

KIC 009045521

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})
009045521-01	OBS	No	0.927882	132.017854	88.8	4.915	13.1	10.8	1.62	6409	1.54	10441.57
009045521-02	OBS	No	0.582277	131.794413	210.3	2.358	9.4	10.4	1.62	6409	2.75	19434.93

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009045521-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT
009045521-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

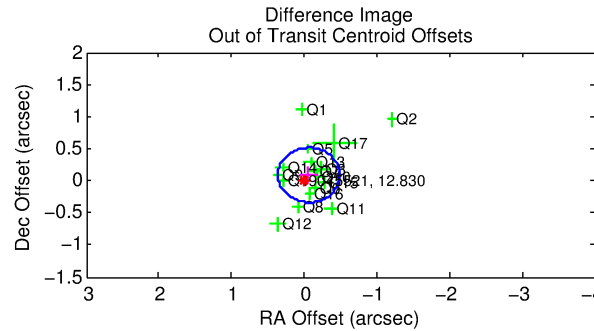
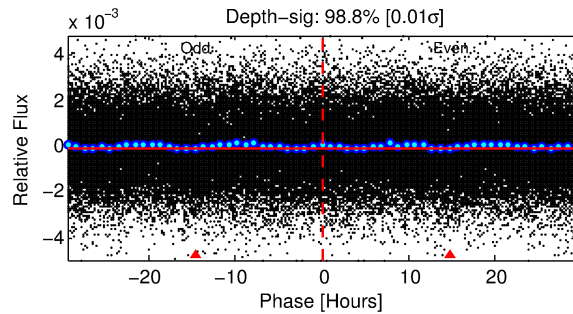
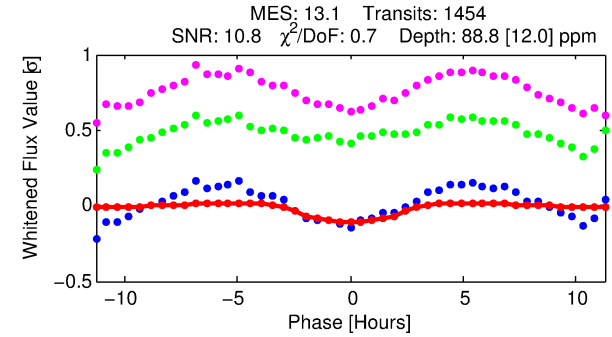
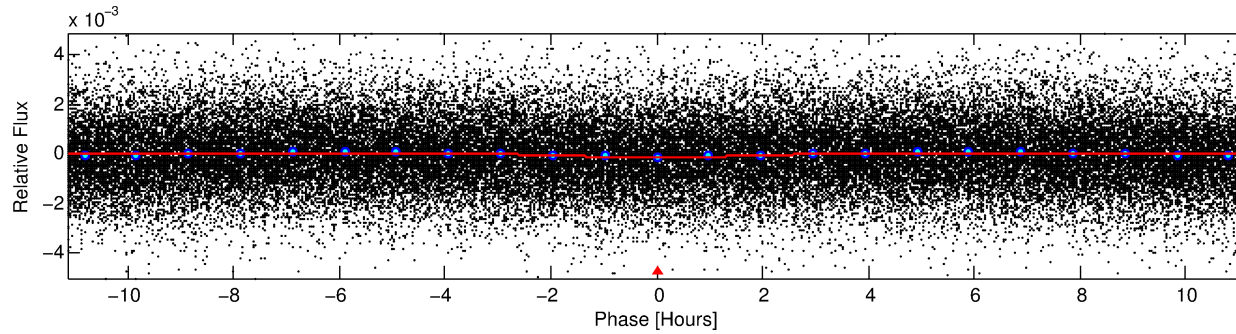
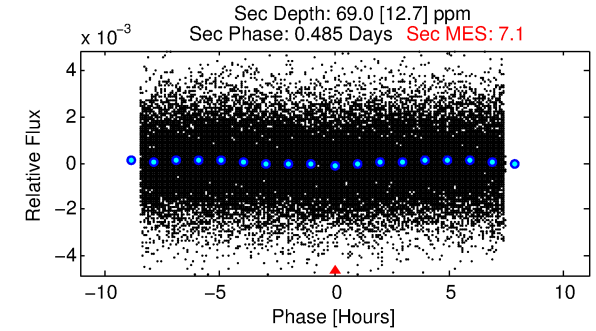
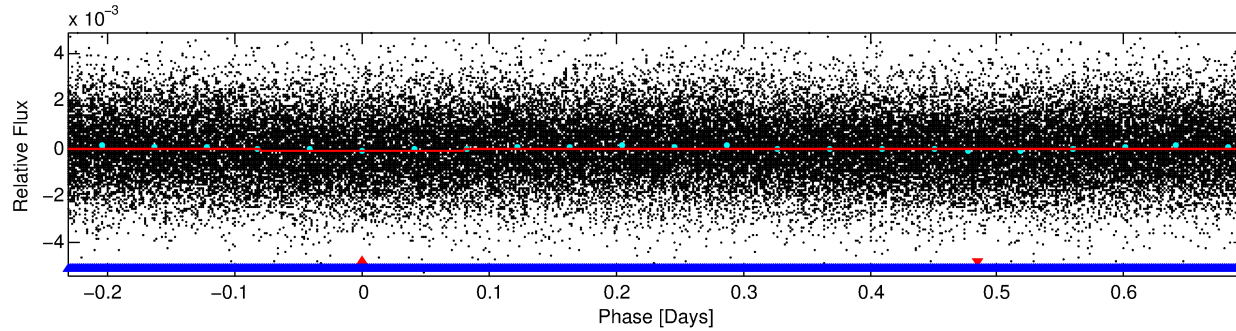
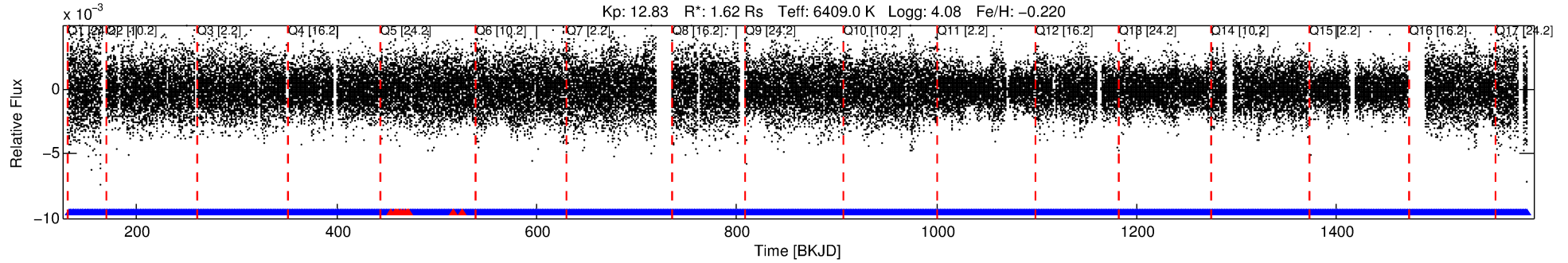
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009045521-01

No Significant Match Found

DV One-Page Summary

KIC: 9045521 Candidate: 1 of 2 Period: 0.928 d



DV Fit Results:

Period = 0.92788 [0.00001] d
Epoch = 132.0179 [0.0065] BKJD
Rp/R* = 0.0087 [0.0144]
a/R* = 1.57 [8.09]
b = 0.09 [98.87]
Seff = 10441.57 [4898.84]
Teq = 2578 [302] K
Rp = 1.54 [2.59] Re
a = 0.0195 [0.0056] AU
Ag = 6.13 [20.59] [0.25σ]
Teffp = 6272 [5218] K [0.71σ]

