

KIC 009116075

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})
009116075-01	OBS	5617.01	24.499194	154.656771	168.6	6.486	10.8	11.9	0.60	4519	1.69	6.62
009116075-02	OBS	No	24.499131	134.859535	121.1	5.103	10.5	9.7	0.60	4519	0.70	6.62

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009116075-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
009116075-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

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.

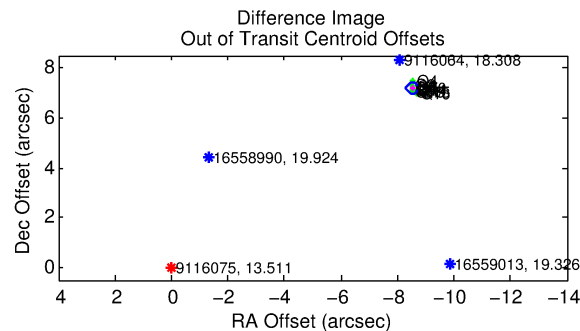
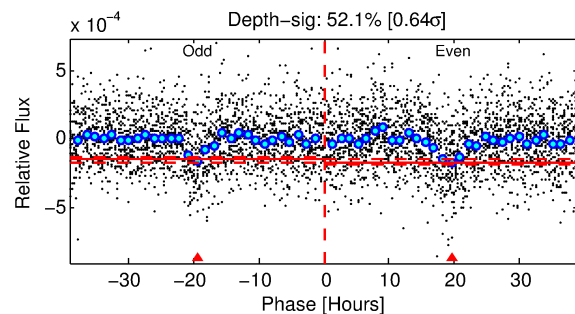
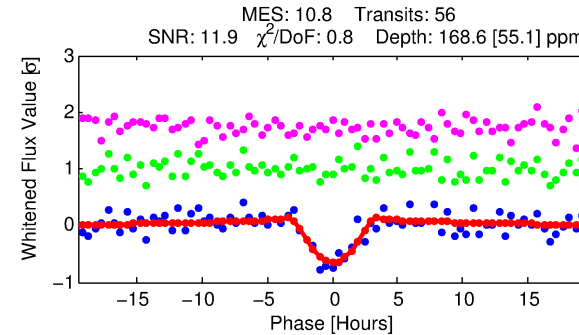
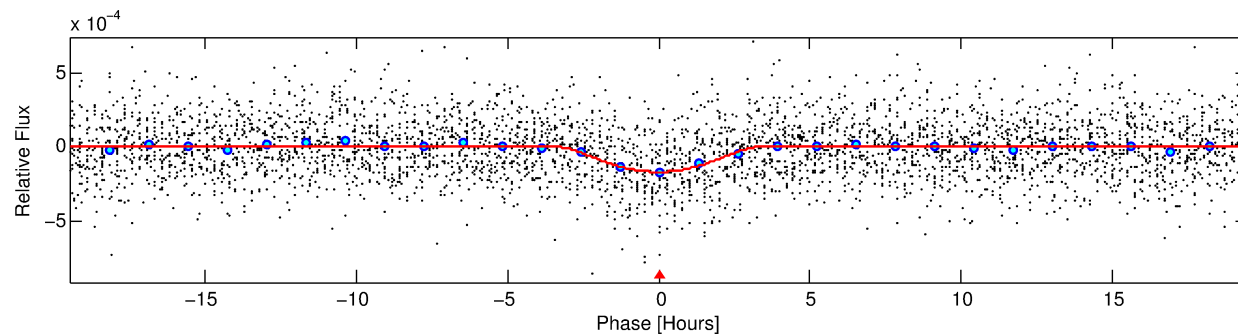
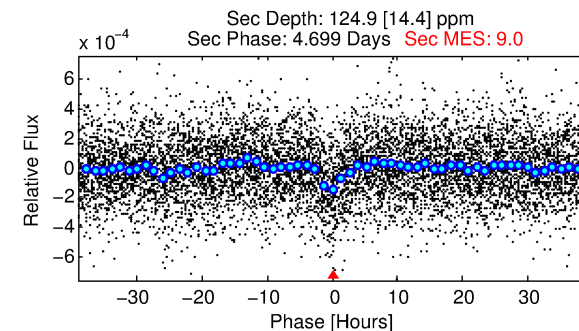
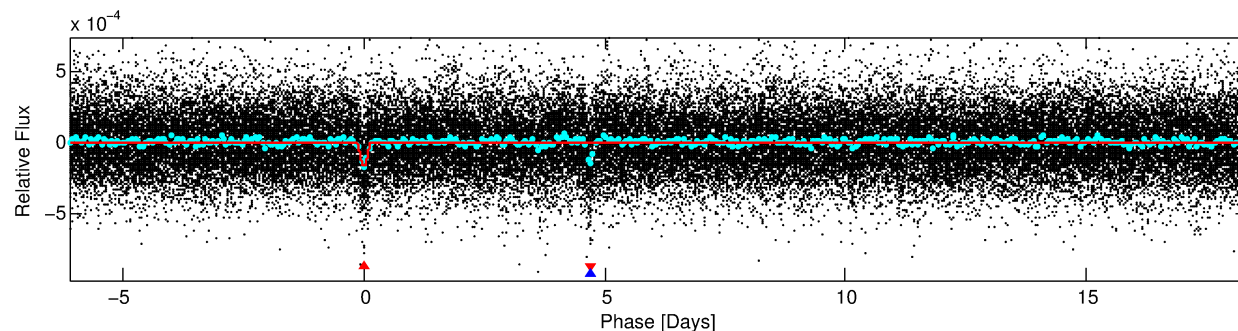
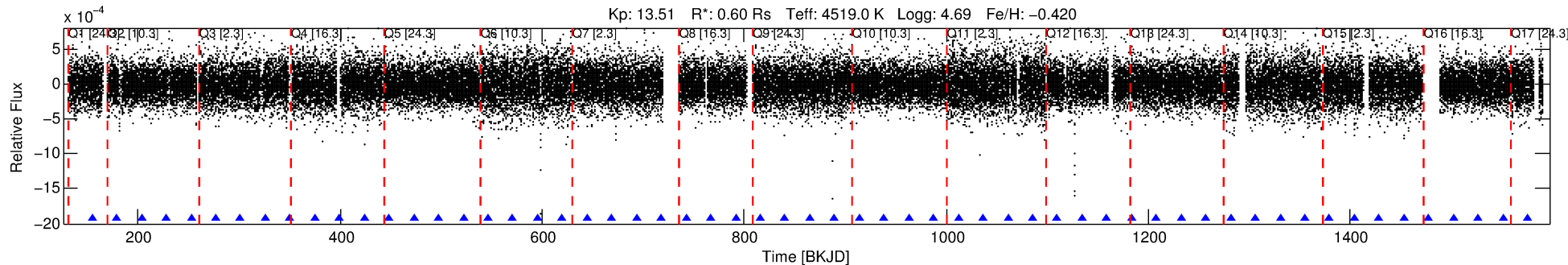
Ephemeris Match Information For 009116075-01

No Significant Match Found

DV One-Page Summary

KIC: 9116075 Candidate: 1 of 2 Period: 24.499 d
KOI: K05617 Corr: No Ephemeris Match

Kp: 13.51 R*: 0.60 Rs Teff: 4519.0 K Logg: 4.69 Fe/H: -0.420



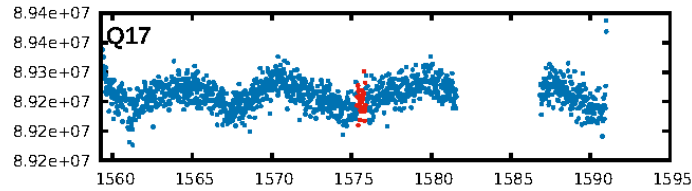
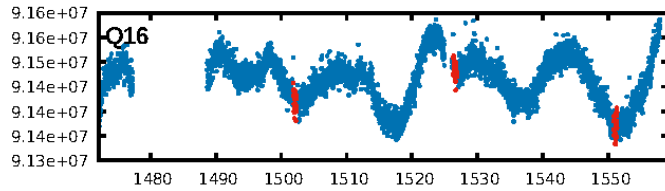
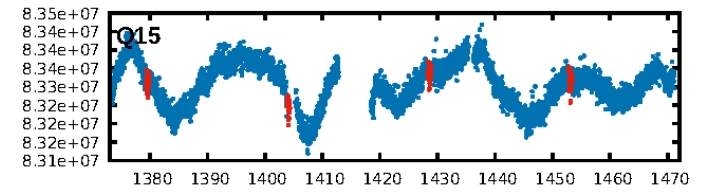
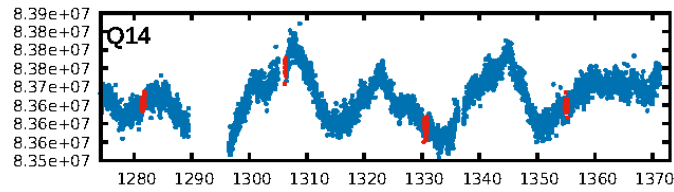
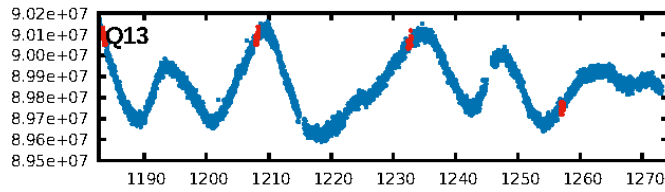
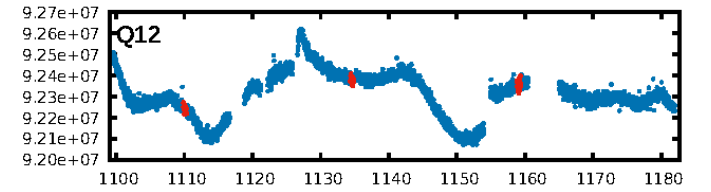
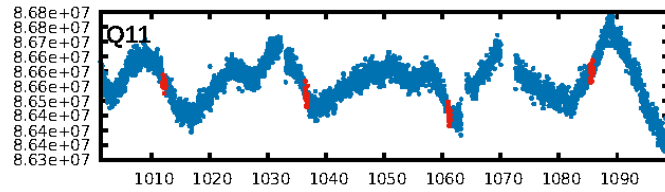
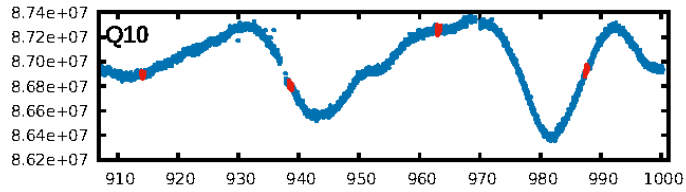
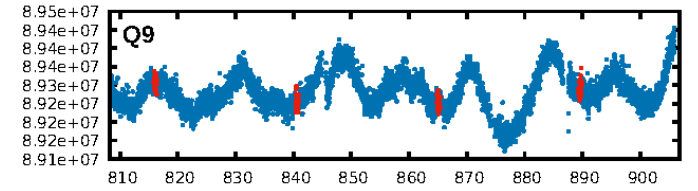
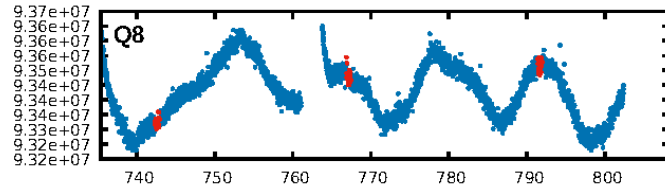
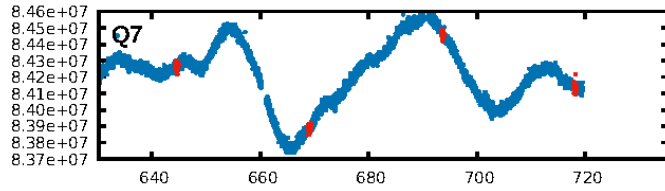
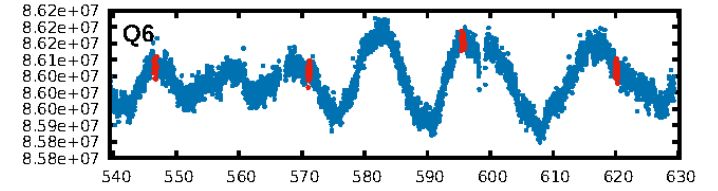
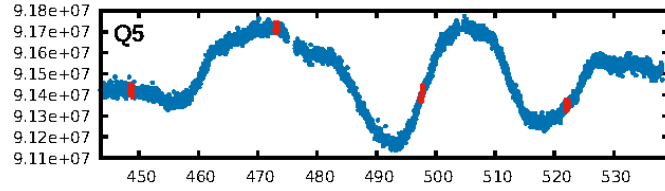
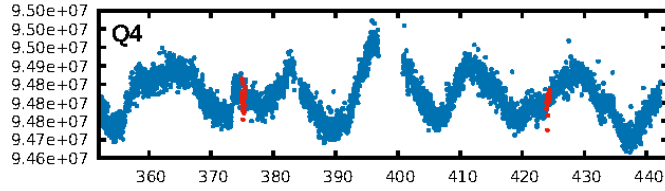
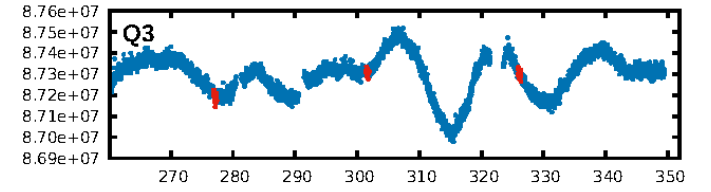
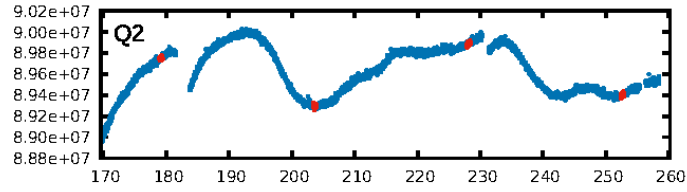
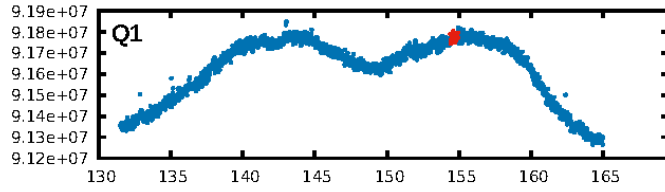
DV Fit Results:

Period = 24.49919 [0.00033] d
Epoch = 154.6568 [0.0107] BKJD
Rp/R* = 0.0259 [0.0631]
a/R* = 6.71 [4.19]
b = 1.00 [0.10]
Seff = 6.62 [1.05]
Teq = 409 [16] K
Rp = 1.69 [4.11] Re
a = 0.1418 [0.0113] AU
Ag = 485.02 [2362.58] [0.20σ]
Teff = 2968 [3614] K [0.71σ]

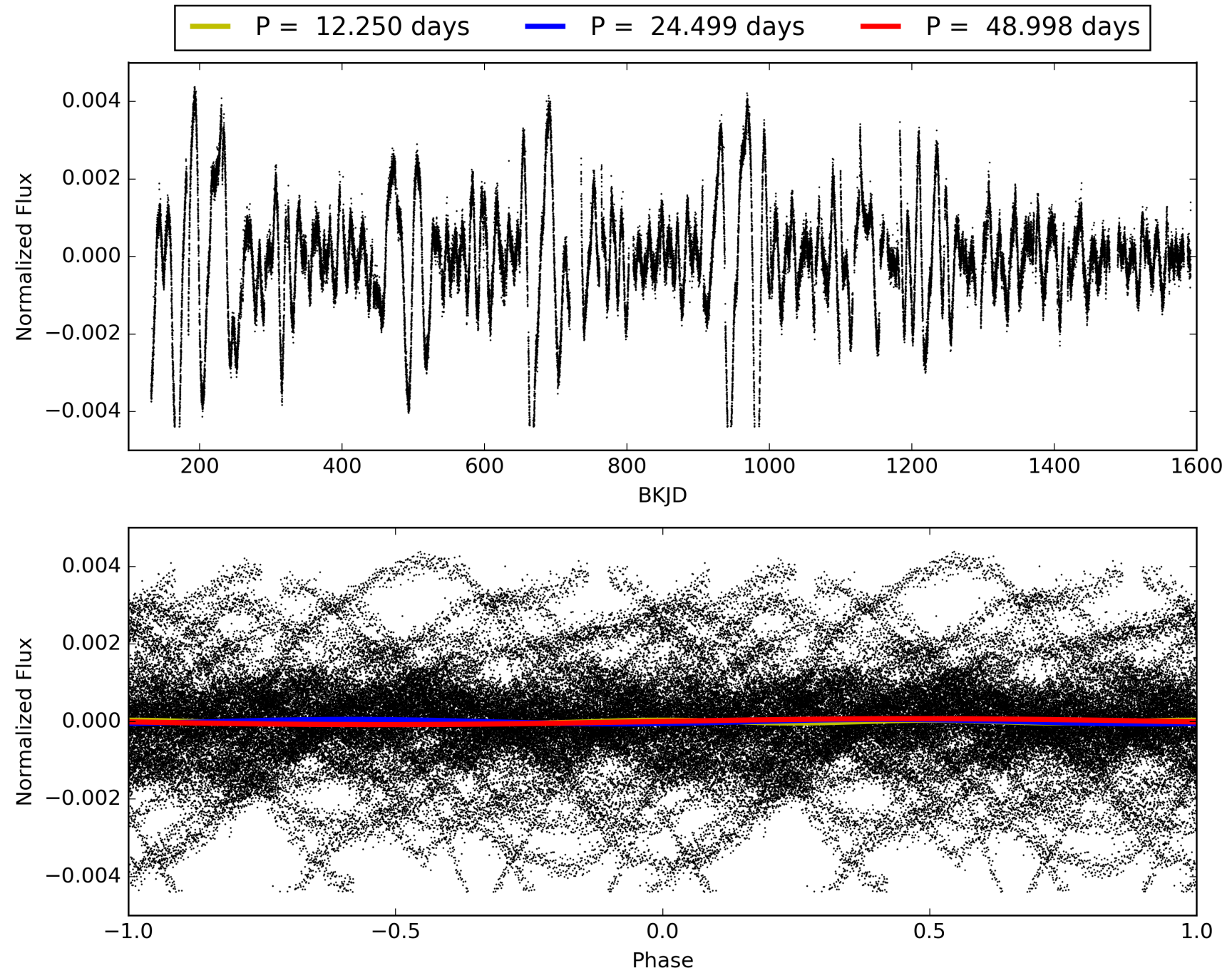
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 10.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.17e-26
RollingBand-fgt: 1.00 [54/54]
GhostDiagnostic-chr: -0.2928
Centroid-sig: 0.0%
Centroid-so: 62.334 arcsec [61.83σ]
OotOffset-rm: 11.142 arcsec [159.39σ]
KicOffset-rm: 11.308 arcsec [161.60σ]
OotOffset-st: 4/4/3/5 [16]
KicOffset-st: 4/4/3/5 [16]
DiffImageQuality-fgm: 1.00 [16/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009116075-01, PDC Light Curves

