

KIC 005456651

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})
005456651-01	OBS	0835.01	11.763085	133.883316	1010.6	3.110	39.6	43.8	0.76	4959	2.83	34.05
005456651-02	OBS	0835.02	56.228194	132.287146	873.2	3.451	16.5	18.0	0.76	4959	2.43	4.23

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005456651-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
005456651-02	OBS	PC	0.88	0	0	0	0	CENT_KIC_POS

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.

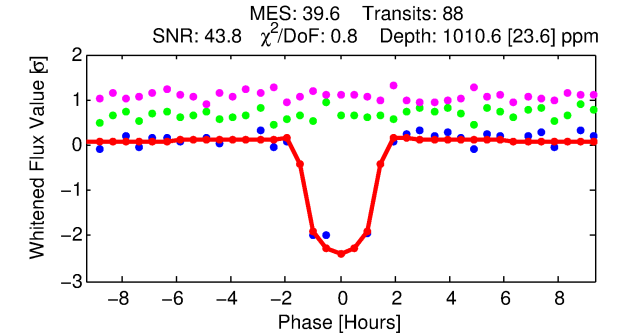
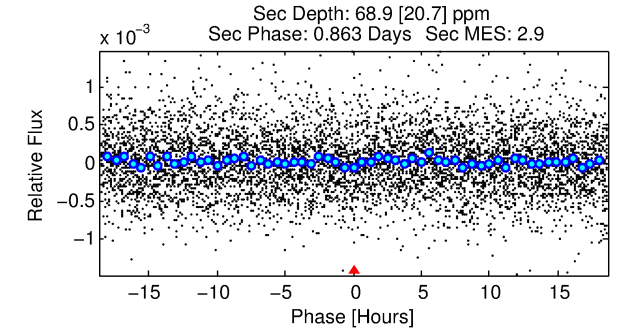
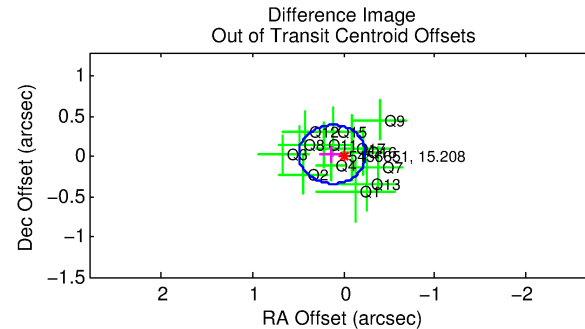
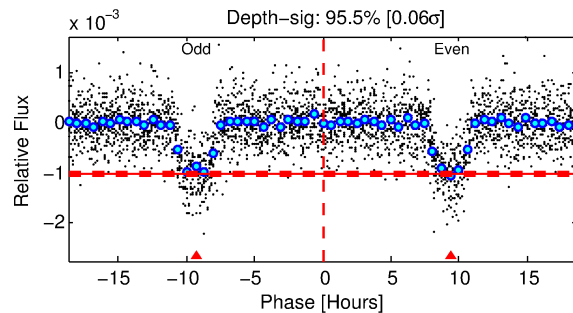
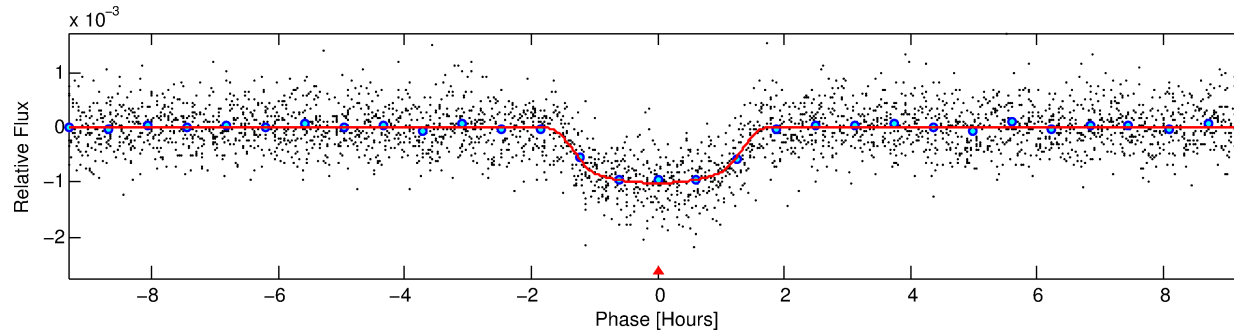
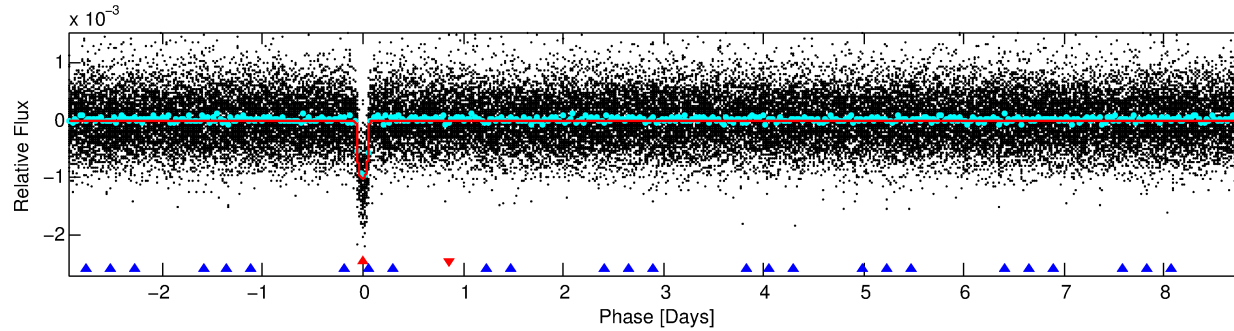
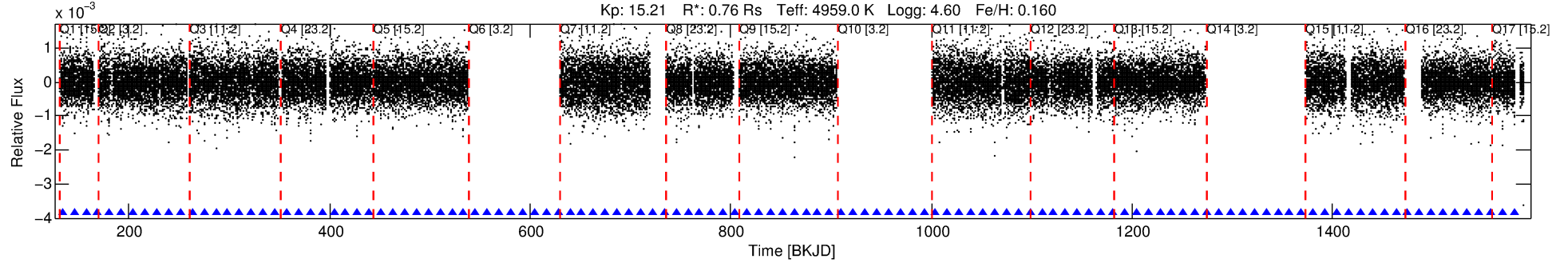
Ephemeris Match Information For 005456651-01

No Significant Match Found

DV One-Page Summary

KIC: 5456651 Candidate: 1 of 2 Period: 11.763 d
KOI: K00835.01 Name: Kepler-239b Corr: 0.966

Kp: 15.21 R*: 0.76 Rs Teff: 4959.0 K Logg: 4.60 Fe/H: 0.160



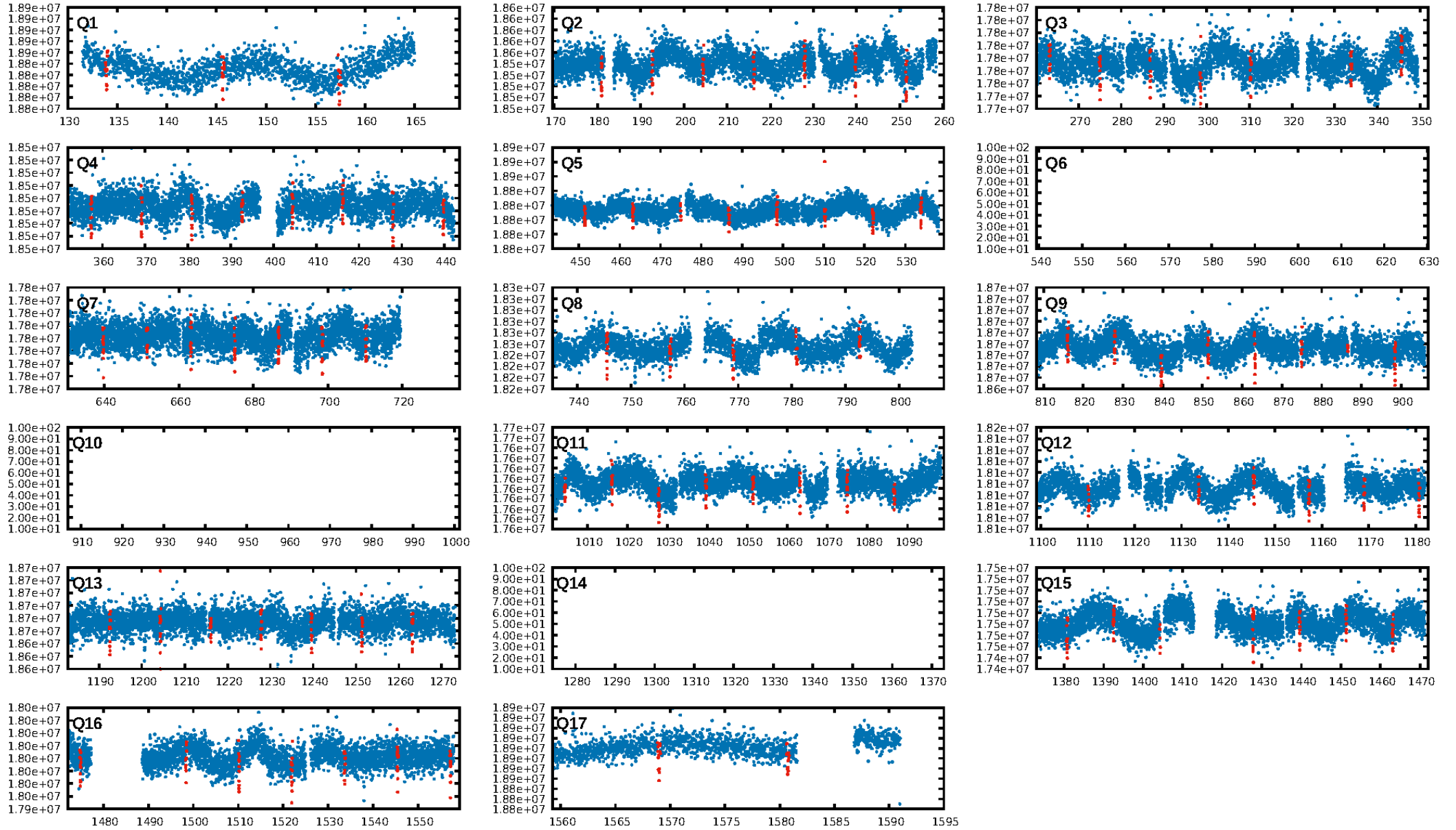
DV Fit Results:

Period = 11.76308 [0.00002] d
Epoch = 133.8833 [0.0015] BKJD
Rp/R* = 0.0343 [0.0034]
a/R* = 16.45 [5.70]
b = 0.86 [0.11]
Seff = 34.05 [4.46]
Teq = 616 [20] K
Rp = 2.83 [0.34] Re
a = 0.0954 [0.0063] AU
Ag = 42.96 [16.03] [2.62σ]
Teffp = 2438 [224] K [8.11σ]

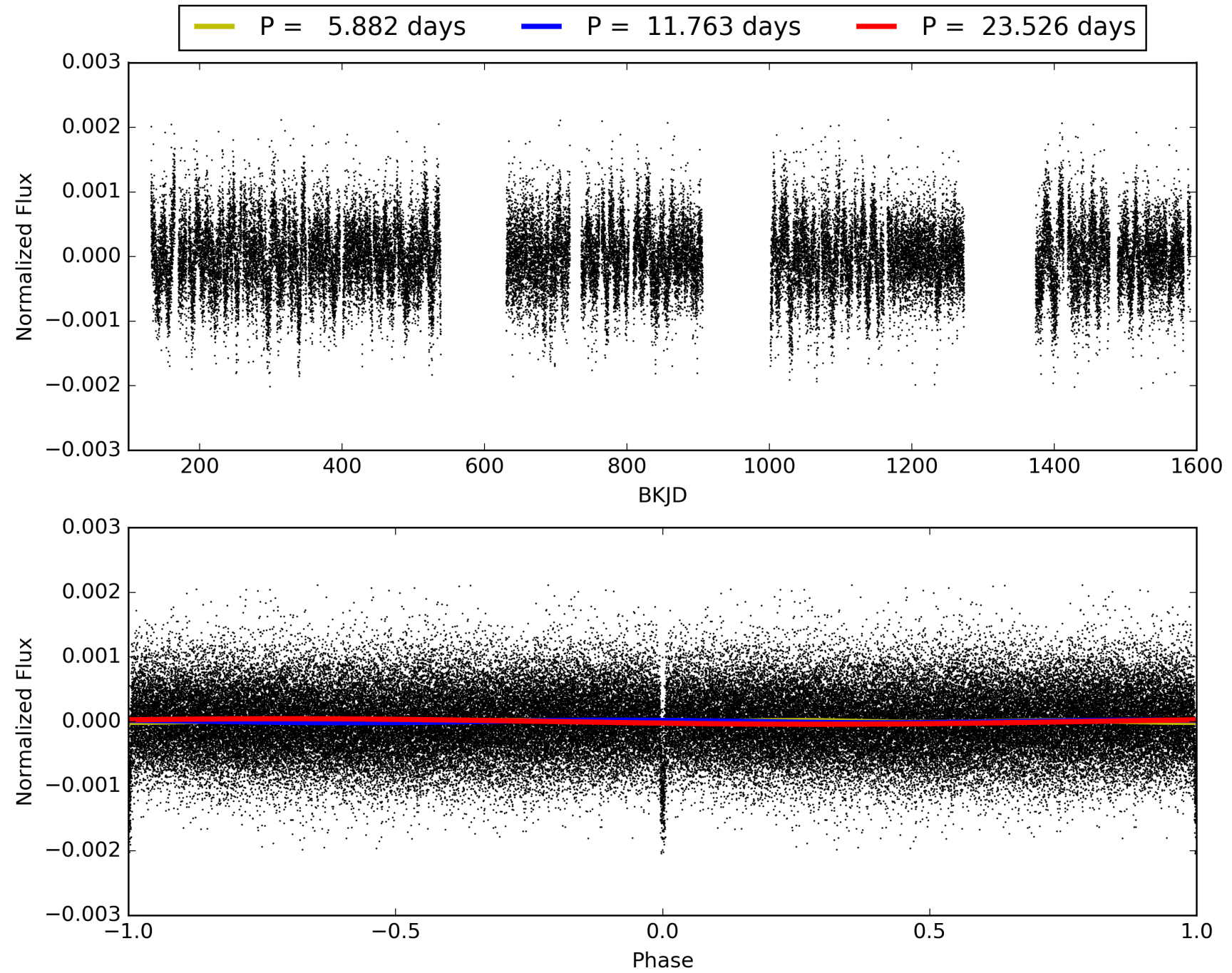
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [229.72σ]
ModelChiSquare2-sig: 93.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [83/83]
GhostDiagnostic-chr: 5.201
Centroid-sig: 0.8%
Centroid-so: 0.205 arcsec [0.67σ]
OotOffset-rm: 0.127 arcsec [1.04σ]
KicOffset-rm: 0.267 arcsec [2.17σ]
OotOffset-st: 1/4/4/4 [13]
KicOffset-st: 1/4/4/4 [13]
DiffImageQuality-fgm: 1.00 [13/13]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 005456651-01, PDC Light Curves

