{+0.209}_{-0.215}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

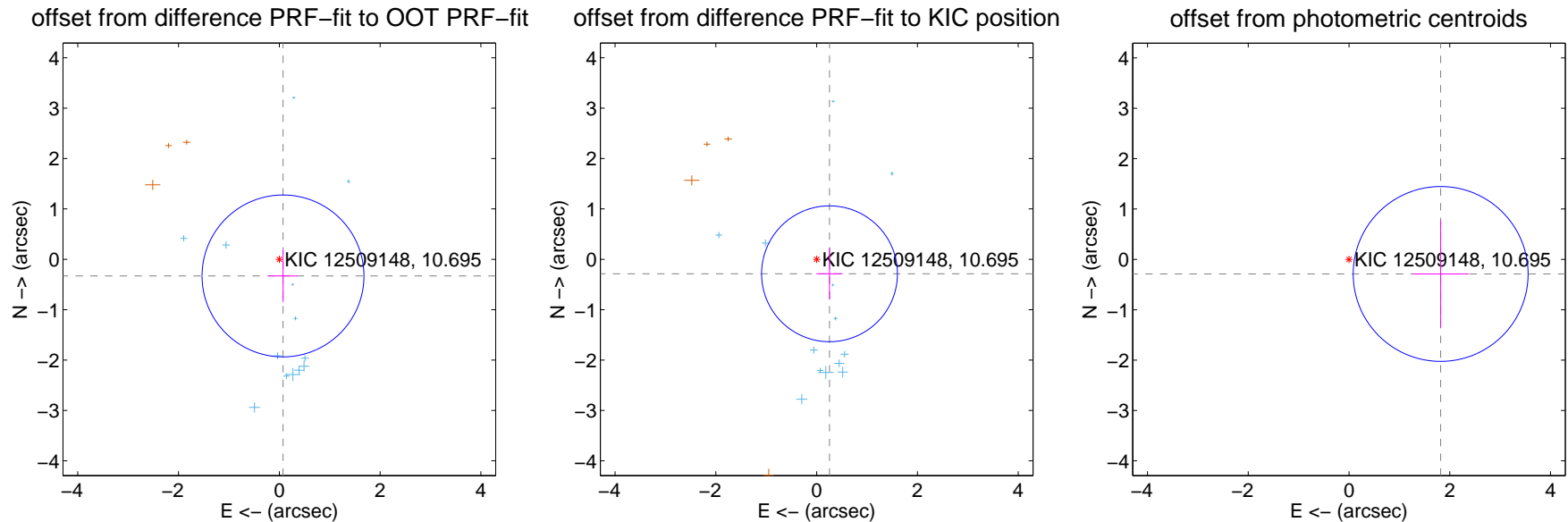
DV Centroid Data

Supplemental centroid analysis for 