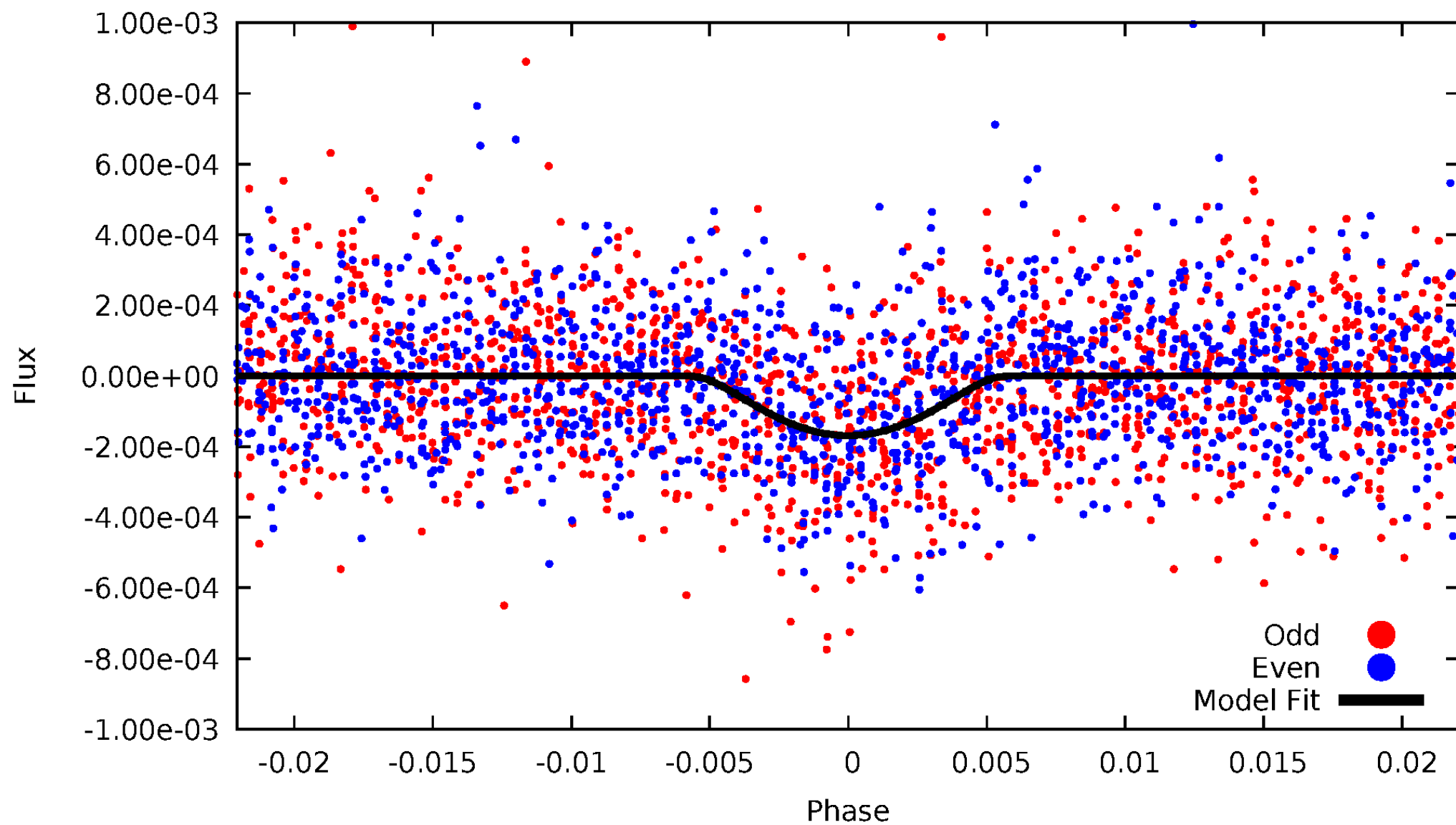


TCE 009116075-01



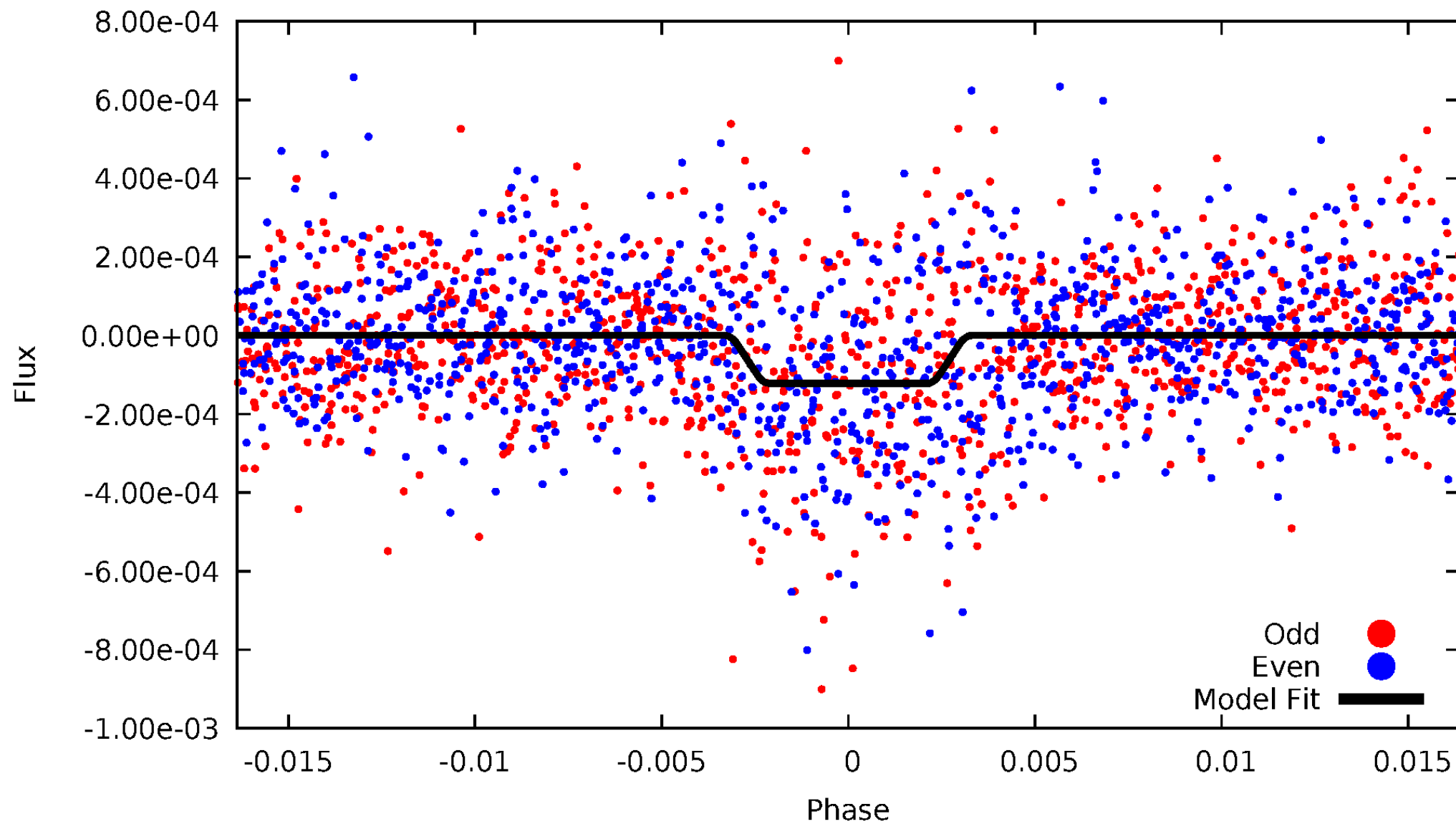
DV Odd/Even

TCE 009116075-01



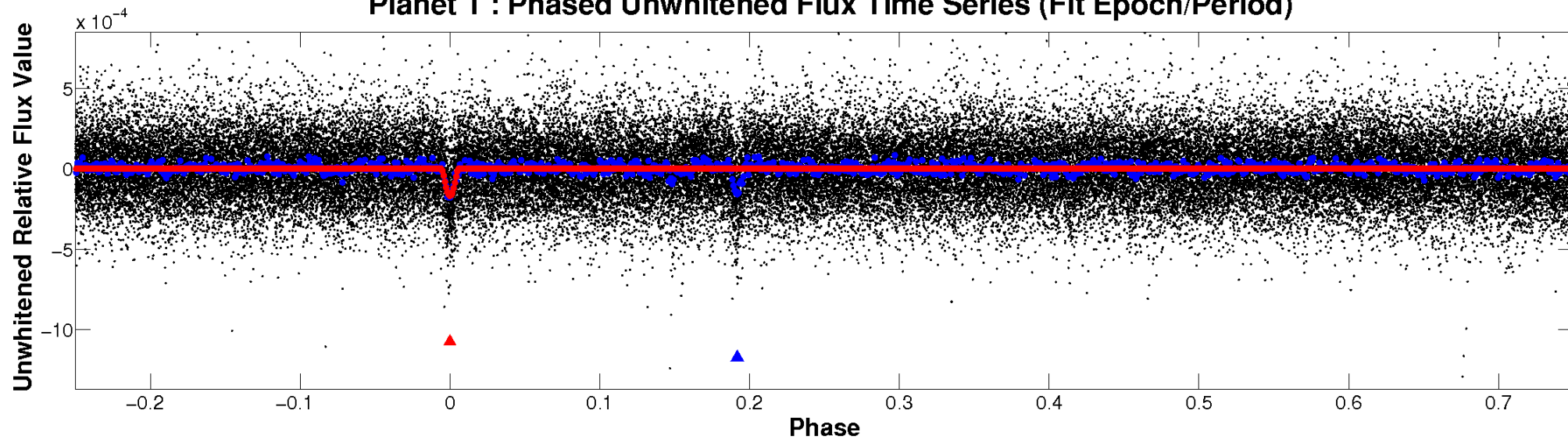
ALT Odd/Even

TCE 009116075-01

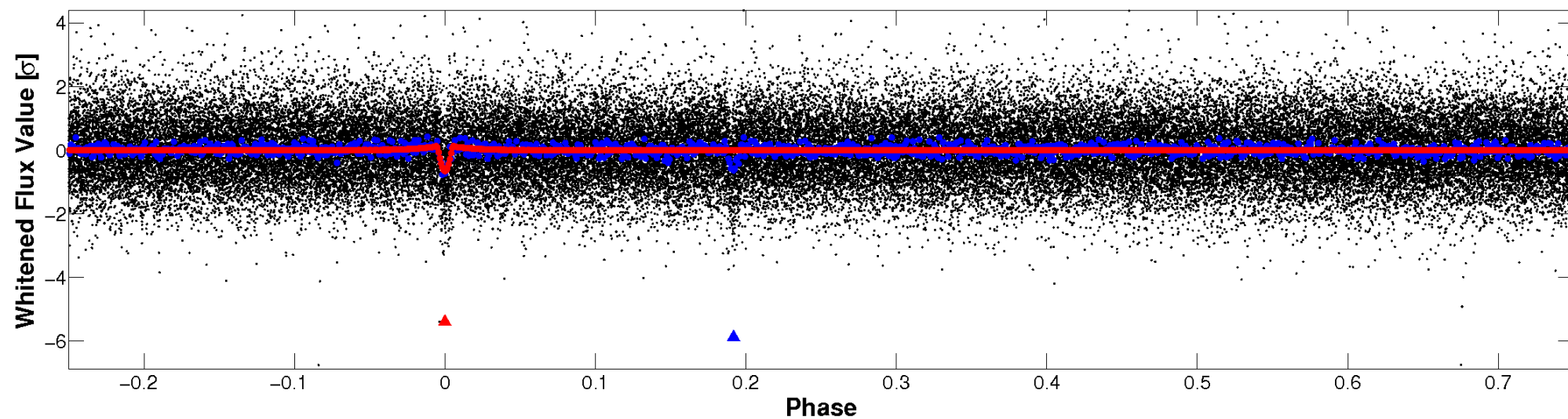


Non-Whitened Vs. Whitened Light Curve

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

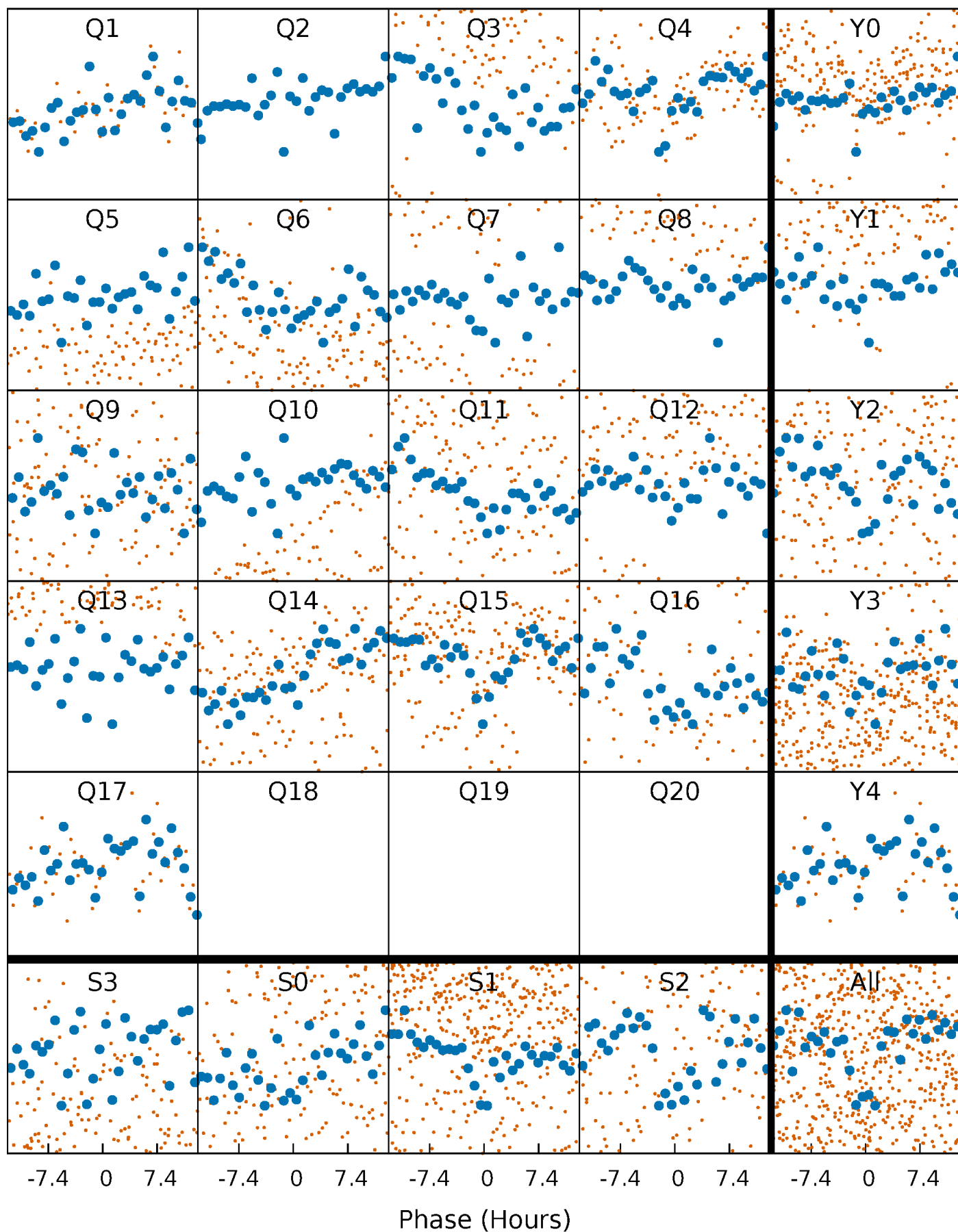


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



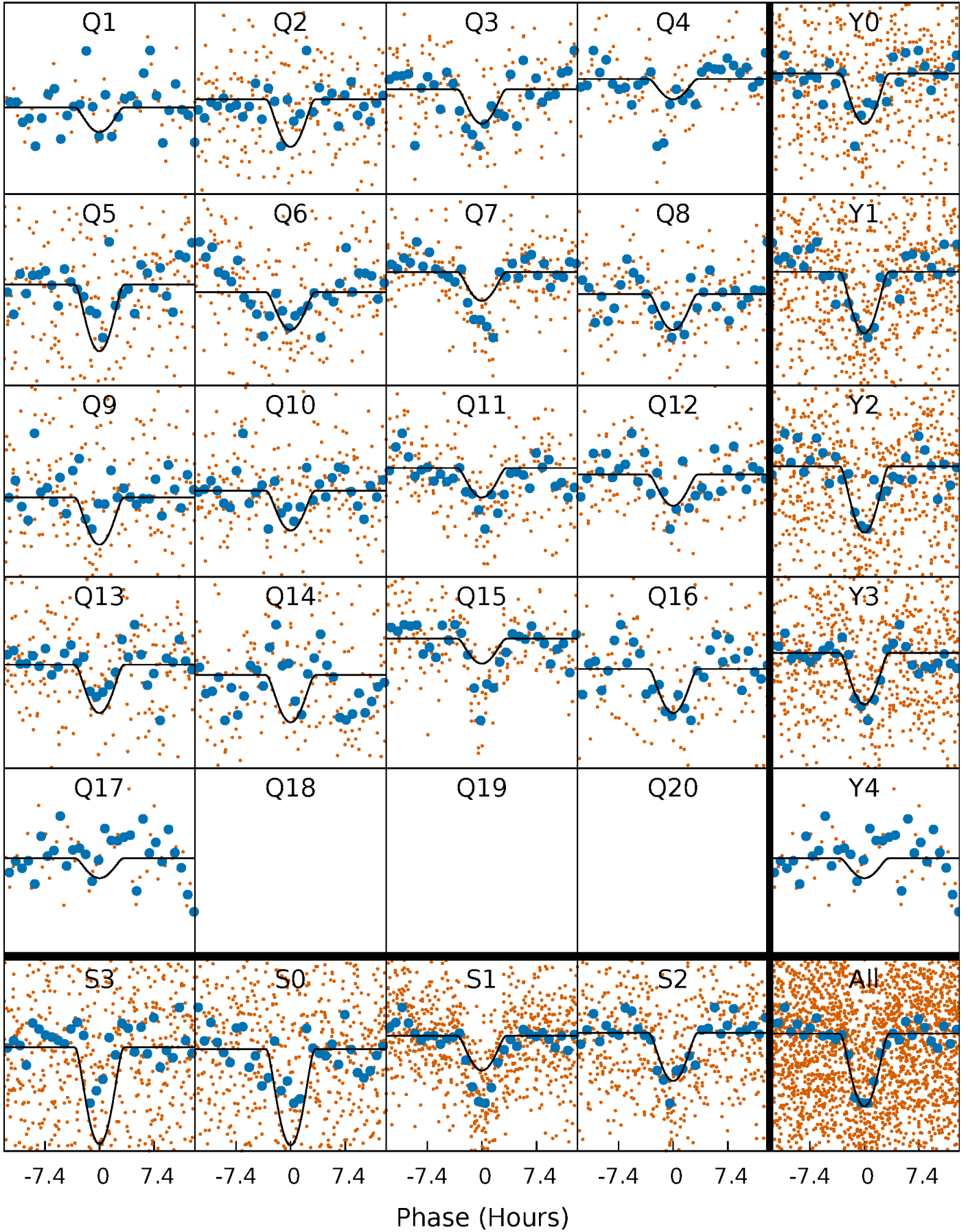
PDC Quarter-Phased Transit Curves

TCE 009116075-01 P= 24.499194 Days $T_0=154.656771$ (BKJD)



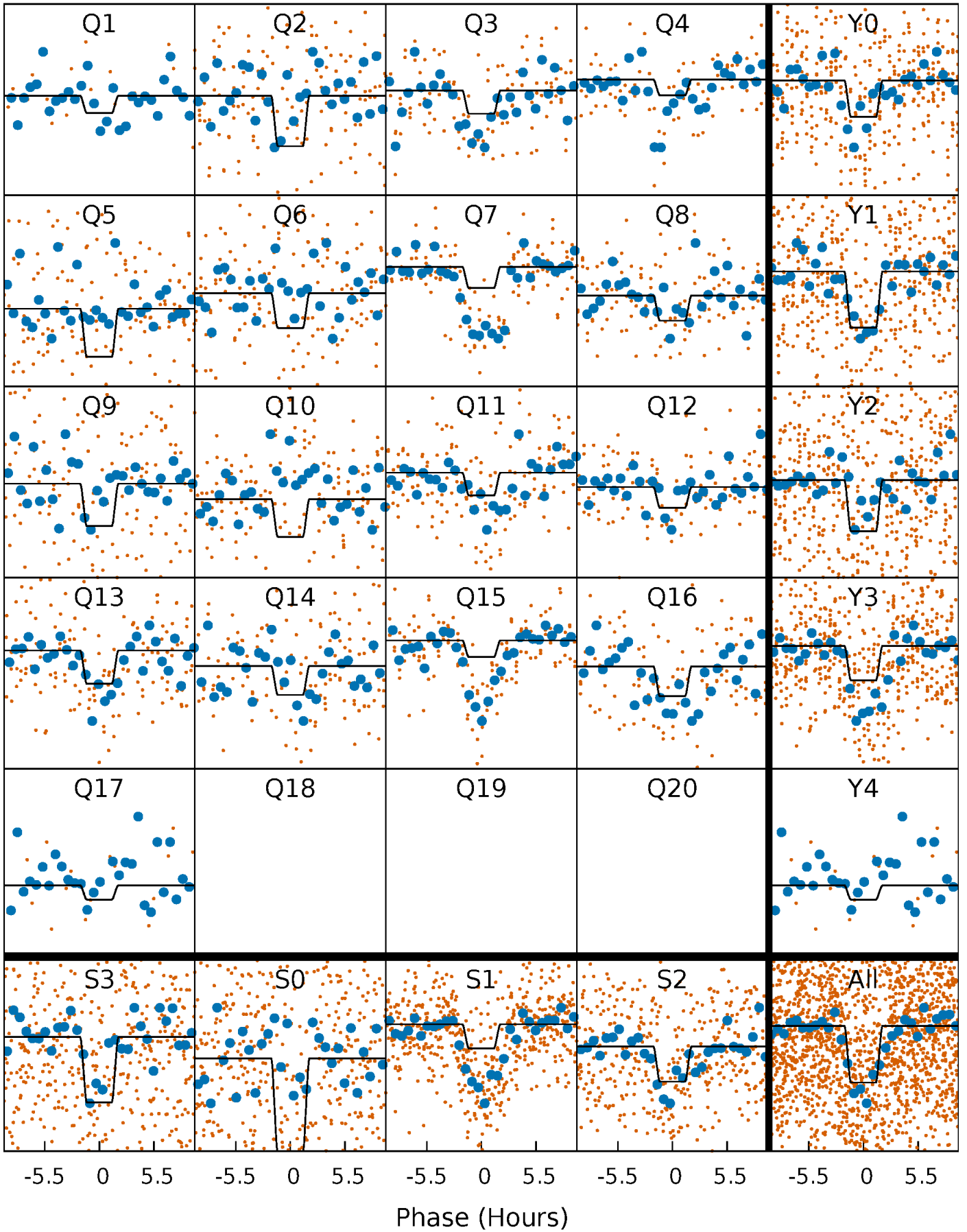
DV Quarter-Phased Transit Curves

TCE 009116075-01 P= 24.499194 Days $T_0=154.656771$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

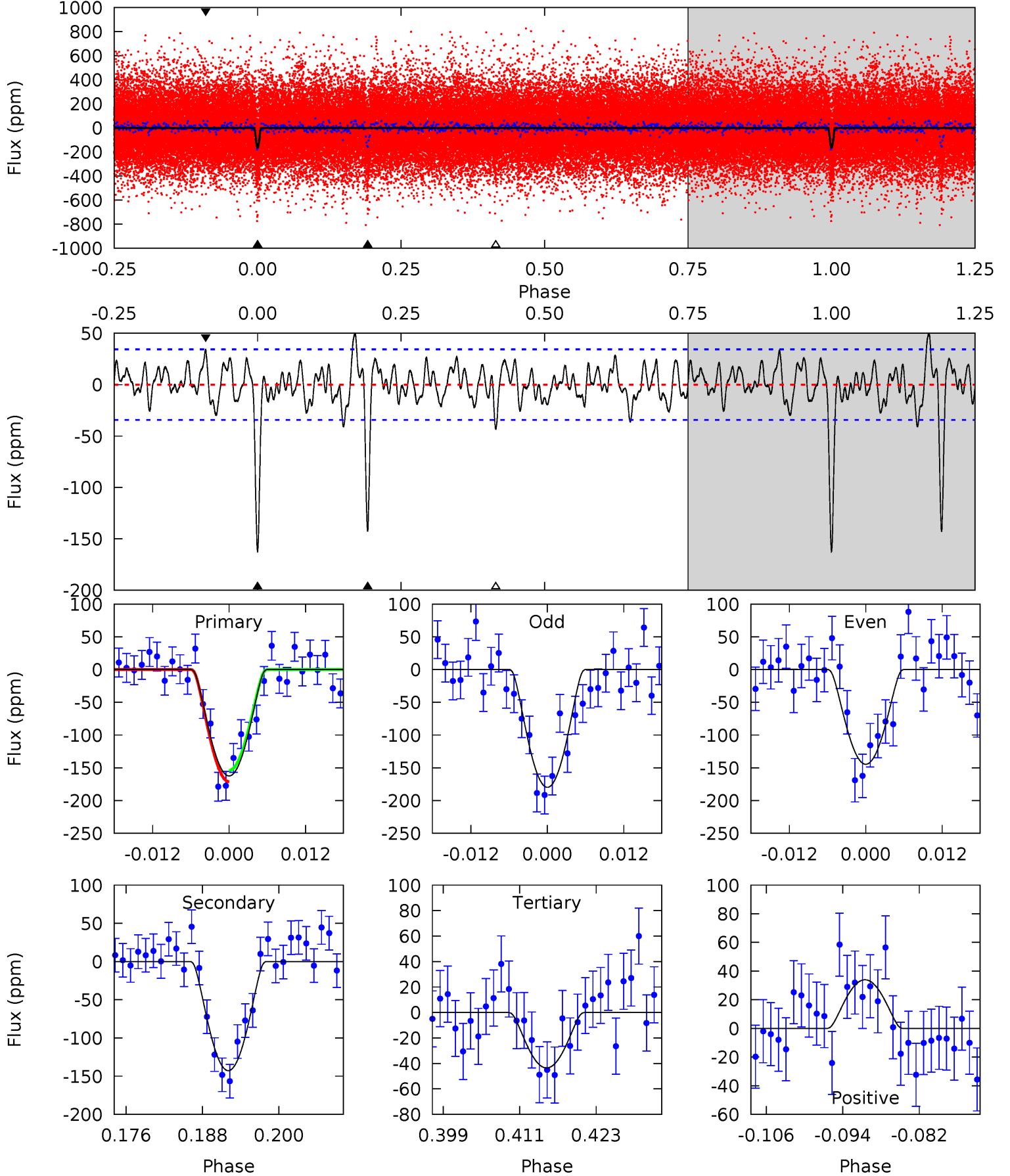
TCE 009116075-01 P= 24.499515 Days $T_0=154.638071$ (BKJD)