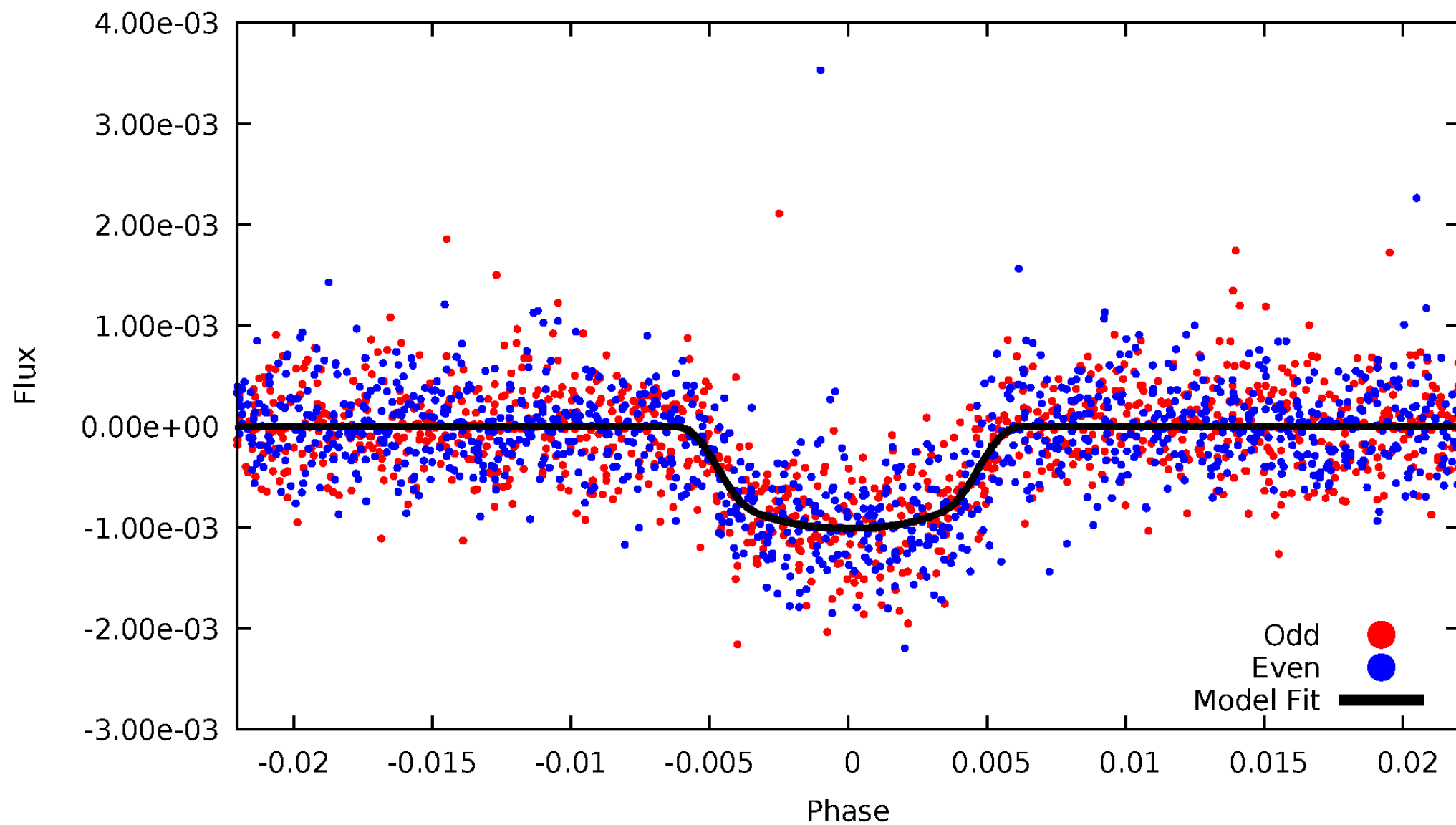


TCE 005456651-01



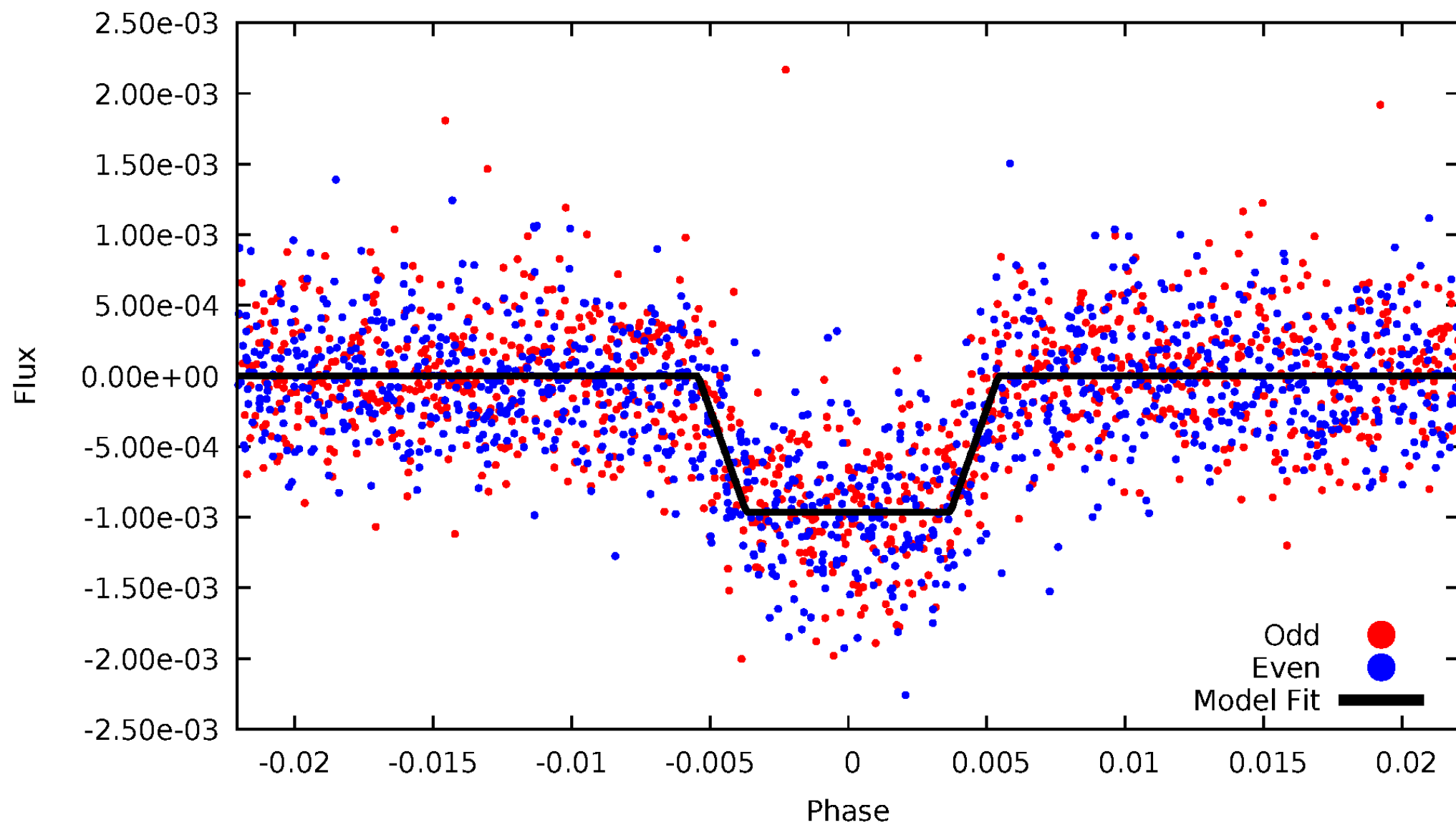
DV Odd/Even

TCE 005456651-01



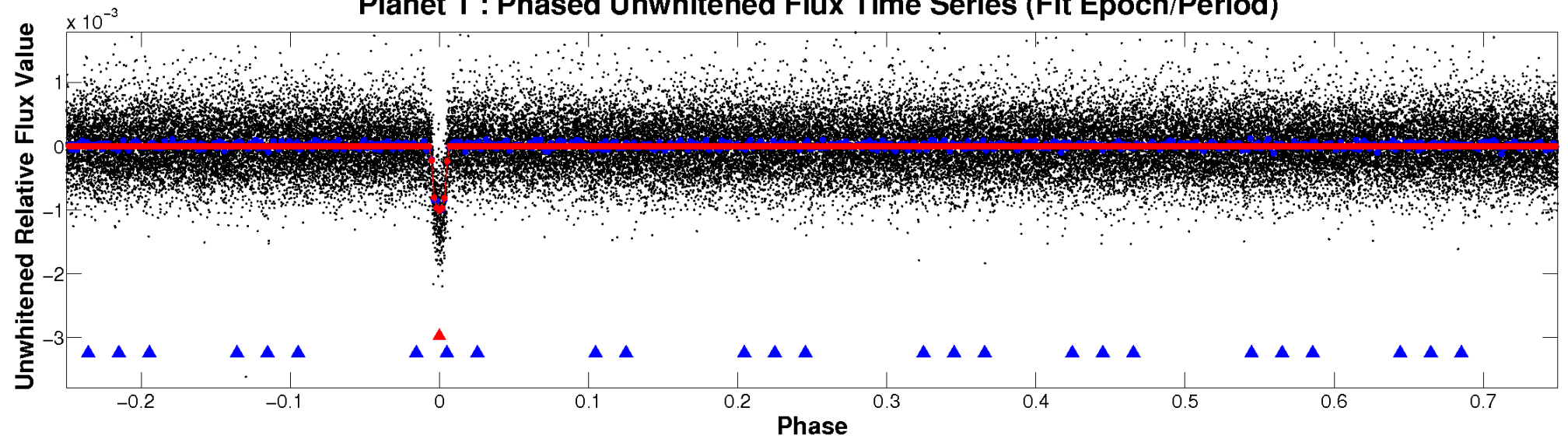
ALT Odd/Even

TCE 005456651-01

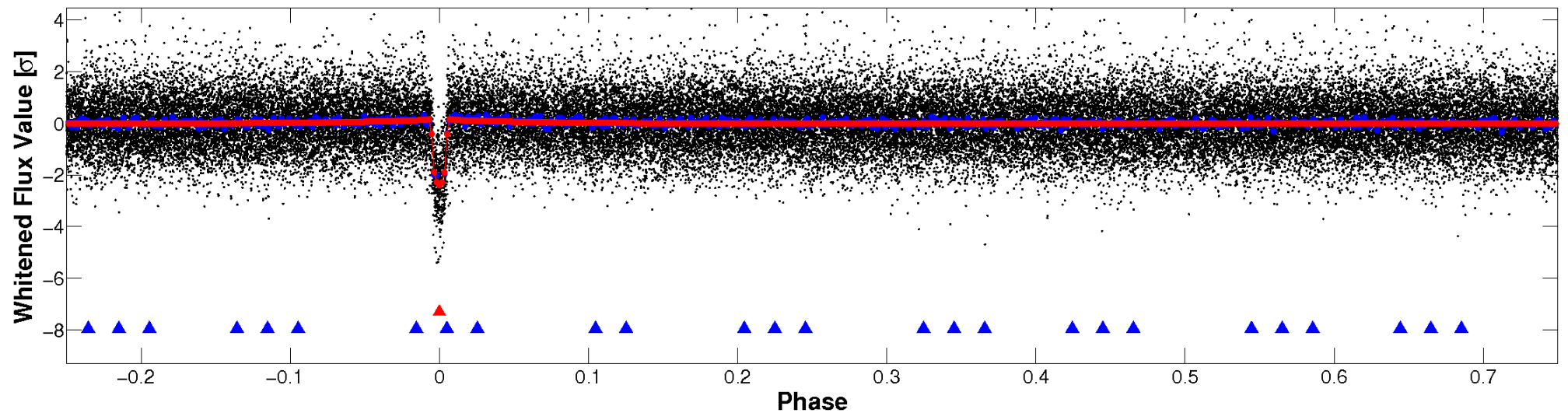


Non-Whitened Vs. Whitened Light Curve

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

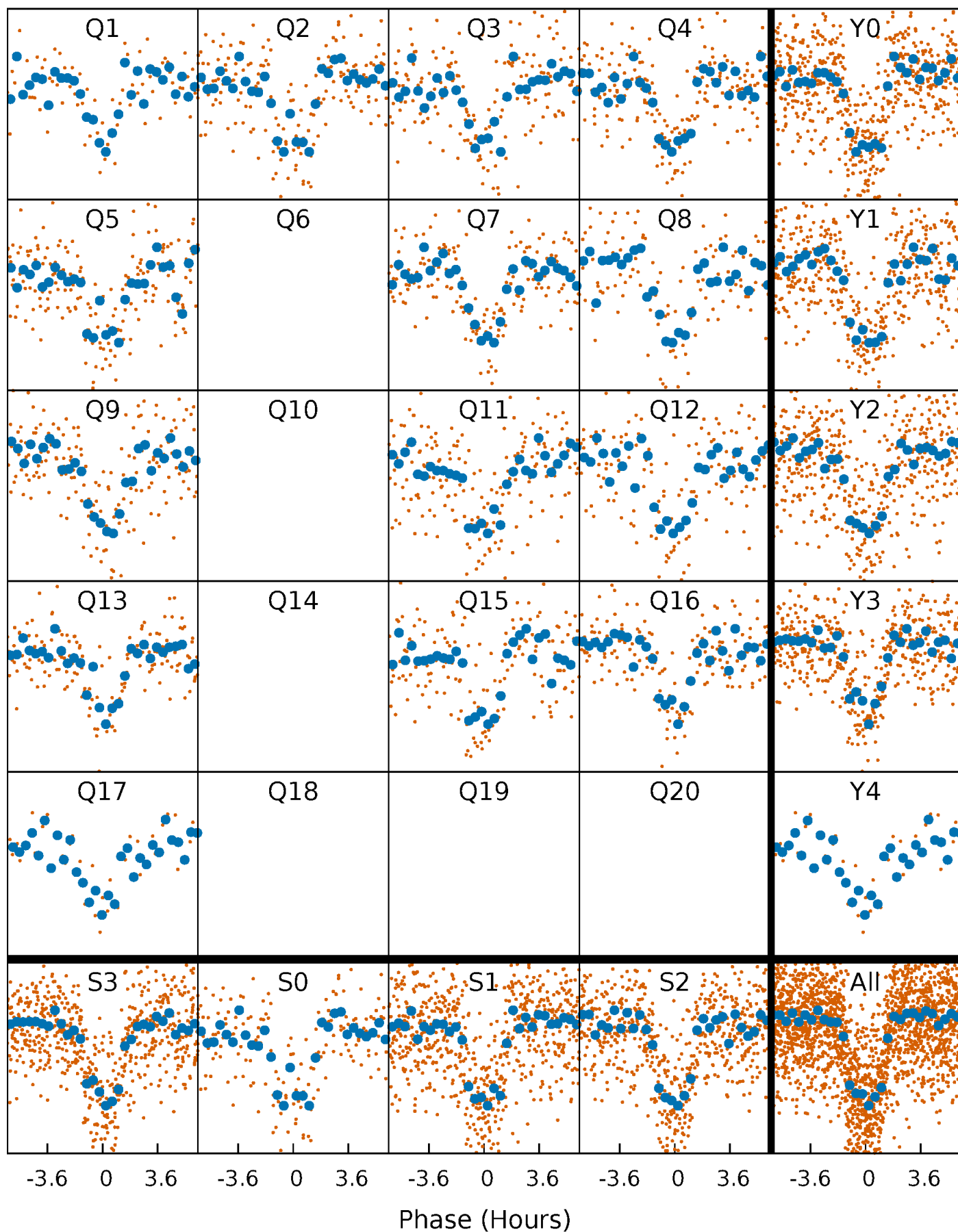


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



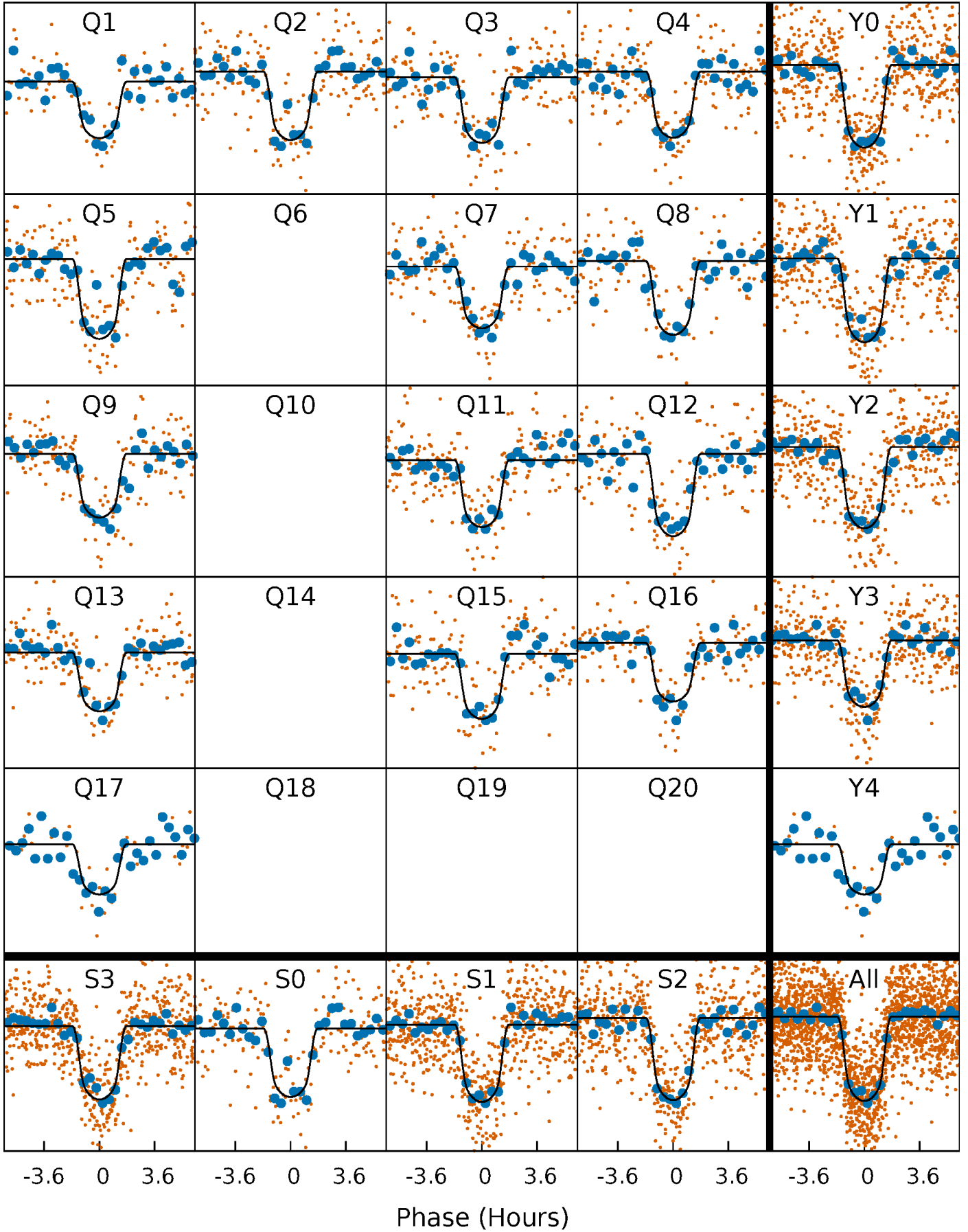
PDC Quarter-Phased Transit Curves

TCE 005456651-01 P= 11.763085 Days $T_0=133.883316$ (BKJD)



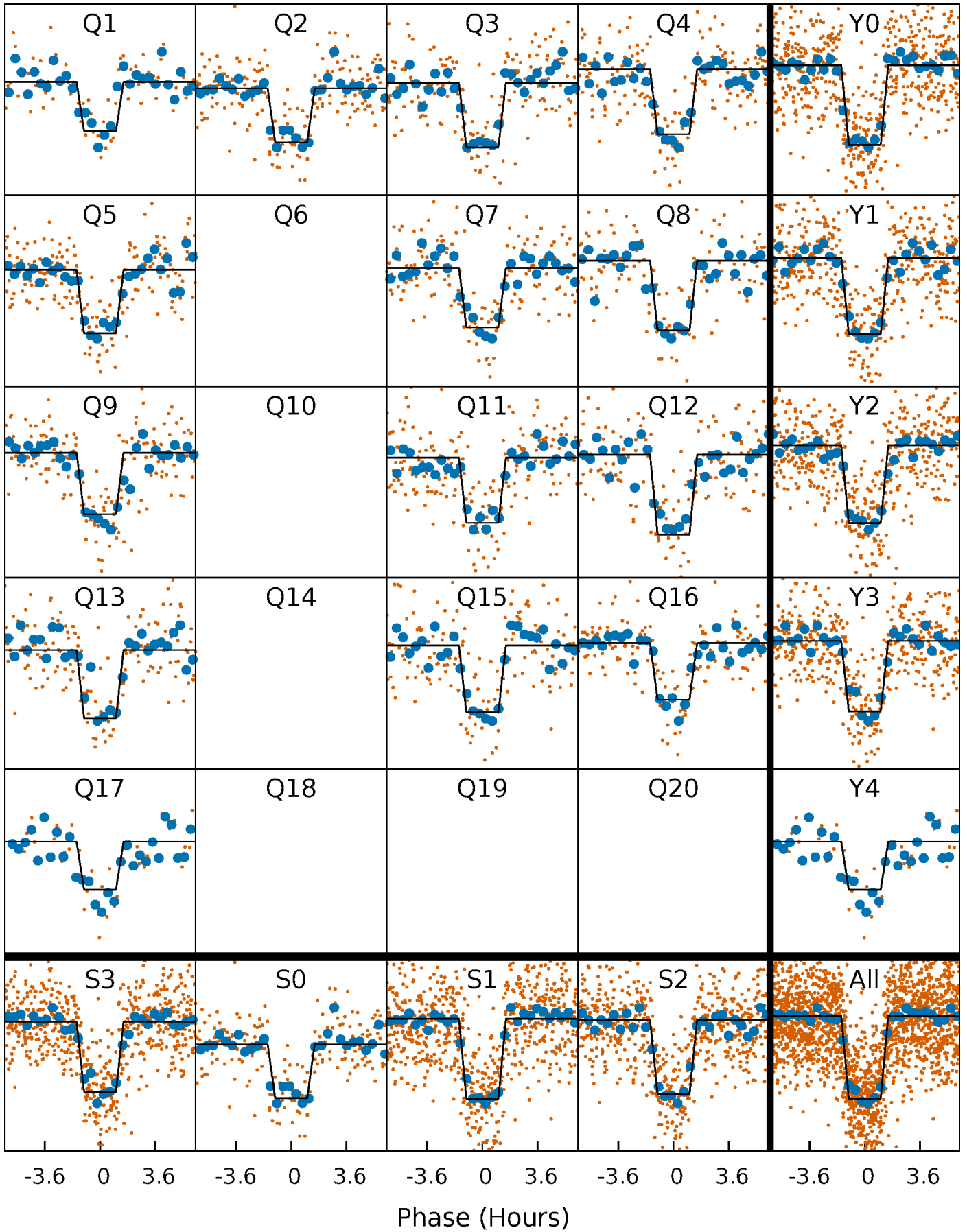
DV Quarter-Phased Transit Curves

TCE 005456651-01 P= 11.763085 Days $T_0=133.883316$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