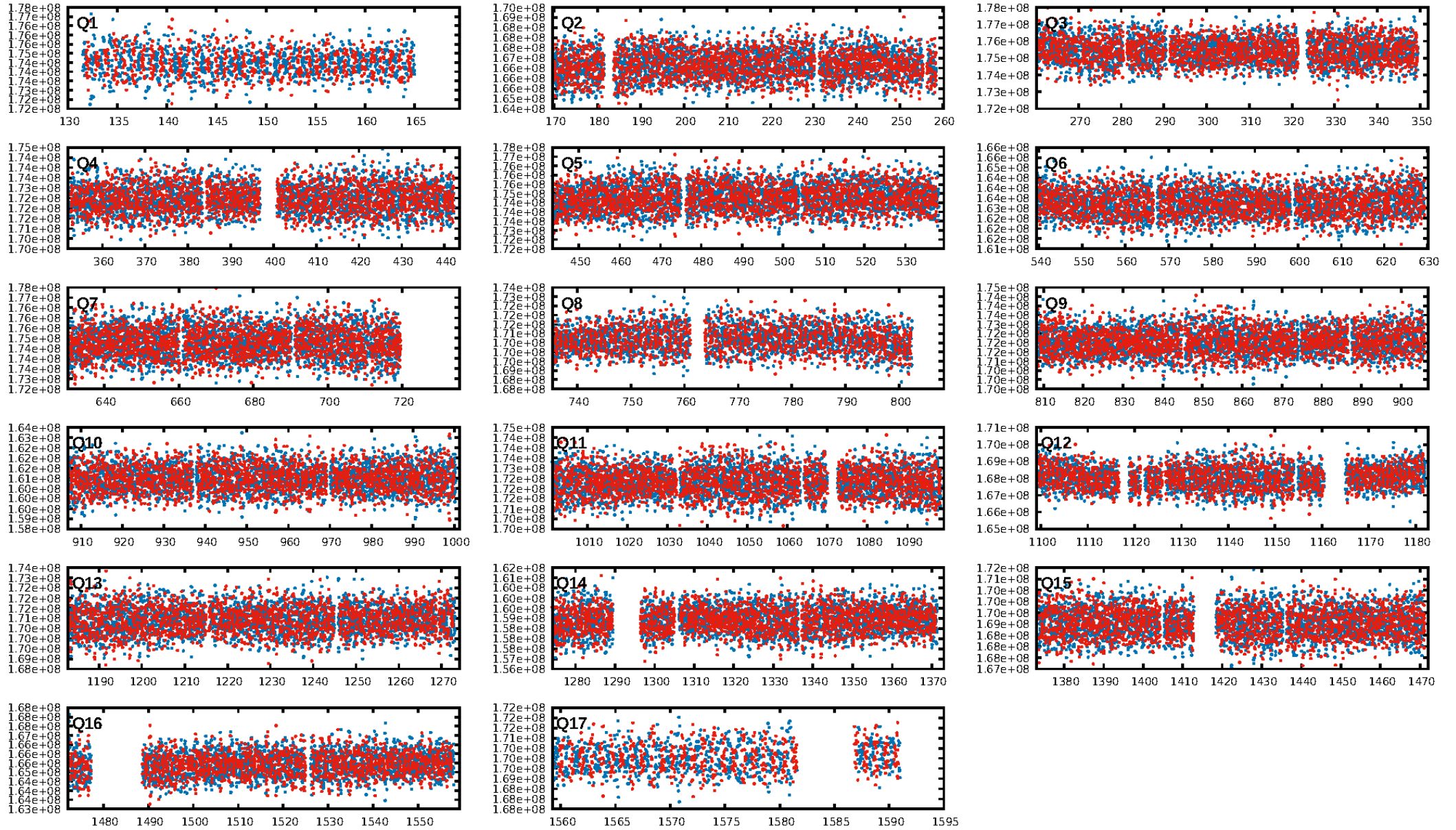
DV Diagnostic Results:

ShortPeriod-sig: 87.2% [1.52σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.69e-42
RollingBand-fgt: 0.99 [1377/1389]
GhostDiagnostic-chr: 2.083
Centroid-sig: 22.5%
Centroid-so: 0.200 arcsec [0.83σ]
OotOffset-rm: 0.105 arcsec [0.74σ]
KicOffset-rm: 0.099 arcsec [0.72σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

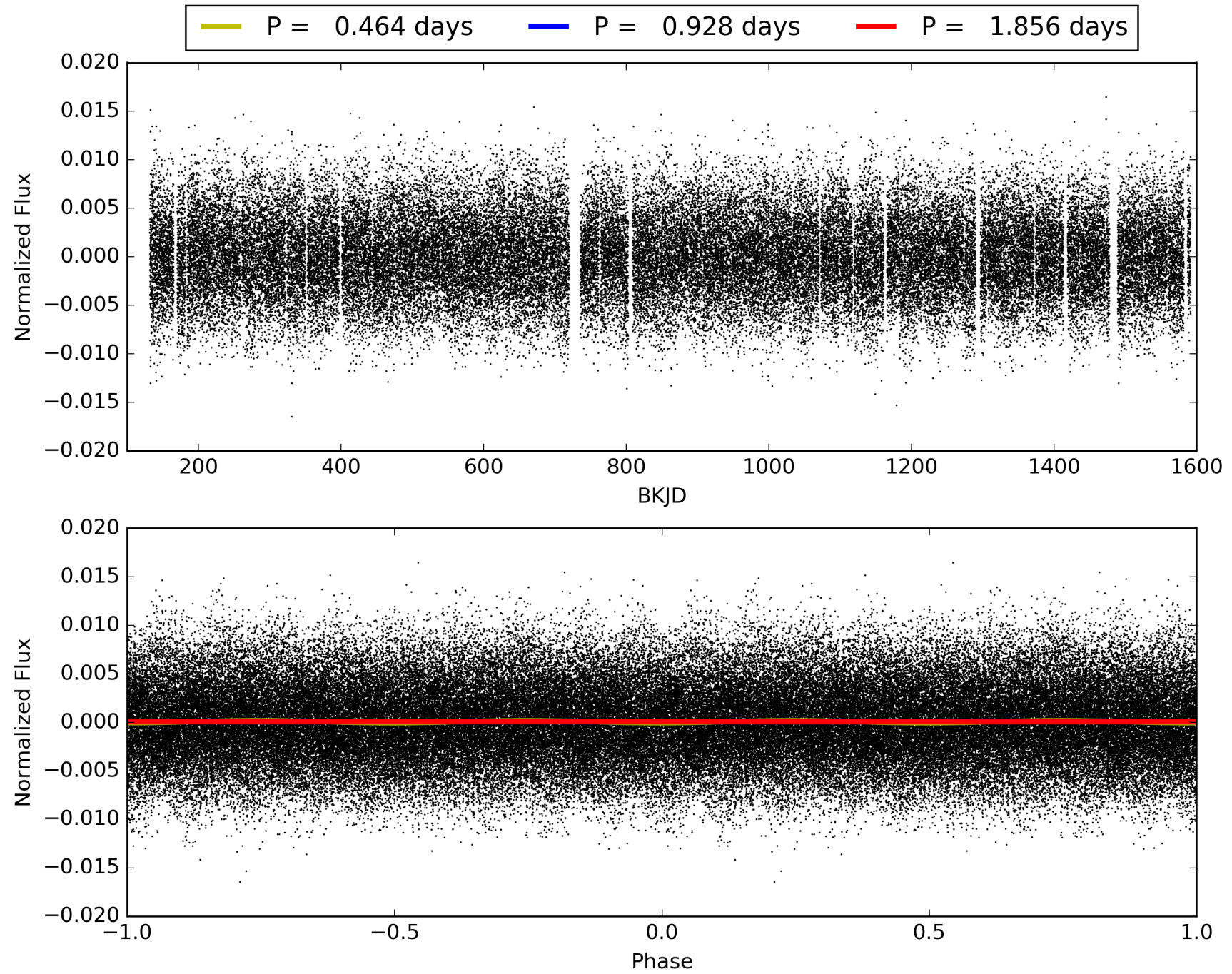
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:02:20 Z