DV Model-Shift Uniqueness Test

009116075-01, $P = 24.499194$ Days, $E = 130.157577$ Days

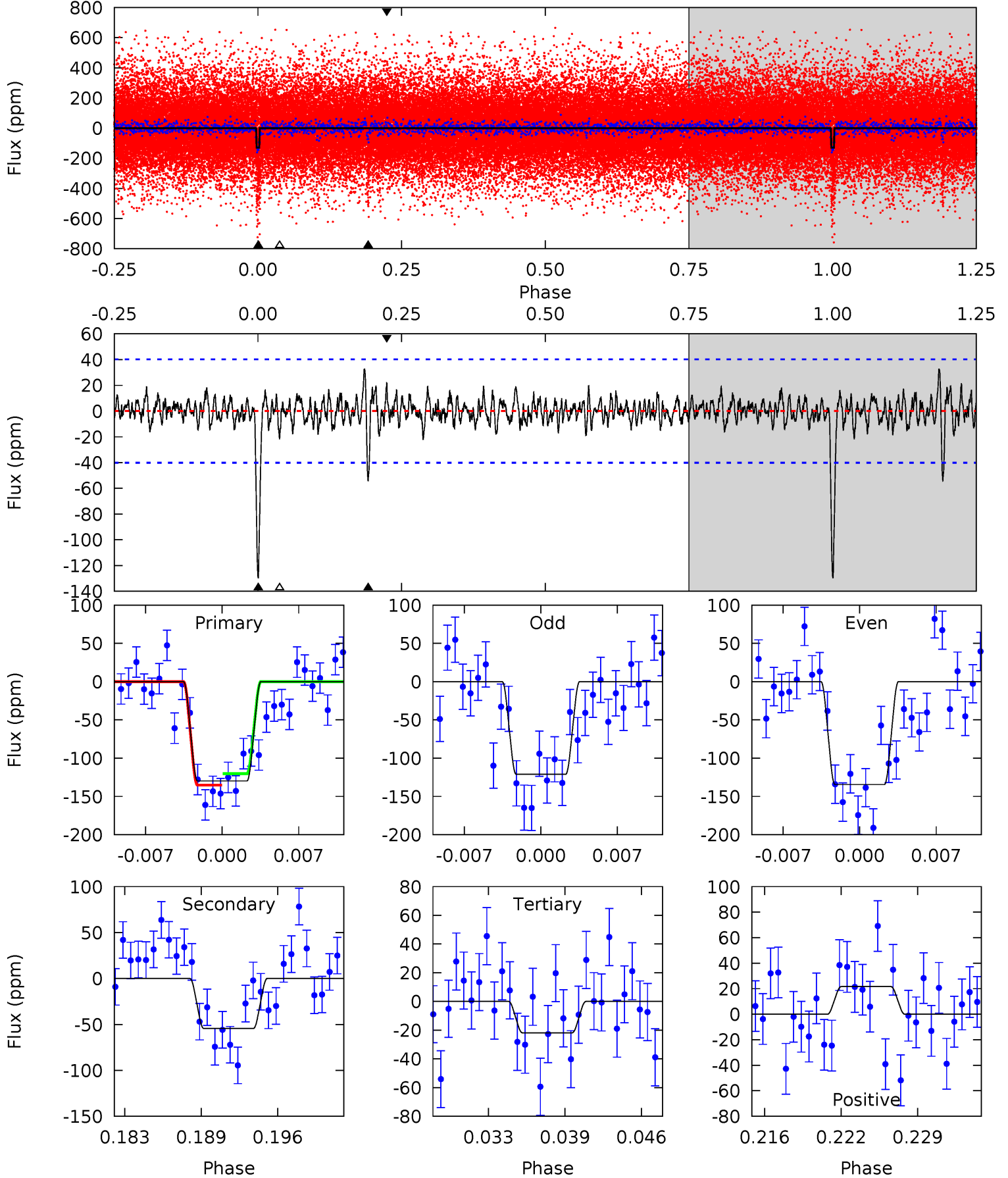
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.7	20.8	6.33	4.94	5.00	2.52	2.07	17.3	18.7	14.5	15.8	2.57	0.98	0.24	1.26



Alt Model-Shift Uniqueness Test

009116075-01, $P = 24.499515$ Days, $E = 130.138556$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	6.92	2.78	2.76	5.11	2.72	0.94	13.7	13.8	4.14	4.17	0.84	1.24	0.20	0.93



Stellar Parameters For KIC 009116075

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4519^{+120}_{-134}	$4.688^{+0.028}_{-0.052}$	$-0.420^{+0.300}_{-0.300}$	$0.597^{+0.062}_{-0.042}$	$0.641^{+0.055}_{-0.066}$	$4.241^{+0.633}_{-0.859}$
	+3%/-3%	+1%/-1%	+71%/-71%	+10%/-7%	+9%/-10%	+15%/-20%
Source	PHO1	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 009116075-01 / KOI 5617.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-143 ± 7	$3.39^{+3.74}_{-2.34}$	576^{+18}_{-20}	2825^{+1257}_{-474}	136^{+1280}_{-105}
Alt.	-54 ± 8	$3.08^{+3.31}_{-2.19}$	574^{+18}_{-20}	2555^{+1136}_{-400}	65^{+698}_{-50}

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 $A_{obs} \gg 1.0$

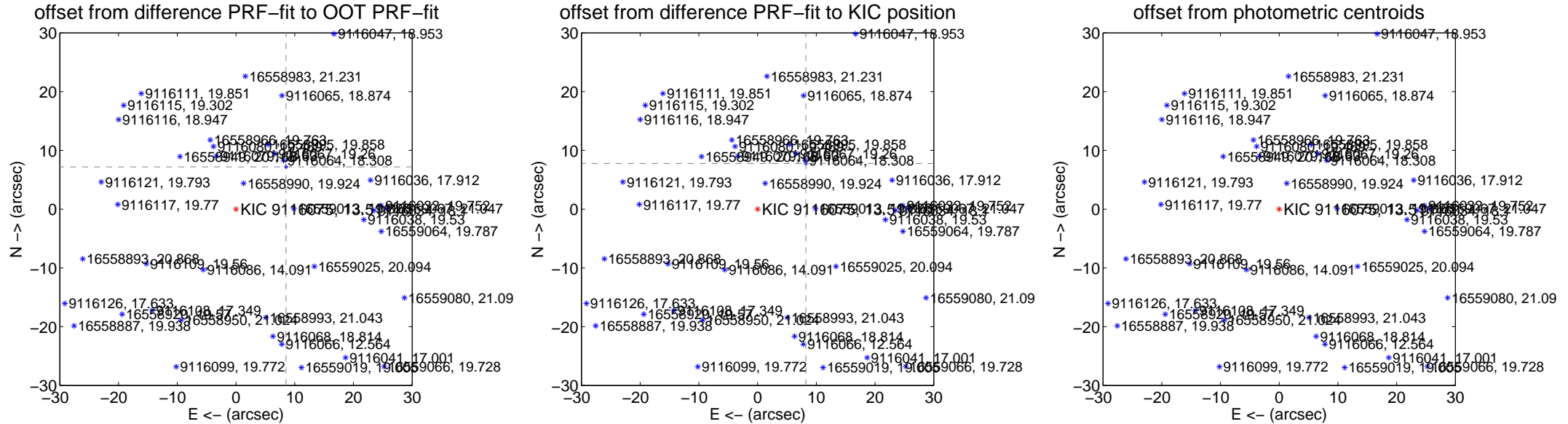
DV Centroid Data

Supplemental centroid analysis for 009116075-01. Kepler magnitude: 13.51. Transit SNR 11.85

There are 16 quarters with good PRF difference image offsets

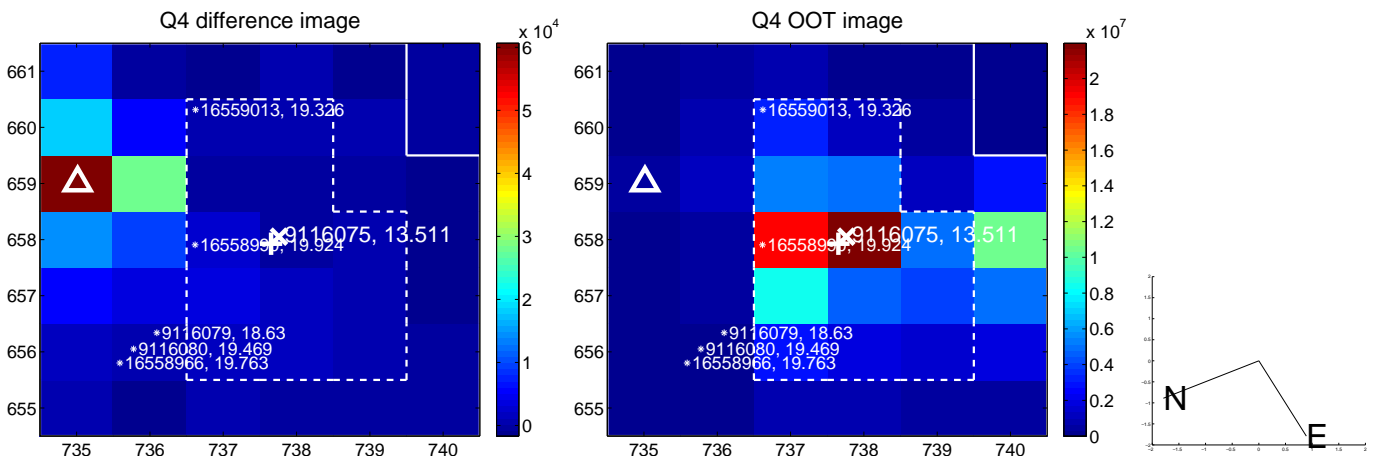
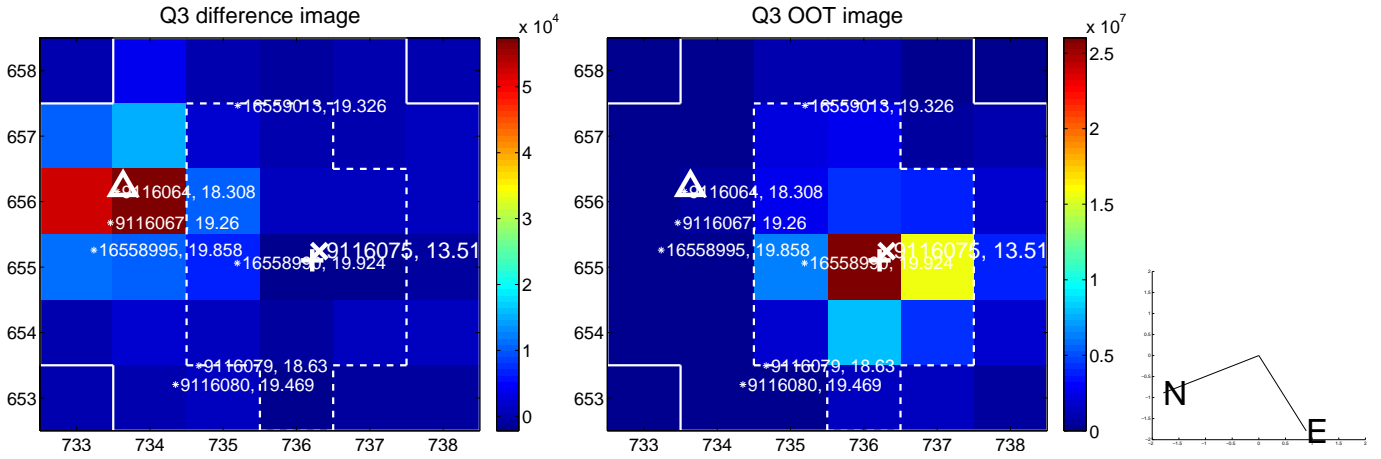
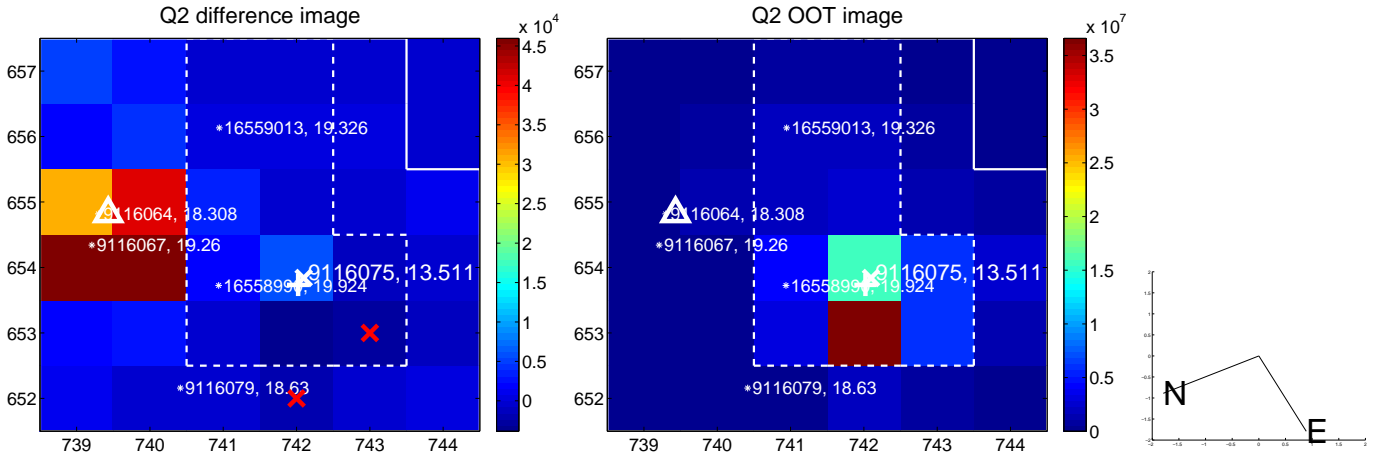
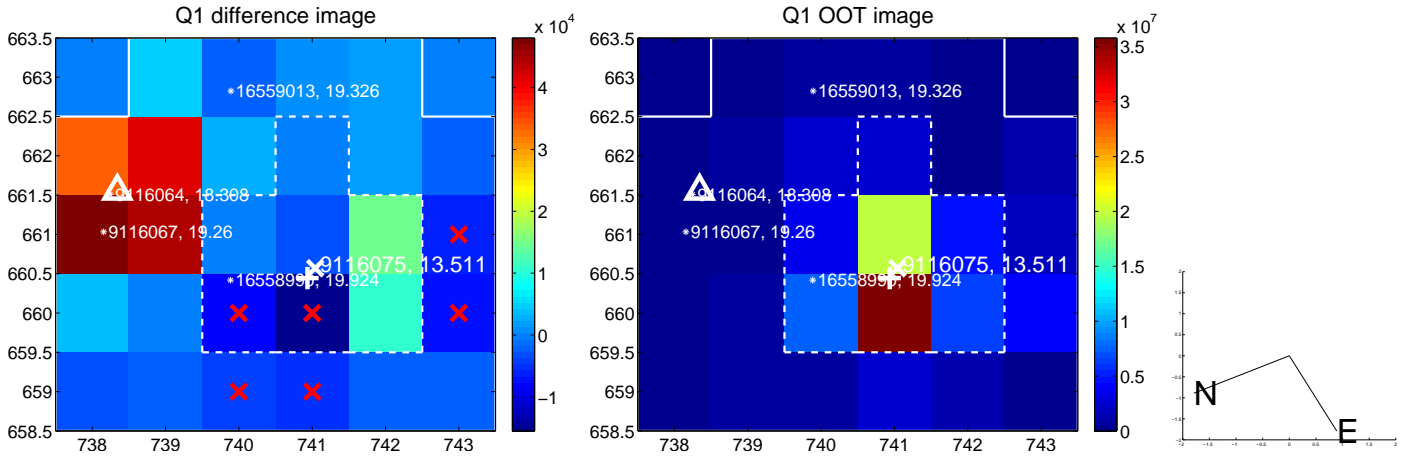
The direct PRF centroid is offset from the target star catalog position by about 0.89 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	11.142 \pm 0.070	159.39	-8.513 \pm 0.069	7.188 \pm 0.075
PRF-fit source offset from KIC position	11.308 \pm 0.070	161.60	-8.218 \pm 0.068	7.767 \pm 0.071
photometric centroid source offset	62.33 \pm 1.01	61.83	-47.45 \pm 1.03	40.41 \pm 0.97

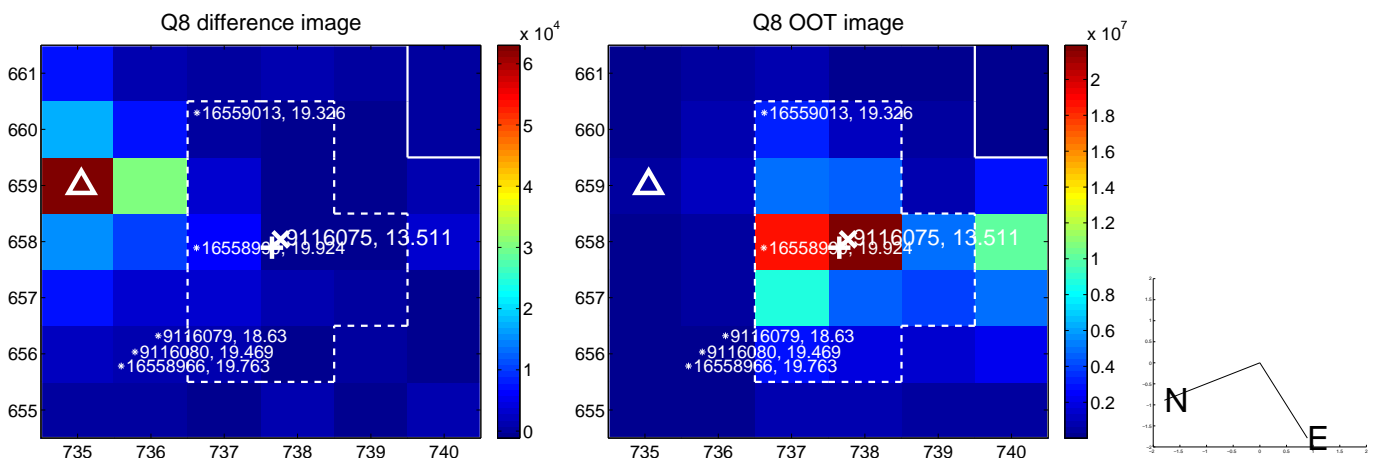
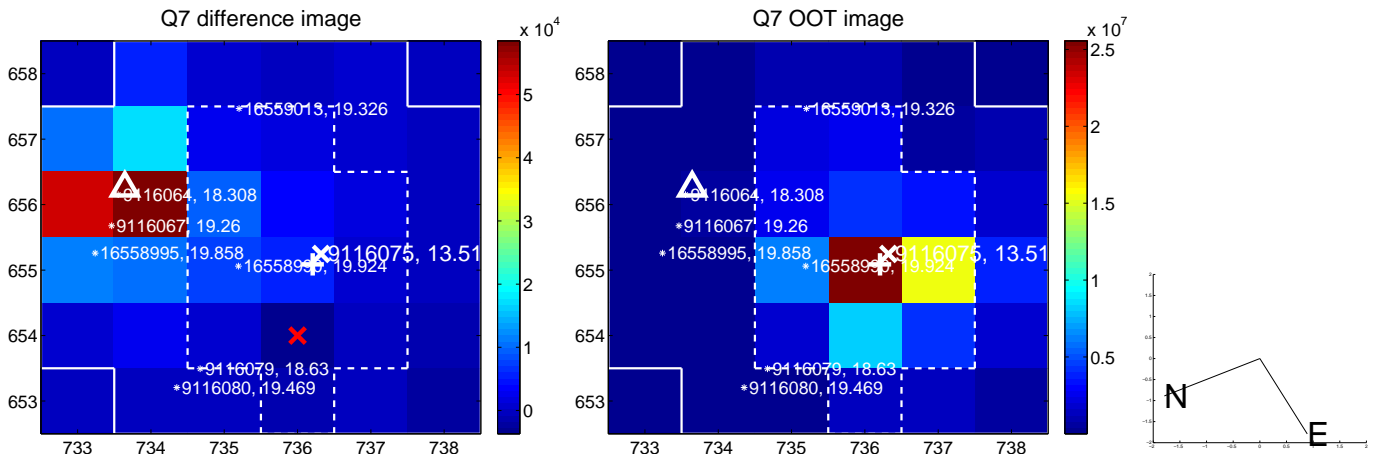
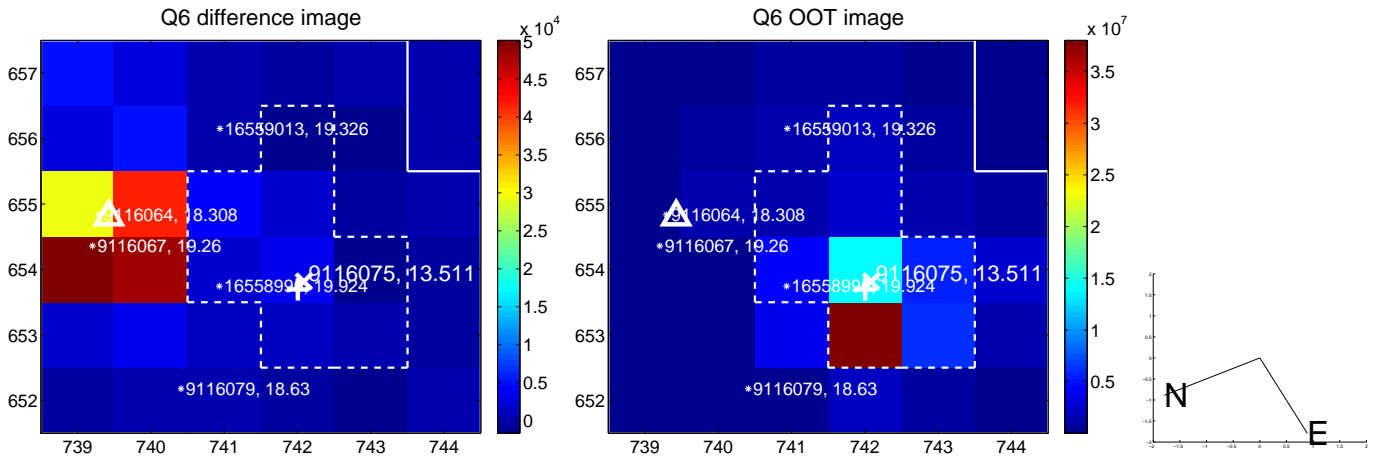
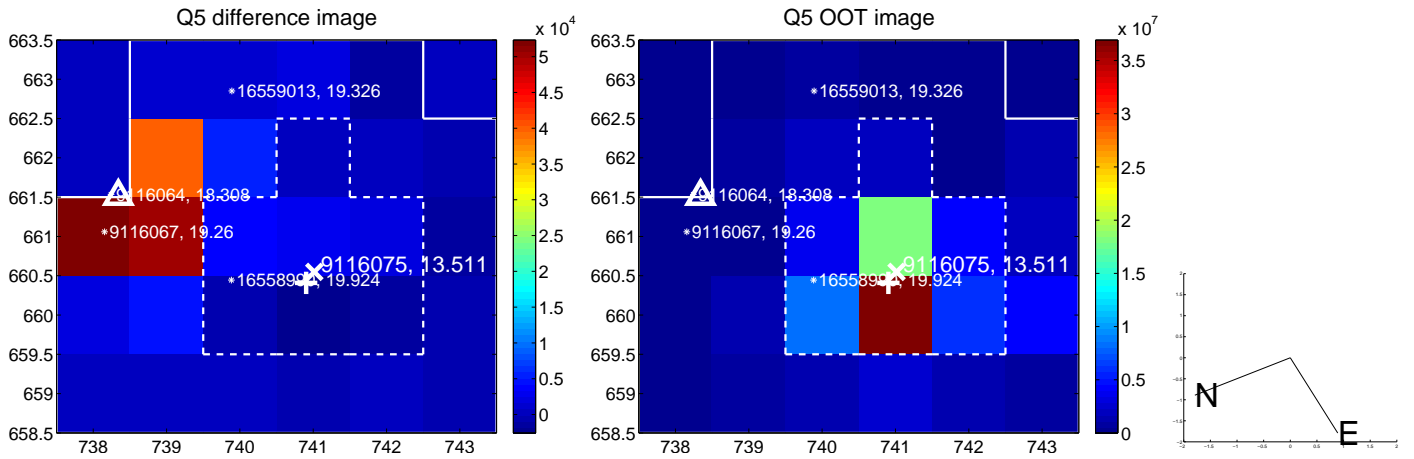