012509148-02. **Kepler magnitude: 10.70.** Transit SNR 12.77

There are 13 quarters with good PRF difference image offsets

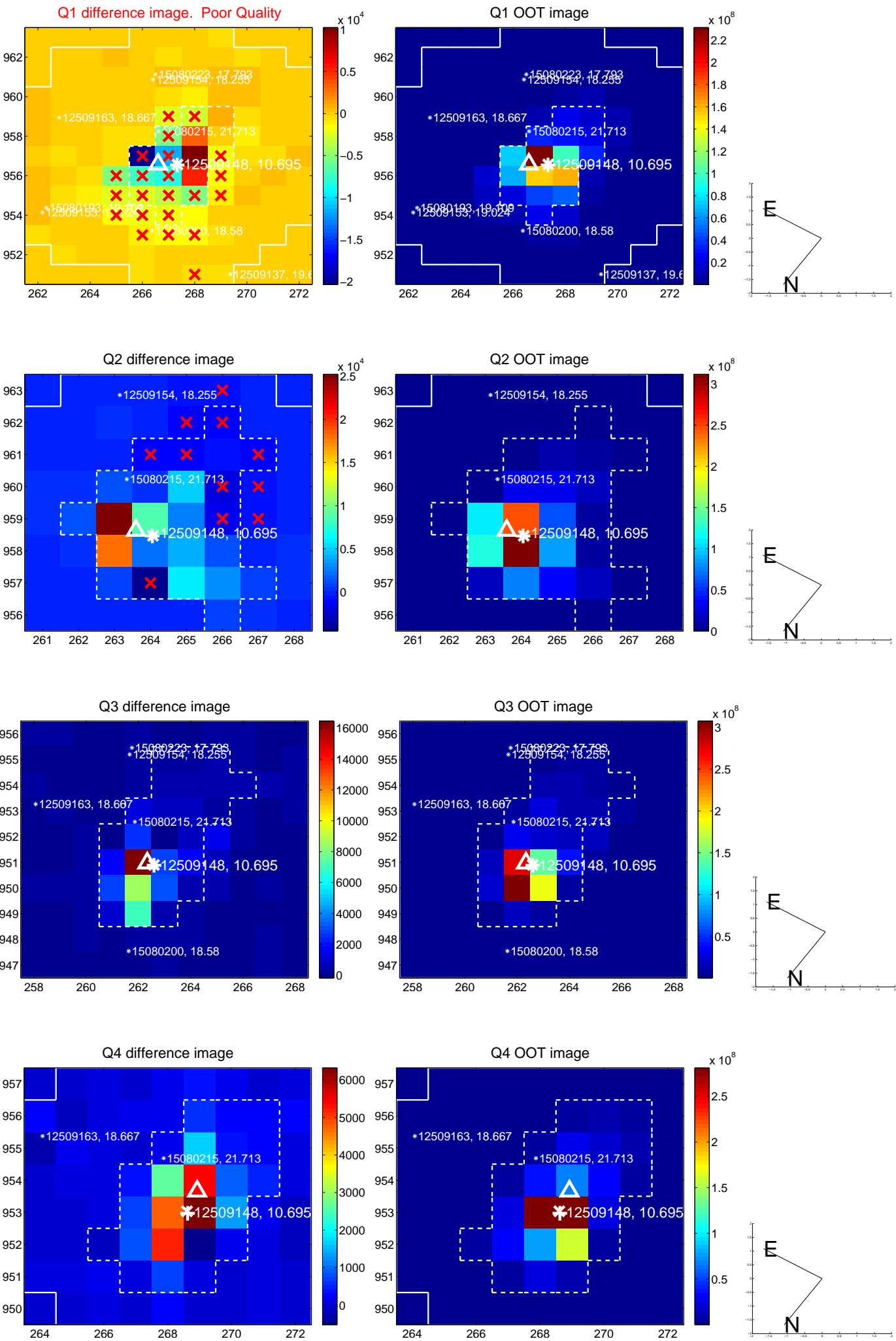