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

TCE 009045521-01, PDC Light Curves

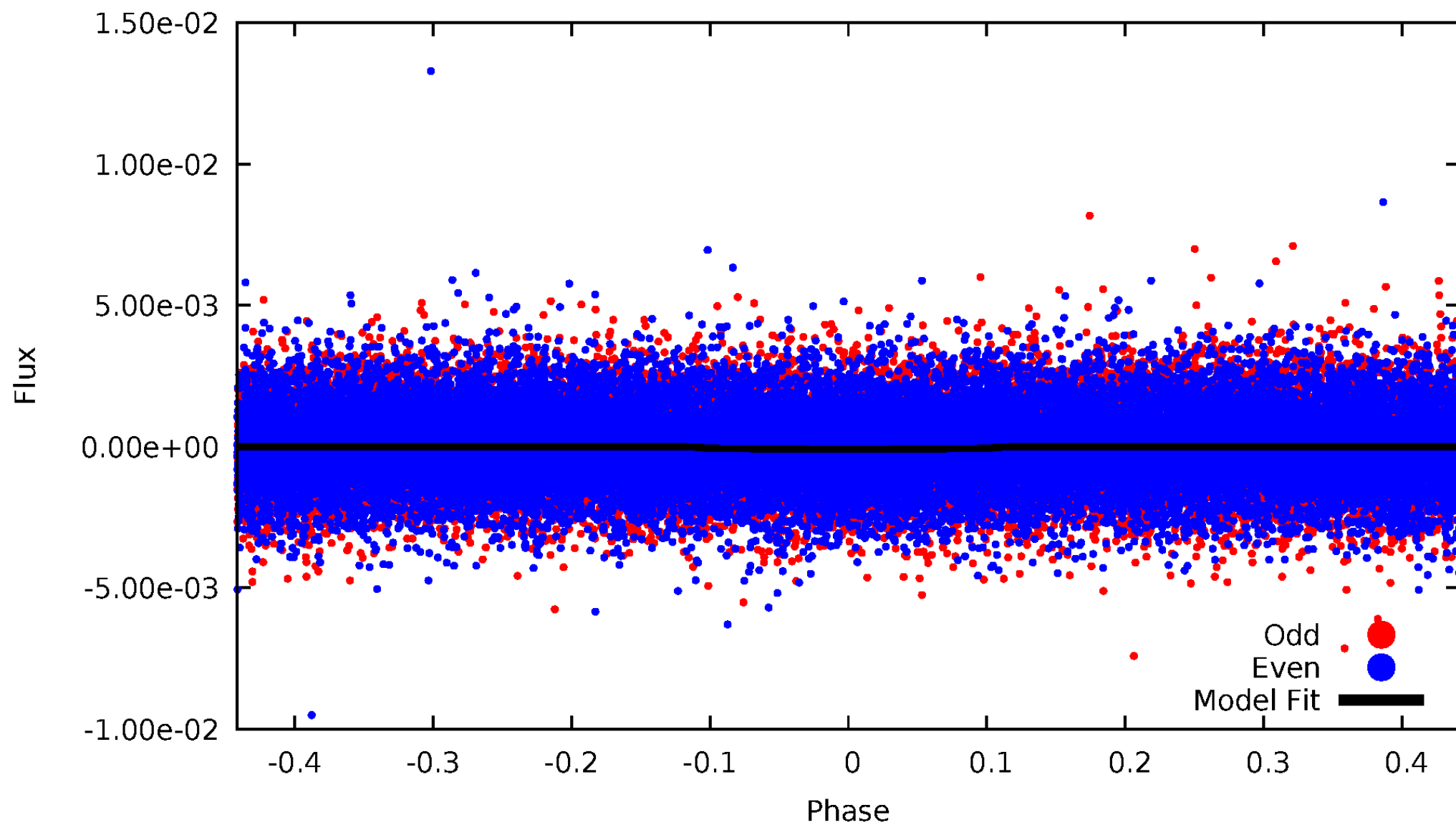


TCE 009045521-01



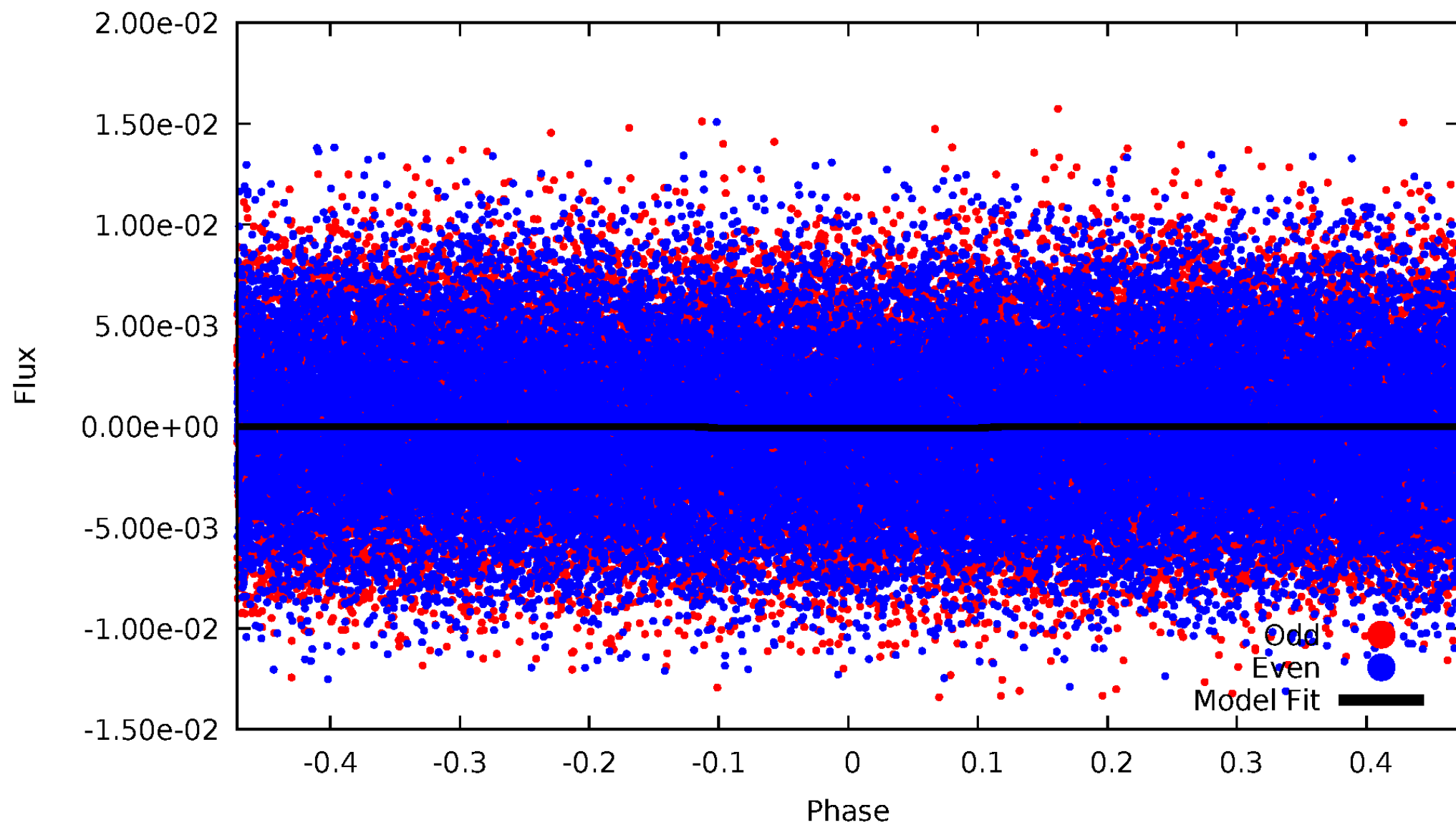
DV Odd/Even

TCE 009045521-01



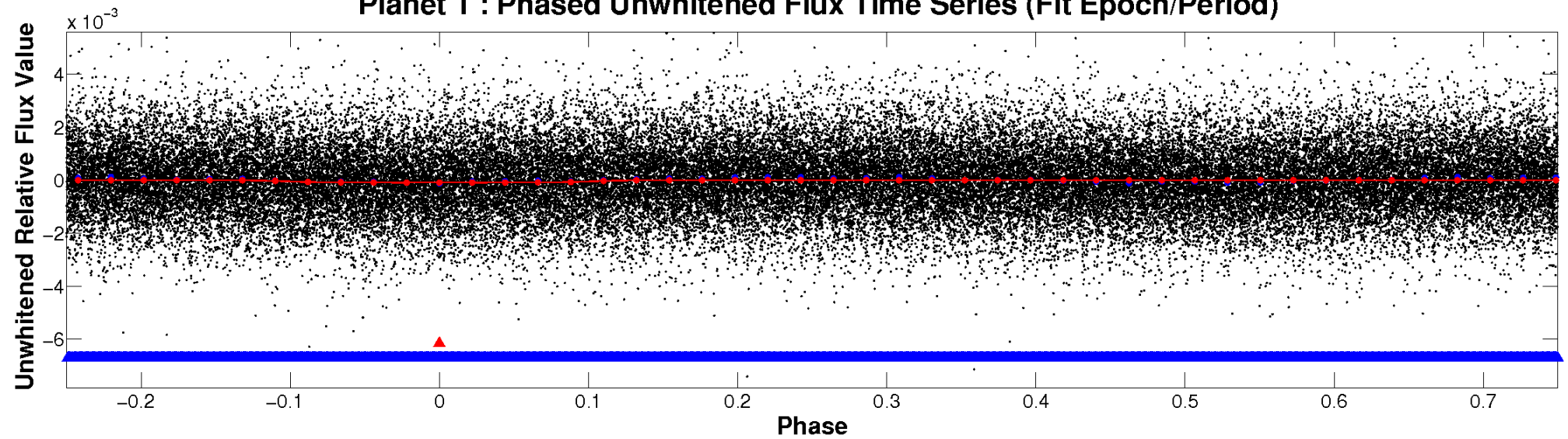
ALT Odd/Even

TCE 009045521-01

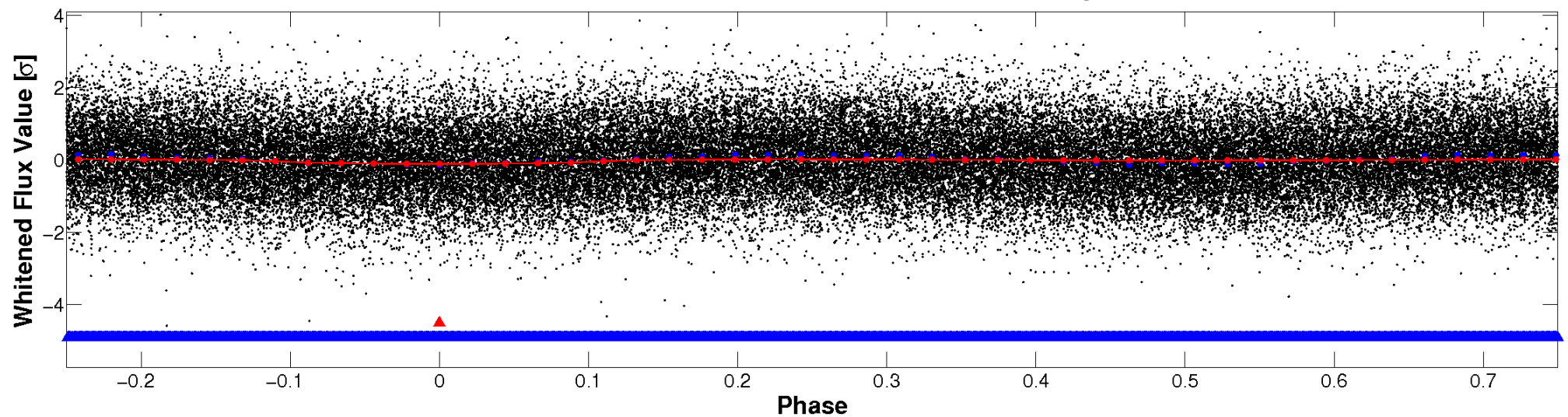