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

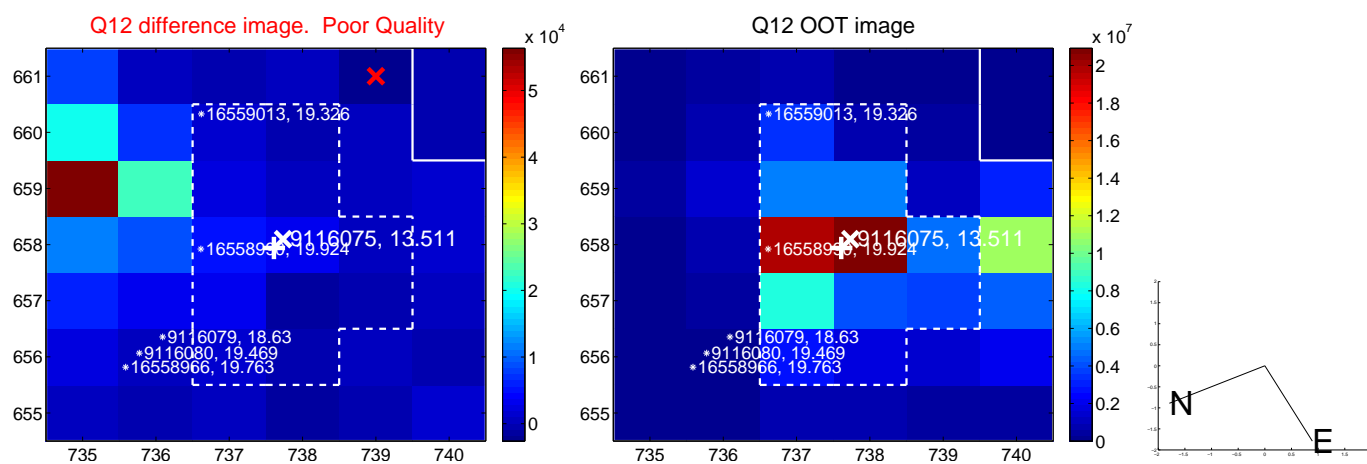
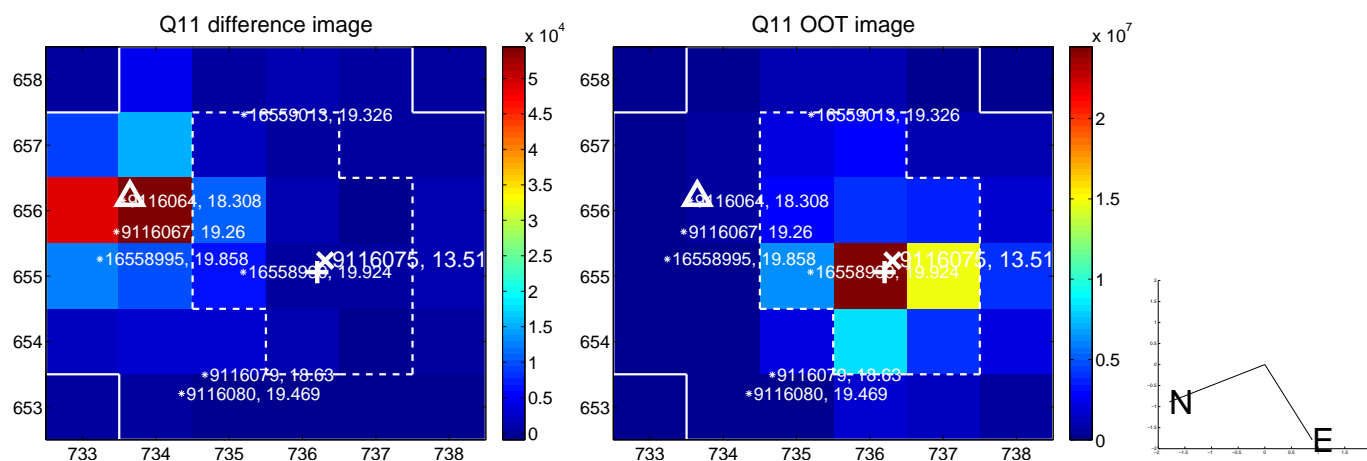
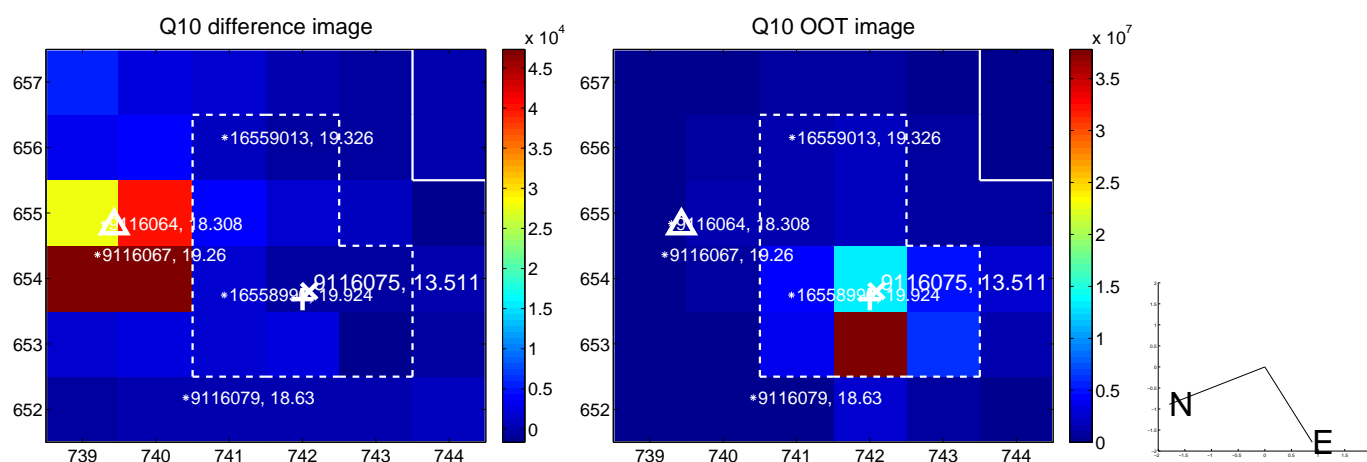
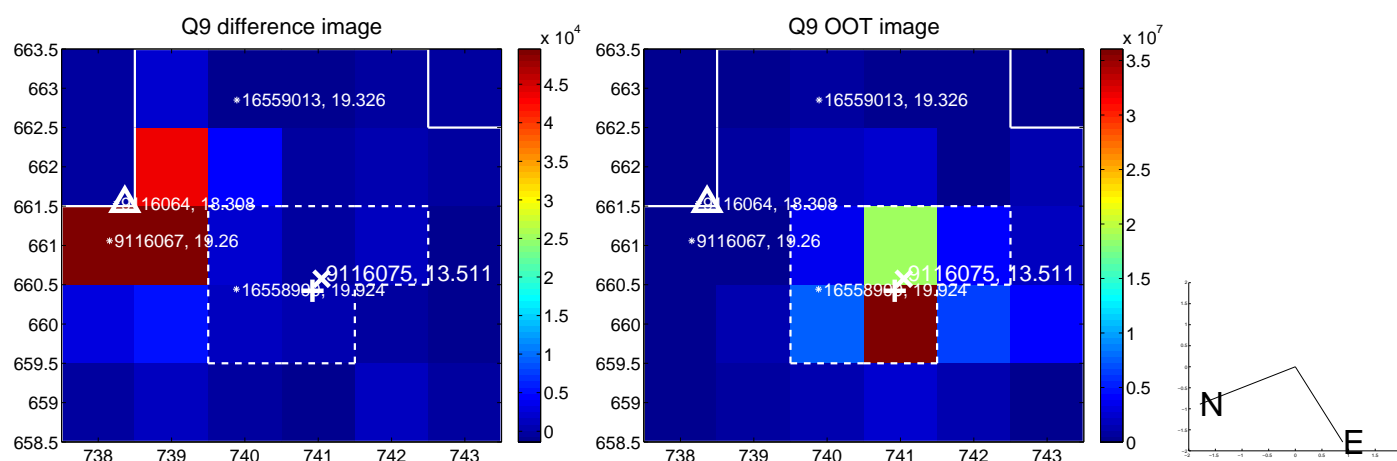
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



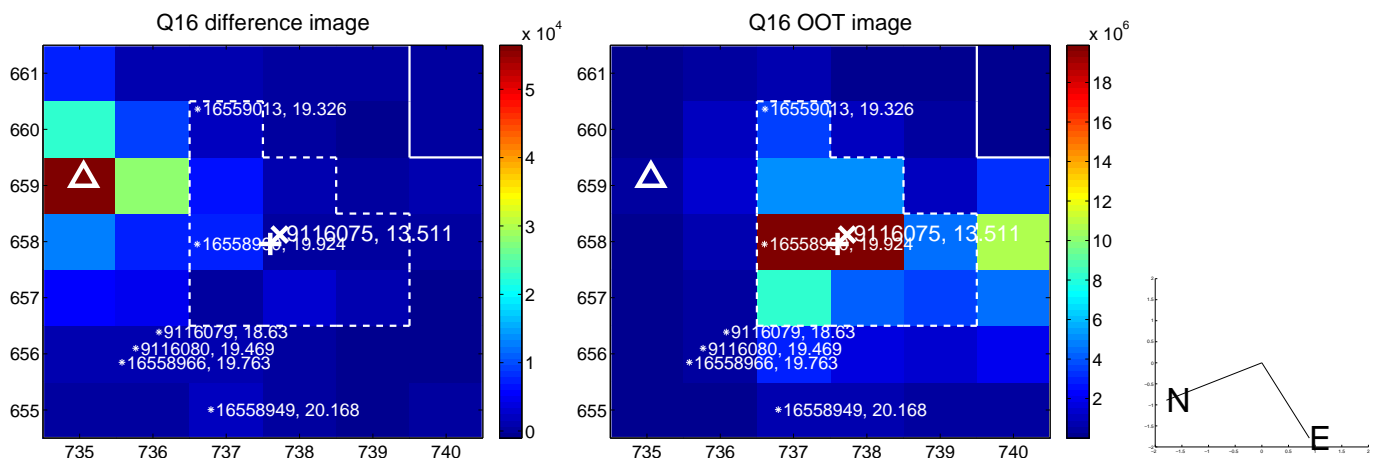
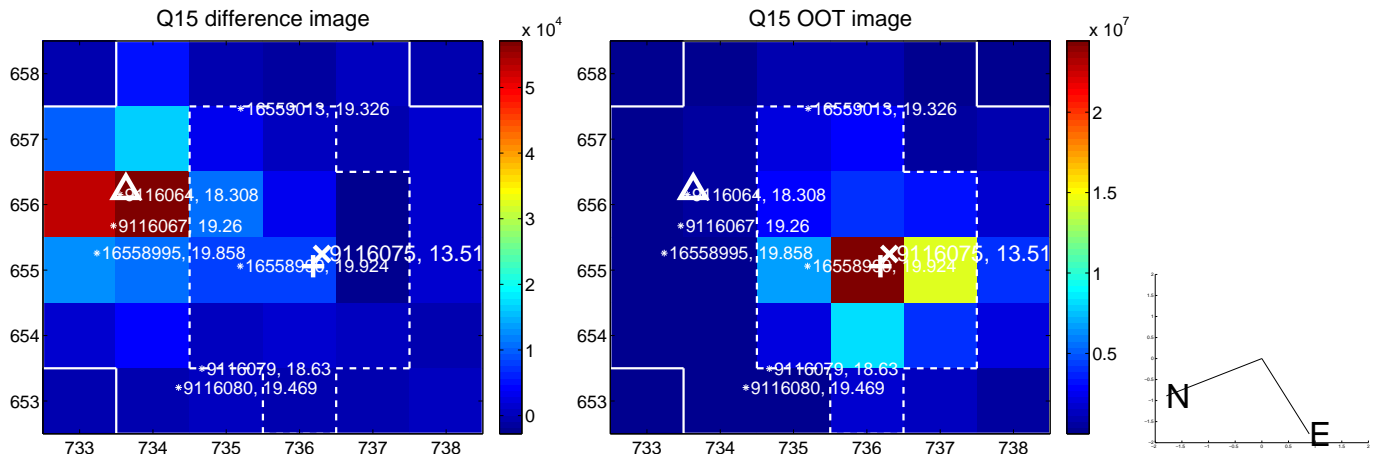
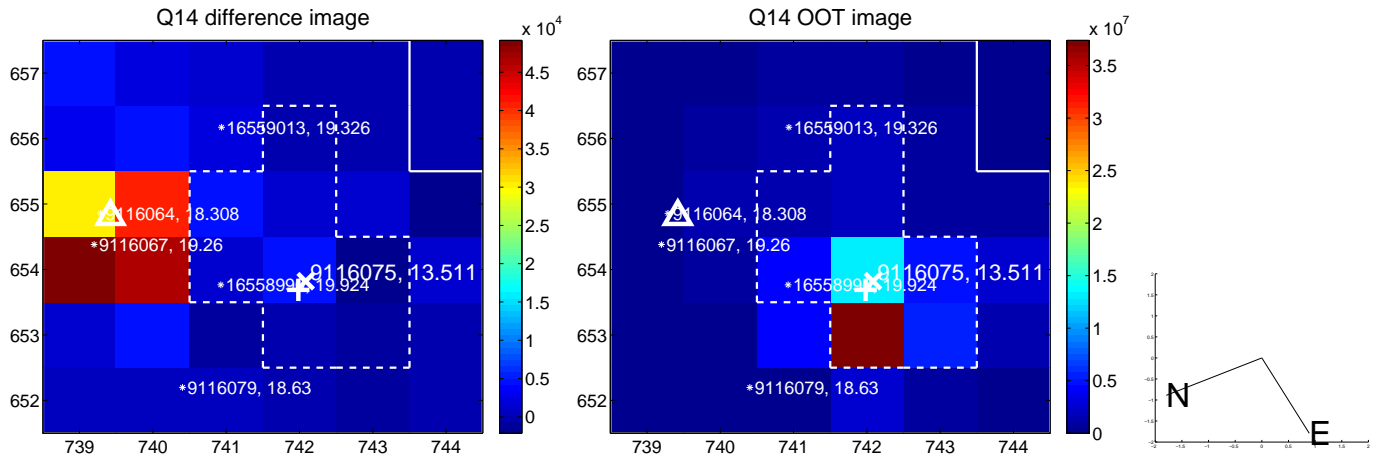
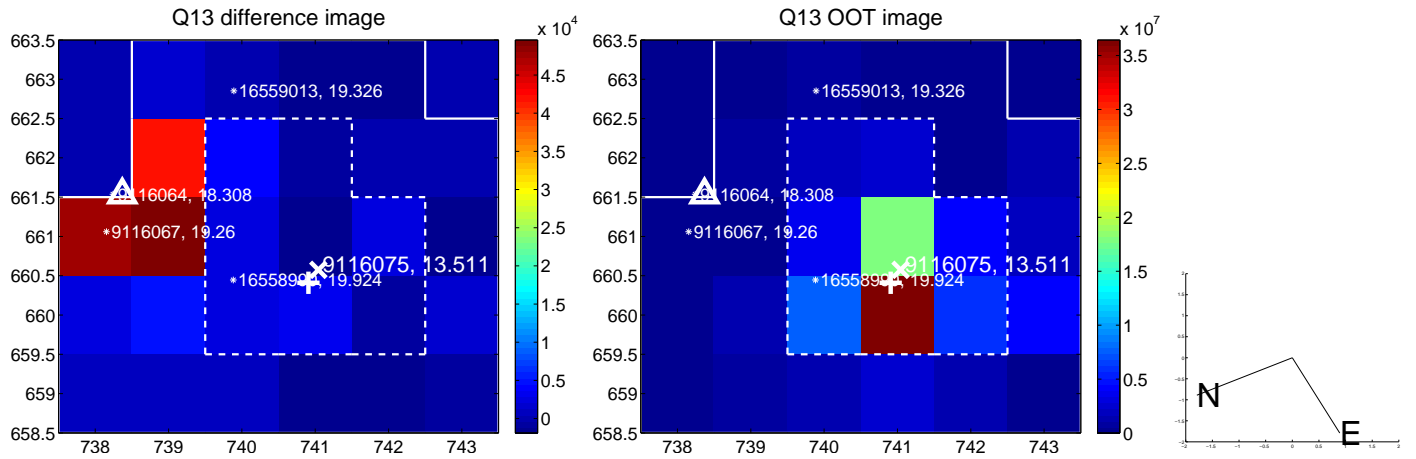
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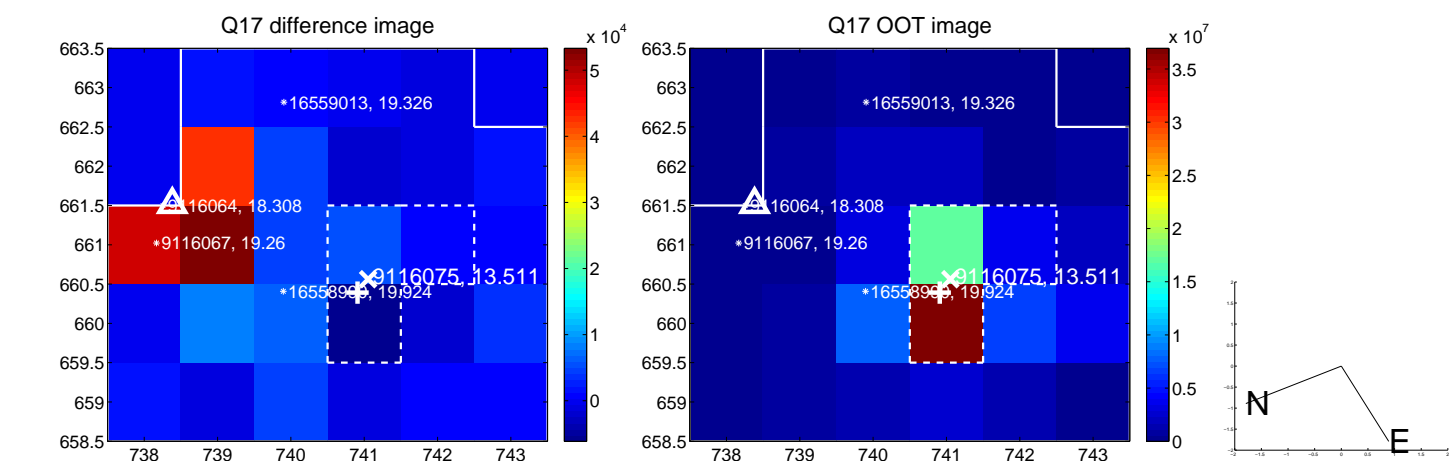
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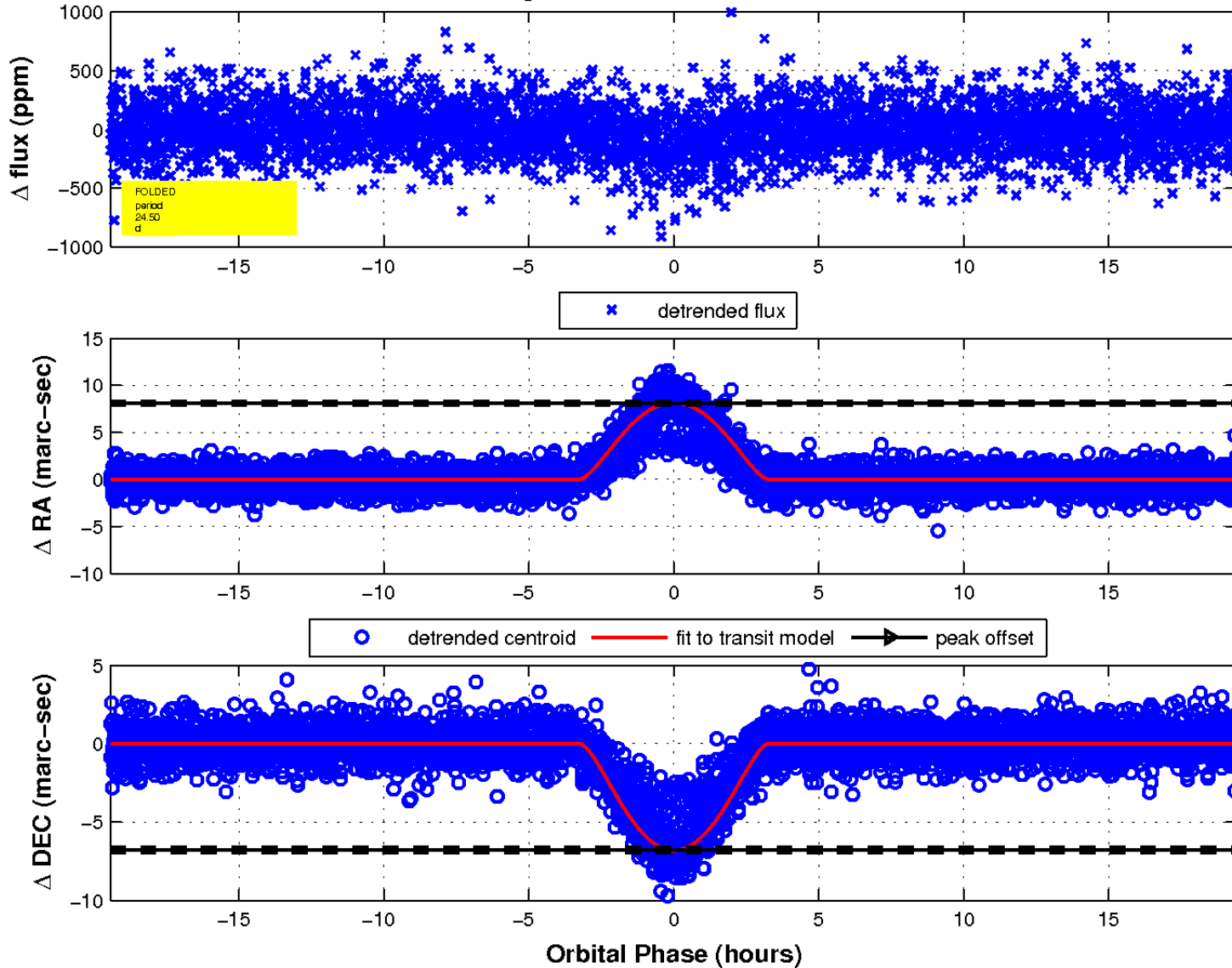
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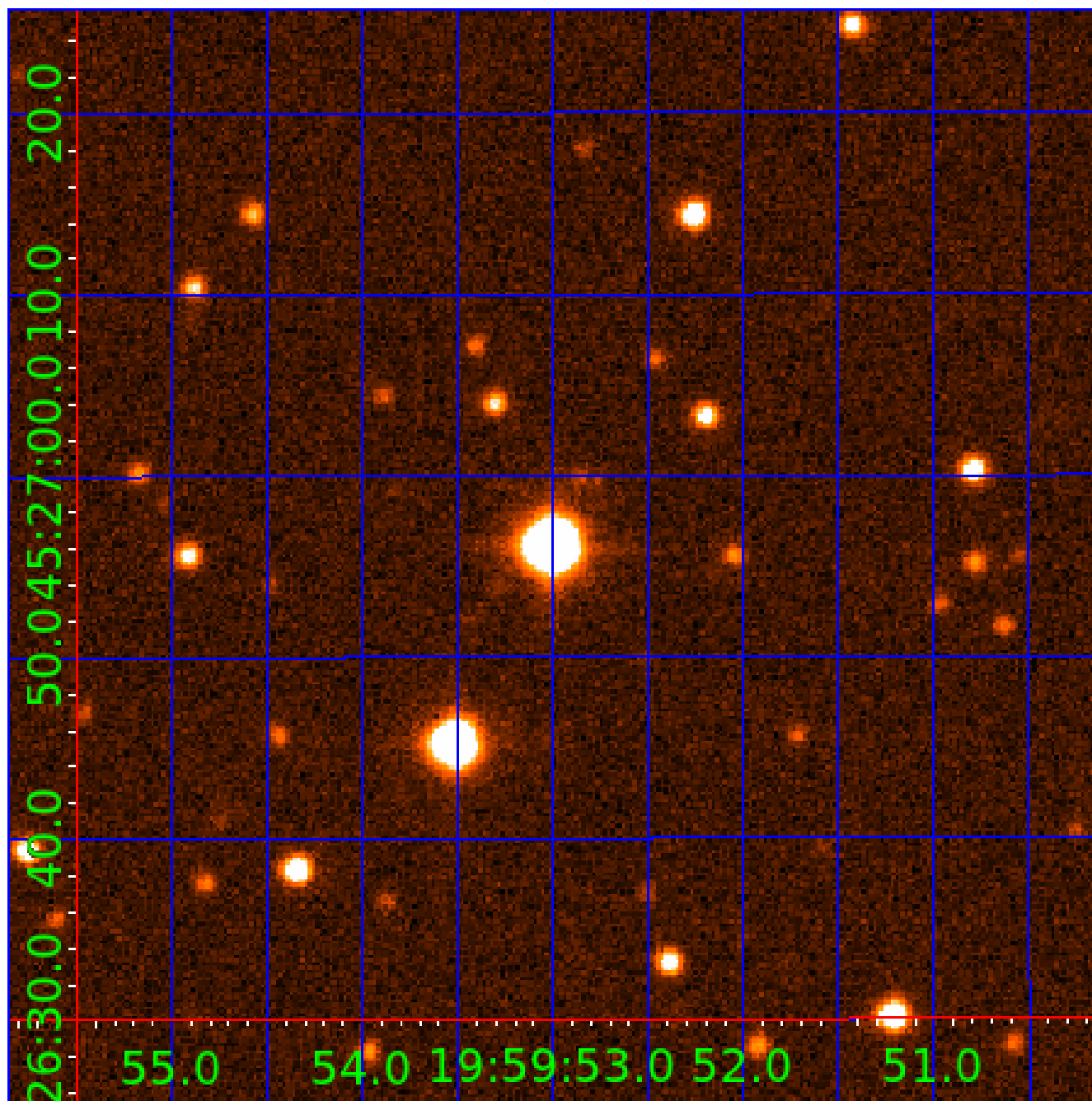