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.338 ± 0.535	0.63	-0.074 ± 0.284	-0.330 ± 0.519
PRF-fit source offset from KIC position	0.384 ± 0.449	0.86	-0.255 ± 0.262	-0.288 ± 0.511
photometric centroid source offset	1.84 ± 0.58	3.18	-1.82 ± 0.56	-0.29 ± 1.06

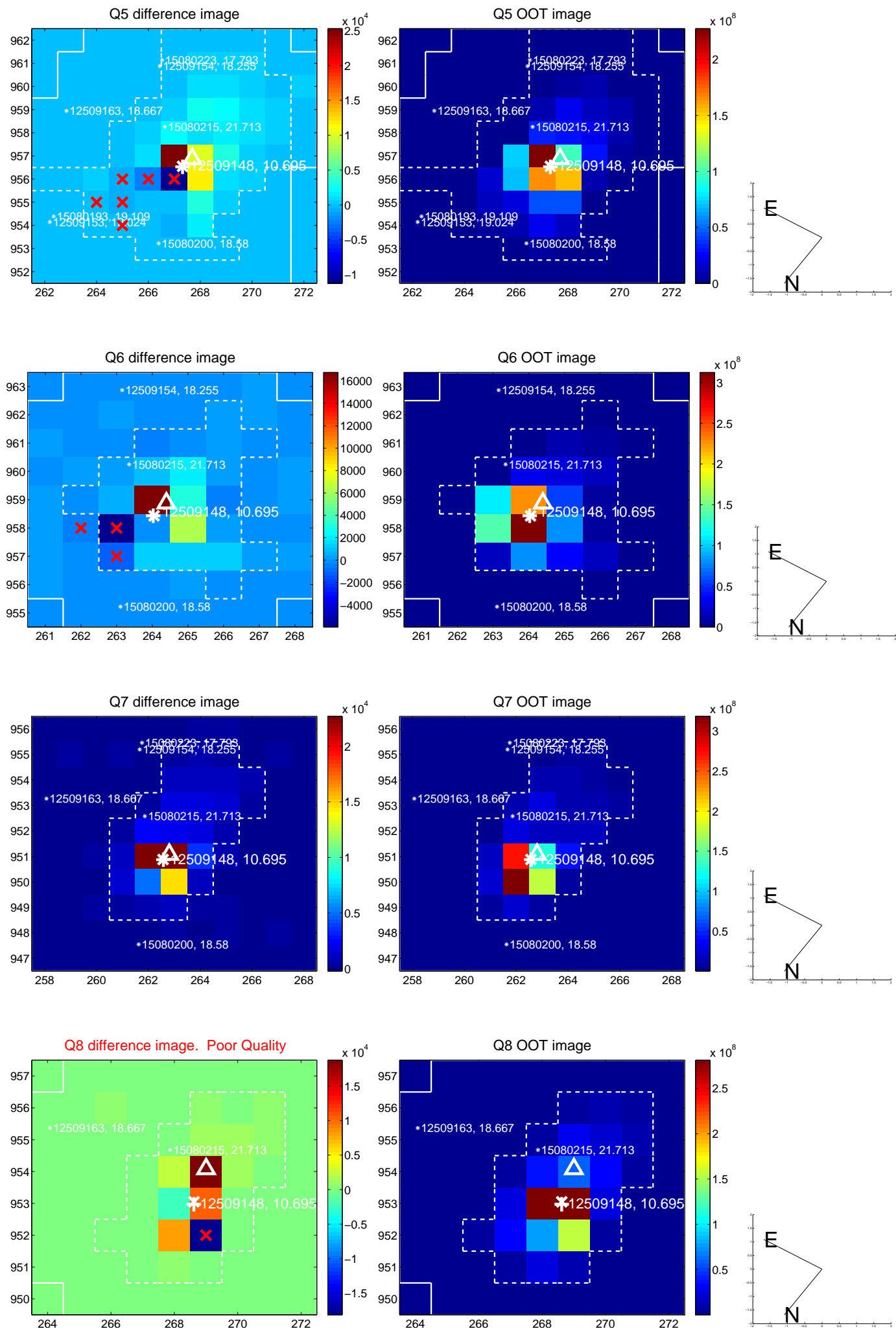


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