Non-Whitened Vs. Whitened Light Curve

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

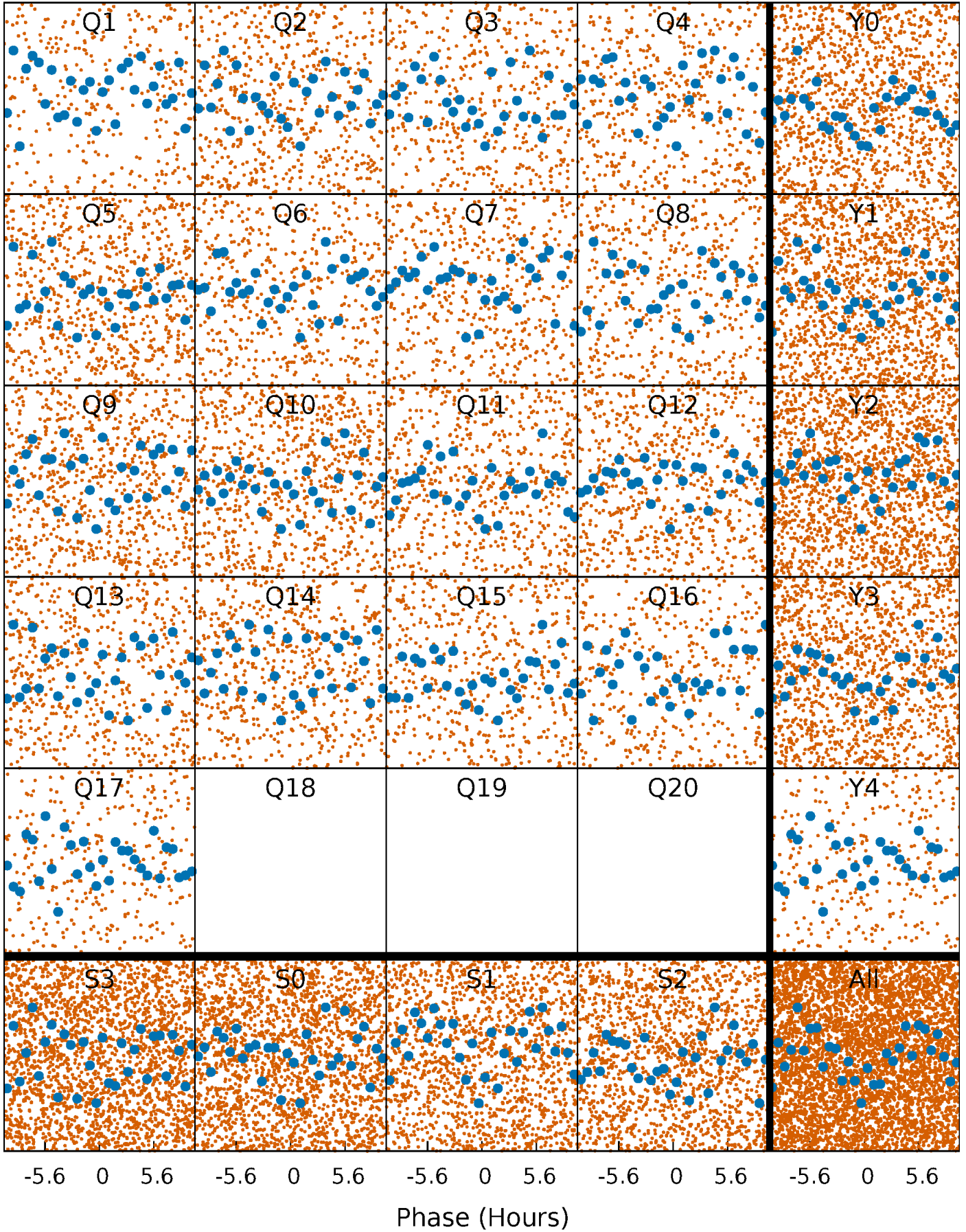


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



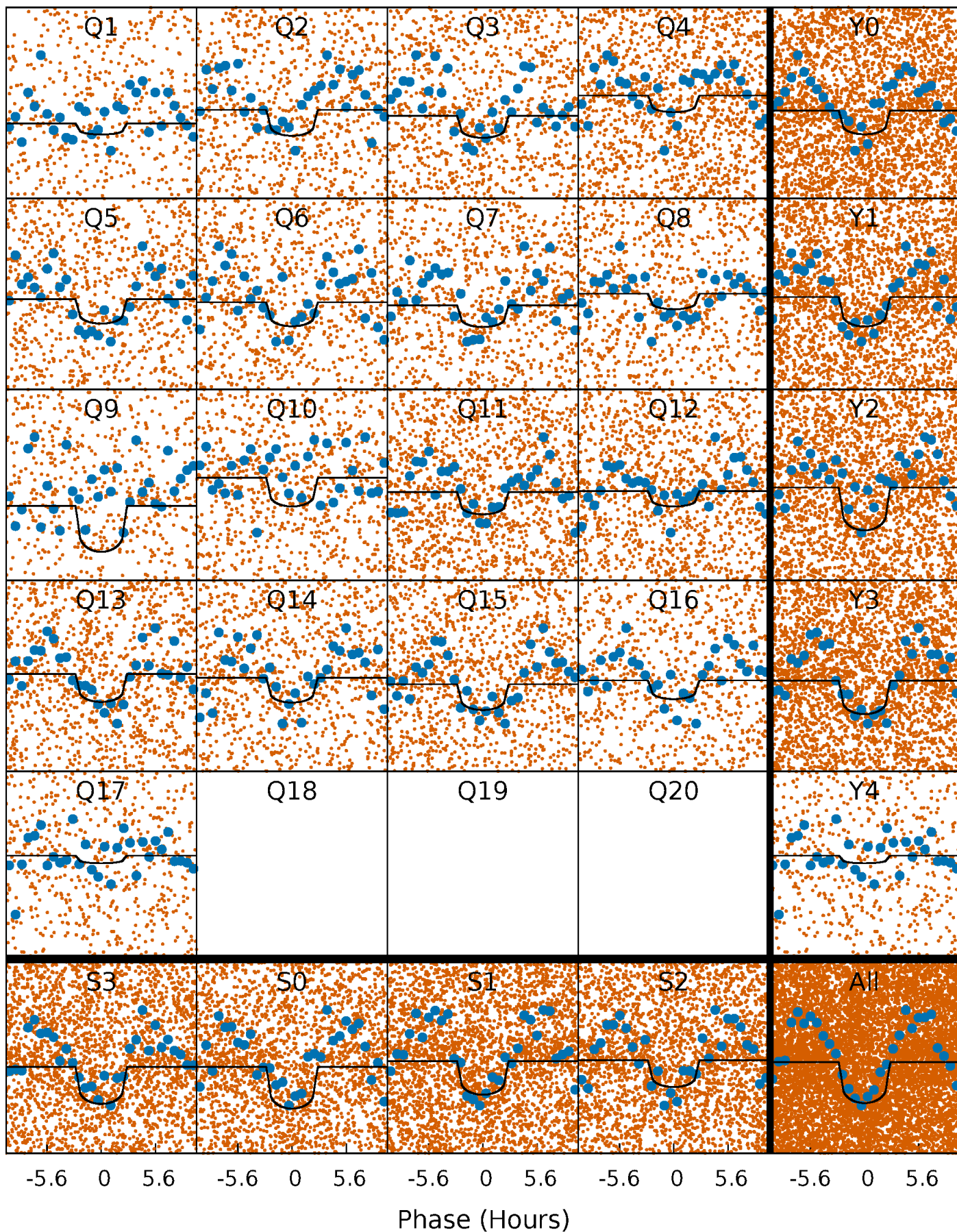
PDC Quarter-Phased Transit Curves

TCE 009045521-01 P= 0.927882 Days $T_0=132.017854$ (BKJD)