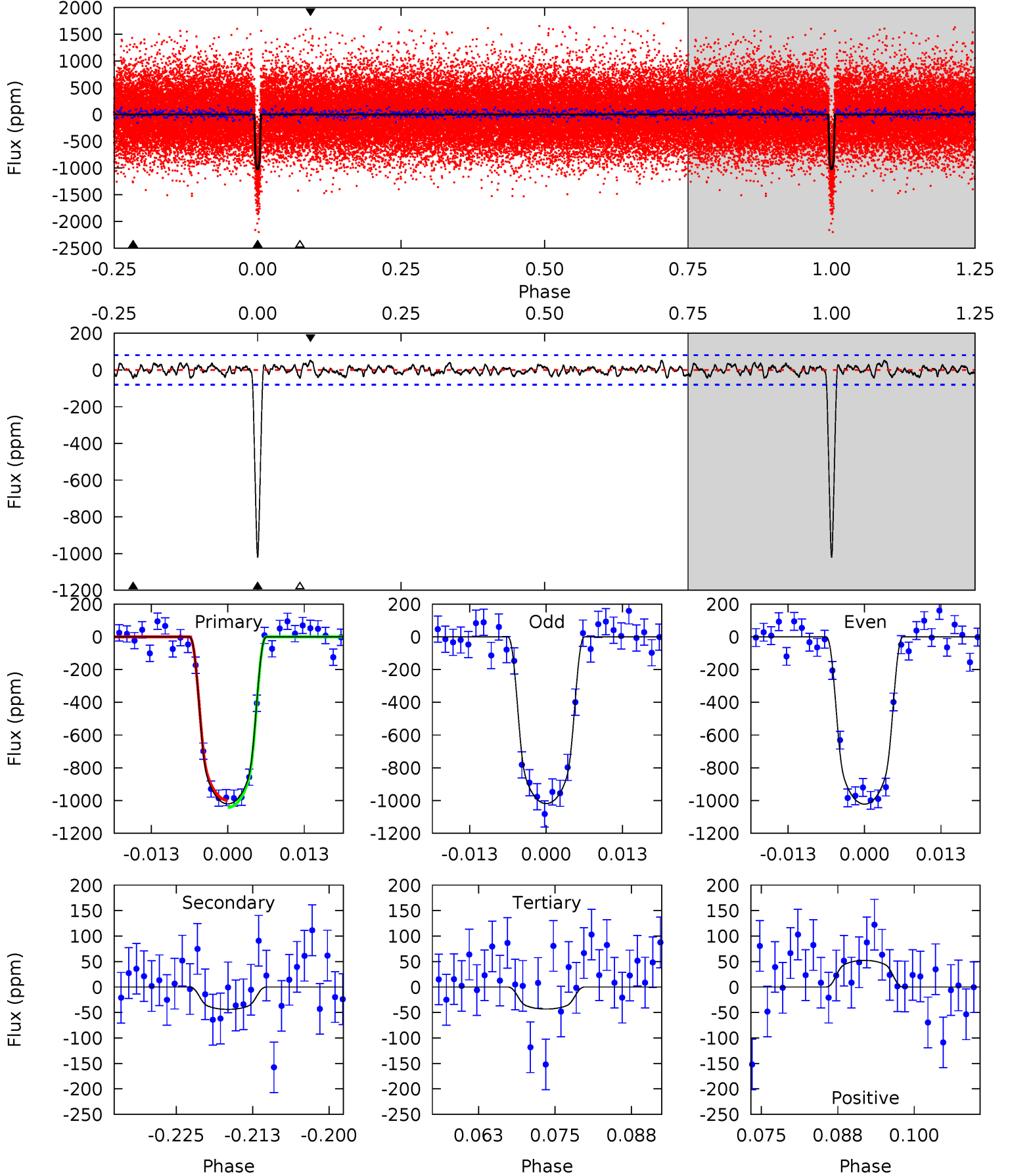
TCE 005456651-01 P= 11.763006 Days $T_0=133.887847$ (BKJD)



DV Model-Shift Uniqueness Test

005456651-01, $P = 11.763085$ Days, $E = 122.120231$ Days

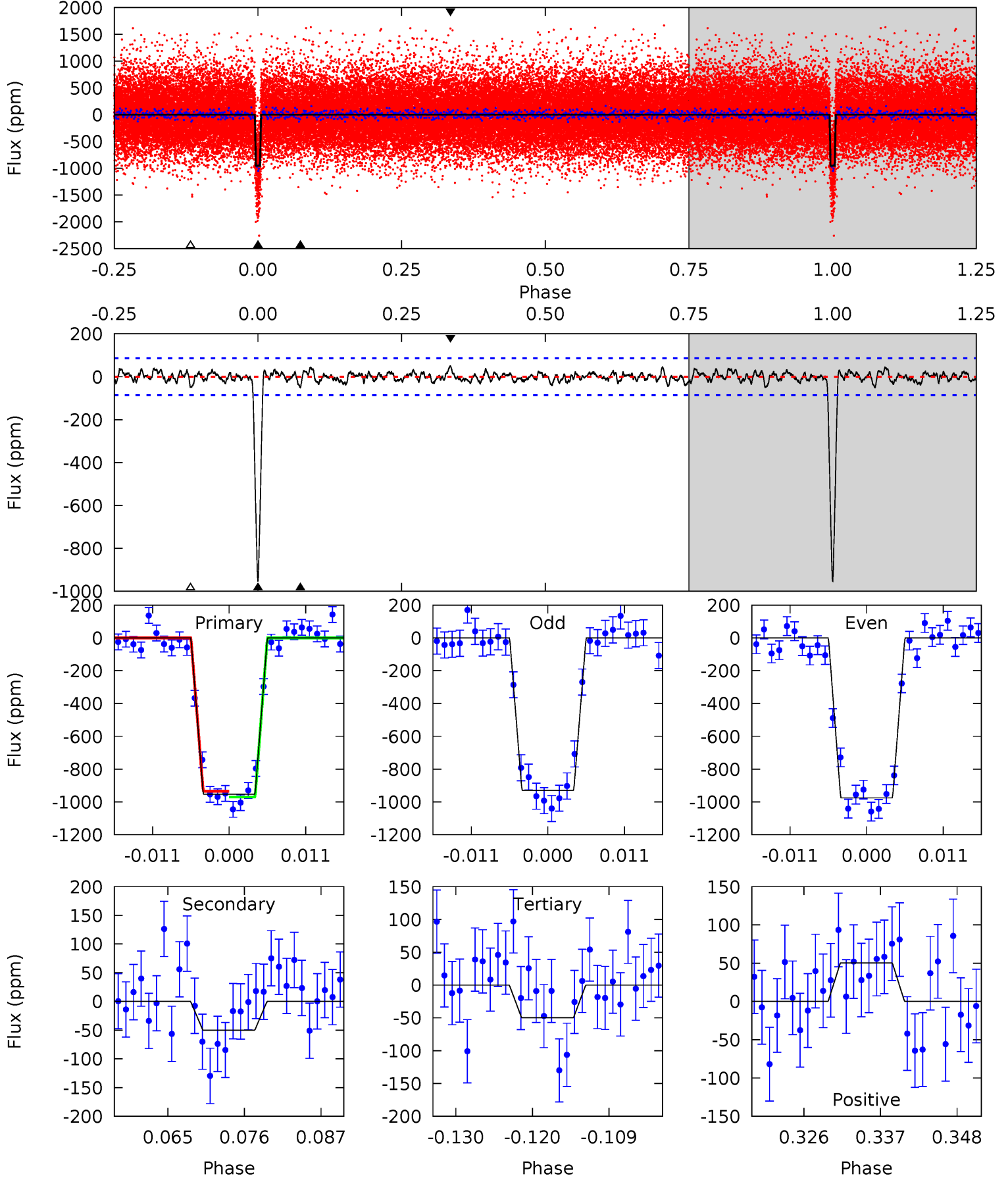
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
63.3	2.72	2.68	3.24	4.98	2.50	1.10	60.6	60.0	0.04	-0.51	0.10	1.00	0.05	1.35



Alt Model-Shift Uniqueness Test

005456651-01, P = 11.763006 Days, E = 122.124841 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.3	2.91	2.89	2.93	5.01	2.55	0.96	52.5	52.4	0.02	-0.02	1.34	1.00	0.05	1.03



Stellar Parameters For KIC 005456651

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4959^{+99}_{-1}	$4.603^{+0.011}_{-0.060}$	$0.160^{+0.150}_{-0.150}$	$0.756^{+0.054}_{-0.027}$	$0.849^{+0.025}_{-0.060}$	$2.768^{+0.199}_{-0.551}$
	+2%/-0%	+0%/-1%	+94%/-94%	+7%/-4%	+3%/-7%	+7%/-20%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 005456651-01 / KOI 0835.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-44 ± 16	$2.90^{+0.28}_{-0.30}$	867^{+23}_{-32}	2822^{+182}_{-176}	25^{+13}_{-10}
Alt.	-50 ± 17	$2.62^{+0.31}_{-0.29}$	867^{+23}_{-33}	2966^{+183}_{-202}	36^{+17}_{-14}

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

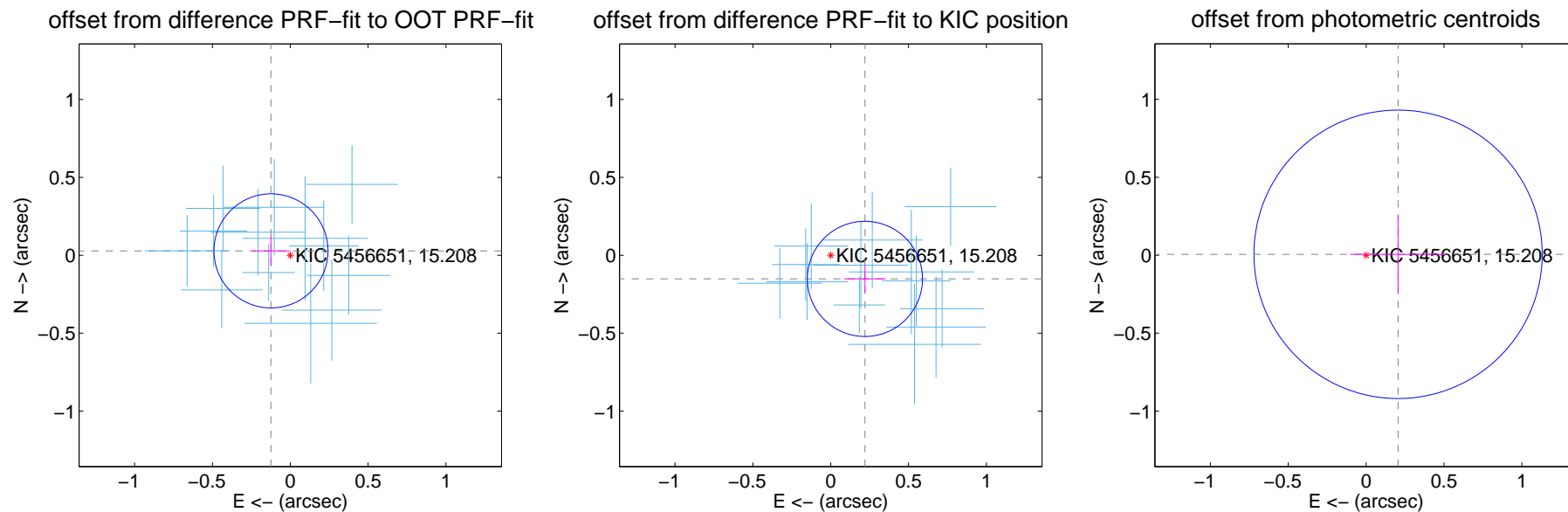
DV Centroid Data

Supplemental centroid analysis for 005456651-01. Kepler magnitude: 15.21. Transit SNR 43.79

There are 13 quarters with good PRF difference image offsets

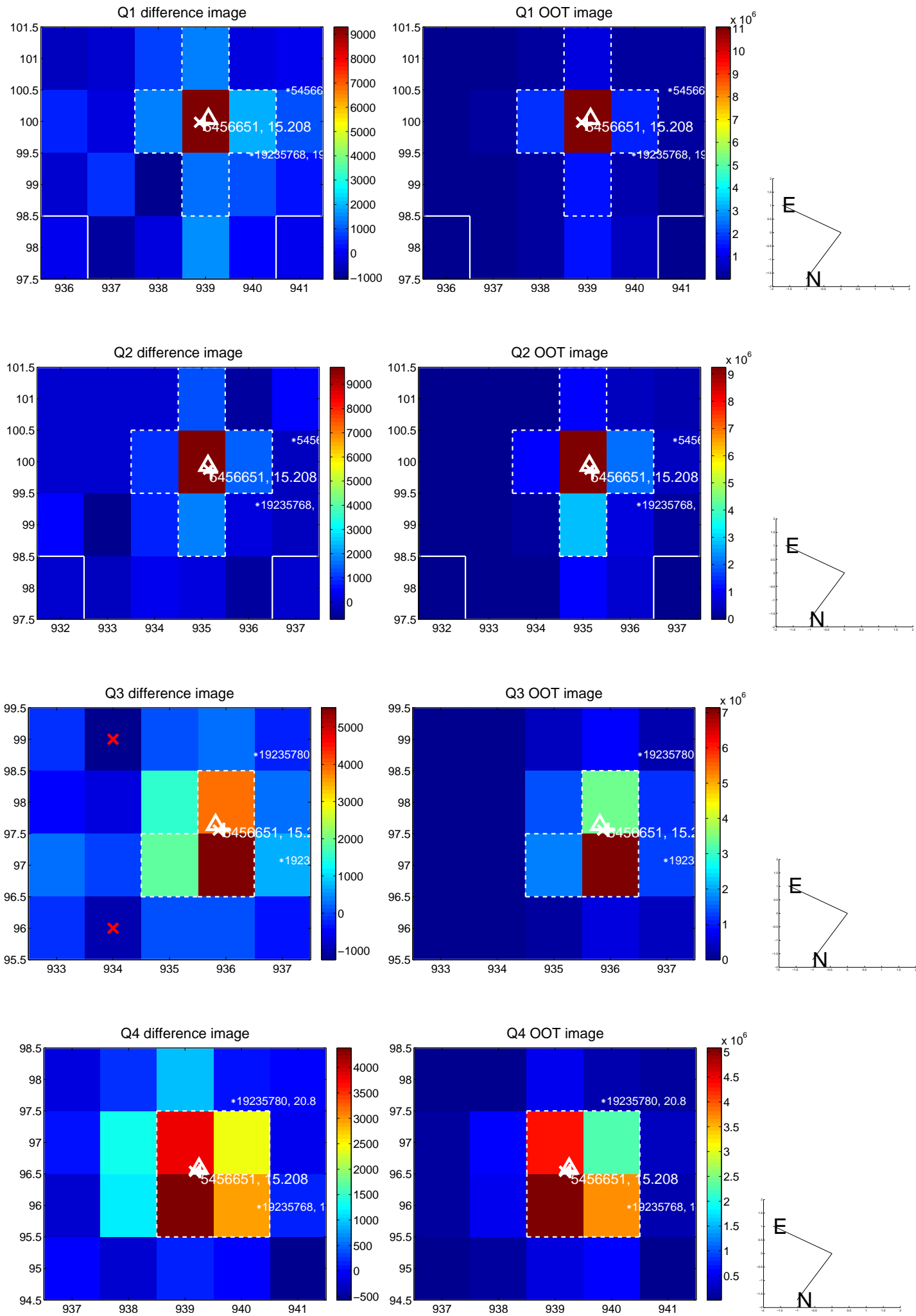
The direct PRF centroid is offset from the target star catalog position by about 0.47 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.127 ± 0.122	1.04	0.124 ± 0.123	0.028 ± 0.098
PRF-fit source offset from KIC position	0.267 ± 0.123	2.17	-0.220 ± 0.132	-0.152 ± 0.091
photometric centroid source offset	0.21 ± 0.31	0.67	-0.21 ± 0.31	0.01 ± 0.25

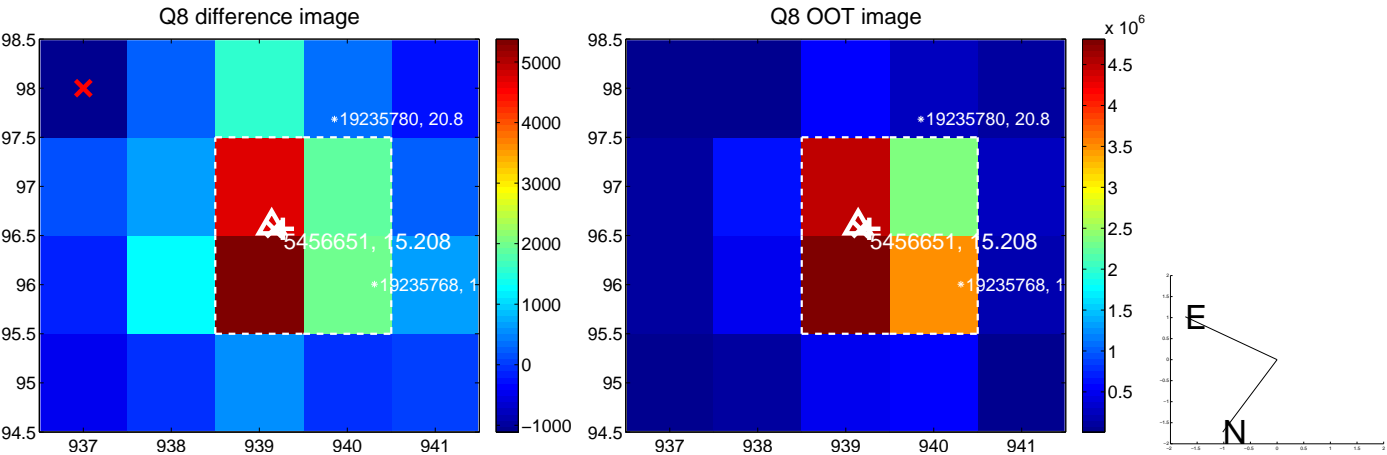
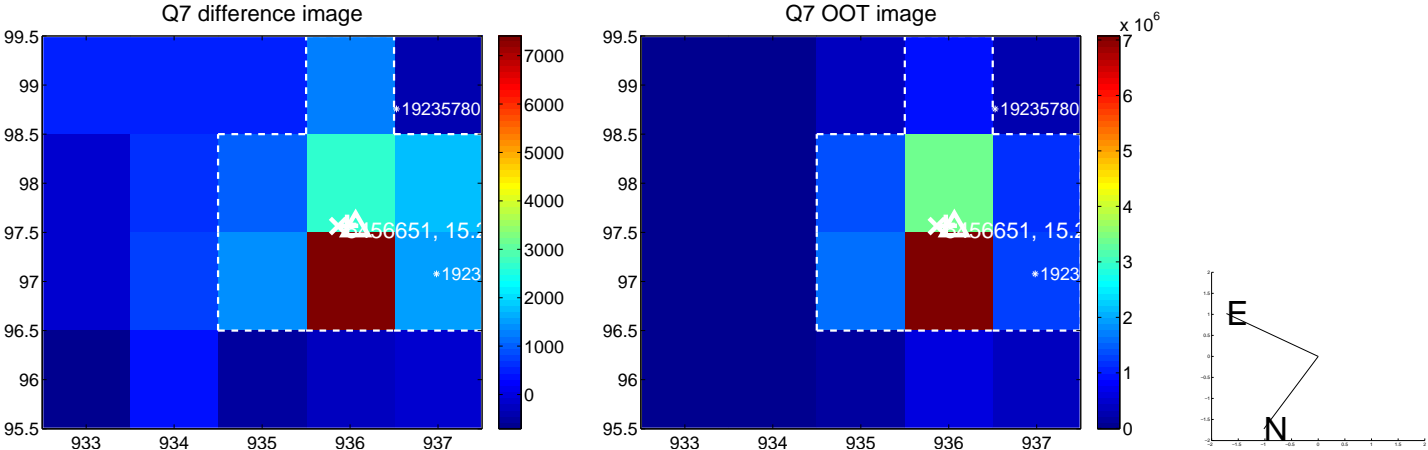
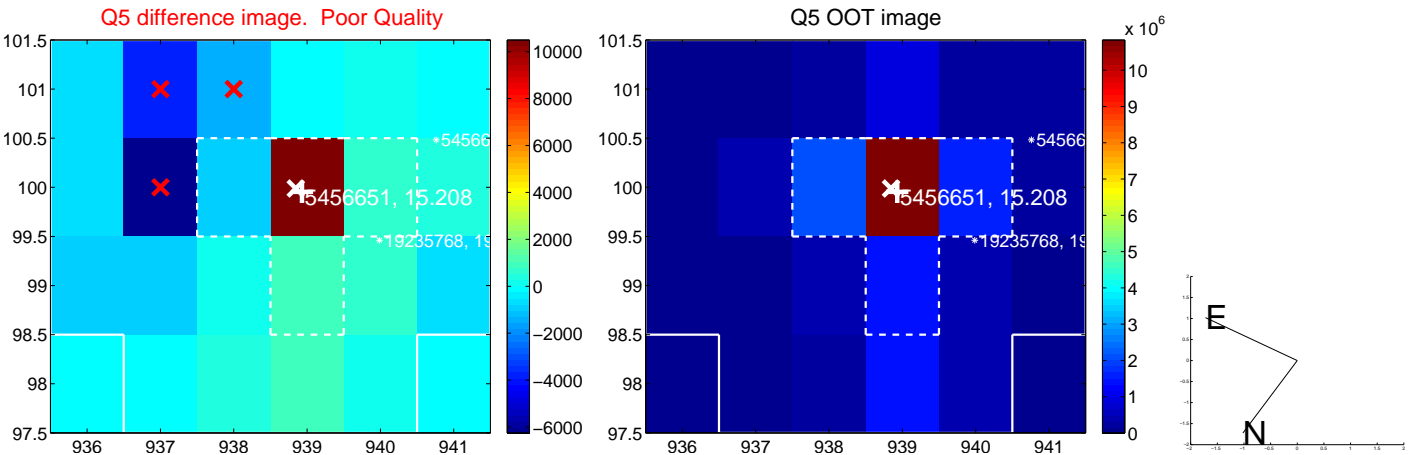