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009116075

Q1-17 DR25 TCE Parameters

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

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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009116075-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

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.

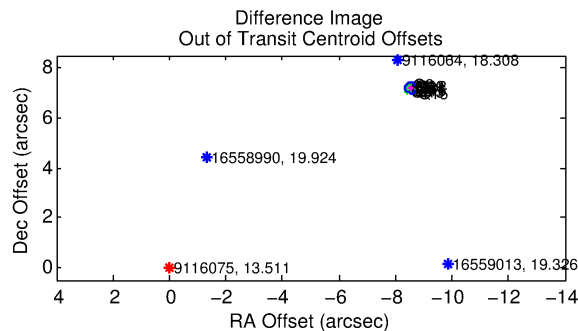
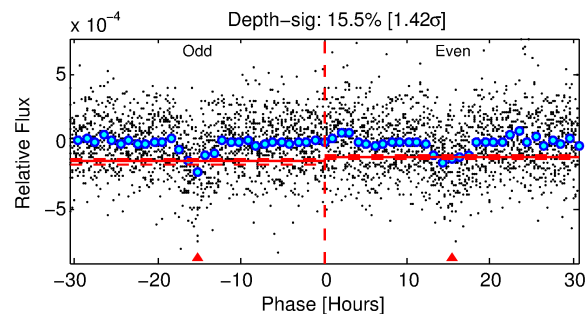
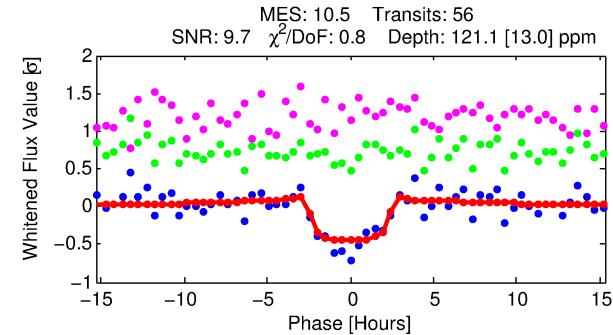
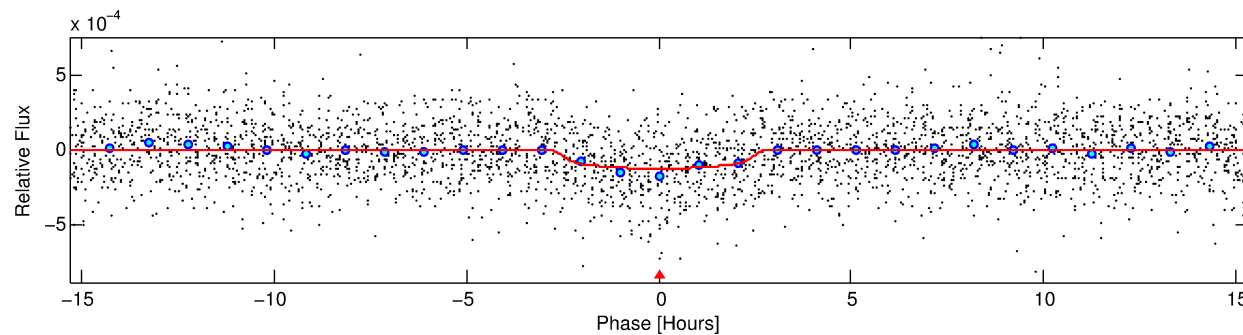
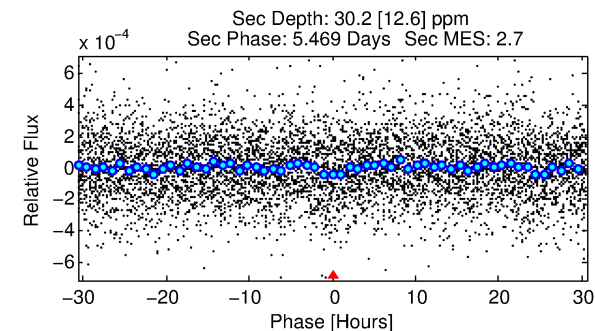
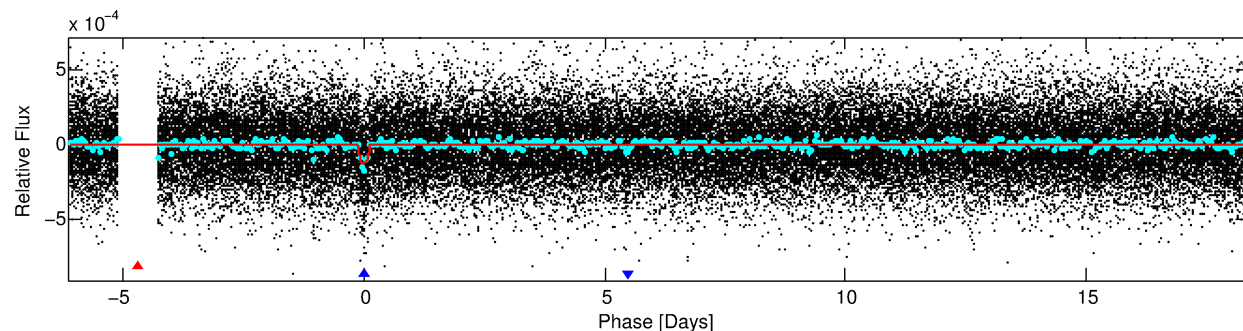
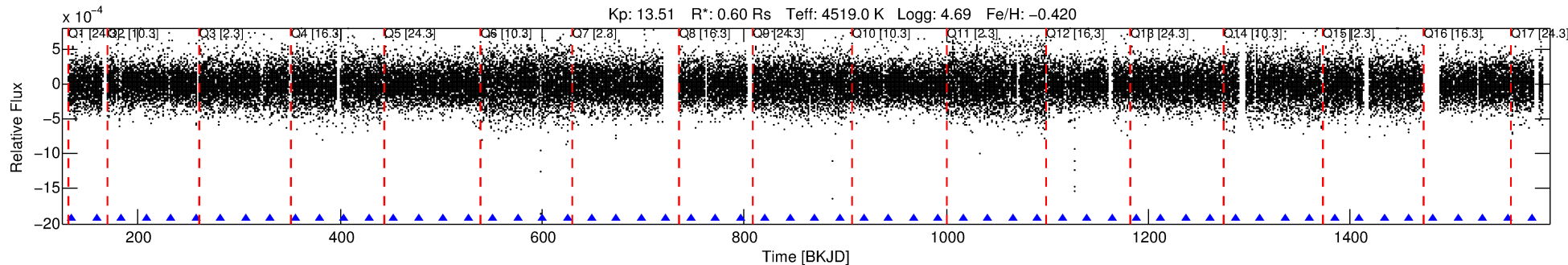
Ephemeris Match Information For 009116075-02

No Significant Match Found

DV One-Page Summary

KIC: 9116075 Candidate: 2 of 2 Period: 24.499 d
KOI: K05617 Corr: No Ephemeris Match

Kp: 13.51 R*: 0.60 Rs Teff: 4519.0 K Logg: 4.69 Fe/H: -0.420



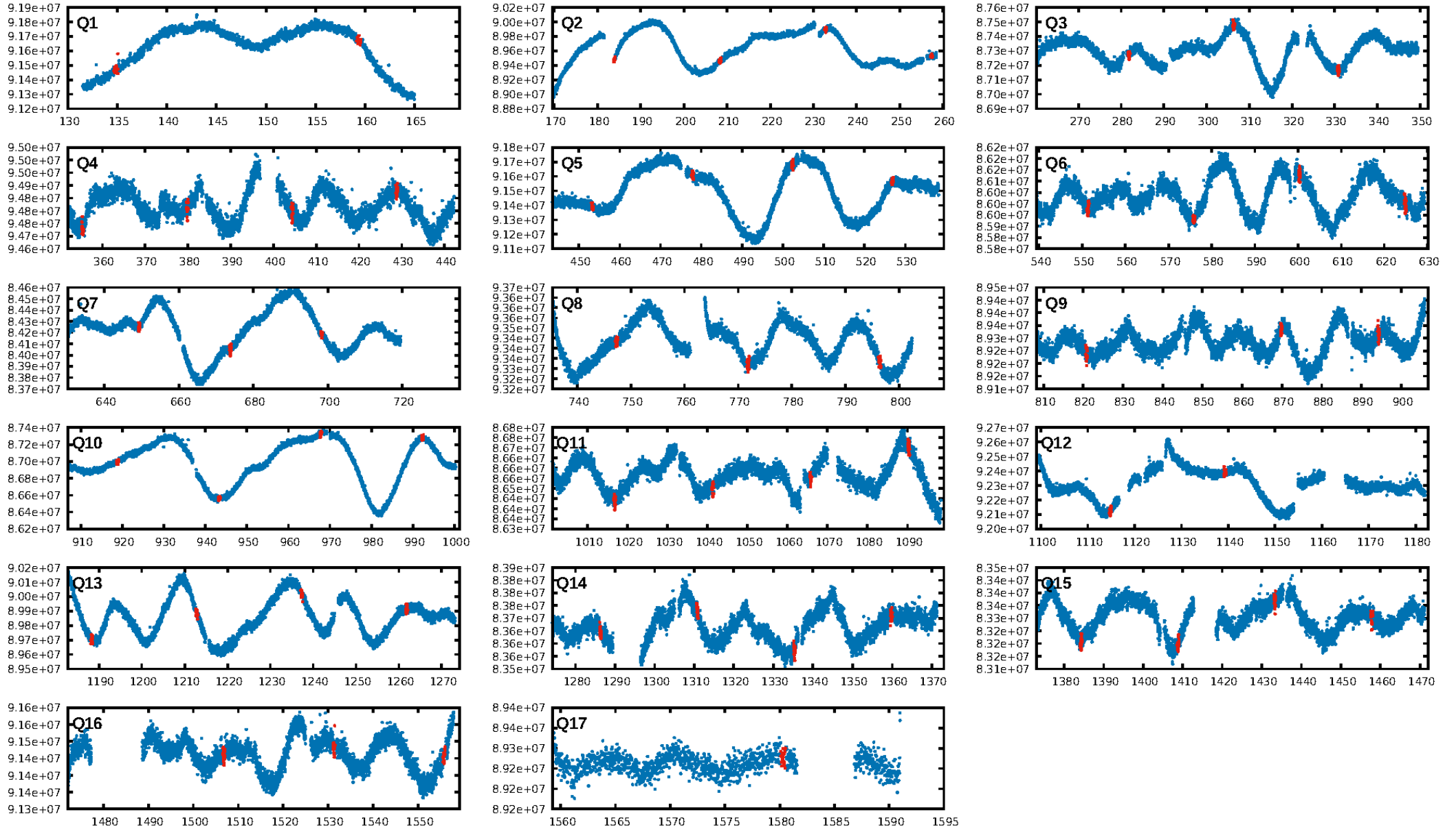
DV Fit Results:

Period = 24.49913 [0.00025] d
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Rp/R* = 0.0108 [0.0073]
a/R* = 26.67 [60.81]
b = 0.70 [1.68]
Seff = 6.62 [1.05]
Teq = 409 [16] K
Rp = 0.70 [0.48] Re
a = 0.1418 [0.0113] AU
Ag = 677.80 [967.77] [0.70σ]
Teff = 3227 [1153] K [2.44σ]

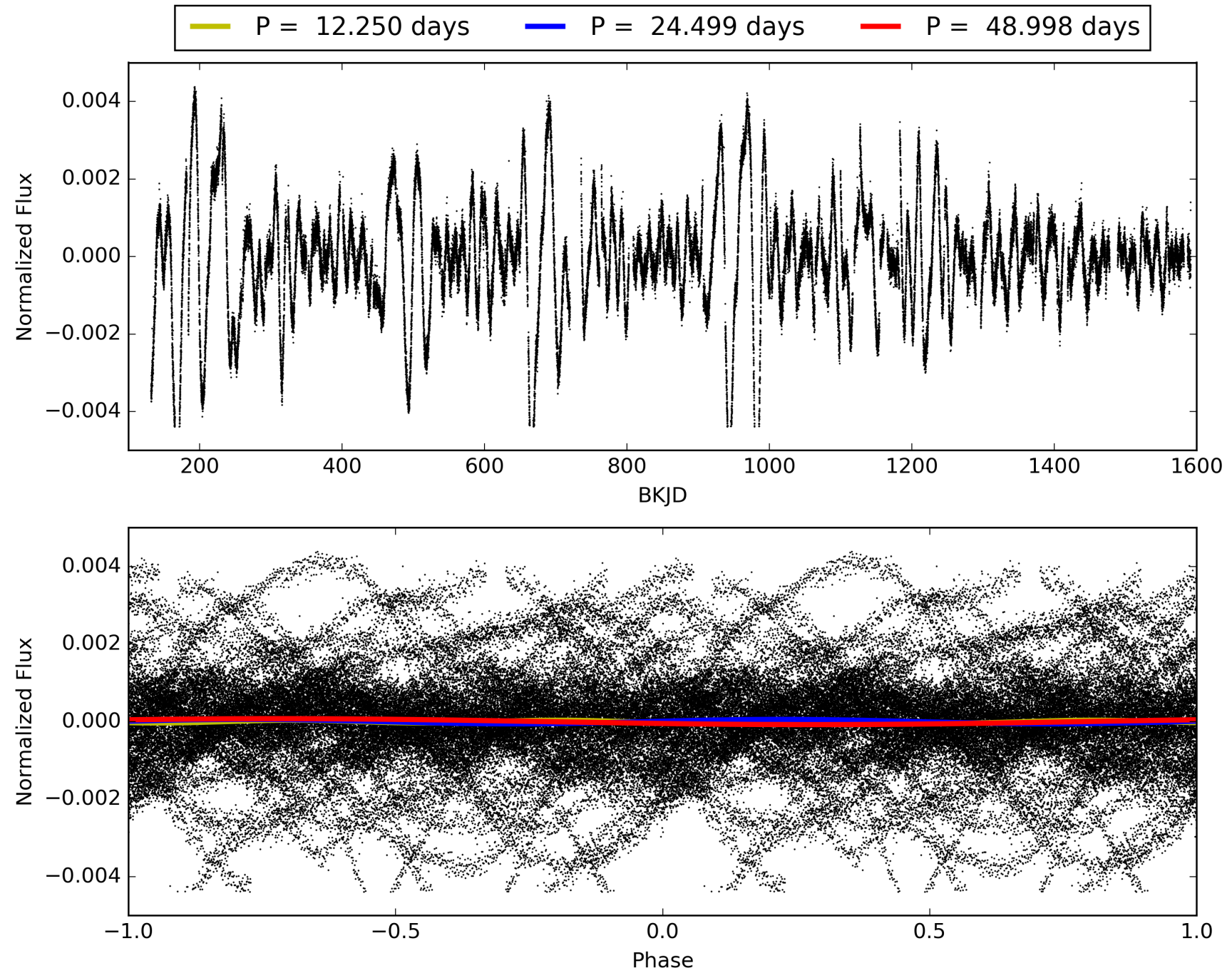
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 16.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.21e-24
RollingBand-fgt: 1.00 [53/53]
GhostDiagnostic-chr: -0.4684
Centroid-sig: 0.0%
Centroid-so: 56.831 arcsec [45.97σ]
OotOffset-rm: 11.157 arcsec [162.25σ]
KicOffset-rm: 11.301 arcsec [162.12σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 009116075-02, PDC Light Curves