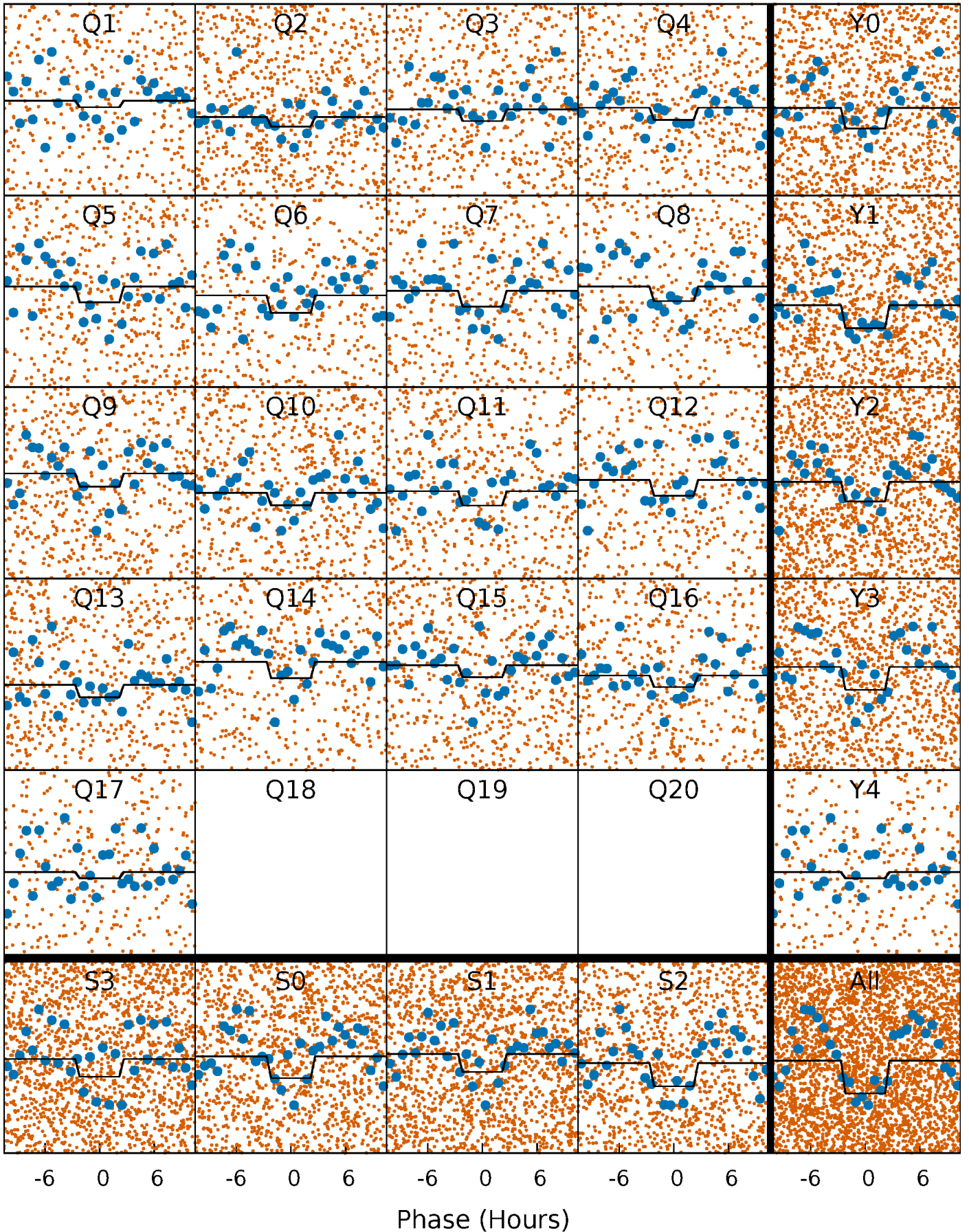
DV Quarter-Phased Transit Curves

TCE 009045521-01 P= 0.927882 Days $T_0=132.017854$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

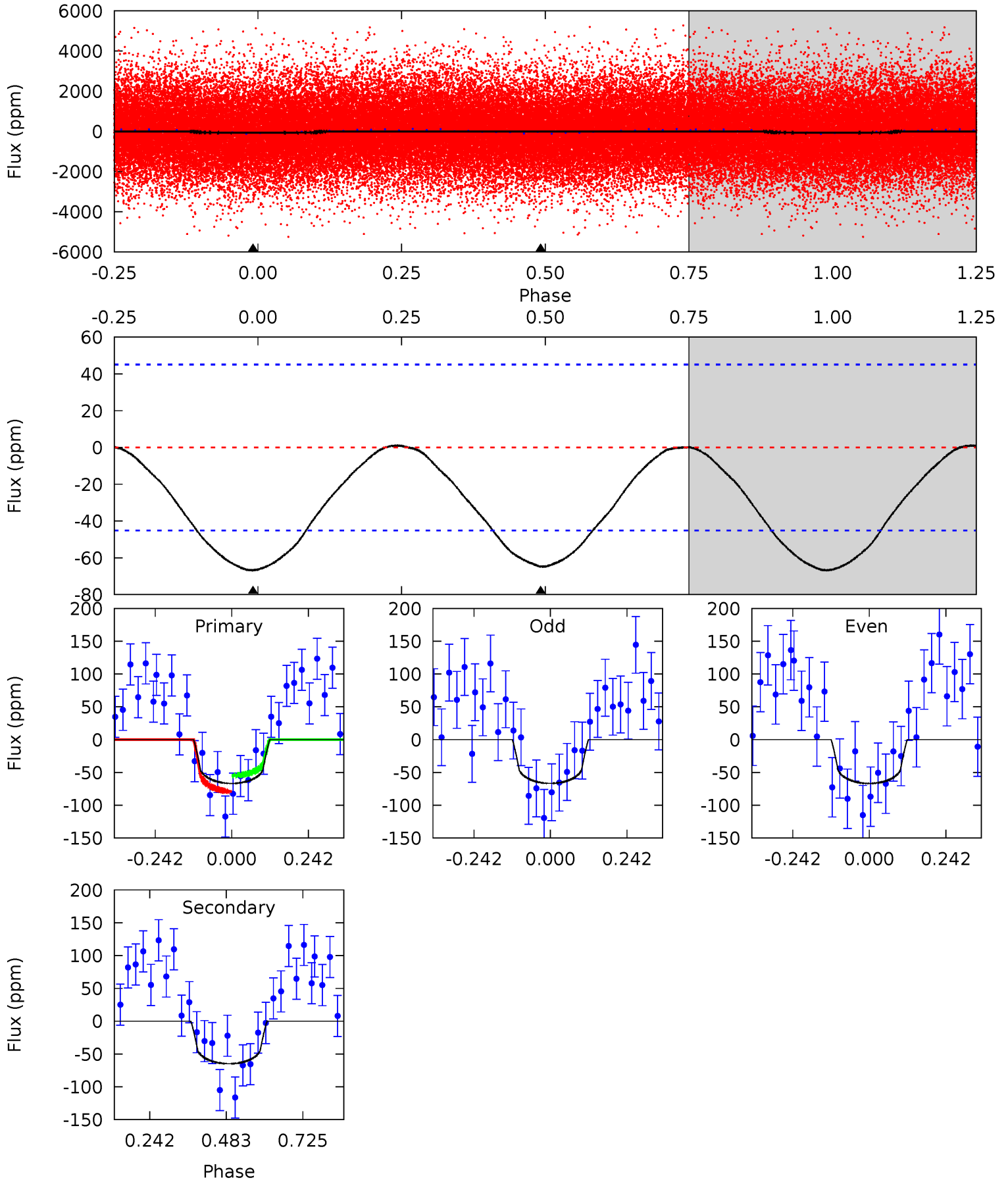
TCE 009045521-01 P= 0.927939 Days $T_0=131.972299$ (BKJD)



DV Model-Shift Uniqueness Test

009045521-01, P = 0.927882 Days, E = 131.089972 Days

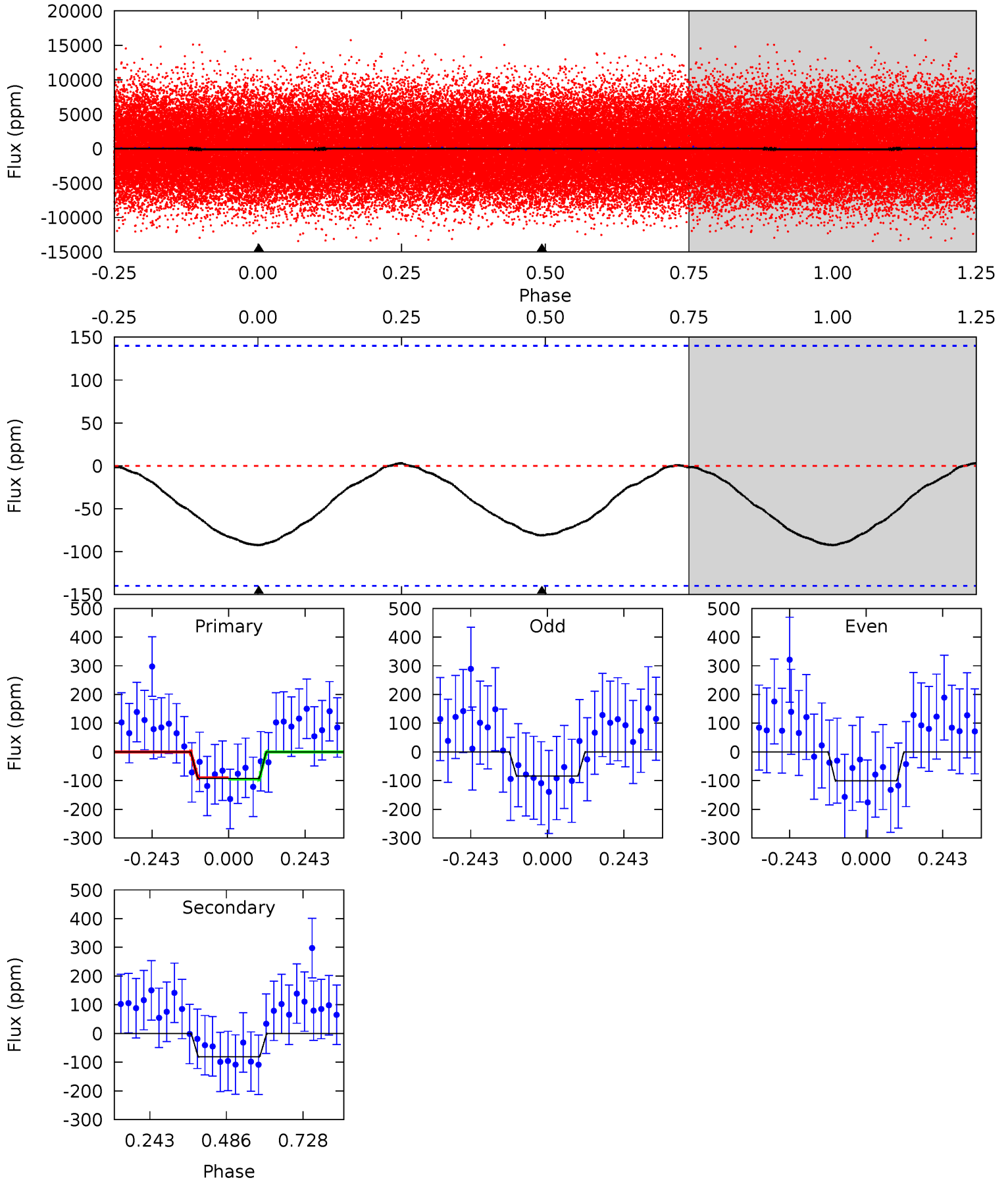
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.48	6.29	0	0	4.38	1.17	0.06	6.48	6.48	6.29	6.29	0.01	1.03	0.02	1.17