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

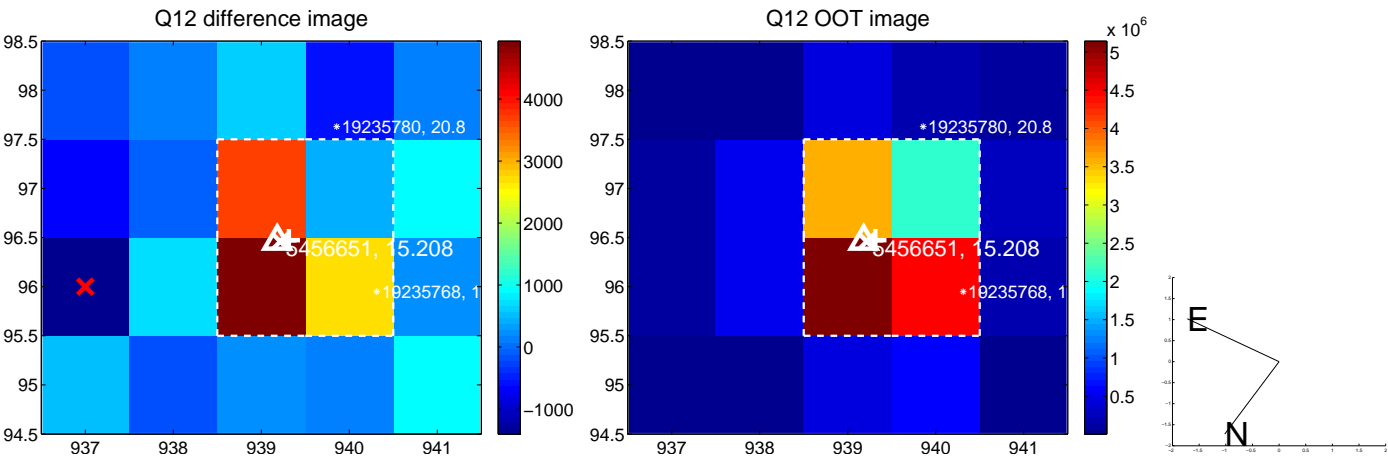
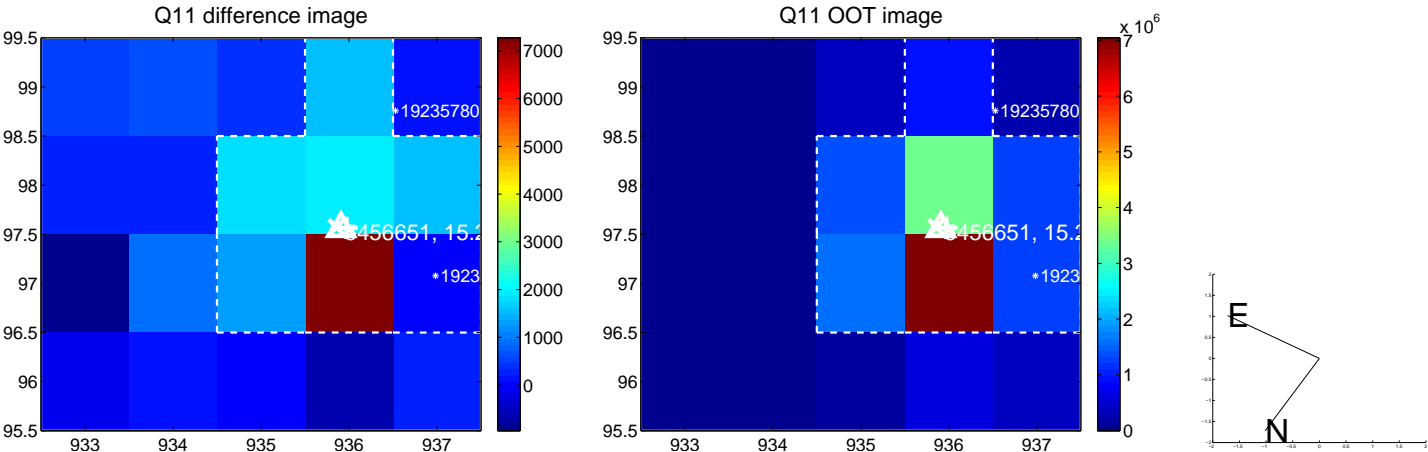
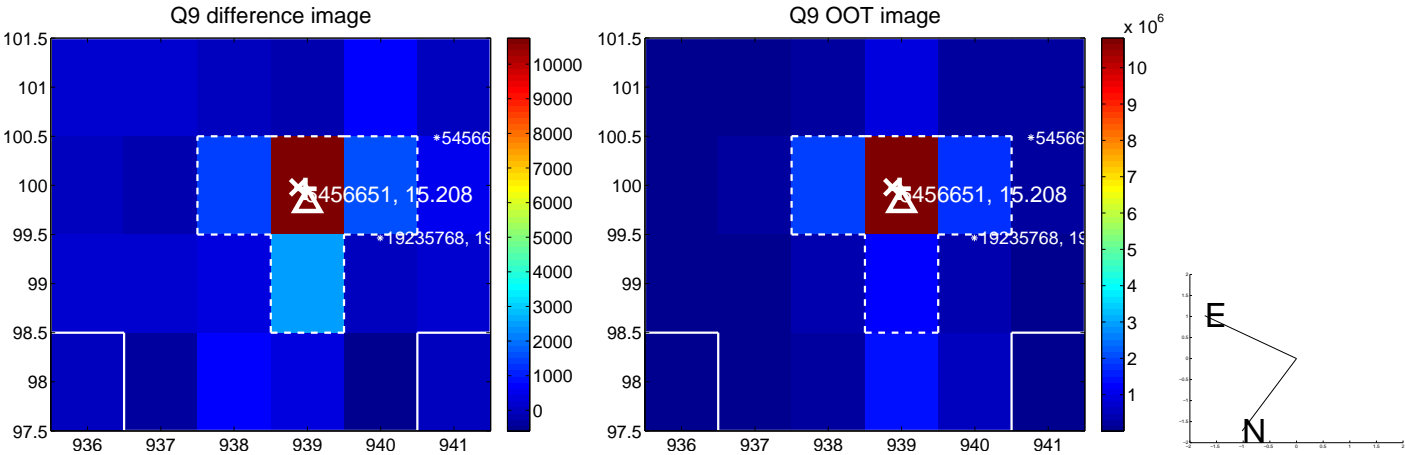
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



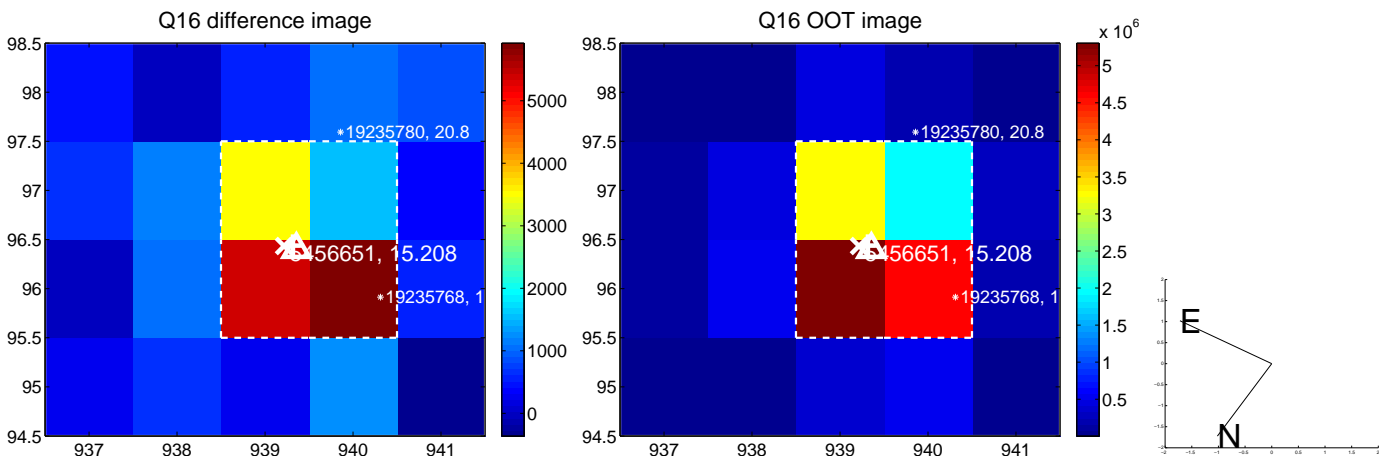
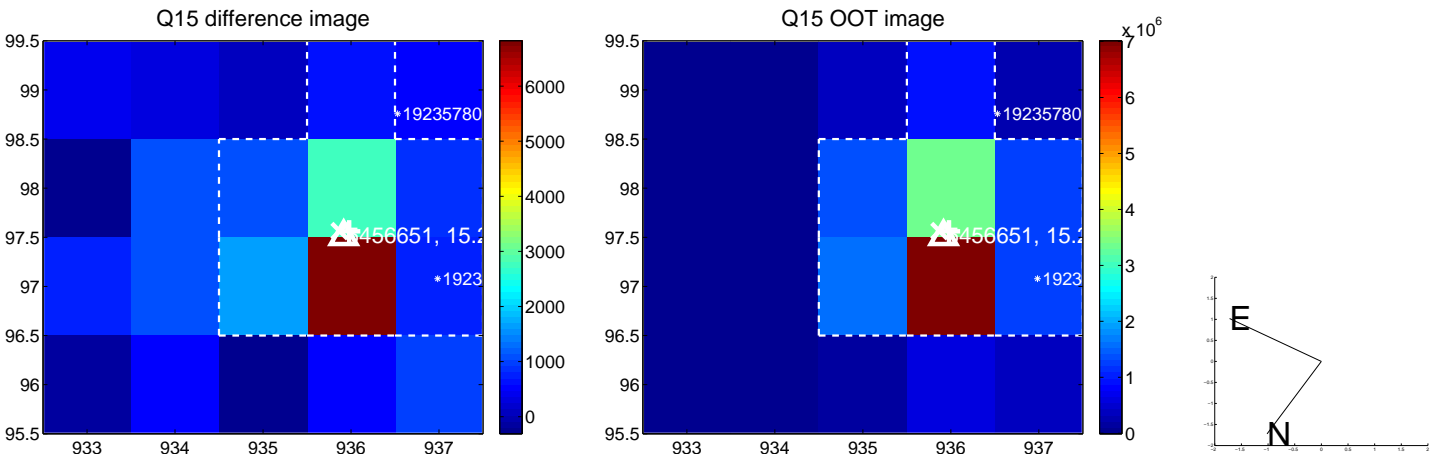
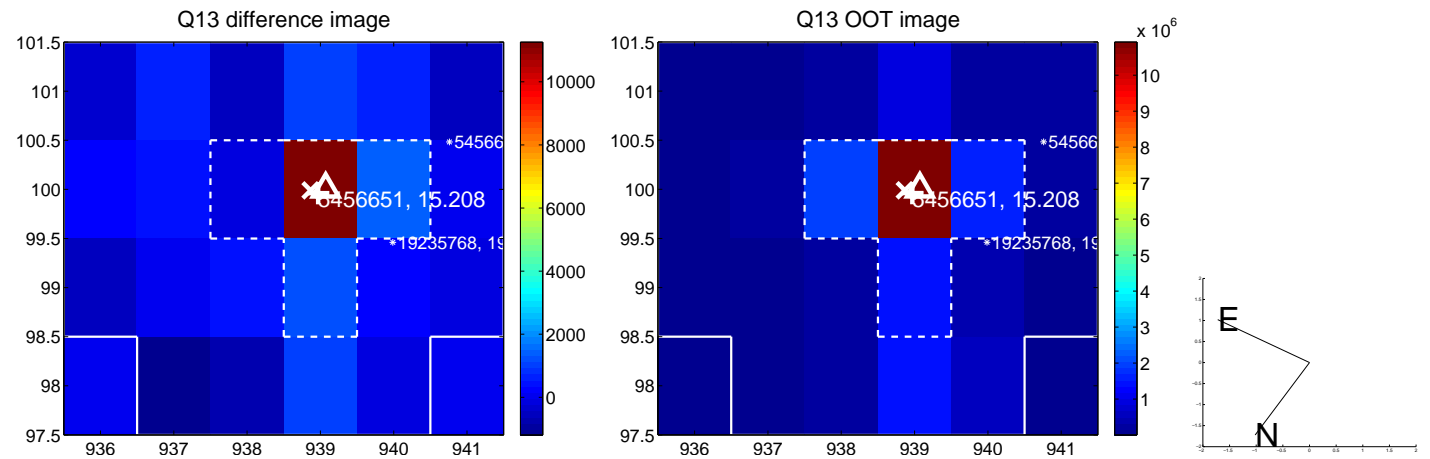
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



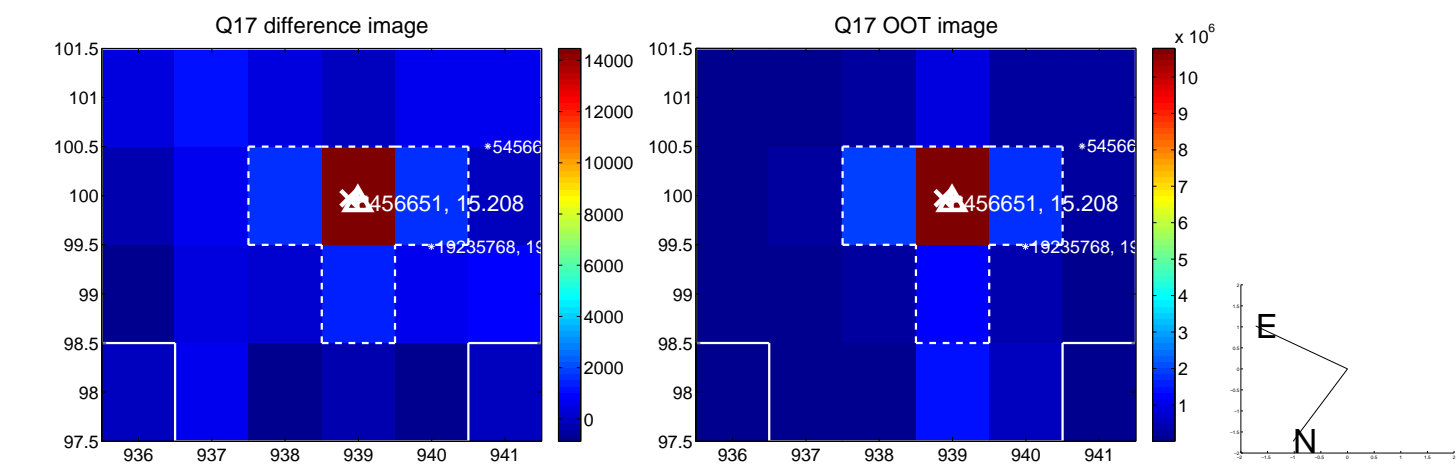
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



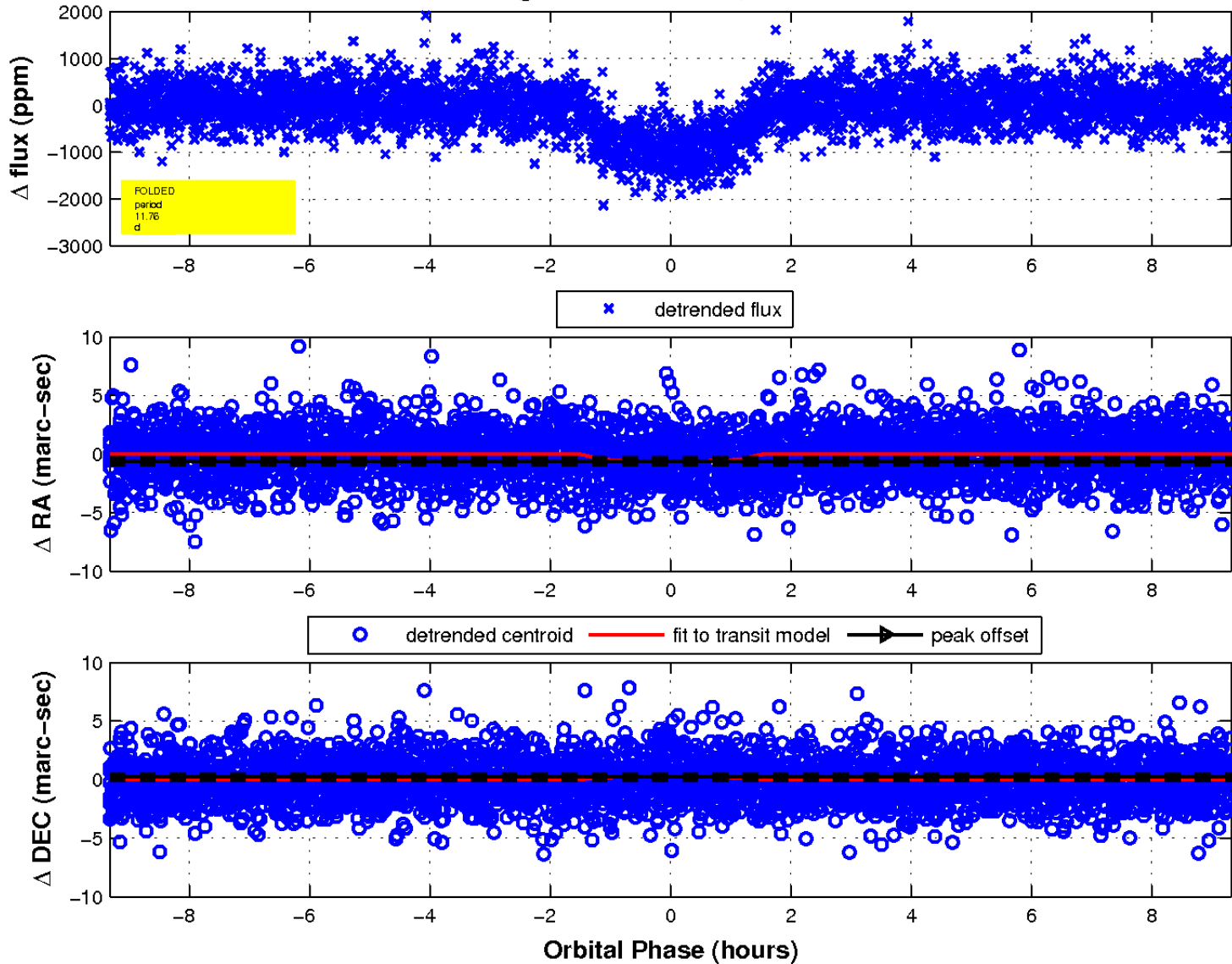
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

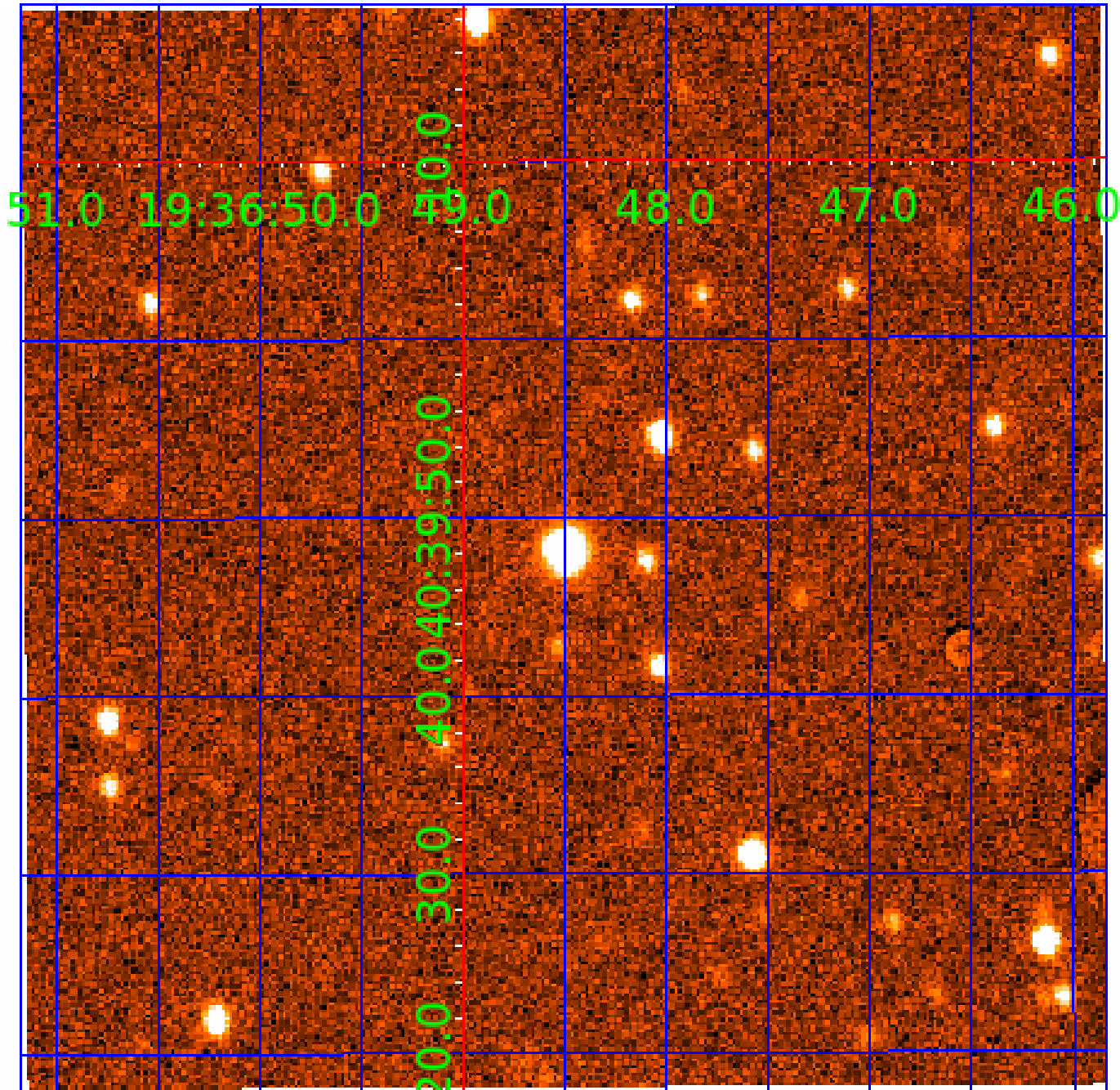


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 005456651

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})
005456651-01	OBS	0835.01	11.763085	133.883316	1010.6	3.110	39.6	43.8	0.76	4959	2.83	34.05
005456651-02	OBS	0835.02	56.228194	132.287146	873.2	3.451	16.5	18.0	0.76	4959	2.43	4.23

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005456651-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
005456651-02	OBS	PC	0.88	0	0	0	0	CENT_KIC_POS

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.