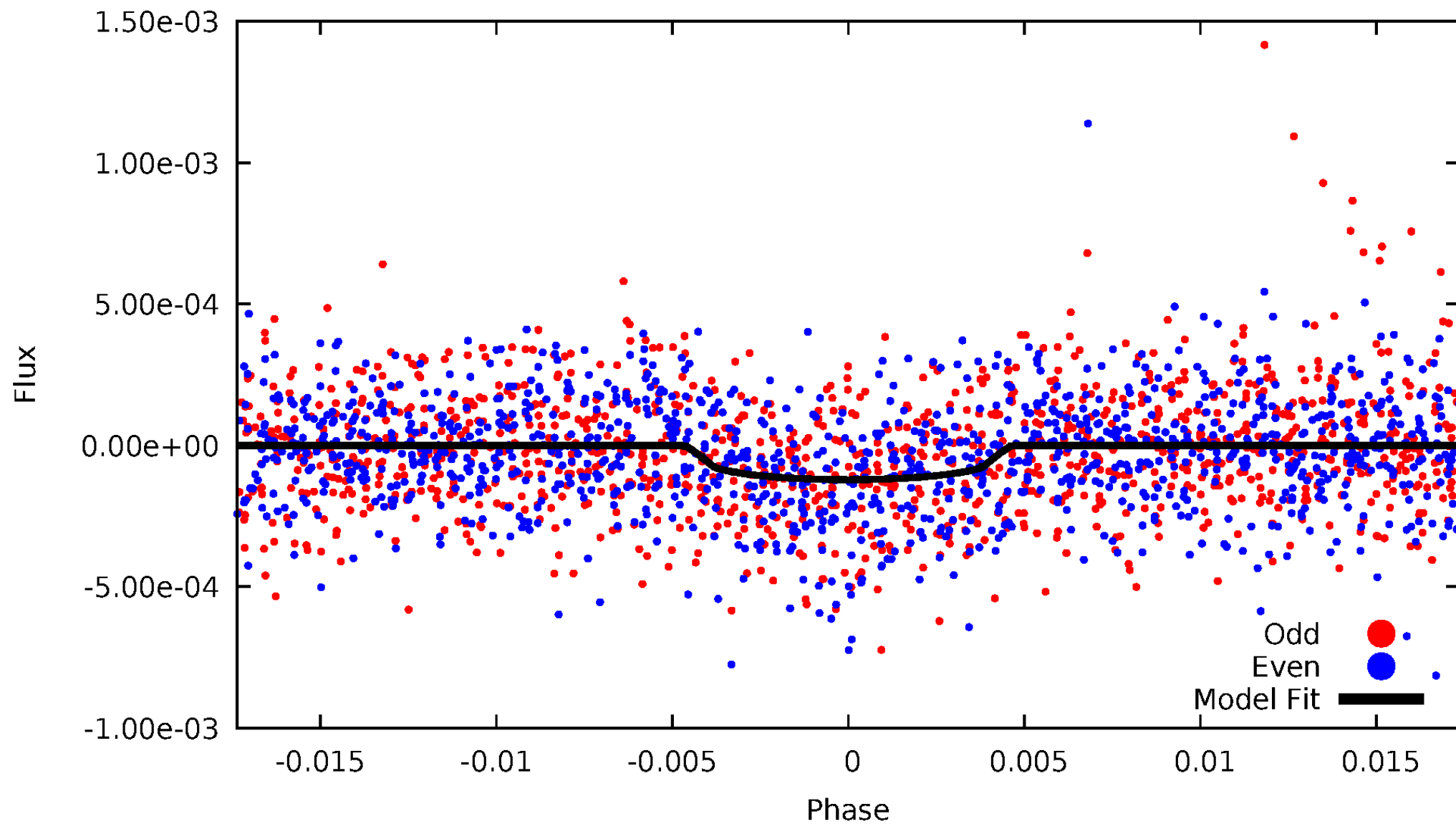


TCE 009116075-02



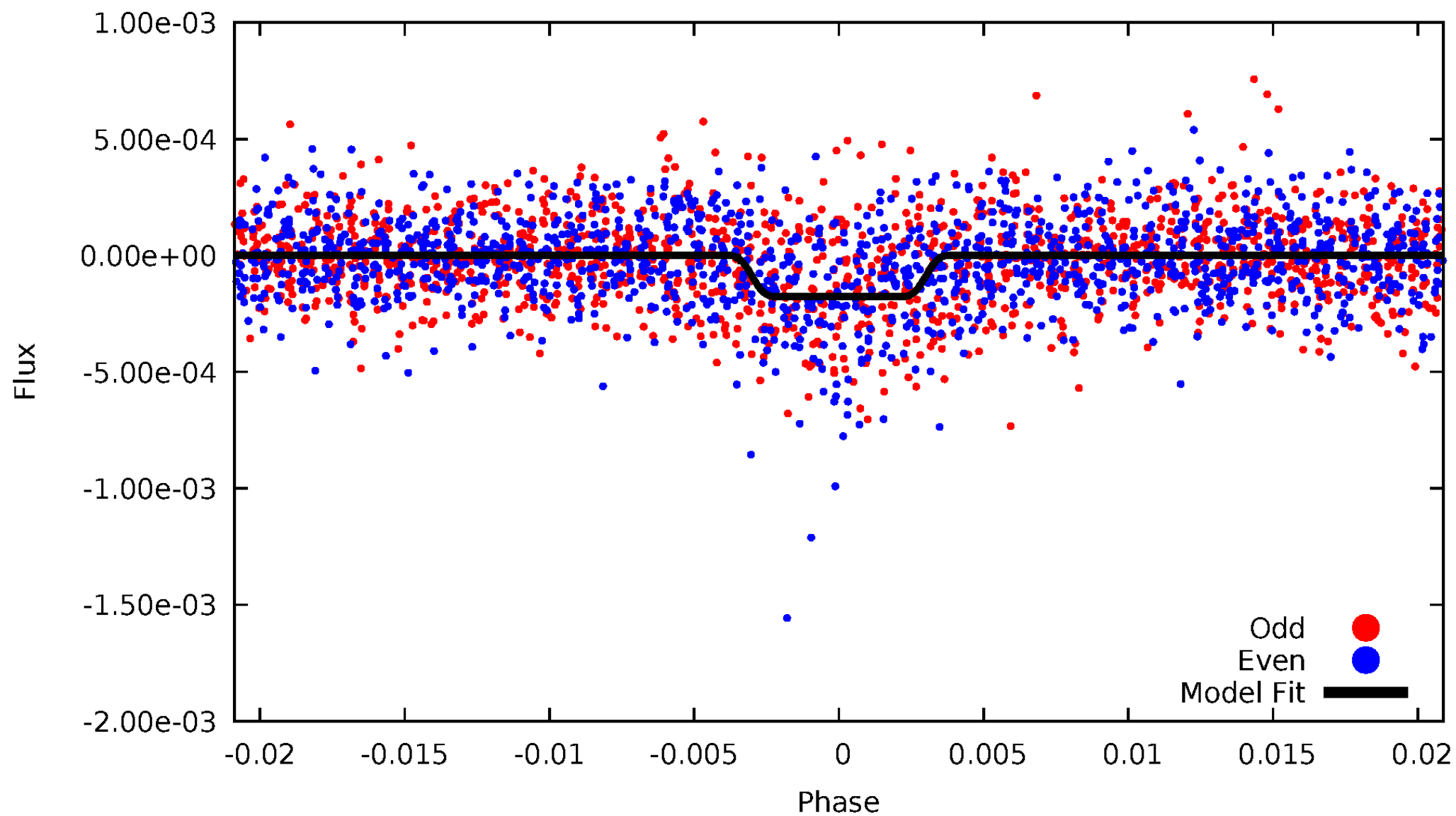
DV Odd/Even

TCE 009116075-02



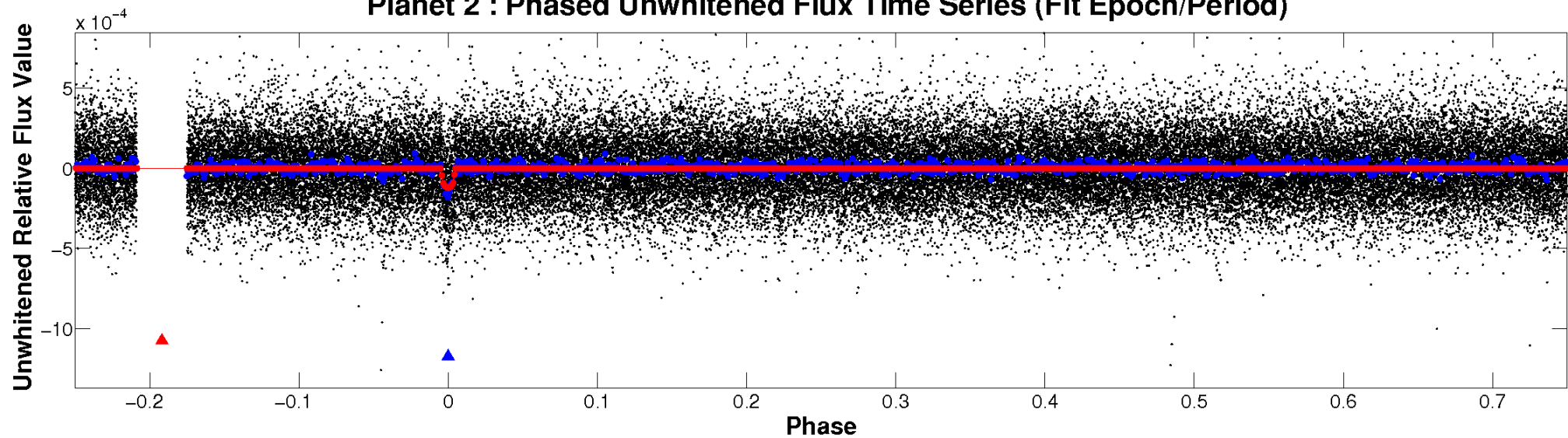
ALT Odd/Even

TCE 009116075-02

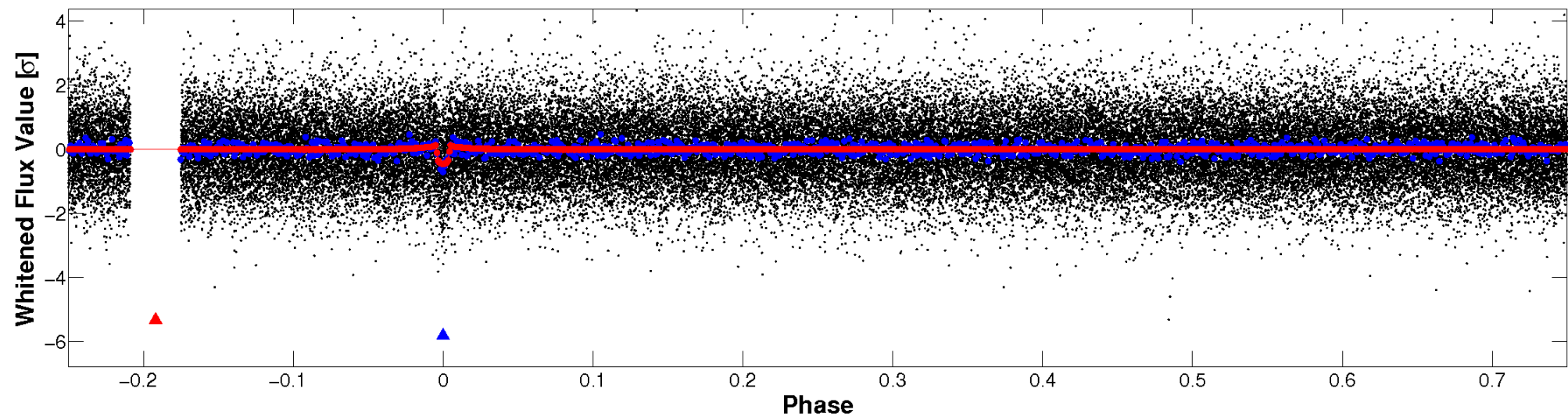


Non-Whitened Vs. Whitened Light Curve

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

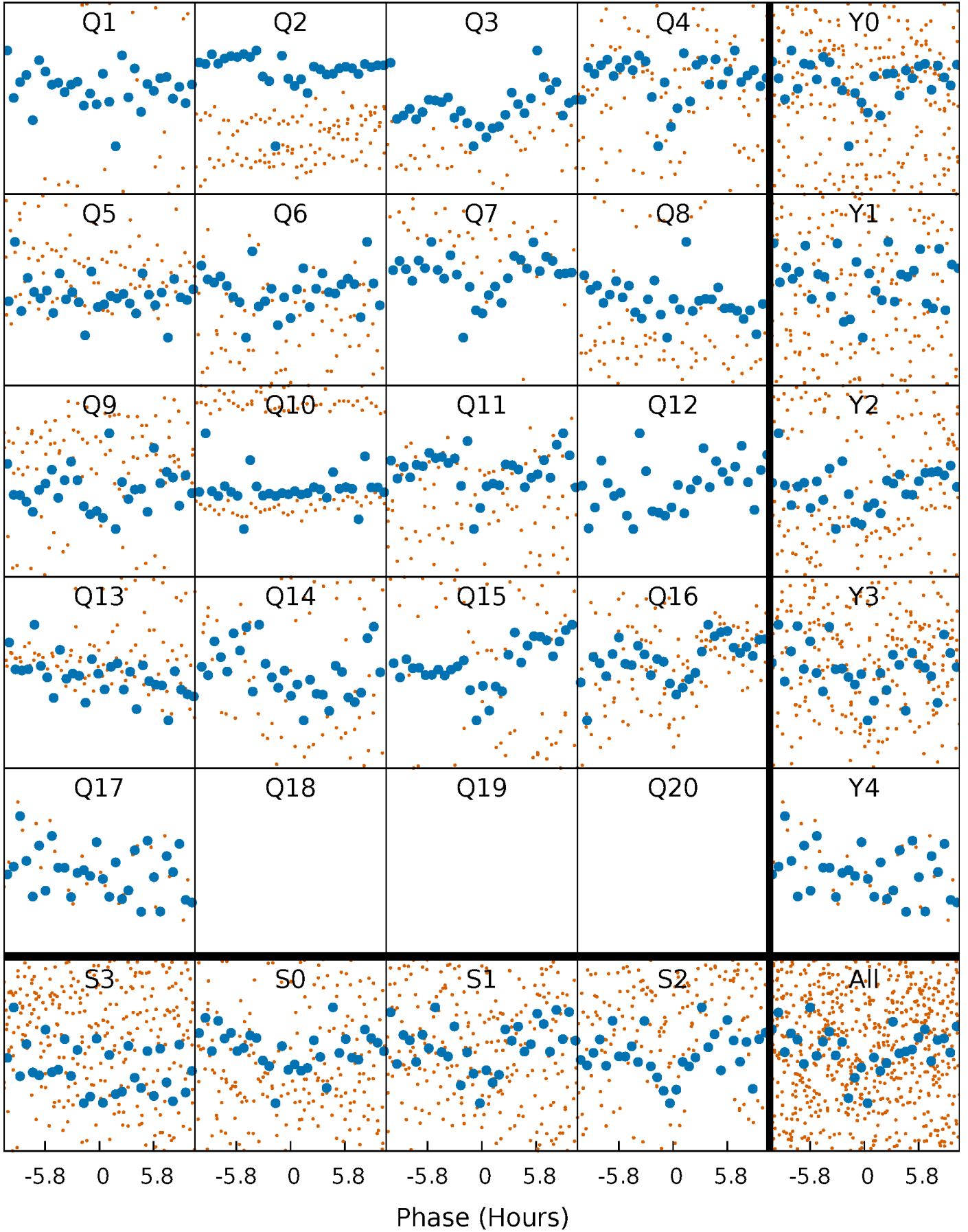


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



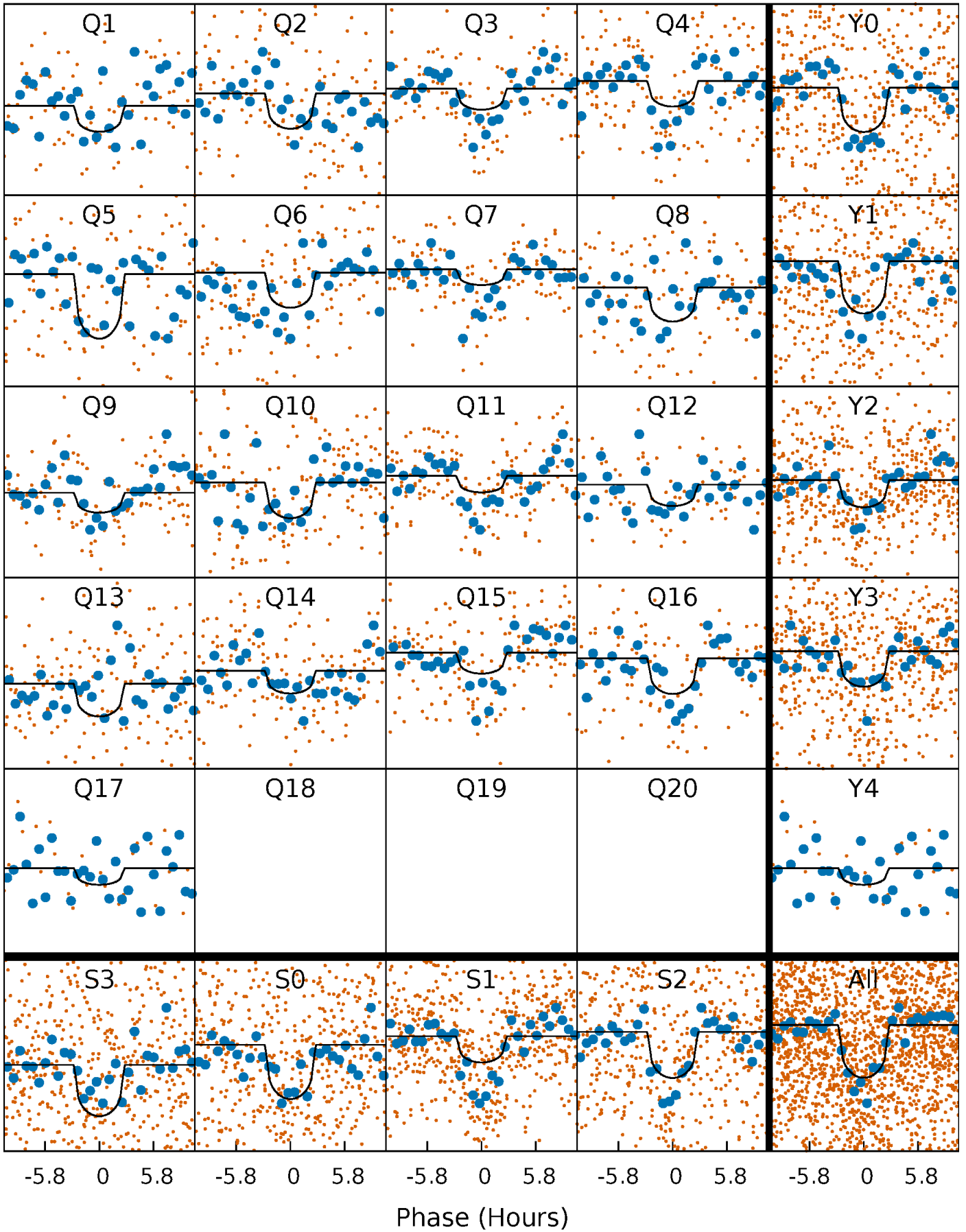
PDC Quarter-Phased Transit Curves

TCE 009116075-02 P= 24.499131 Days $T_0=134.859535$ (BKJD)



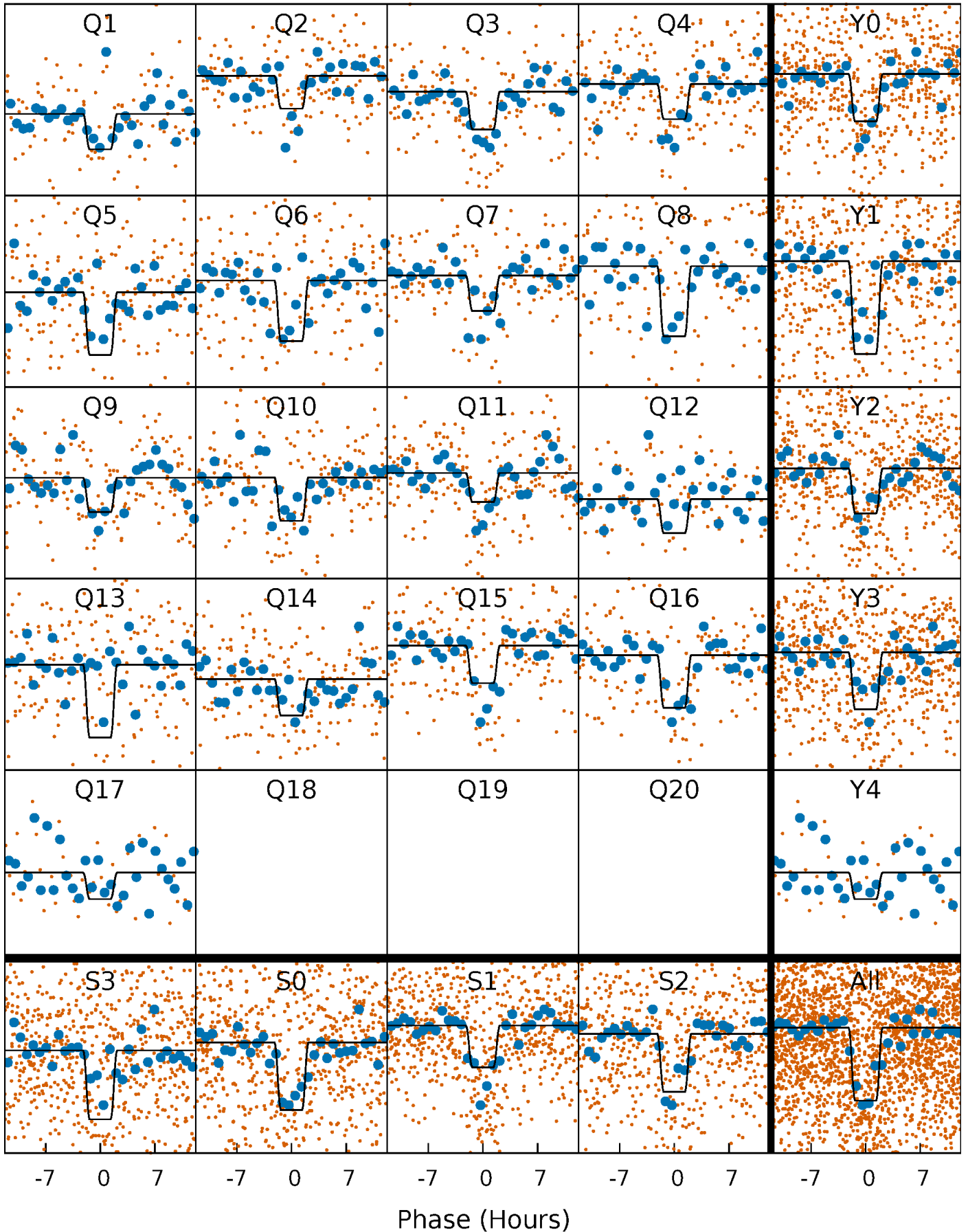
DV Quarter-Phased Transit Curves

TCE 009116075-02 P= 24.499131 Days $T_0=134.859535$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