Alt Model-Shift Uniqueness Test

009045521-01, P = 0.927939 Days, E = 131.044360 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.89	2.53	0	0	4.38	1.17	0.06	2.89	2.89	2.53	2.53	0.27	1.03	0.03	0.07



Stellar Parameters For KIC 009045521

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6409^{+162}_{-194}	$4.079^{+0.264}_{-0.154}$	$-0.220^{+0.250}_{-0.300}$	$1.622^{+0.444}_{-0.494}$	$1.151^{+0.192}_{-0.157}$	$0.380^{+0.686}_{-0.176}$
	+3%/-3%	+6%/-4%	+114%/-136%	+27%/-30%	+17%/-14%	+181%/-46%
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 009045521-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-65 ± 10	$2.30^{+2.12}_{-1.56}$	3557^{+283}_{-328}	4918^{+4499}_{-1377}	$2.653^{+22.851}_{-1.988}$
Alt.	-81 ± 32	$2.35^{+2.26}_{-1.58}$	3562^{+250}_{-327}	5071^{+4795}_{-1506}	$3.037^{+27.596}_{-2.364}$

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

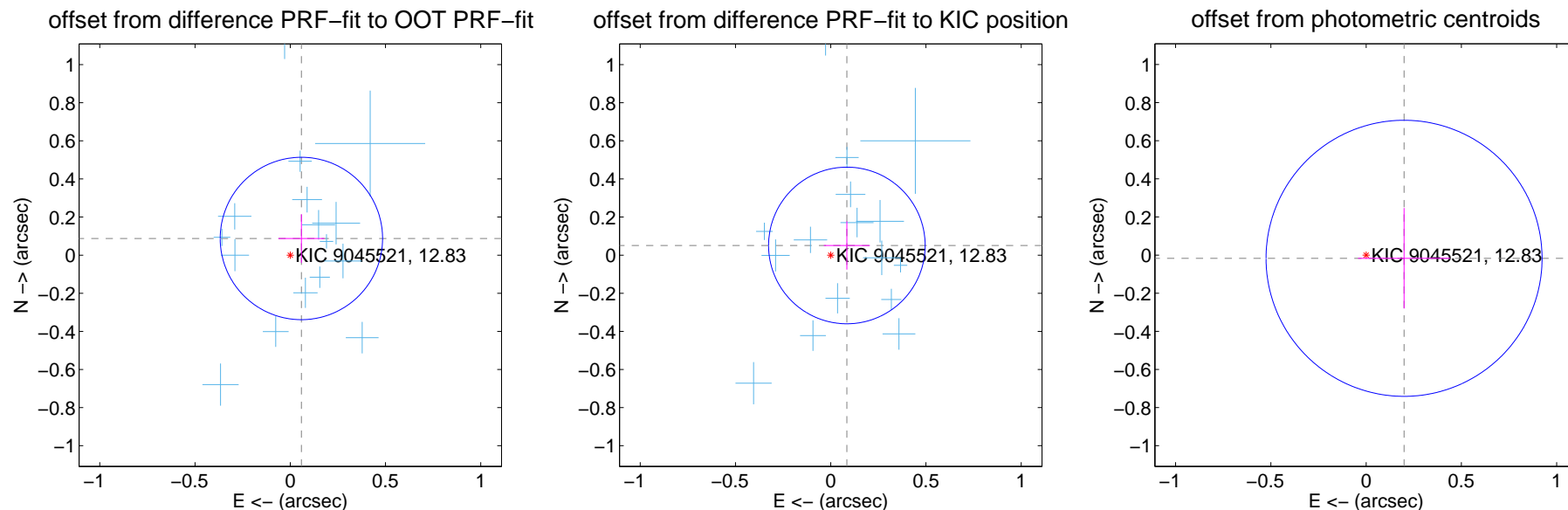
DV Centroid Data

Supplemental centroid analysis for 009045521-01. Kepler magnitude: 12.83. Transit SNR 10.76

There are 17 quarters with good PRF difference image offsets

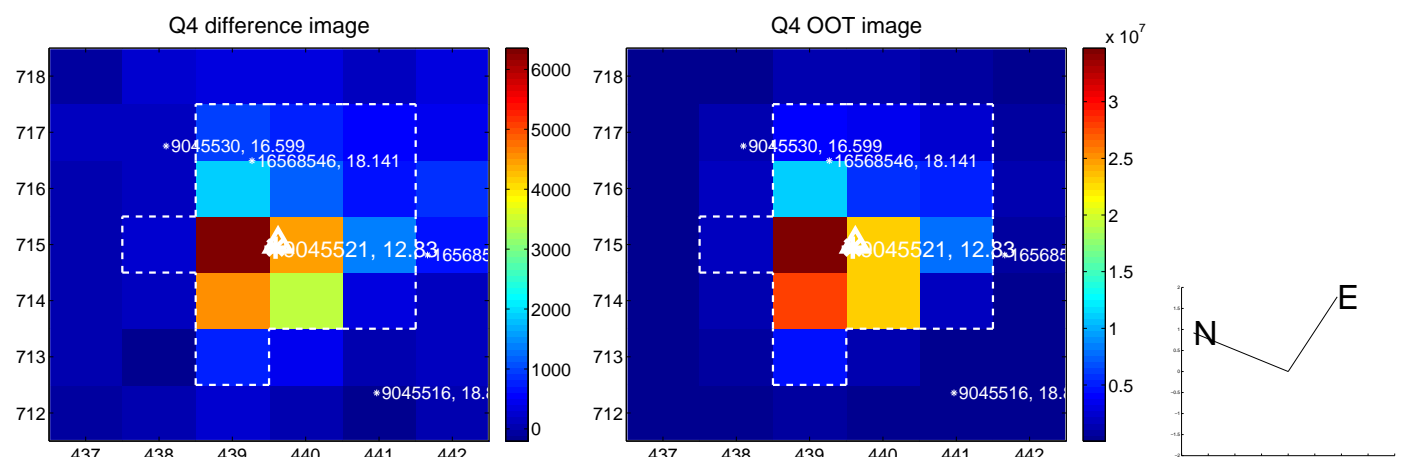
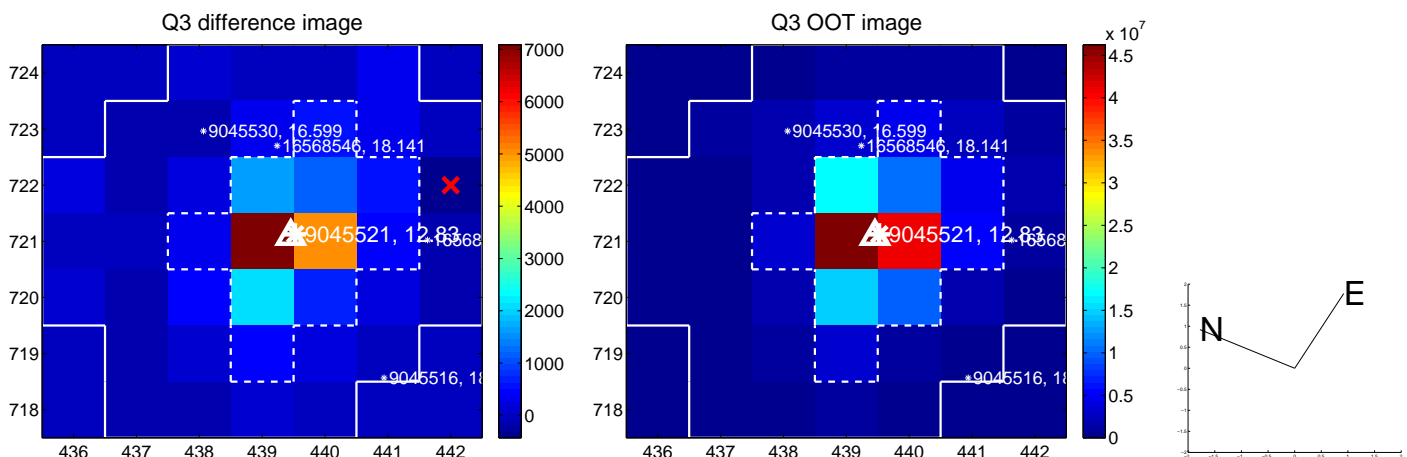
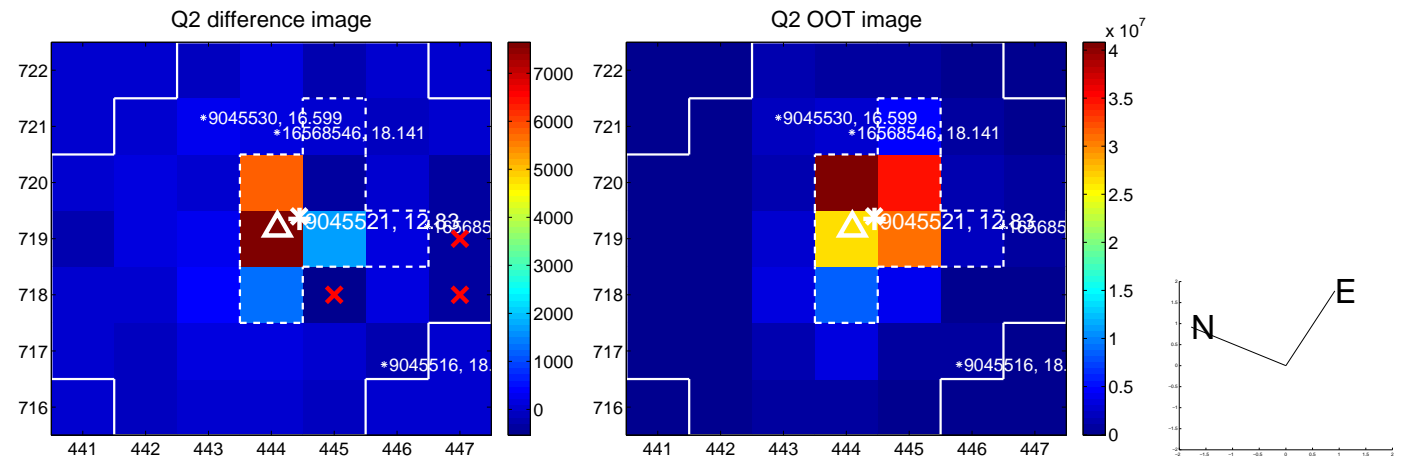
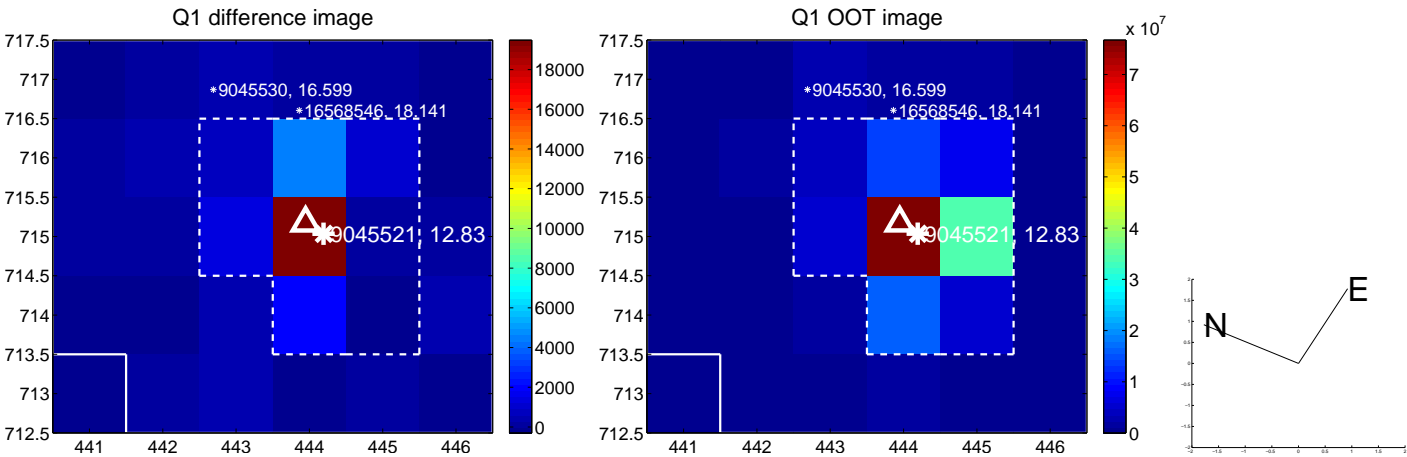
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.105 ± 0.142	0.74	-0.058 ± 0.121	0.088 ± 0.127
PRF-fit source offset from KIC position	0.099 ± 0.137	0.72	-0.085 ± 0.121	0.051 ± 0.127
photometric centroid source offset	0.20 ± 0.24	0.83	-0.20 ± 0.24	-0.02 ± 0.26