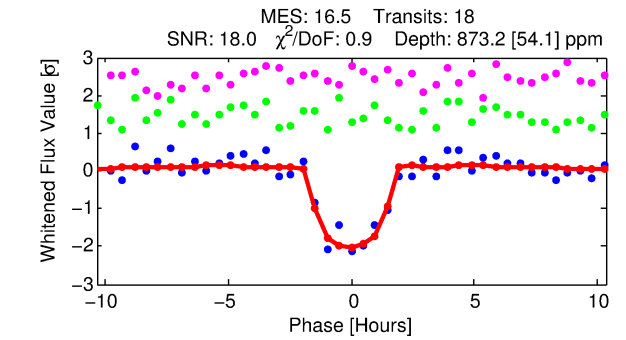
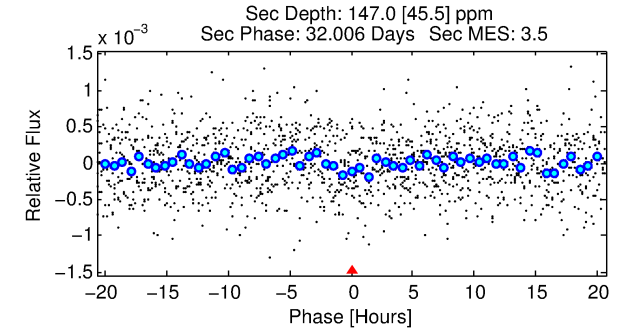
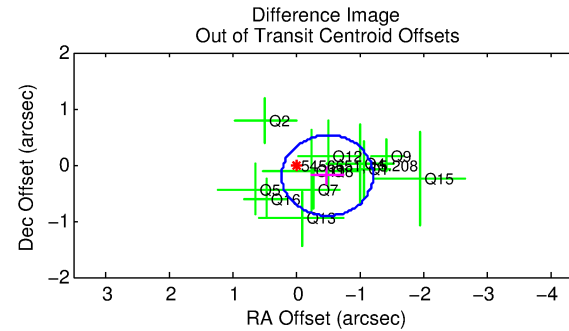
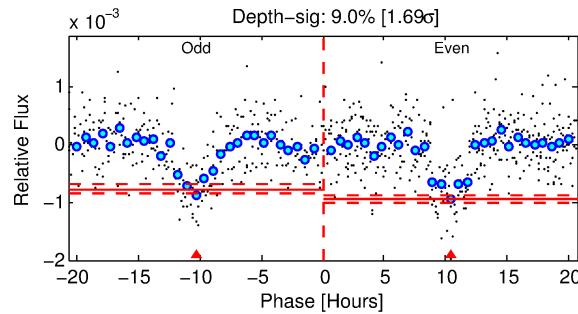
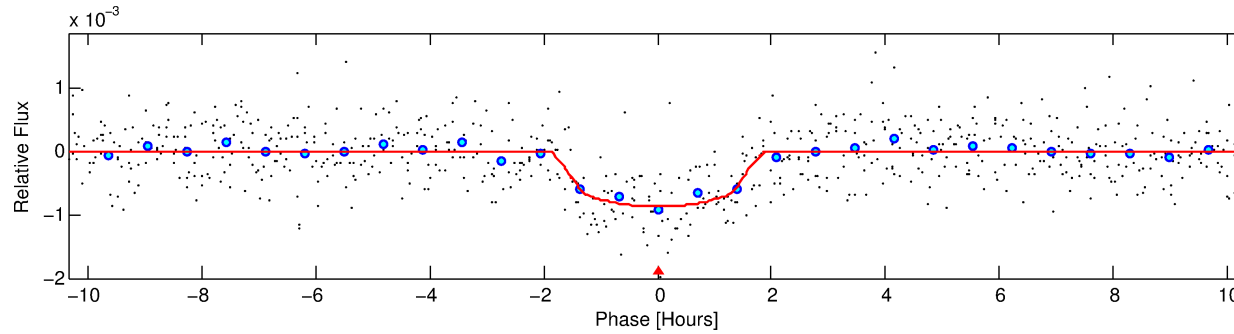
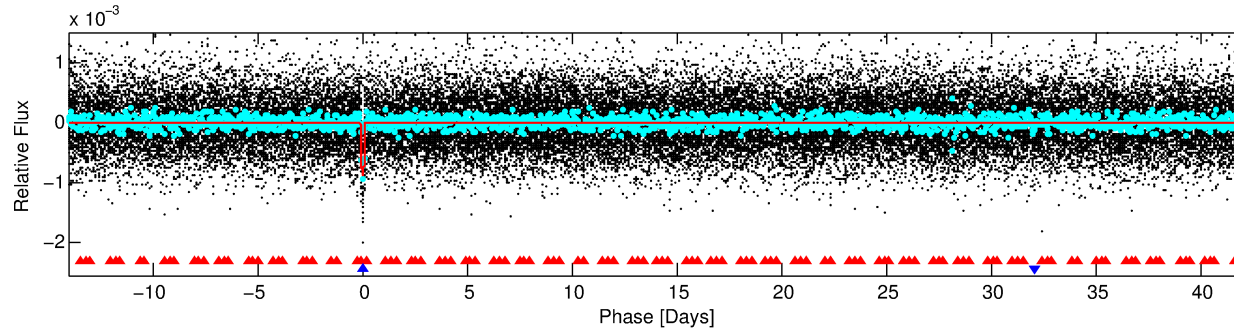
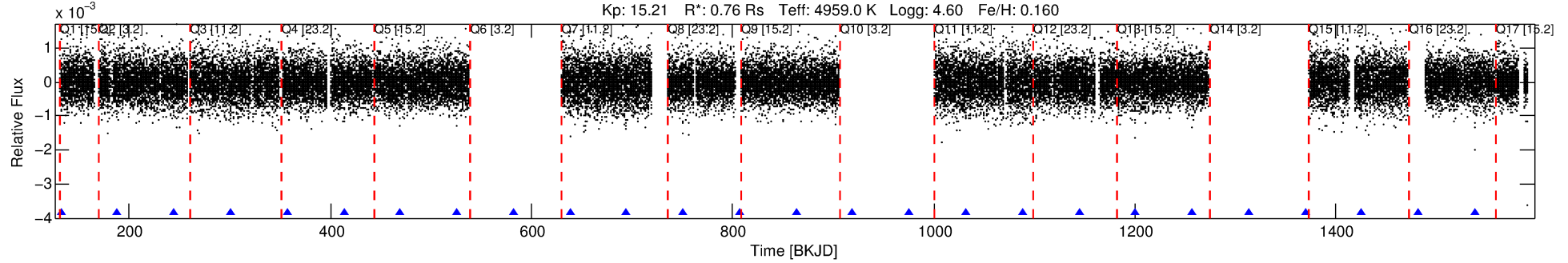
Ephemeris Match Information For 005456651-02

No Significant Match Found

DV One-Page Summary

KIC: 5456651 Candidate: 2 of 2 Period: 56.228 d
KOI: K00835.02 Name: Kepler-239c Corr: 0.985

Kp: 15.21 R*: 0.76 Rs Teff: 4959.0 K Logg: 4.60 Fe/H: 0.160



DV Fit Results:

Period = 56.22819 [0.00029] d
Epoch = 132.2871 [0.0041] BKJD
Rp/R* = 0.0295 [0.0191]
a/R* = 88.44 [195.70]
b = 0.74 [1.36]
Seff = 4.23 [0.55]
Teq = 366 [12] K
Rp = 2.43 [1.58] Re
a = 0.2706 [0.0179] AU
Ag = 1001.22 [1336.68] [0.75σ]
Teffp = 3180 [1060] K [2.65σ]

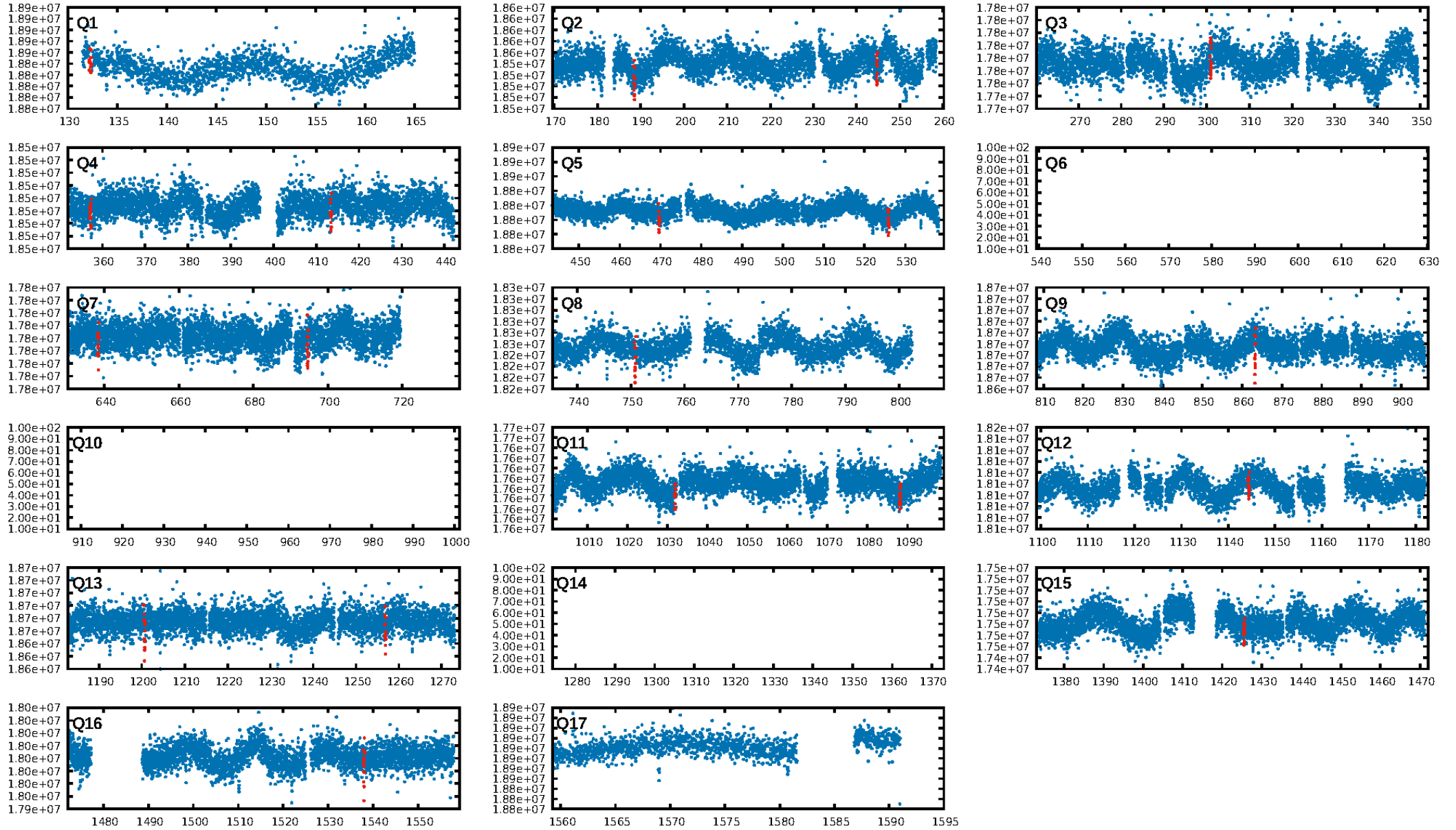
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [229.72σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 52.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.71e-54
RollingBand-fgt: 1.00 [17/17]
GhostDiagnostic-chr: 2.128
Centroid-sig: 12.3%
Centroid-so: 0.906 arcsec [1.51σ]
OotOffset-rm: 0.534 arcsec [2.24σ]
OotOffset-st: 1/3/4/4 [12]
KicOffset-rm: **0.951 arcsec [4.06σ]**
KicOffset-st: 1/3/4/4 [12]
DiffImageQuality-fgm: 1.00 [12/12]
DiffImageOverlap-fno: 0.92 [12/13]

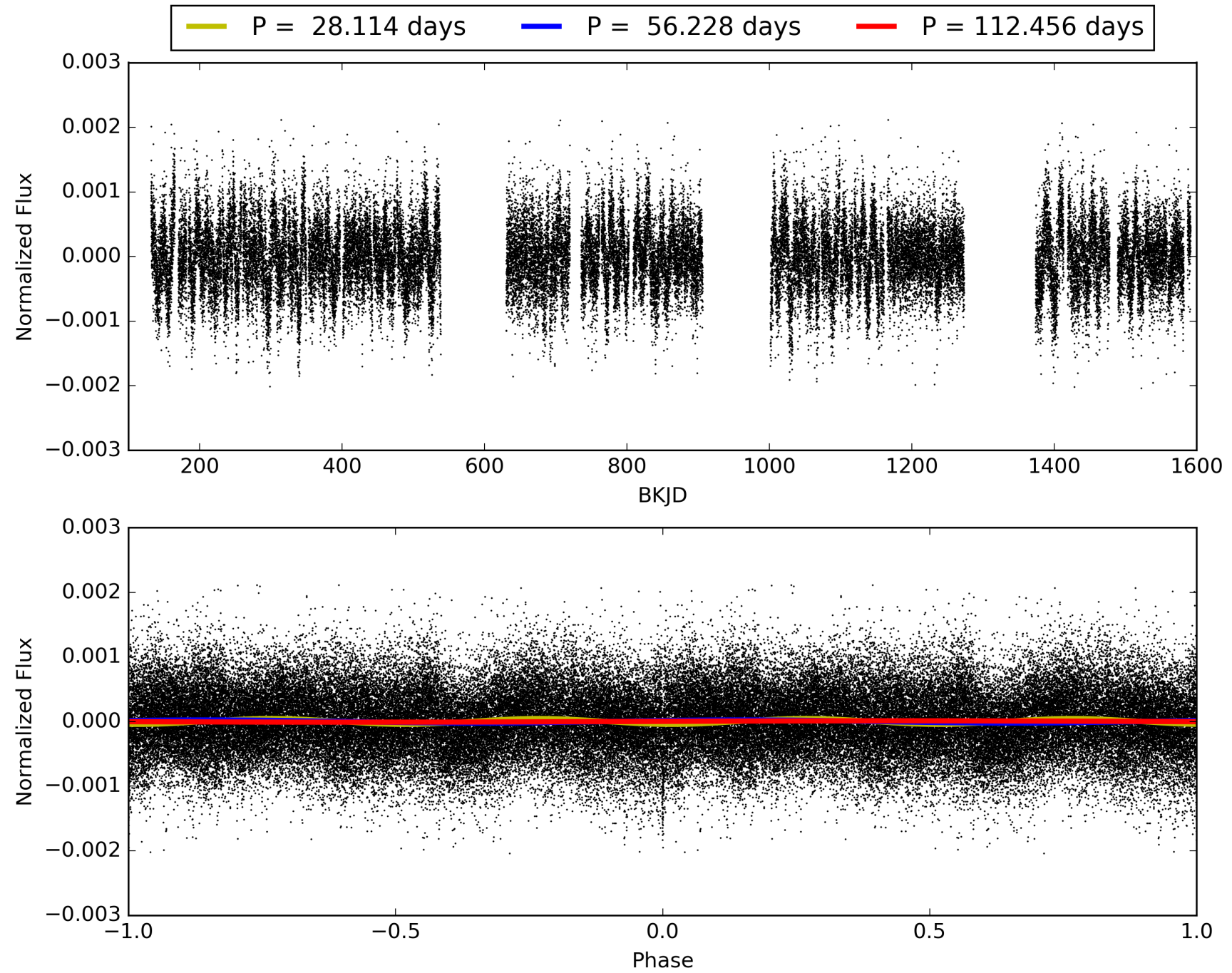
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 005456651-02, PDC Light Curves