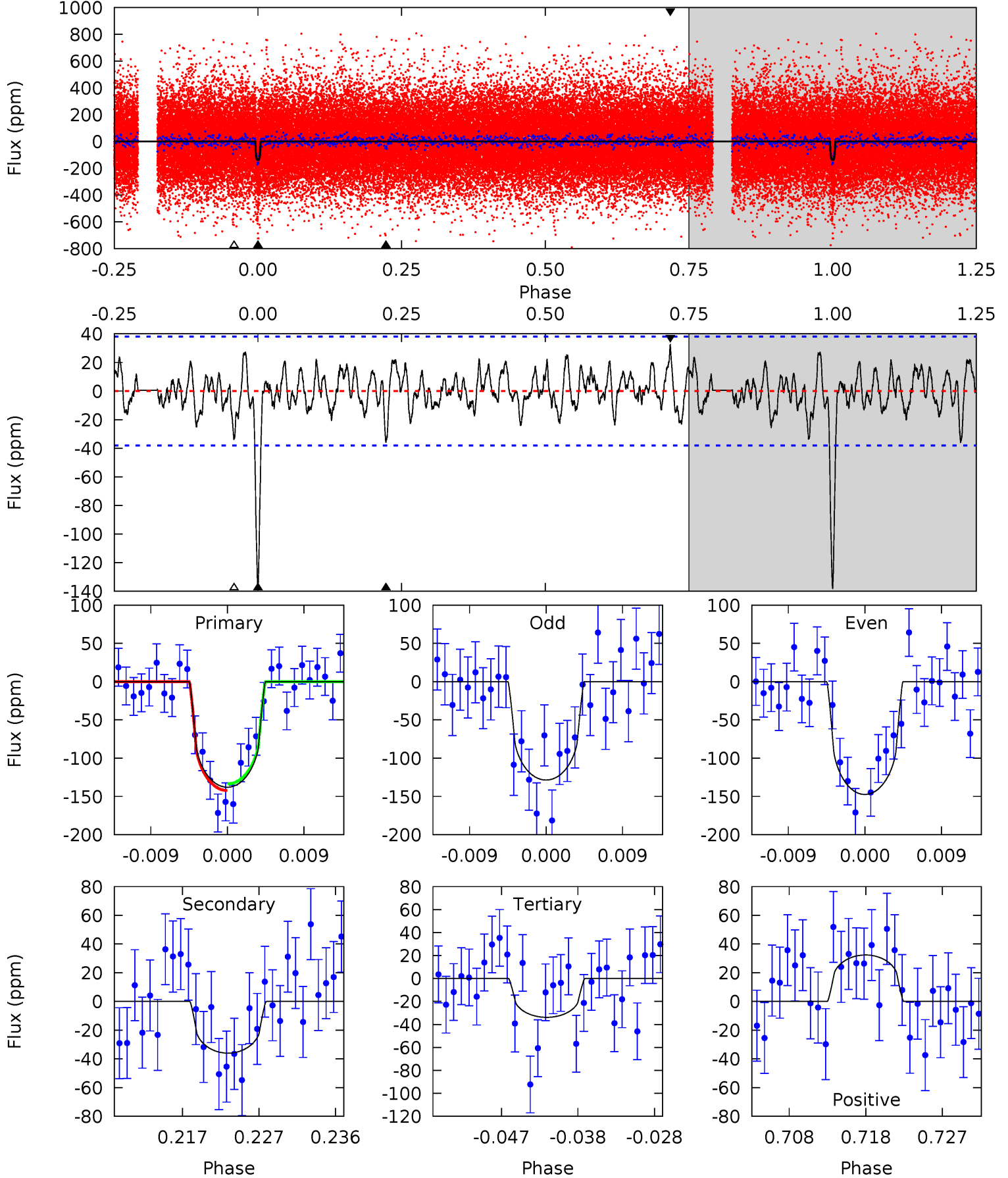
TCE 009116075-02 P= 24.499310 Days $T_0=134.848506$ (BKJD)



DV Model-Shift Uniqueness Test

009116075-02, P = 24.499131 Days, E = 110.360404 Days

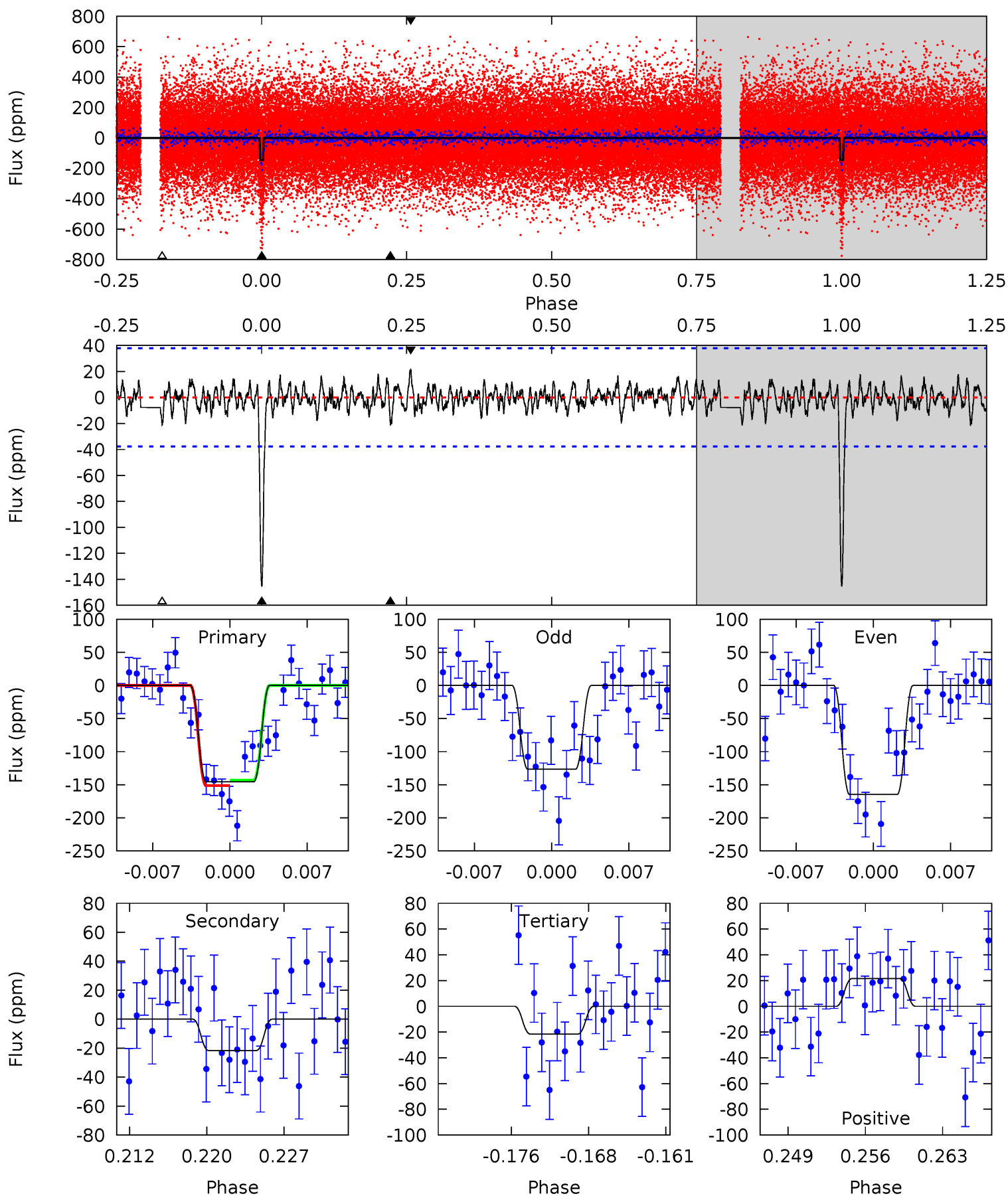
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.3	4.77	4.48	4.29	5.04	2.60	1.44	13.8	14.0	0.29	0.48	1.25	1.04	0.19	0.57



Alt Model-Shift Uniqueness Test

009116075-02, P = 24.499310 Days, E = 110.349196 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.6	2.91	2.90	2.90	5.09	2.68	0.90	16.7	16.7	0.01	0.01	2.57	0.98	0.13	0.56



Stellar Parameters For KIC 009116075

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	4519^{+120}_{-134}	$4.688^{+0.028}_{-0.052}$	$-0.420^{+0.300}_{-0.300}$	$0.597^{+0.062}_{-0.042}$	$0.641^{+0.055}_{-0.066}$	$4.241^{+0.633}_{-0.859}$
	+3%/-3%	+1%/-1%	+71%/-71%	+10%/-7%	+9%/-10%	+15%/-20%
Source	PHO1	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 009116075-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-36 ± 8	$0.74^{+0.45}_{-0.41}$	575^{+20}_{-20}	3599^{+1310}_{-493}	716^{+3040}_{-439}
Alt.	-22 ± 7	$0.90^{+0.49}_{-0.43}$	575^{+20}_{-20}	3128^{+742}_{-406}	290^{+786}_{-183}

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 $A_{obs} \gg 1.0$

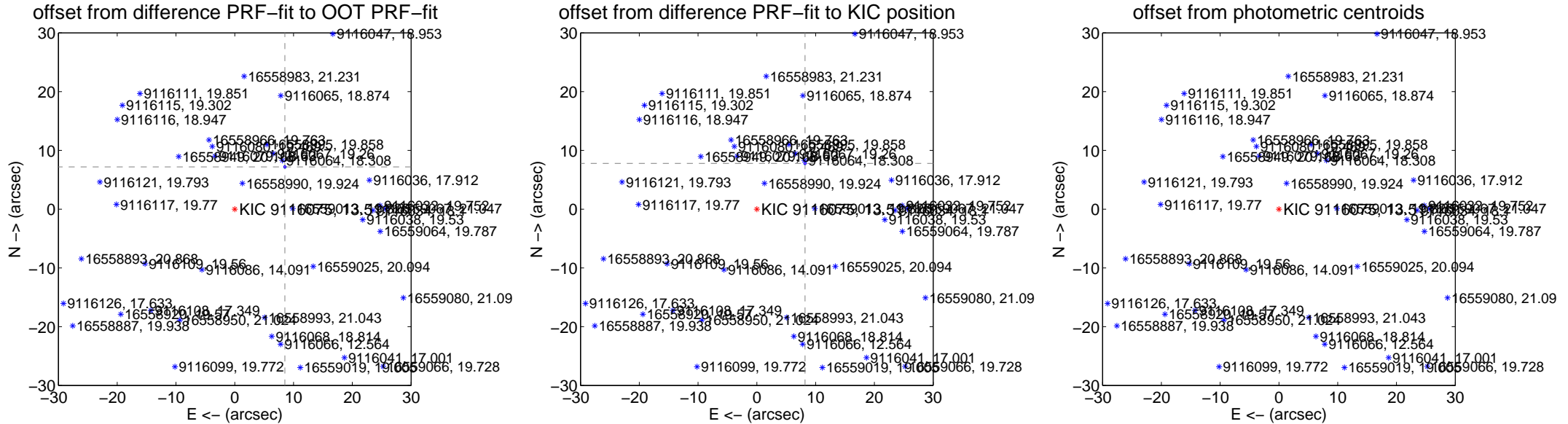
DV Centroid Data

Supplemental centroid analysis for 009116075-02. Kepler magnitude: 13.51. Transit SNR 9.71

There are 17 quarters with good PRF difference image offsets

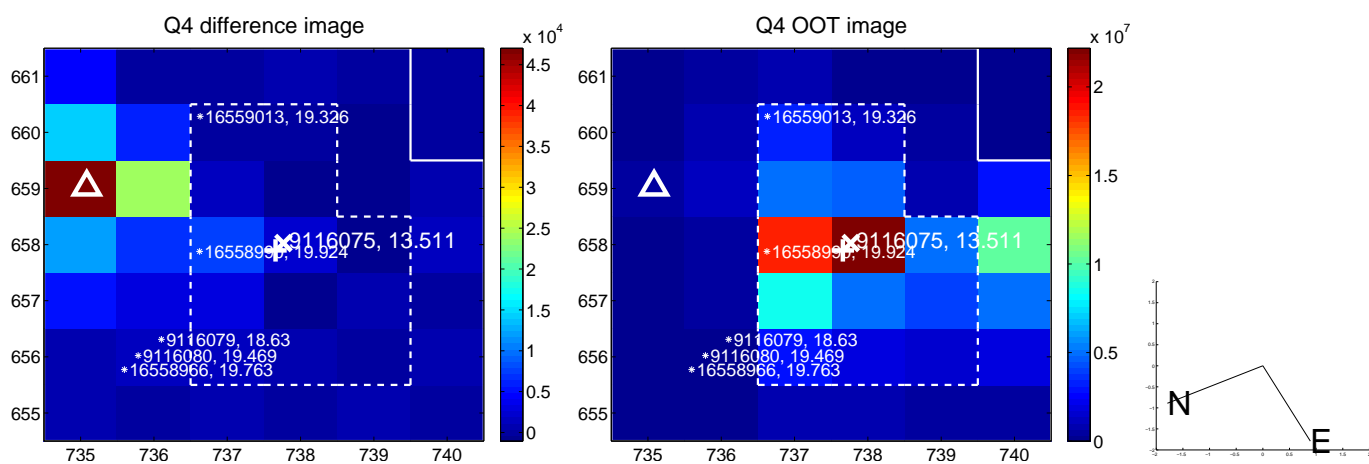
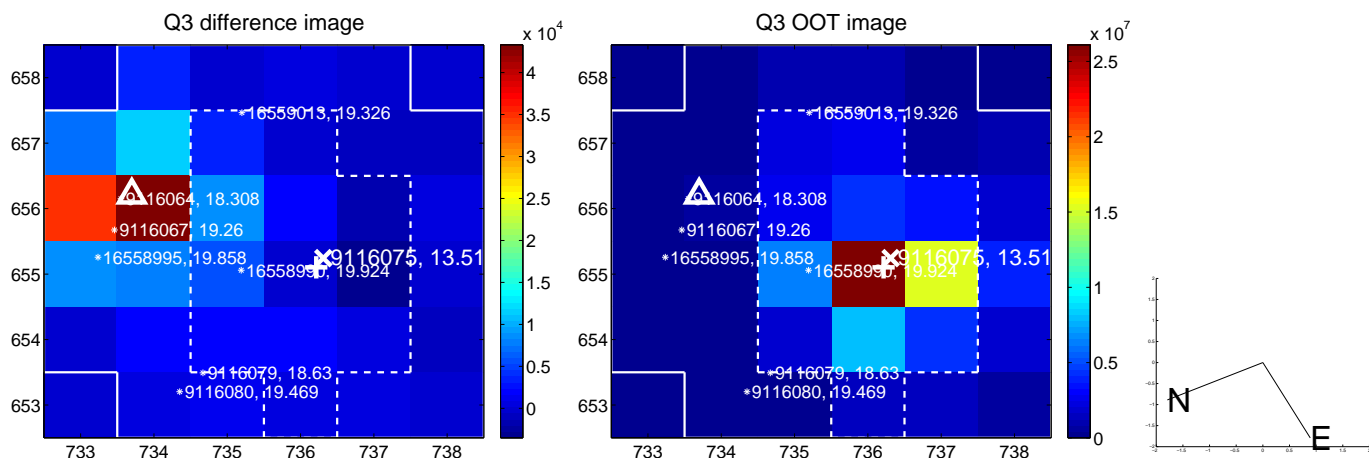
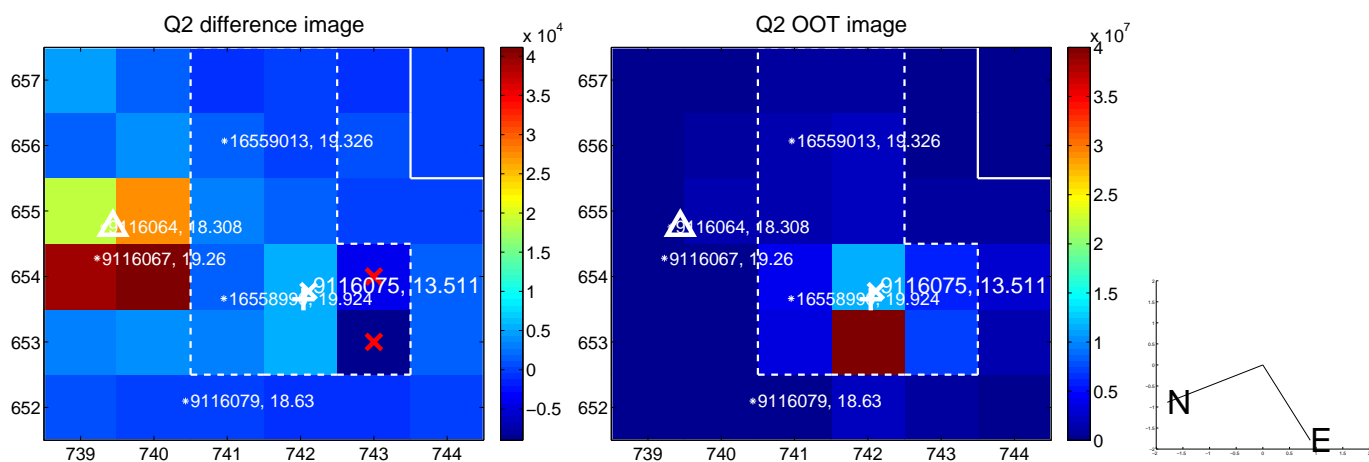
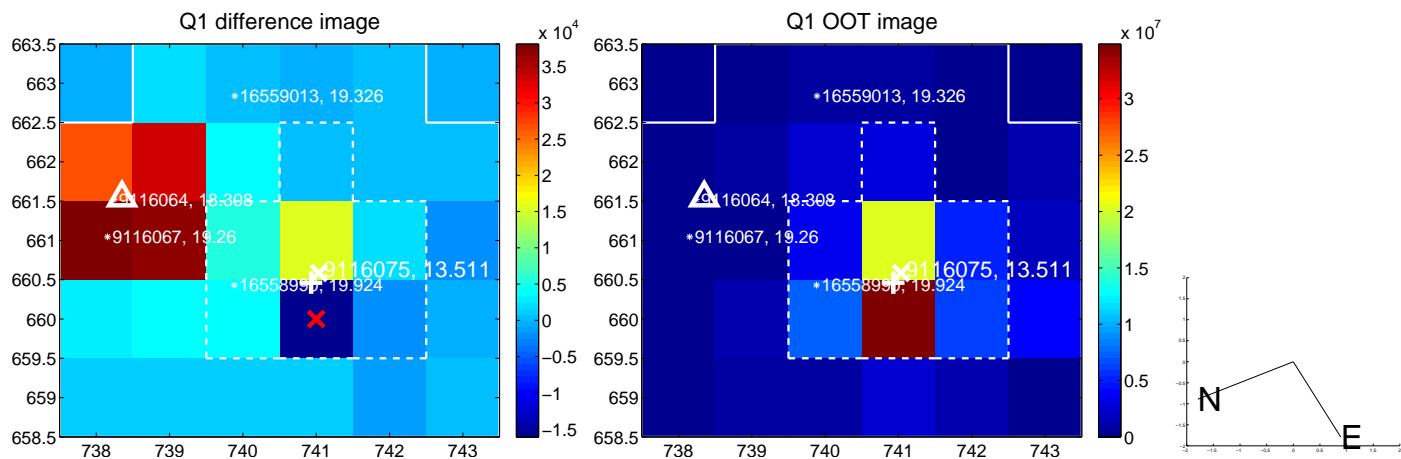
The direct PRF centroid is offset from the target star catalog position by about 0.89 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	11.157 \pm 0.069	162.25	-8.526 \pm 0.068	7.195 \pm 0.070
PRF-fit source offset from KIC position	11.301 \pm 0.070	162.12	-8.193 \pm 0.068	7.783 \pm 0.070
photometric centroid source offset	56.83 \pm 1.24	45.97	-43.71 \pm 1.27	36.31 \pm 1.19