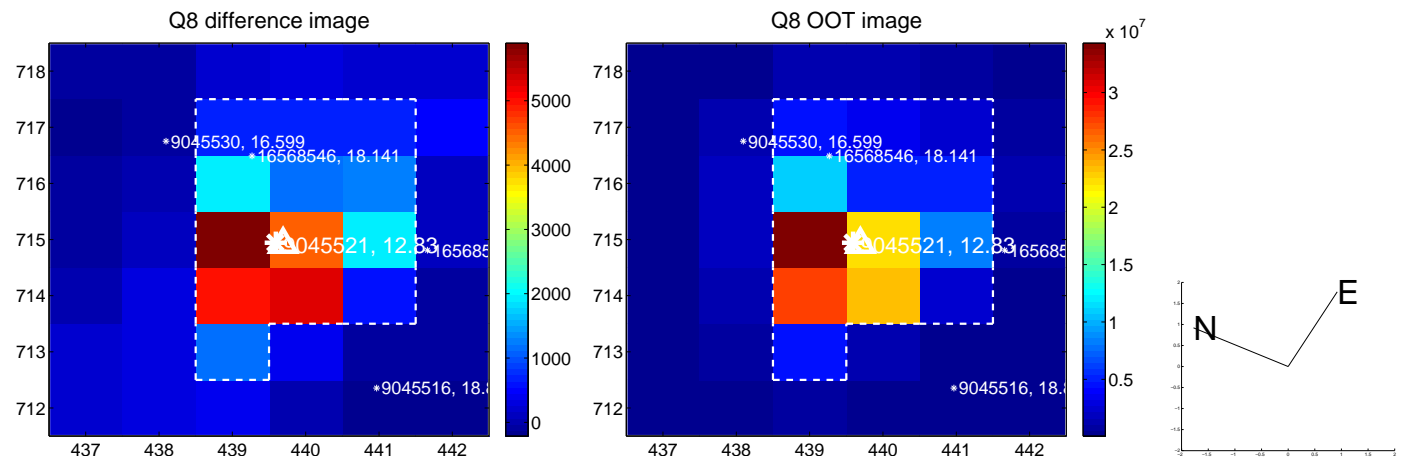
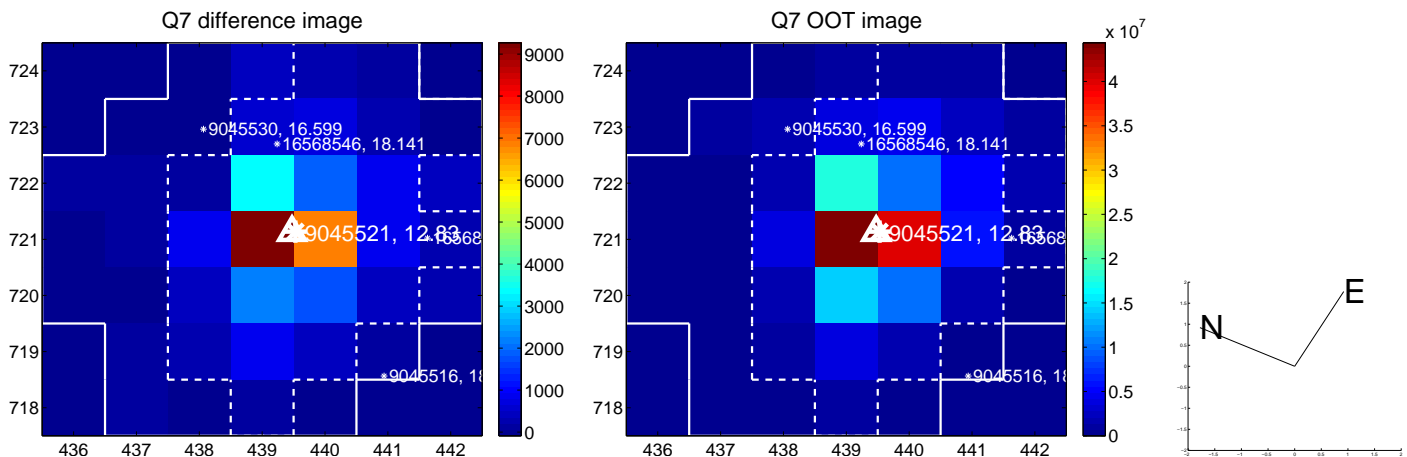
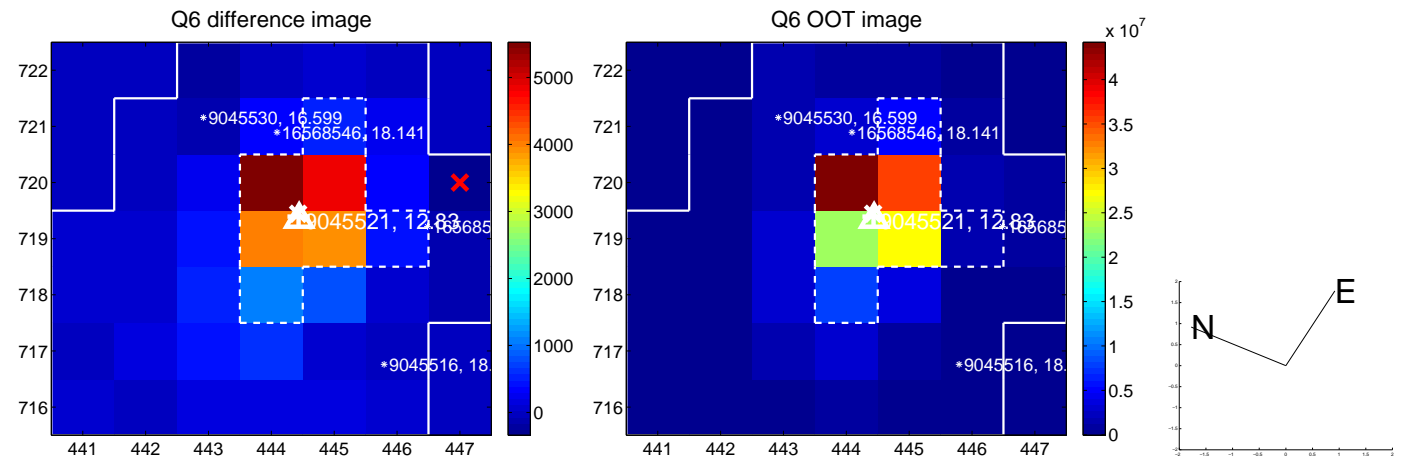
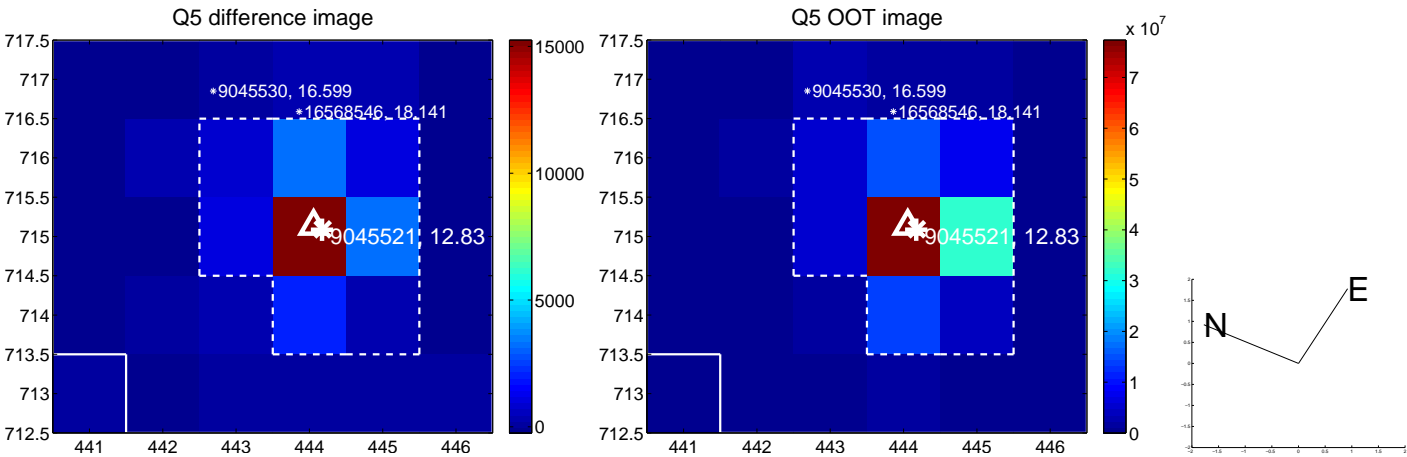