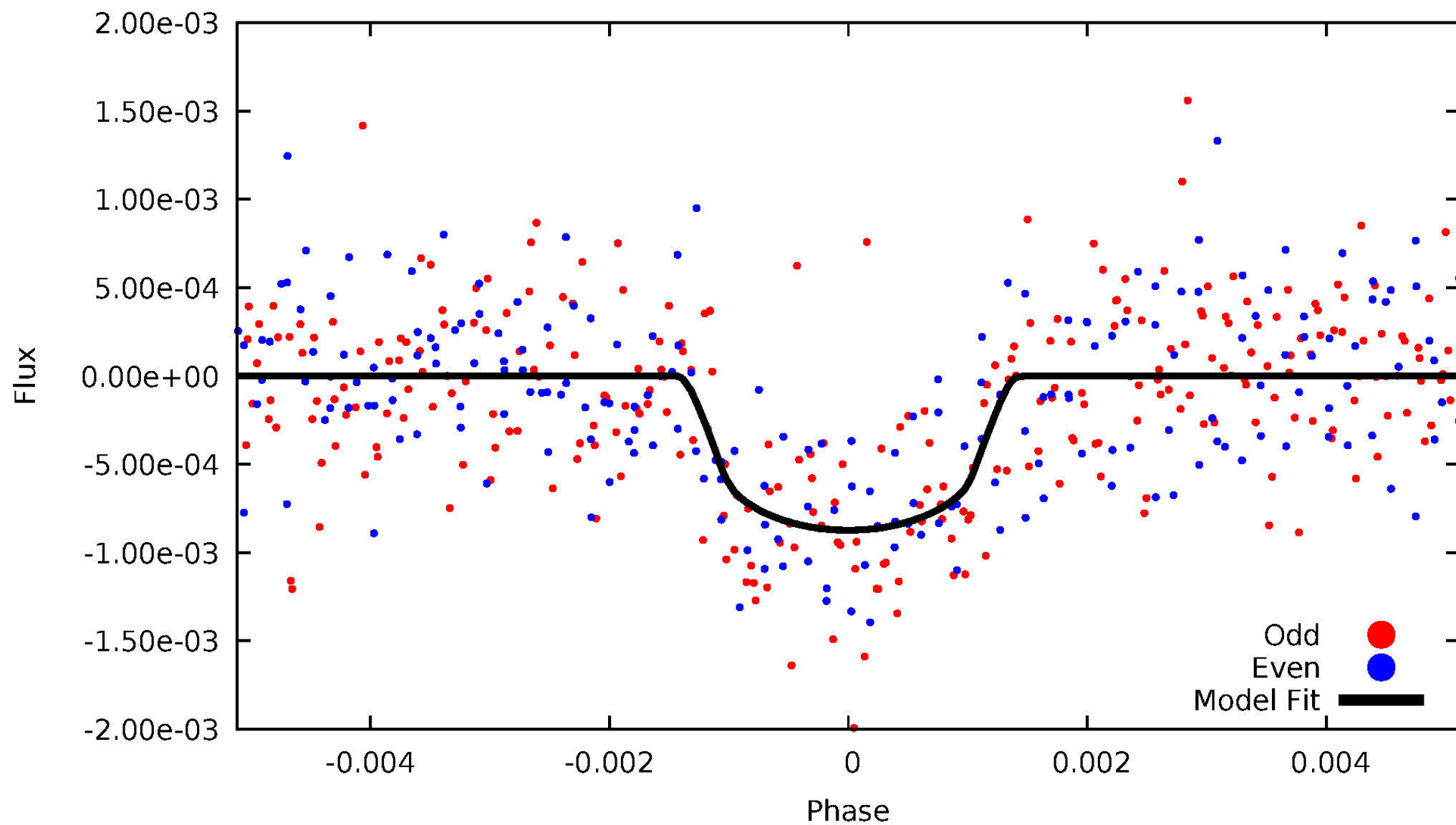


TCE 005456651-02



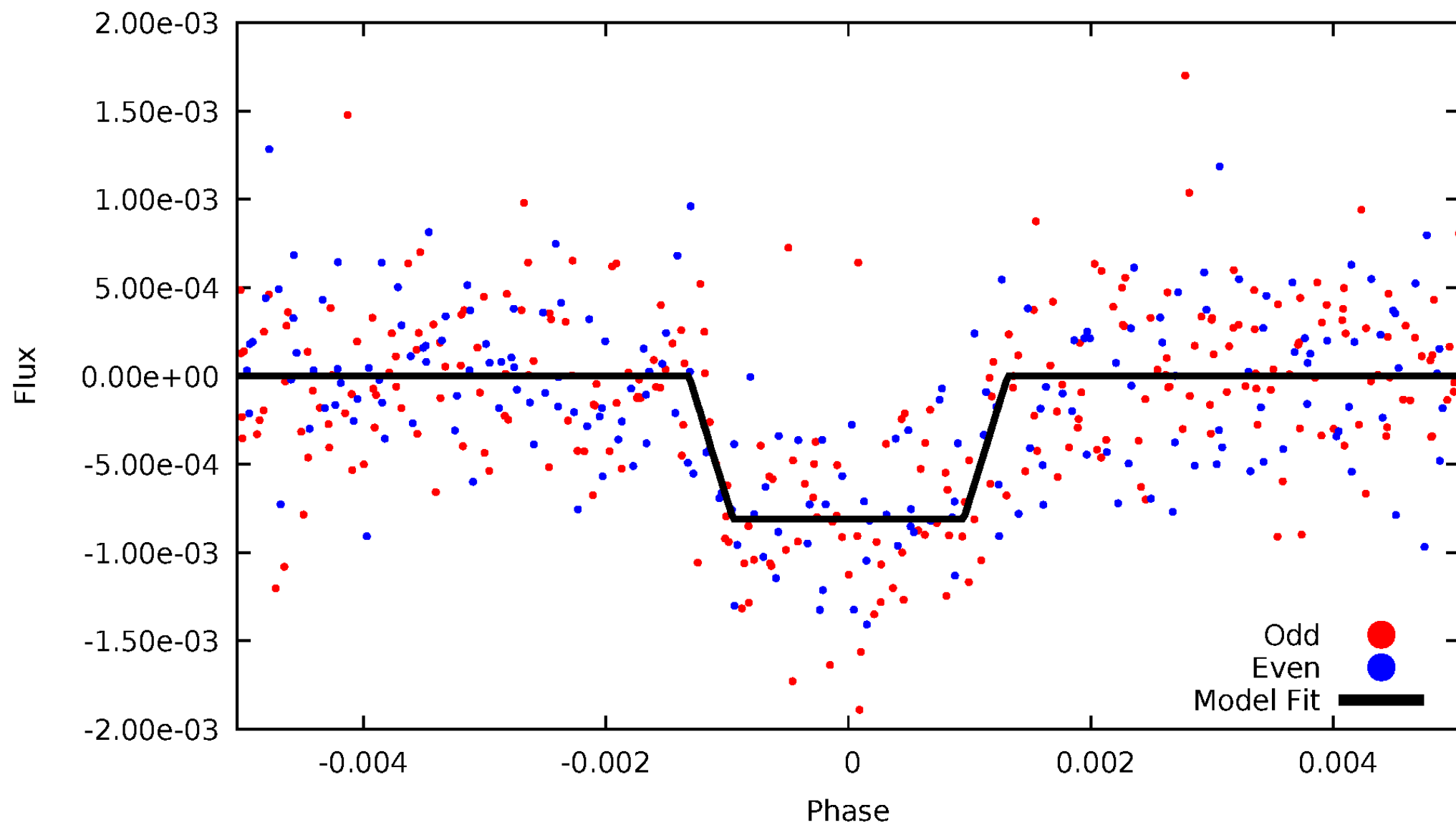
DV Odd/Even

TCE 005456651-02



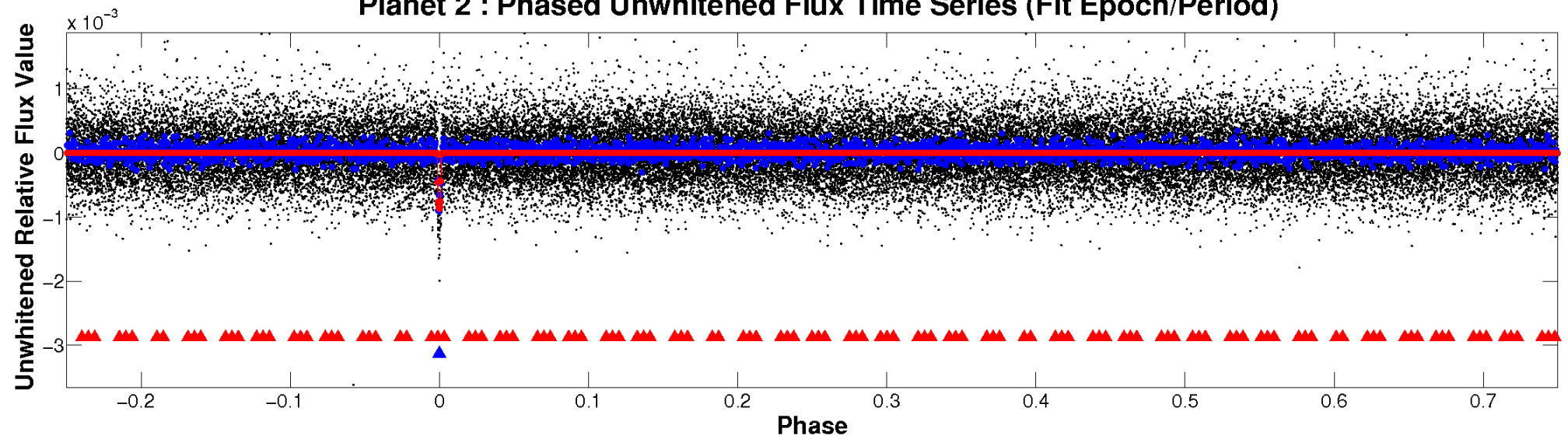
ALT Odd/Even

TCE 005456651-02

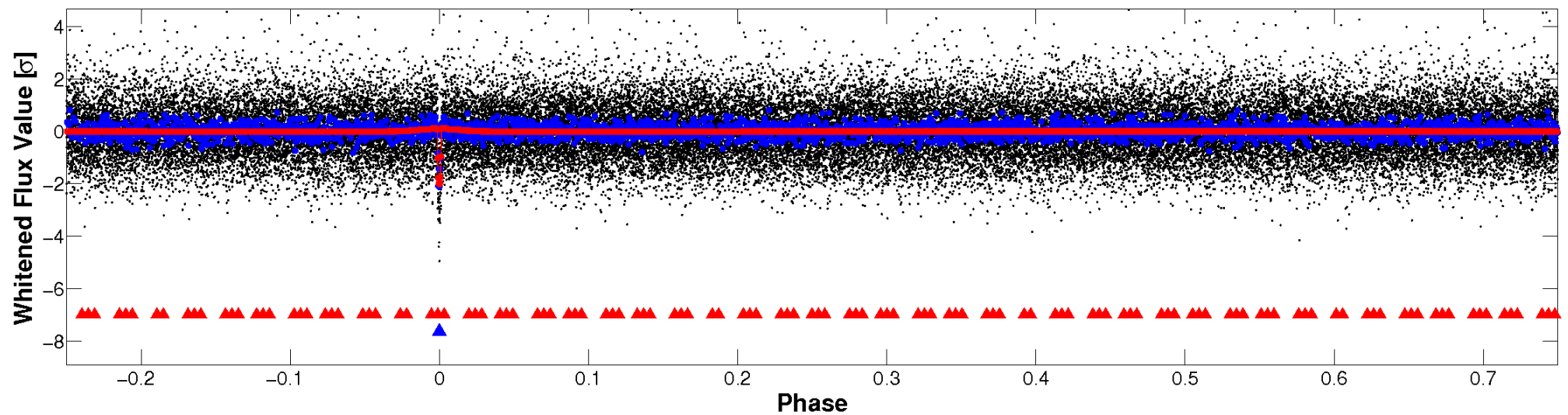


Non-Whitened Vs. Whitened Light Curve

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

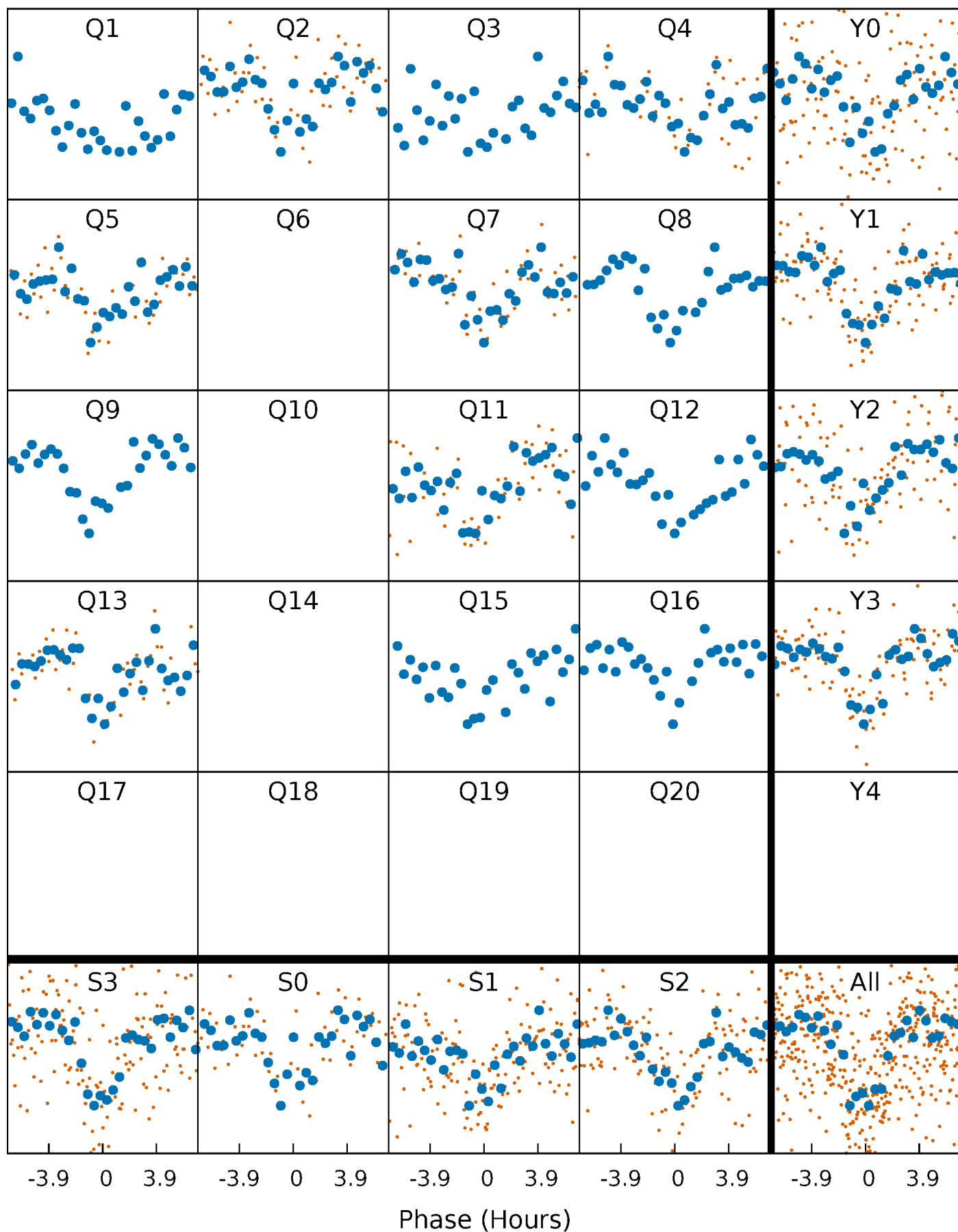


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



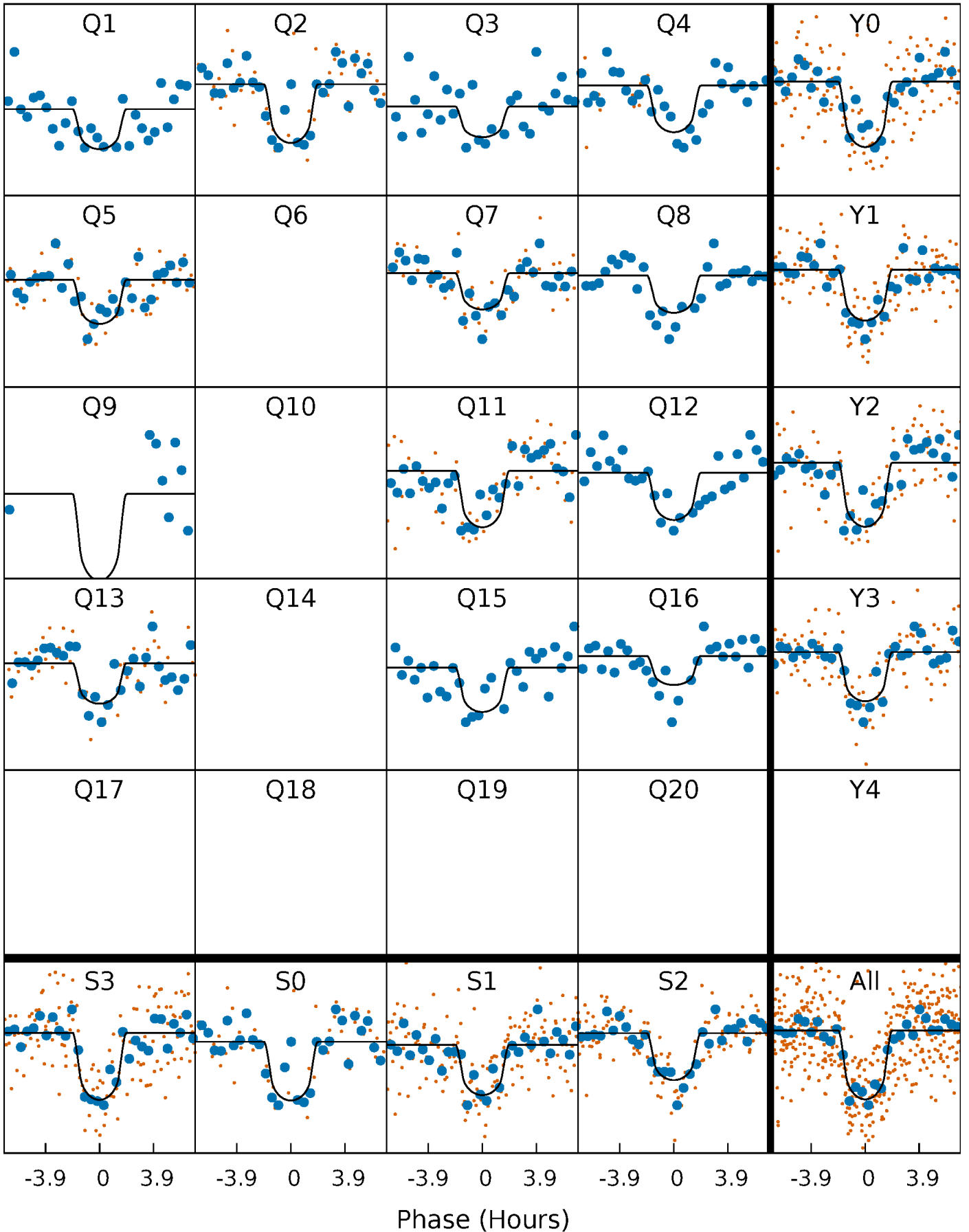
PDC Quarter-Phased Transit Curves

TCE 005456651-02 P= 56.228194 Days $T_0=132.287146$ (BKJD)



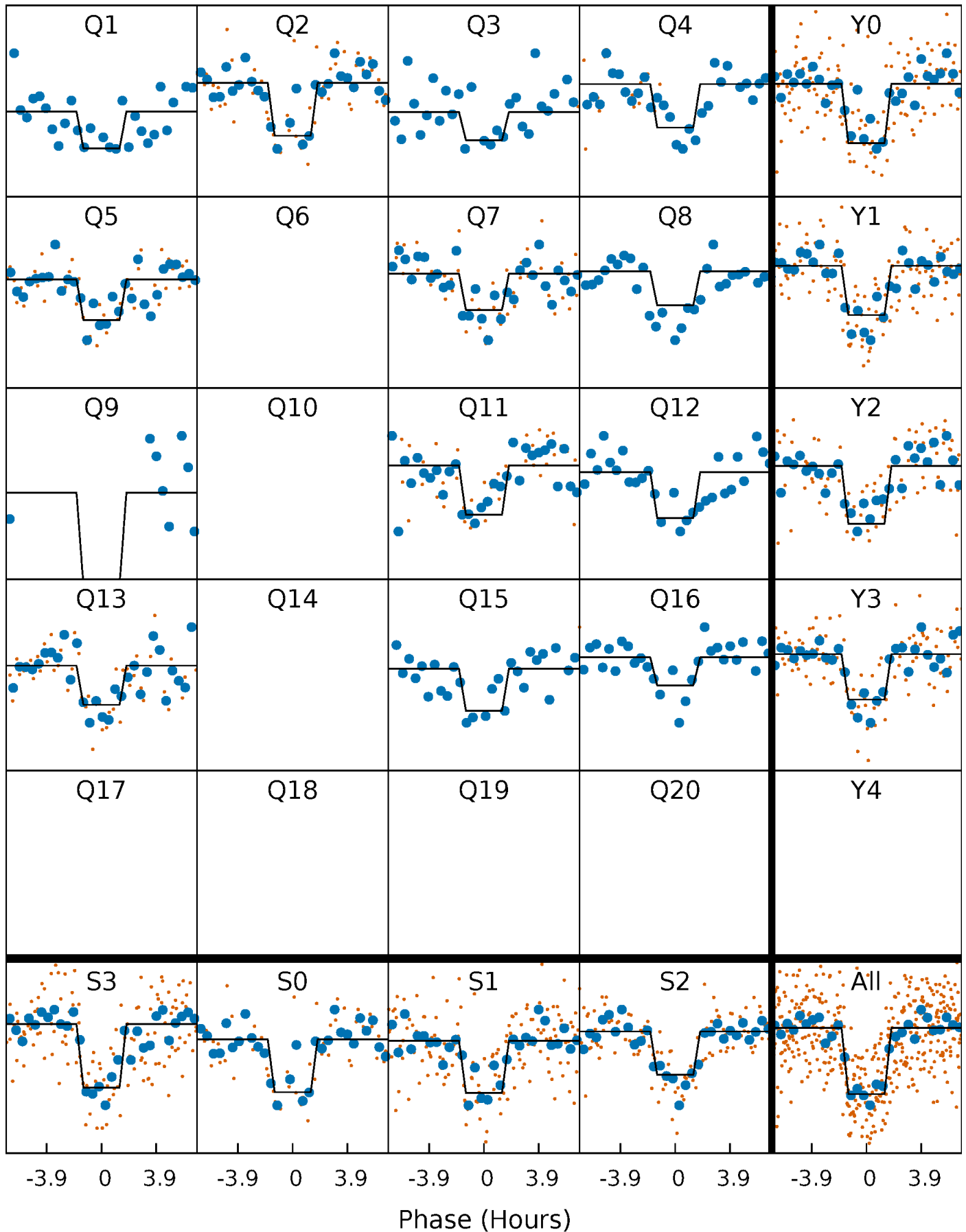
DV Quarter-Phased Transit Curves

TCE 005456651-02 P= 56.228194 Days $T_0=132.287146$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