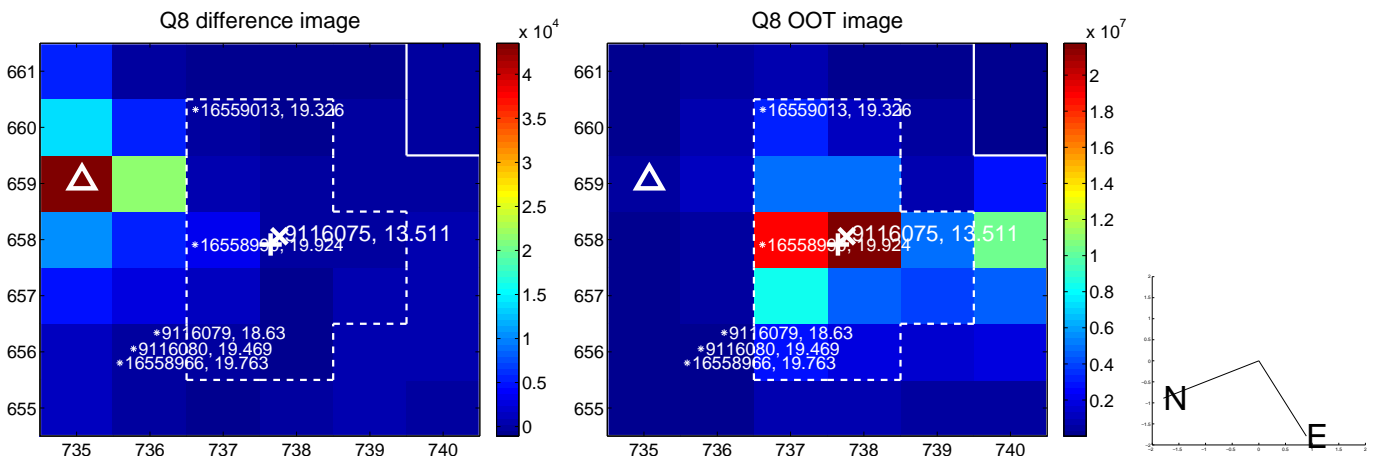
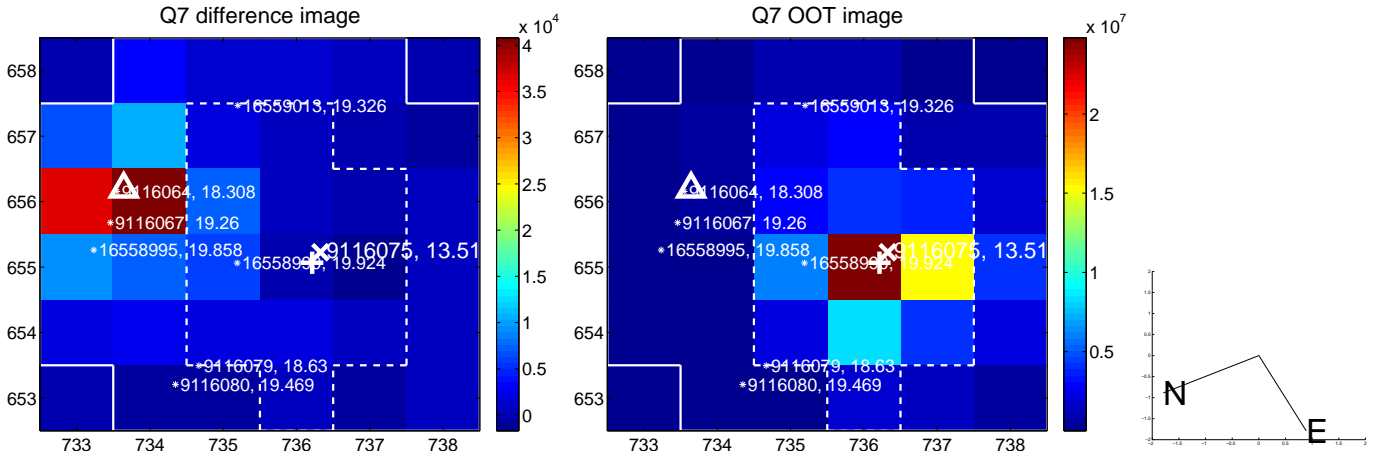
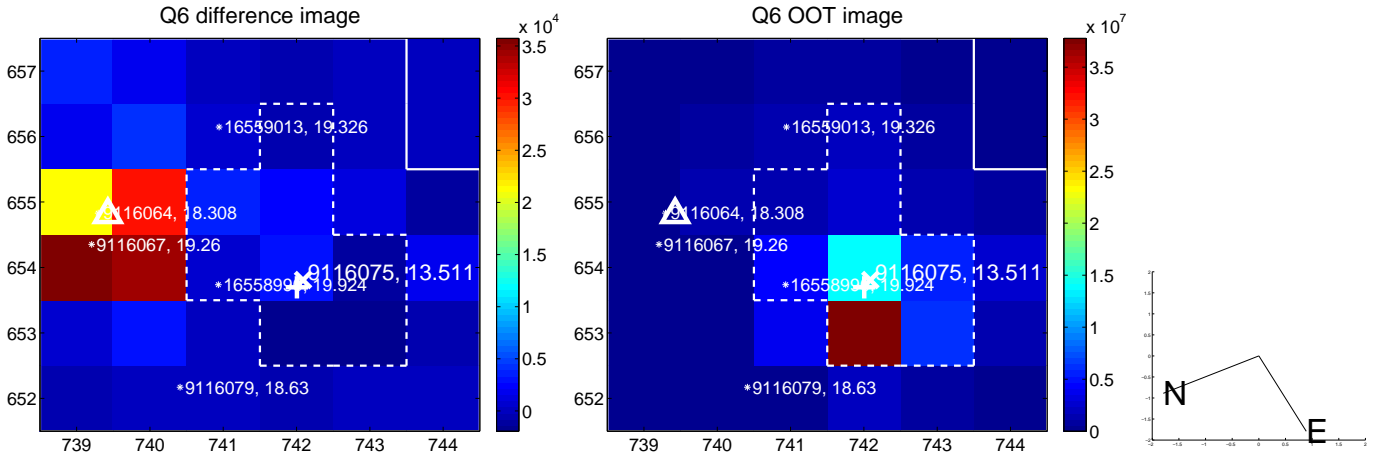
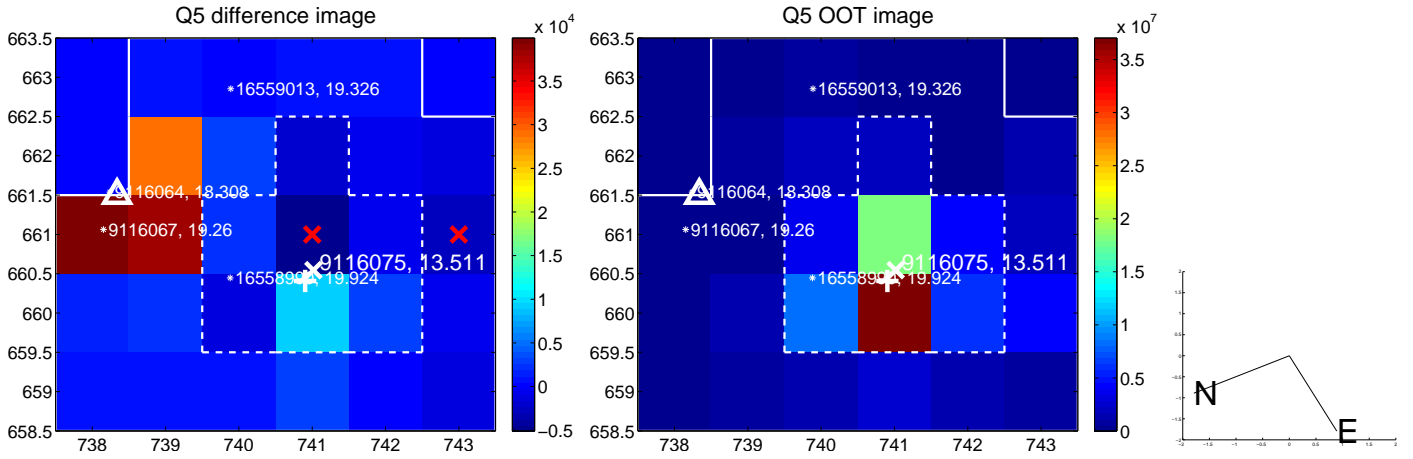


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

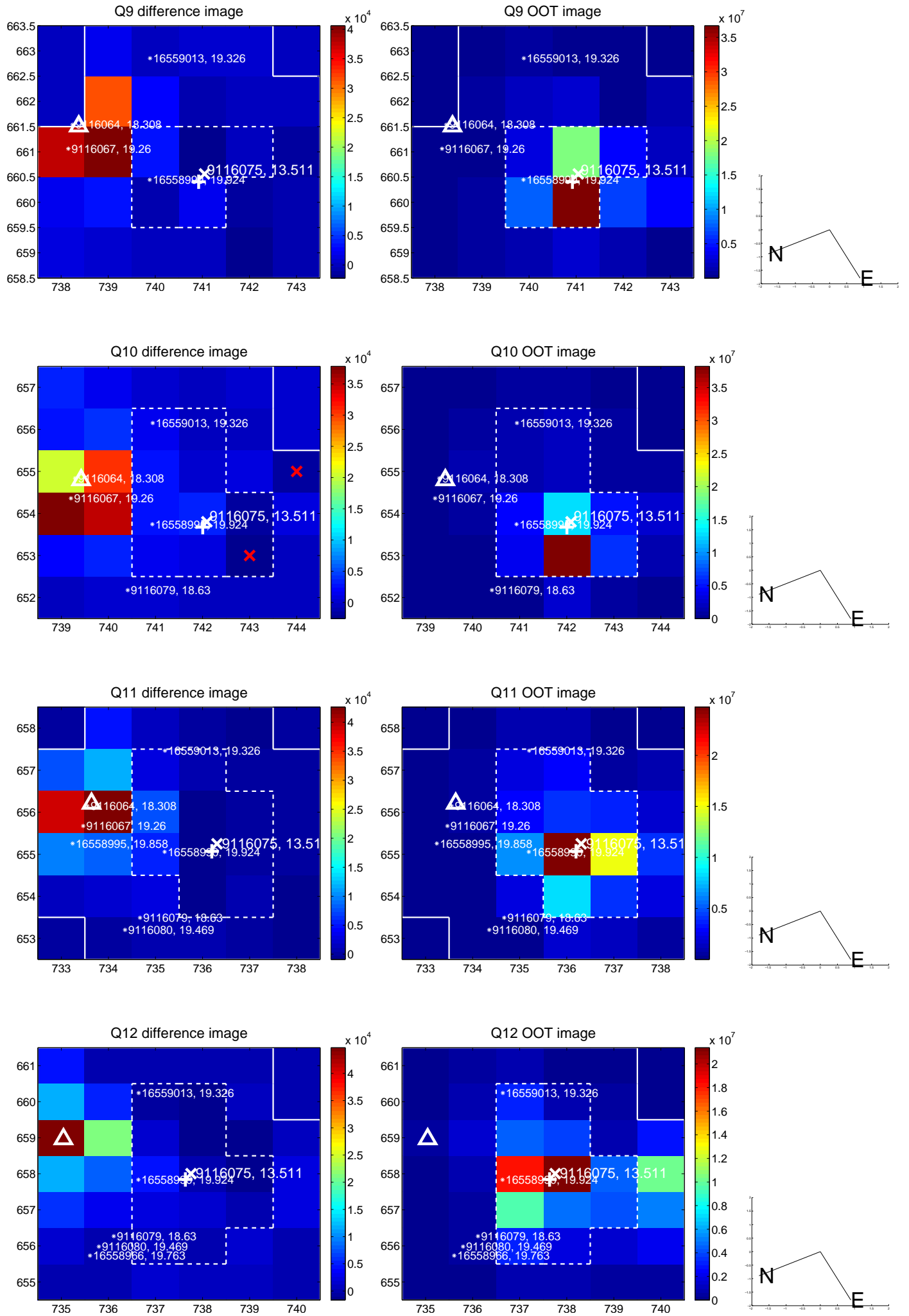
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



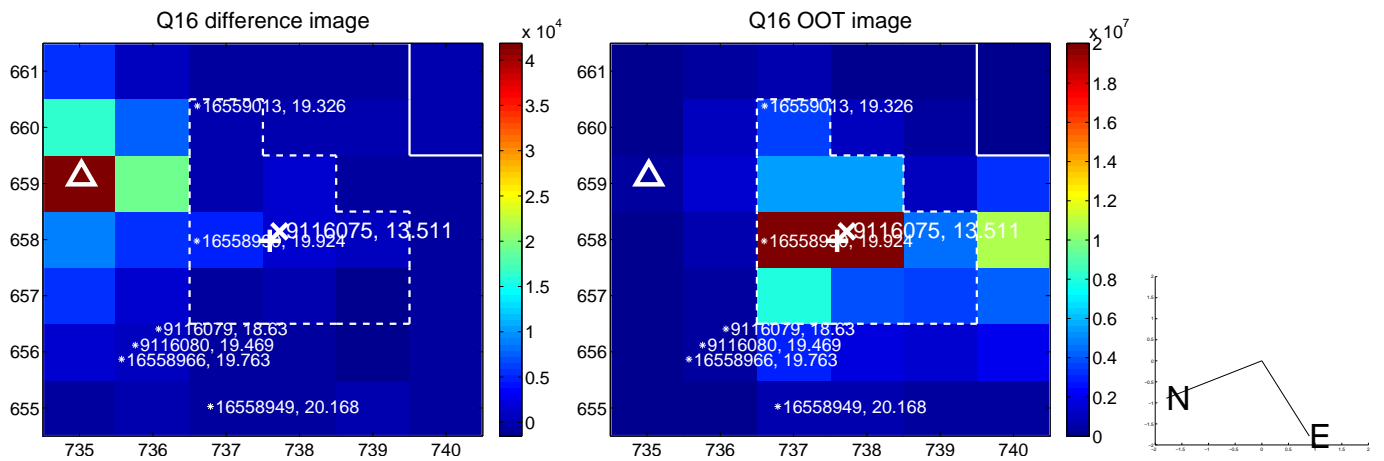
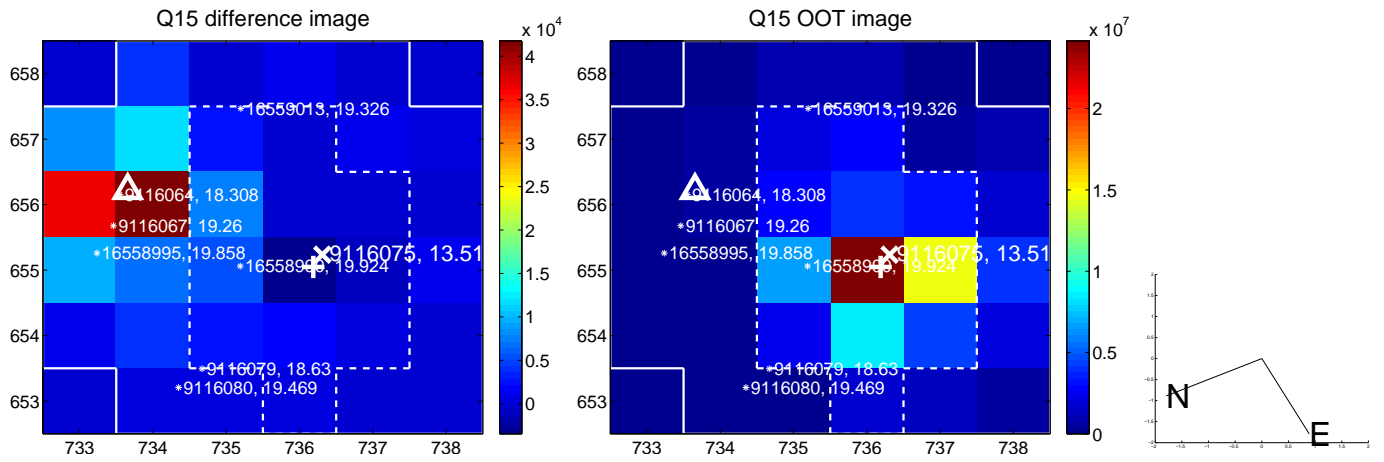
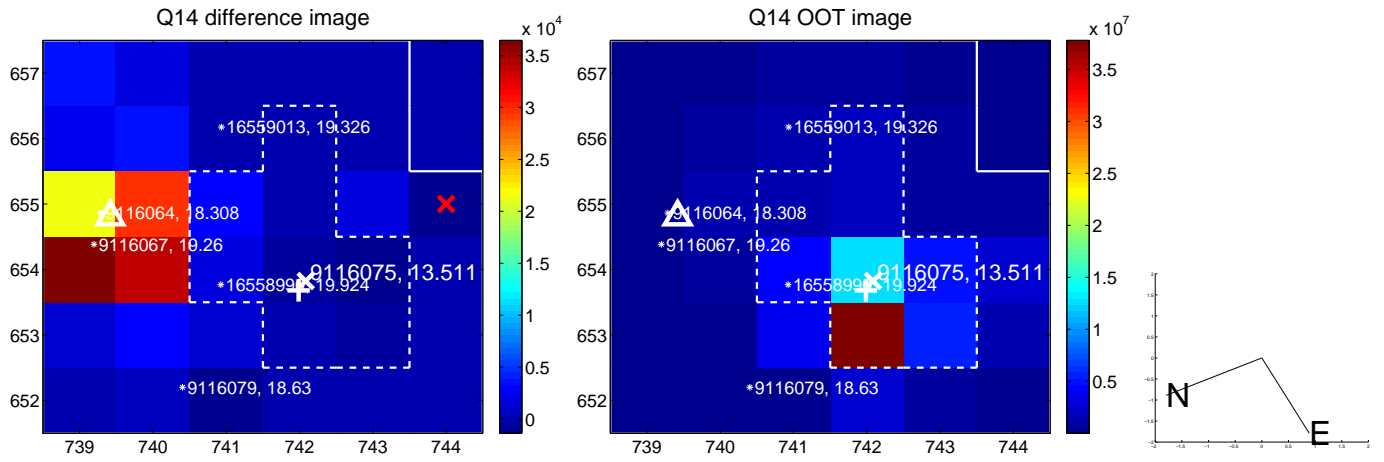
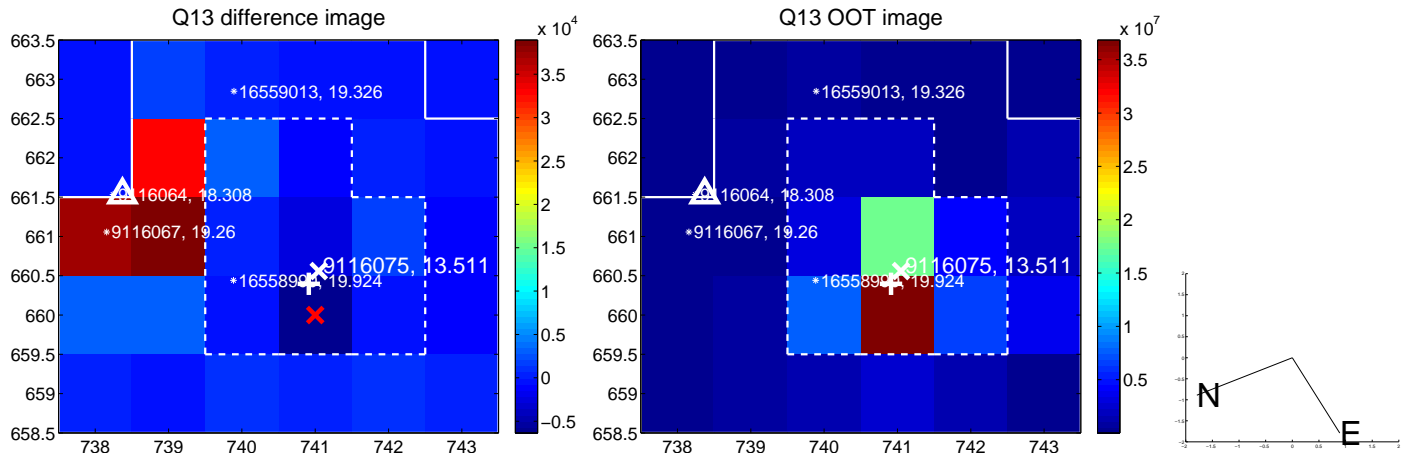
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



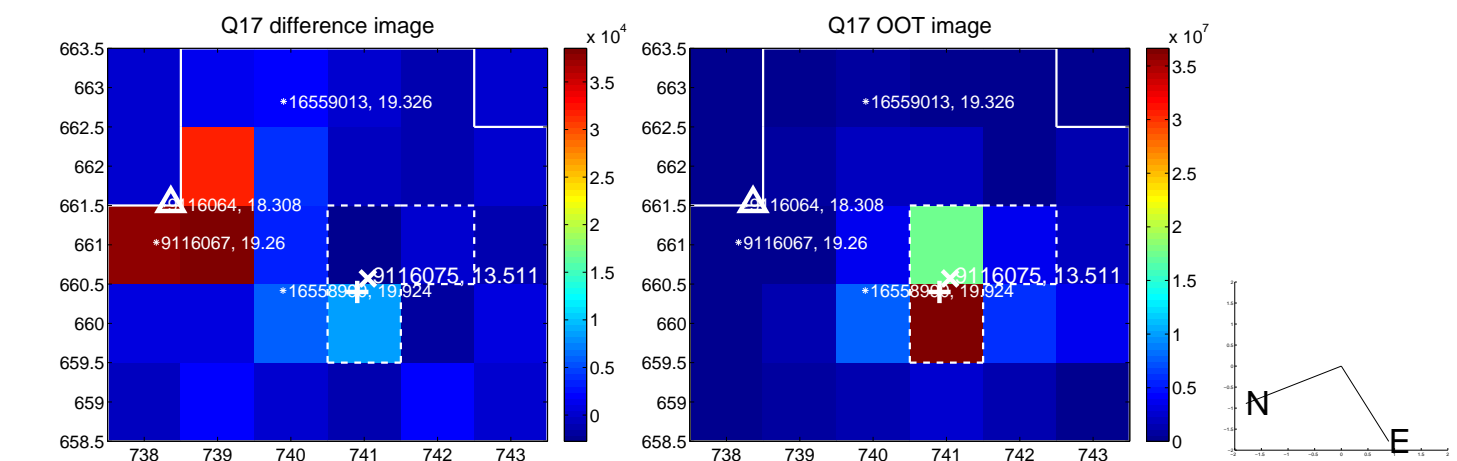
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



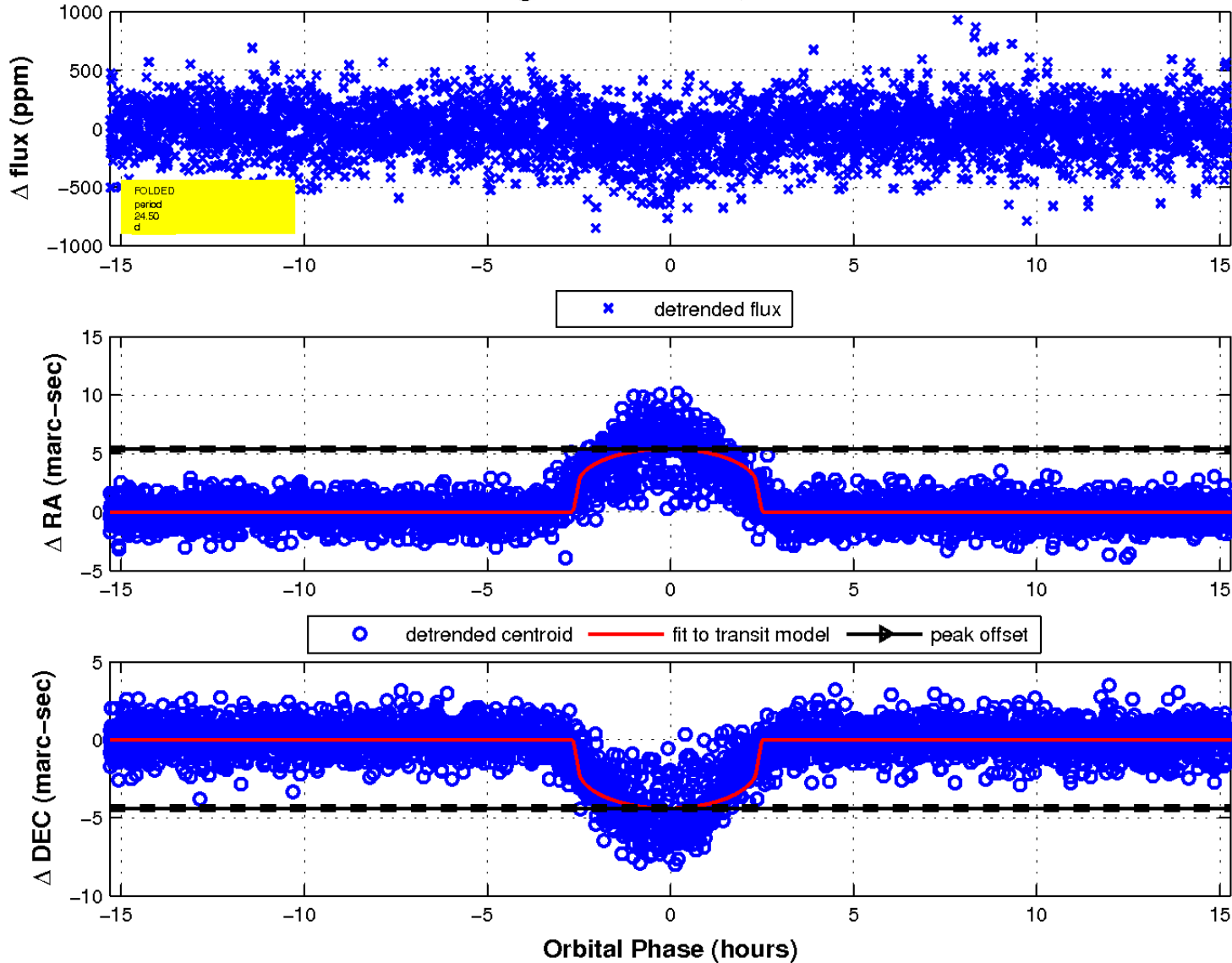
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