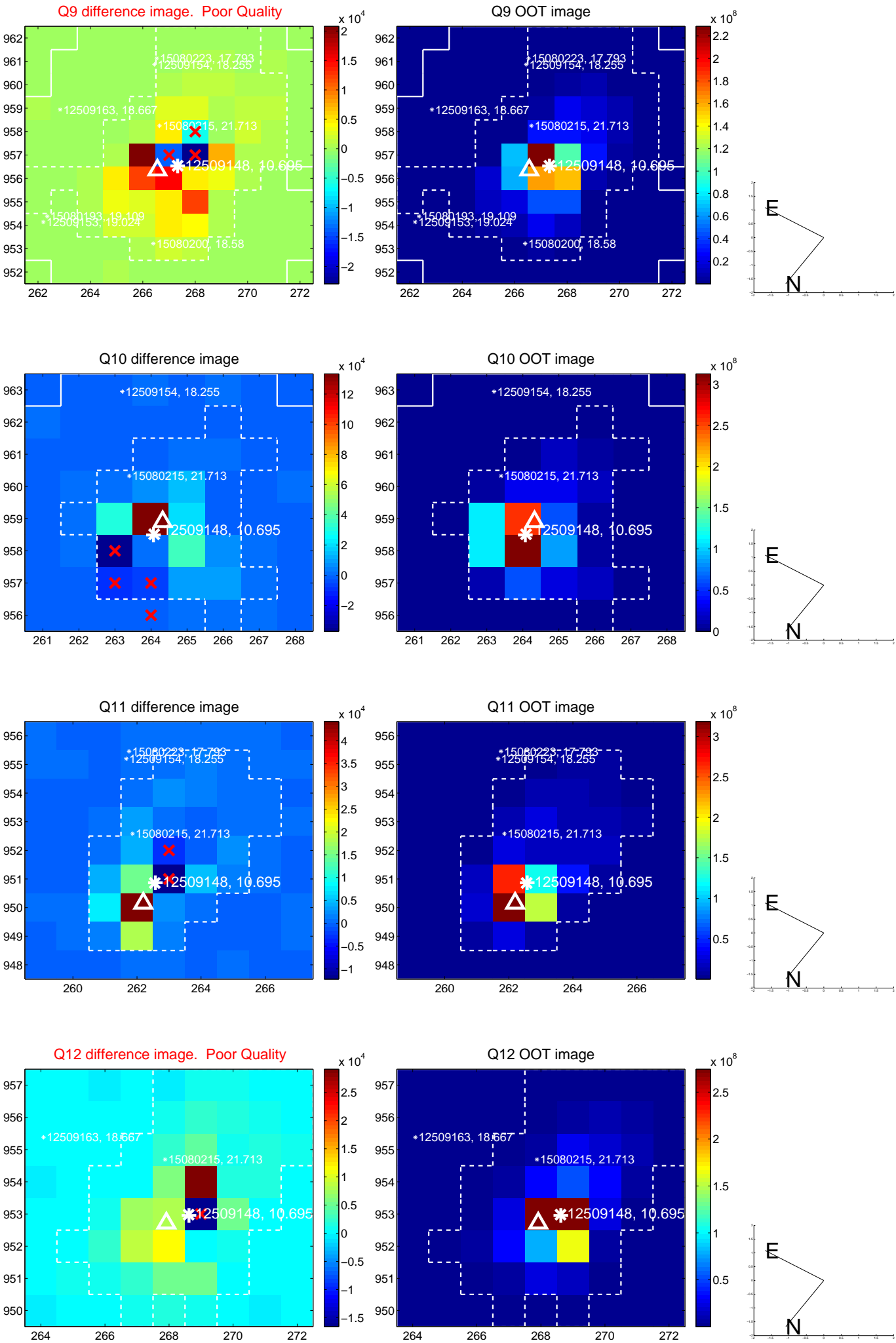
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



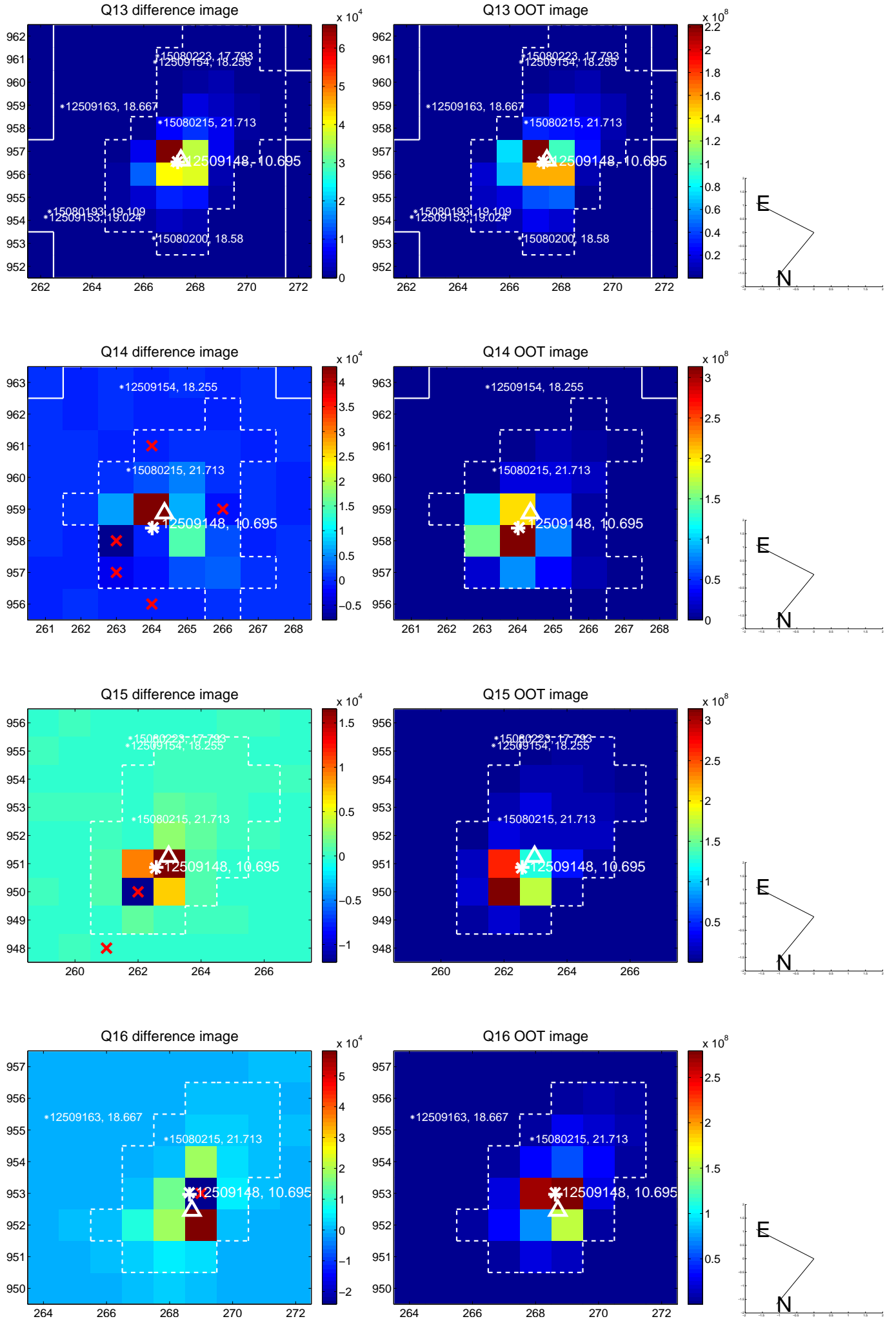