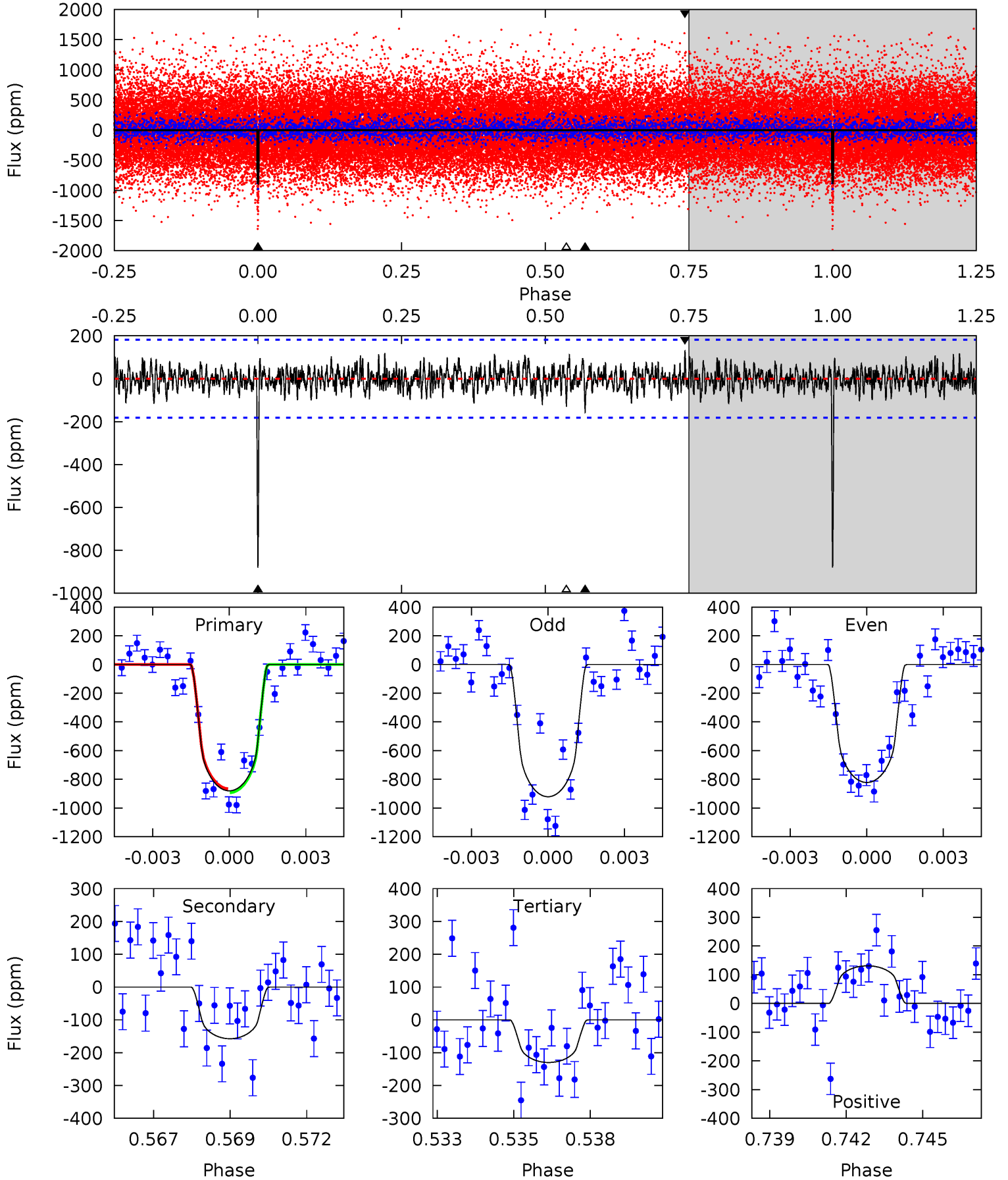
TCE 005456651-02 P= 56.227914 Days $T_0=132.291607$ (BKJD)



DV Model-Shift Uniqueness Test

005456651-02, P = 56.228194 Days, E = 76.058952 Days

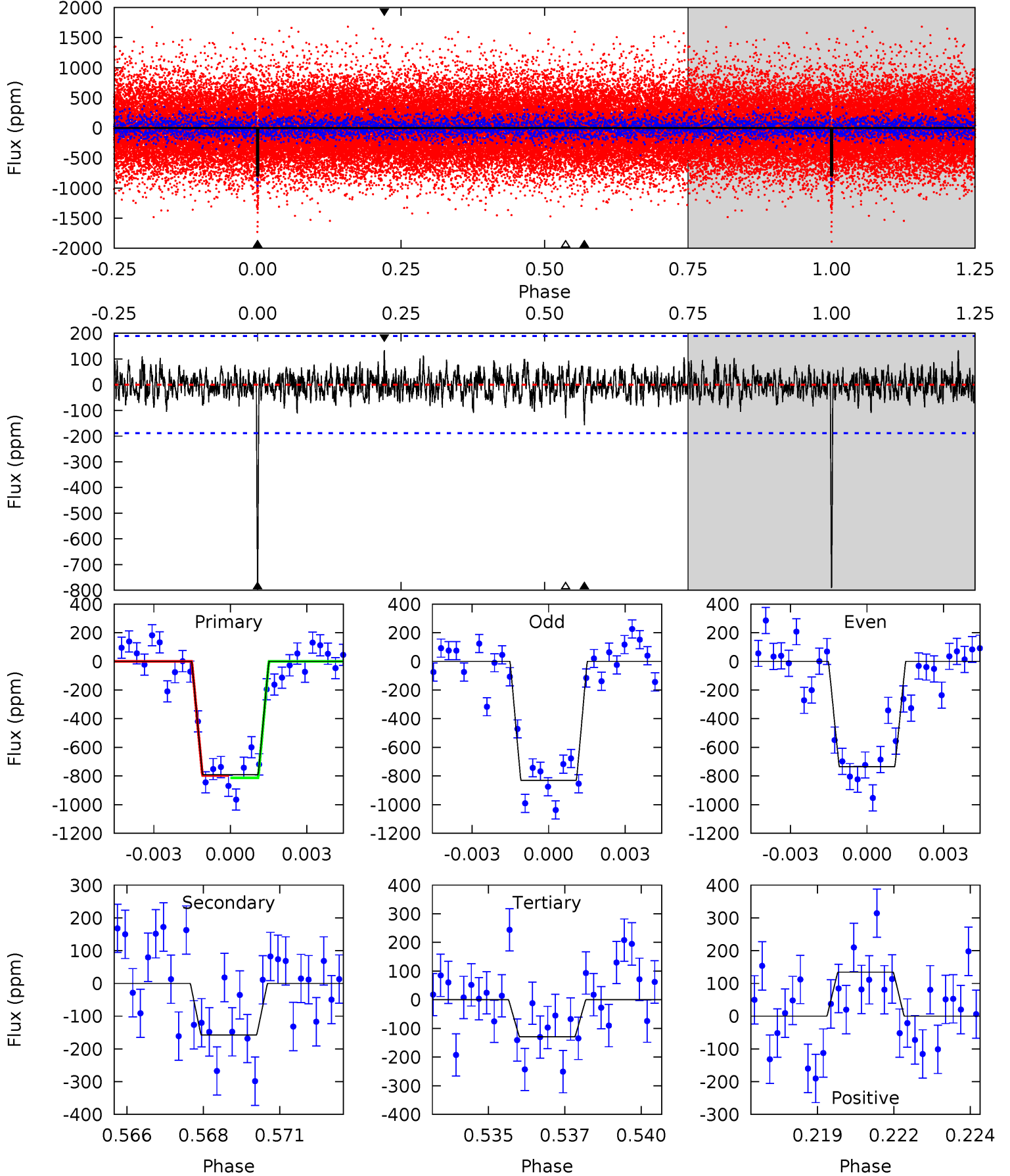
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.5	4.57	3.77	3.80	5.26	2.99	1.17	21.8	21.7	0.80	0.77	1.42	1.03	0.13	0.39



Alt Model-Shift Uniqueness Test

005456651-02, P = 56.227914 Days, E = 76.063693 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.1	4.40	3.61	3.75	5.28	3.01	1.03	18.5	18.3	0.78	0.65	1.32	1.04	0.15	0.23



Stellar Parameters For KIC 005456651

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	4959^{+99}_{-1}	$4.603^{+0.011}_{-0.060}$	$0.160^{+0.150}_{-0.150}$	$0.756^{+0.054}_{-0.027}$	$0.849^{+0.025}_{-0.060}$	$2.768^{+0.199}_{-0.551}$
	+2%/-0%	+0%/-1%	+94%/-94%	+7%/-4%	+3%/-7%	+7%/-20%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 005456651-02 / KOI 0835.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-157 ± 34	$2.58^{+1.52}_{-1.44}$	515^{+15}_{-19}	3557^{+1250}_{-500}	989^{+3980}_{-638}
Alt.	-157 ± 36	$2.48^{+1.58}_{-1.39}$	515^{+14}_{-20}	3579^{+1204}_{-488}	980^{+4106}_{-598}

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

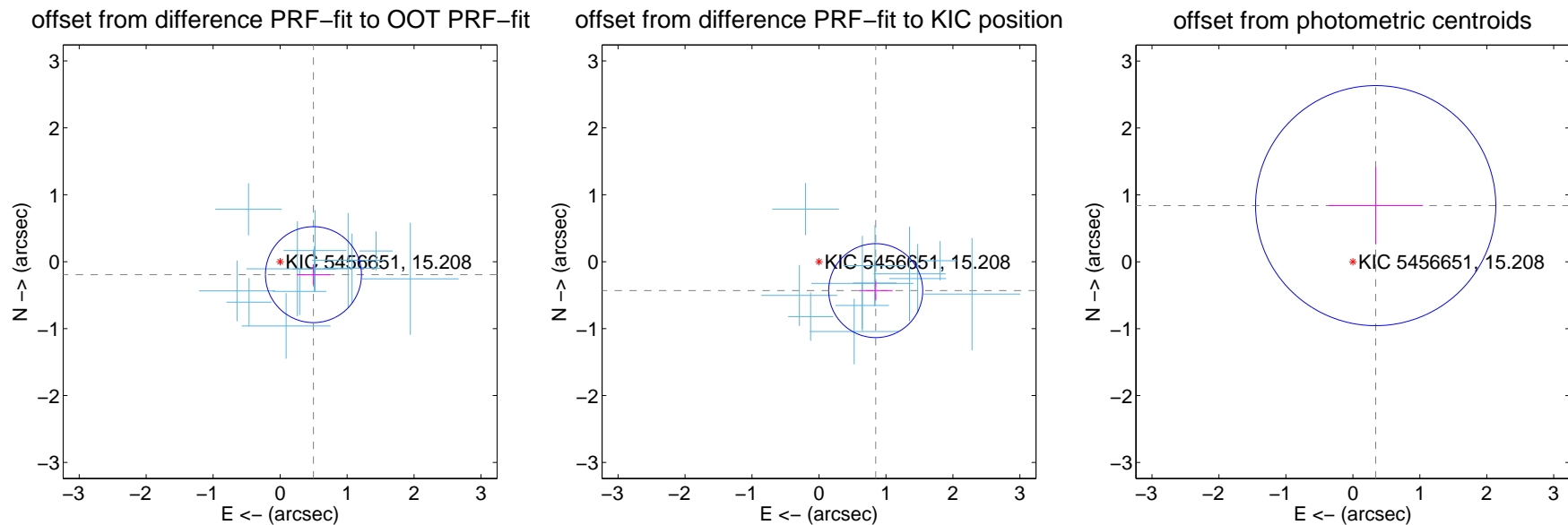
DV Centroid Data

Supplemental centroid analysis for 005456651-02. Kepler magnitude: 15.21. Transit SNR 18.00

There are 12 quarters with good PRF difference image offsets

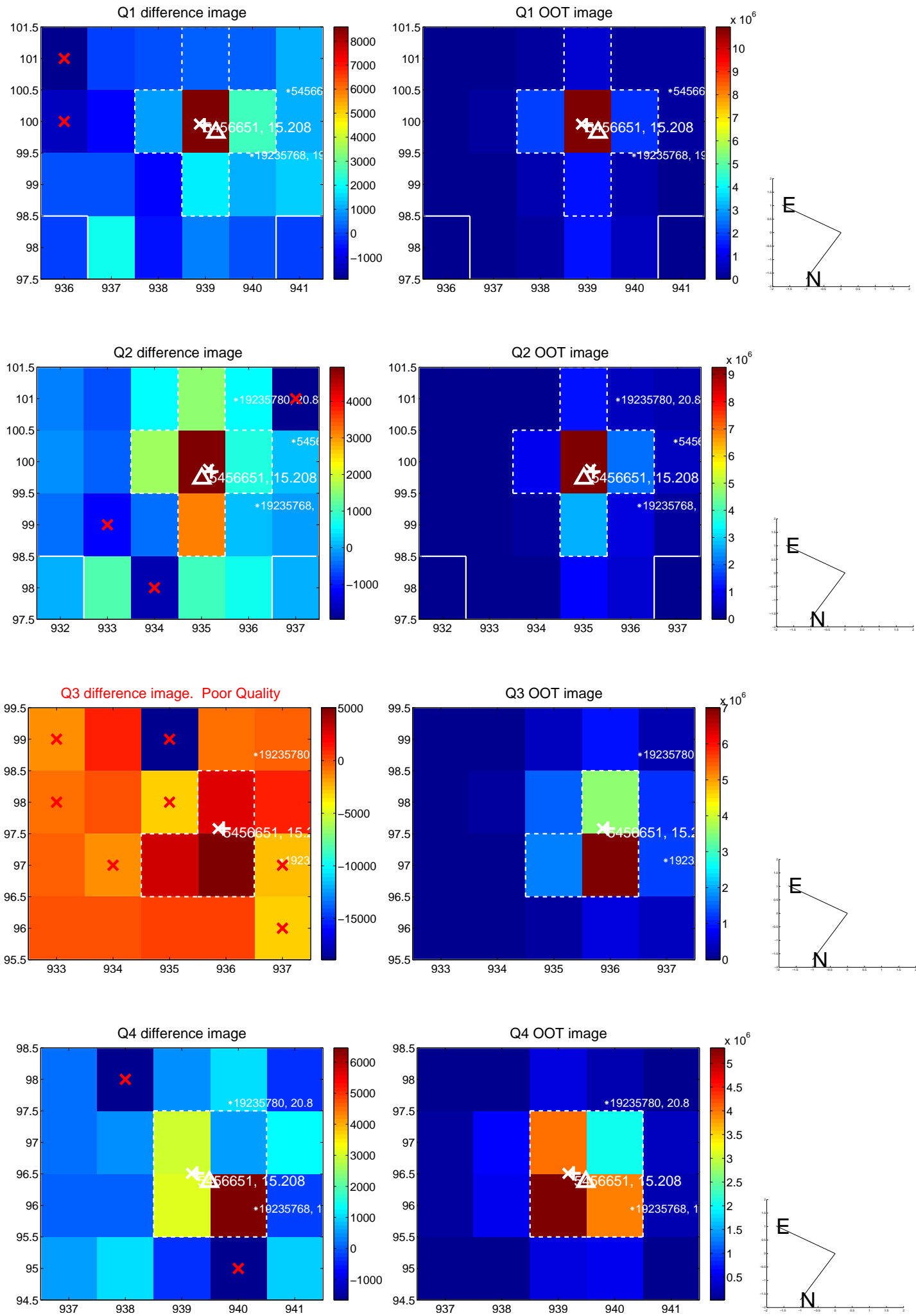
The direct PRF centroid is offset from the target star catalog position by about 0.40 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.534 ± 0.239	2.24	-0.498 ± 0.250	-0.193 ± 0.149
PRF-fit source offset from KIC position	0.951 ± 0.234	4.06	-0.847 ± 0.253	-0.432 ± 0.136
photometric centroid source offset	0.91 ± 0.60	1.51	-0.34 ± 0.71	0.84 ± 0.58

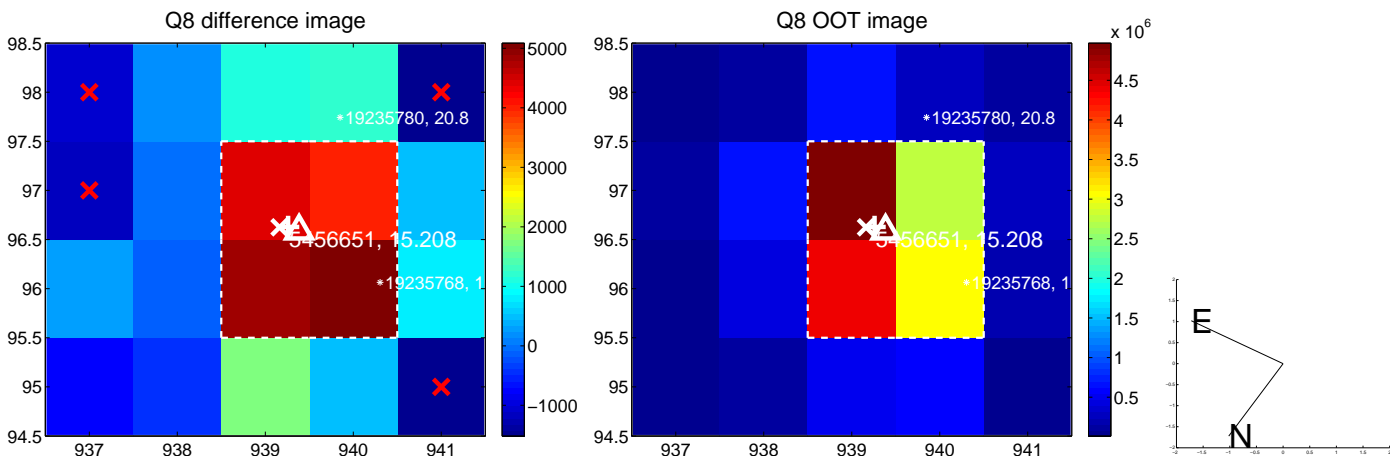
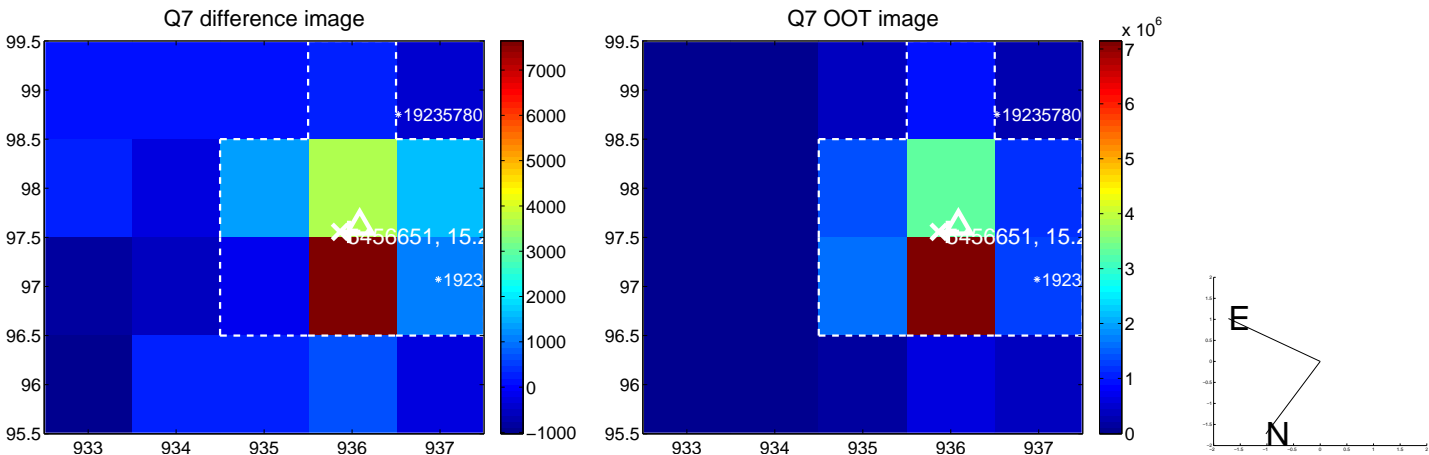
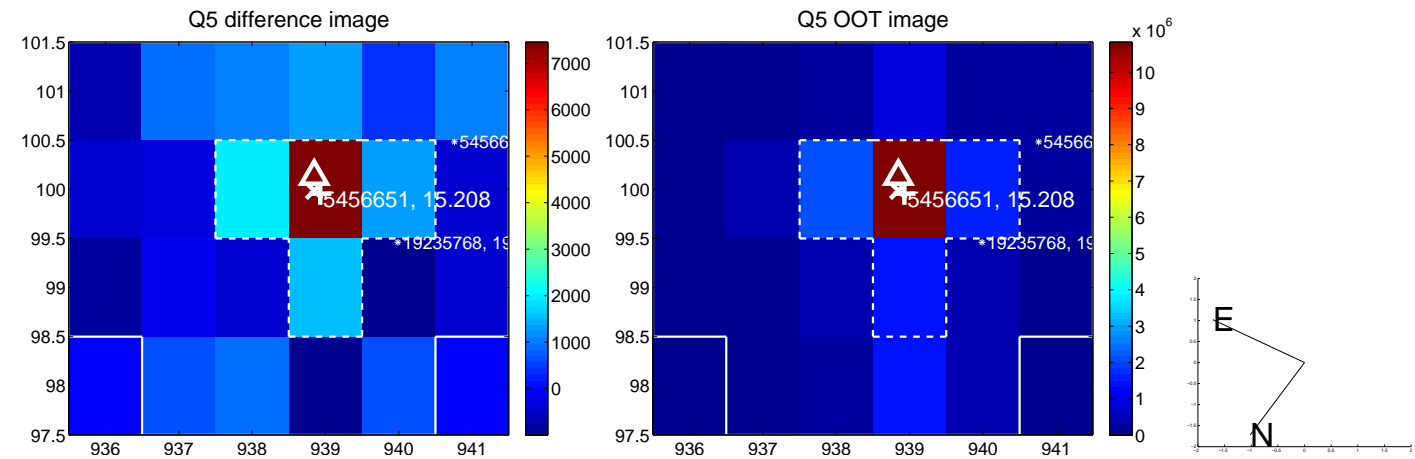