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



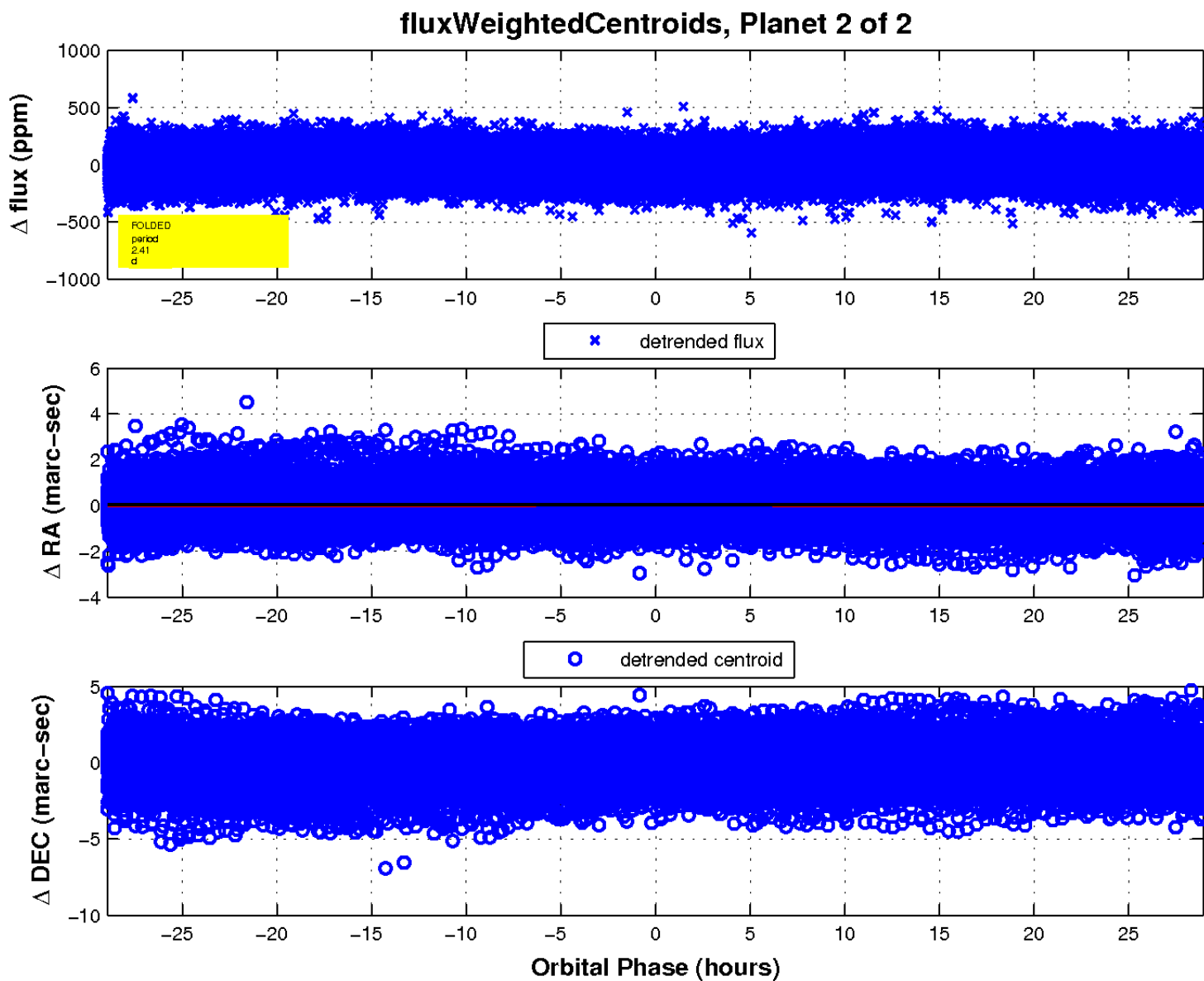
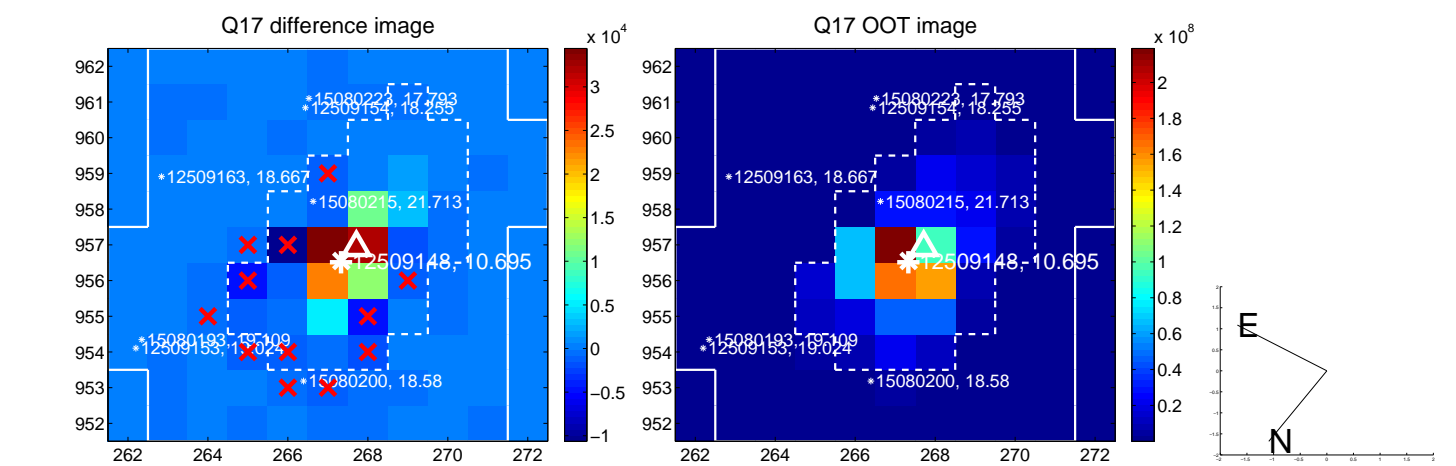
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