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

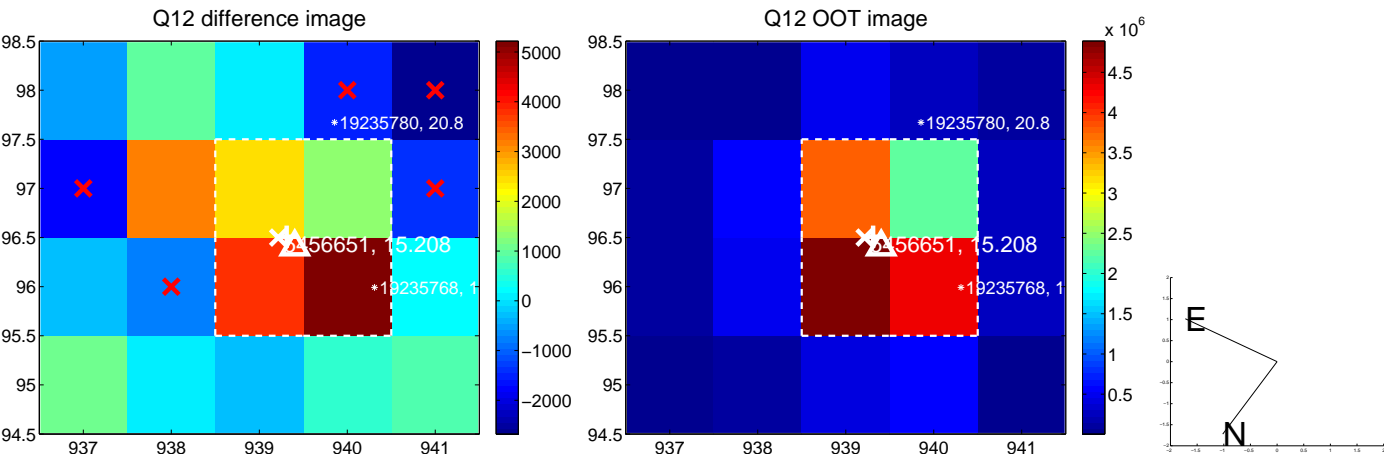
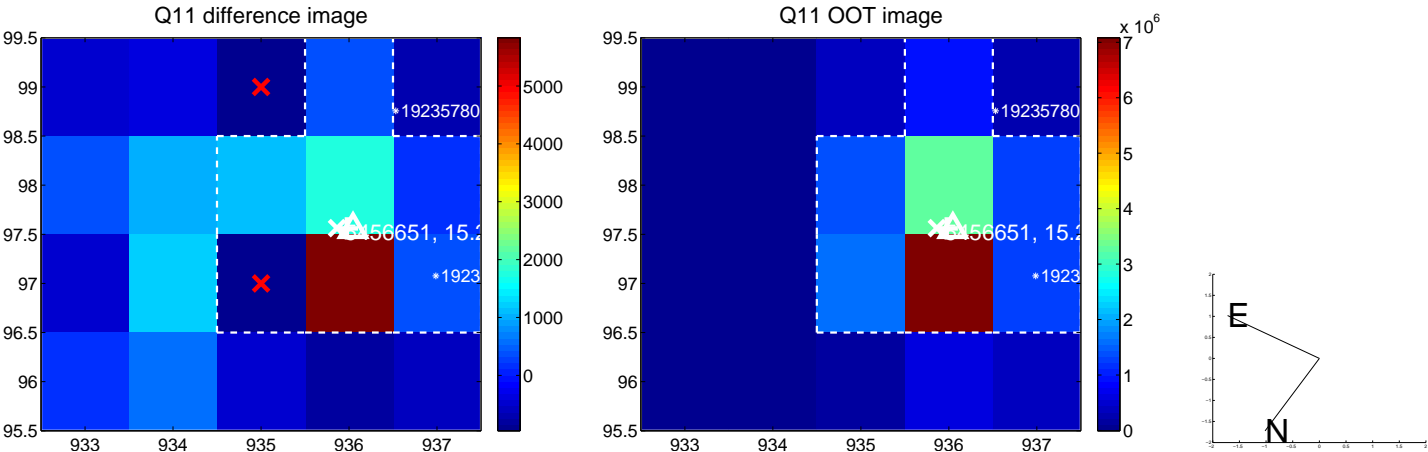
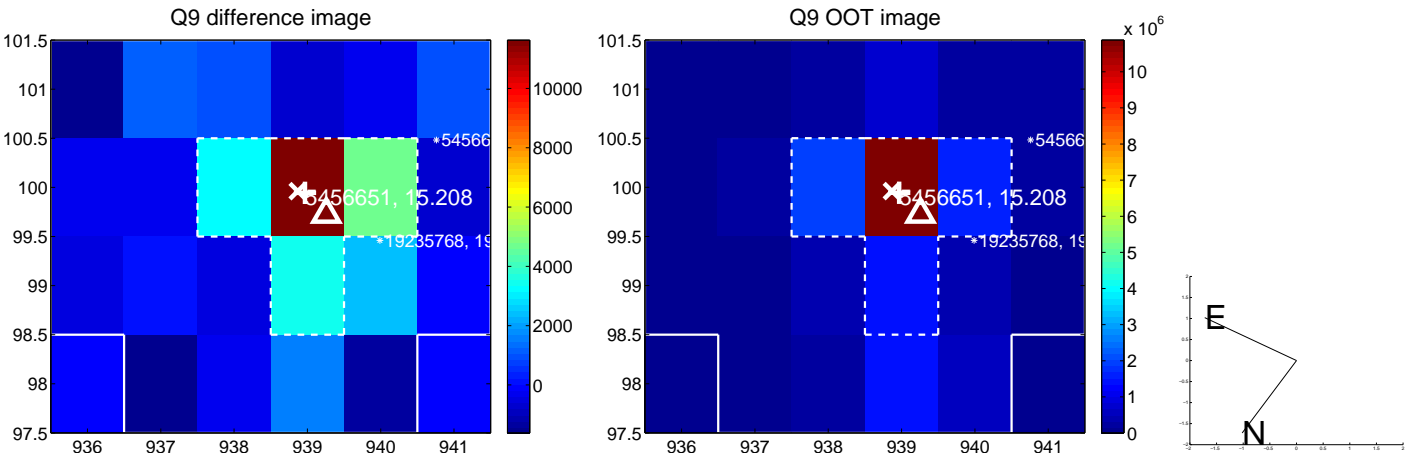
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



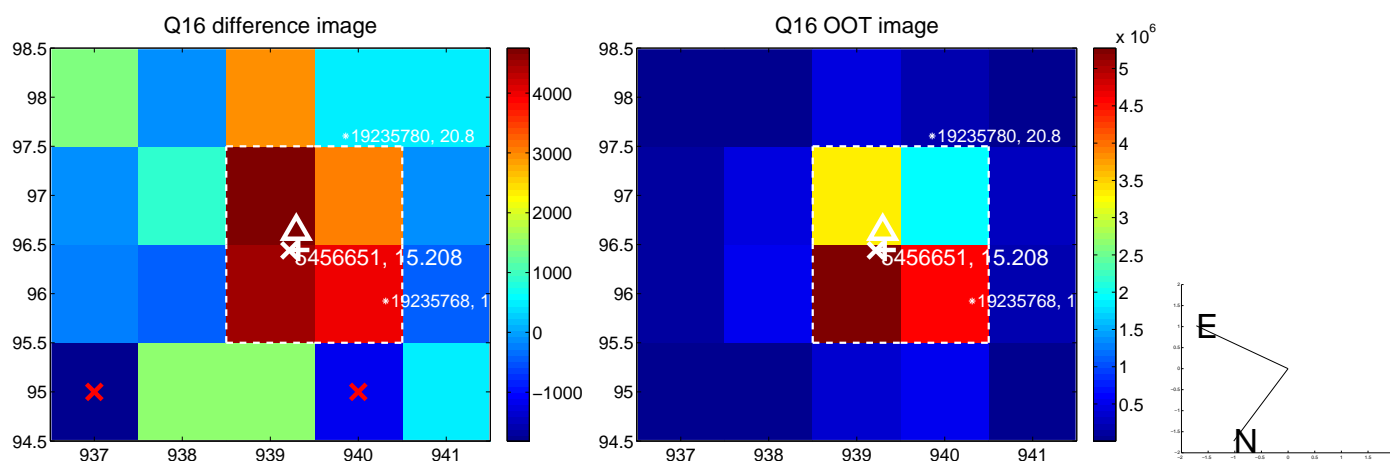
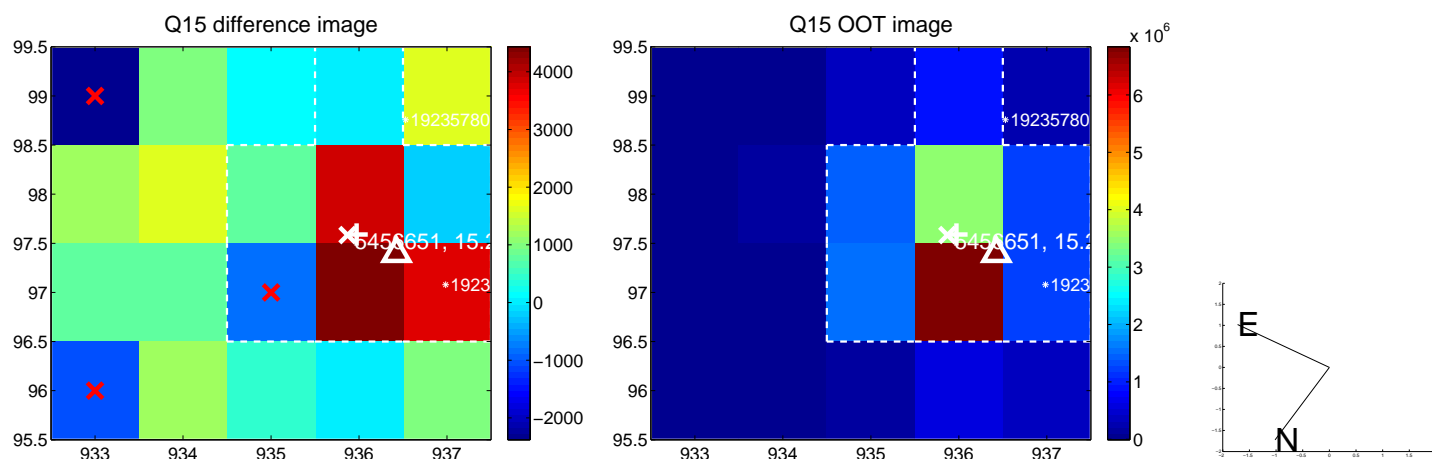
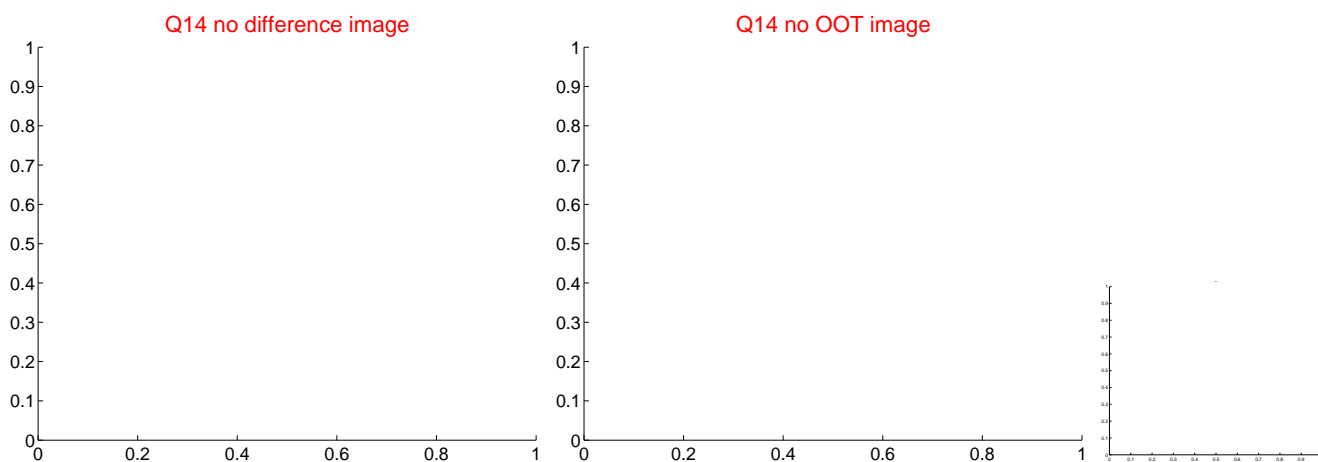
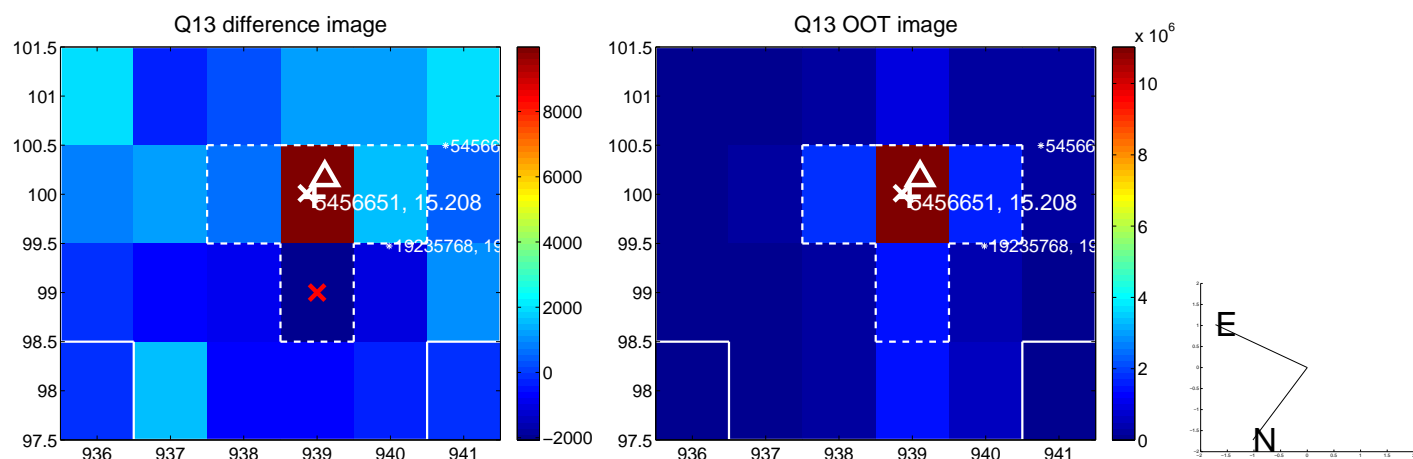
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



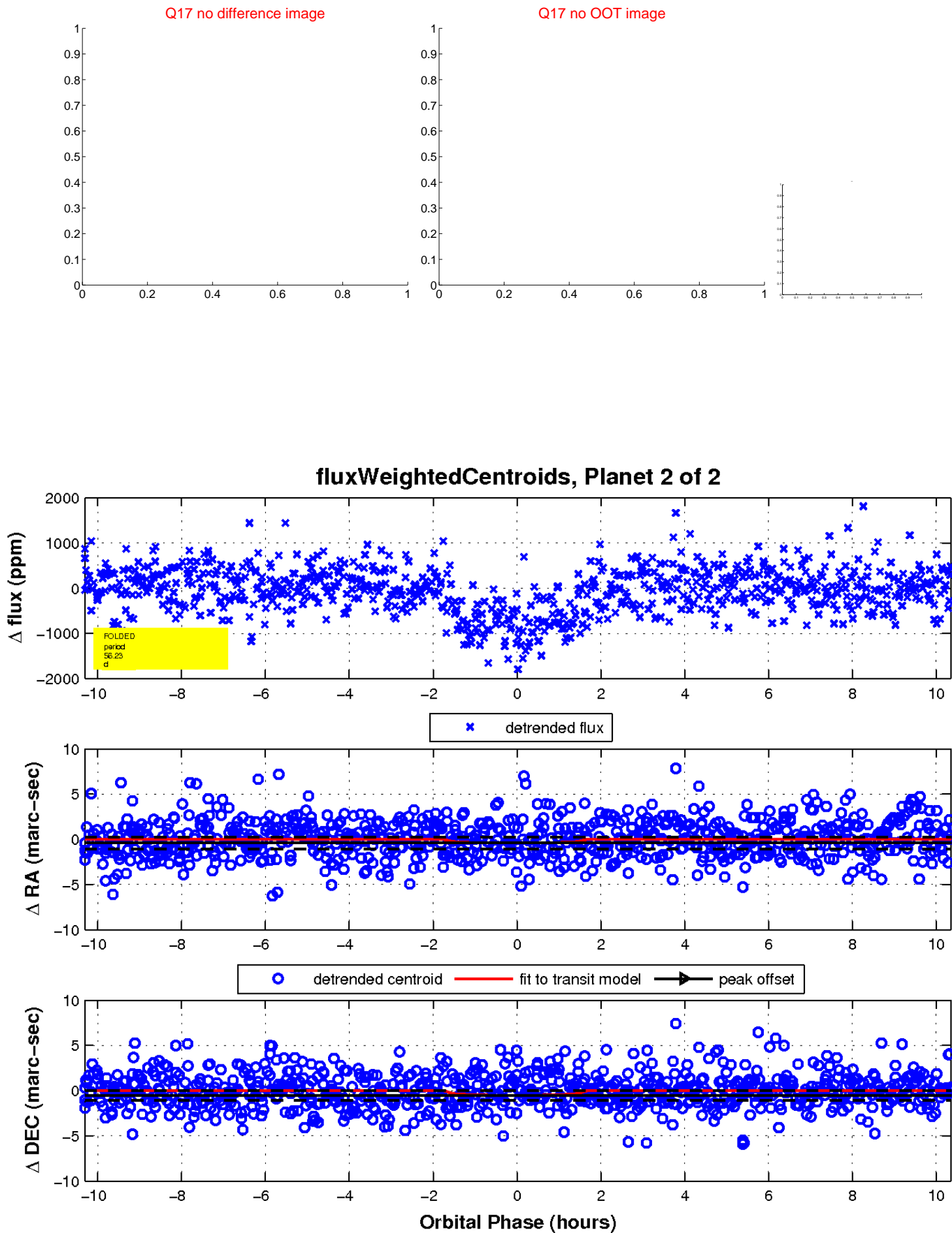
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UKIRT Image

Declination