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

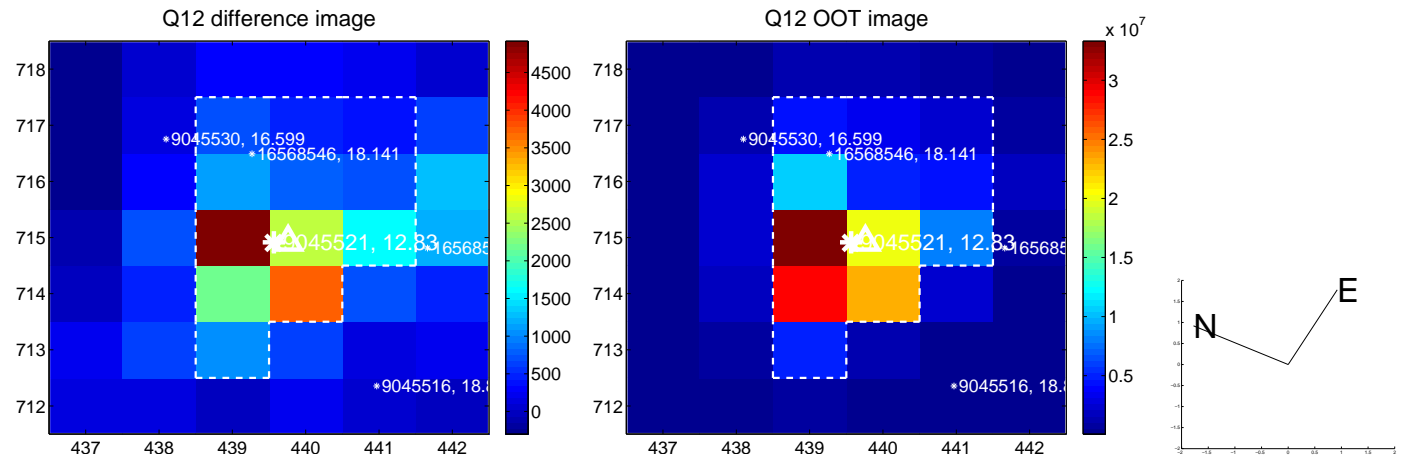
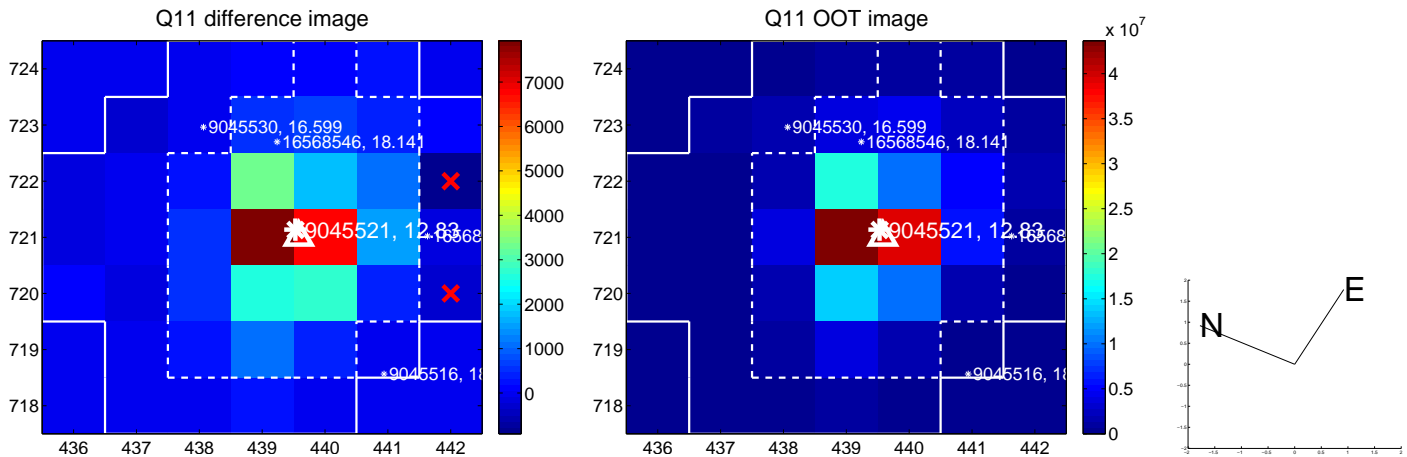
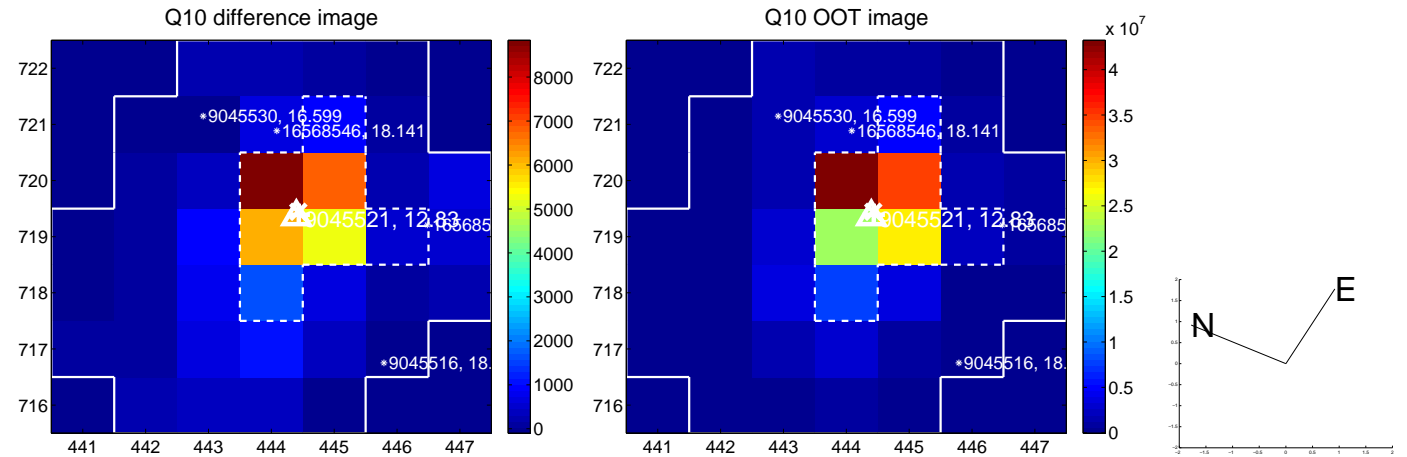
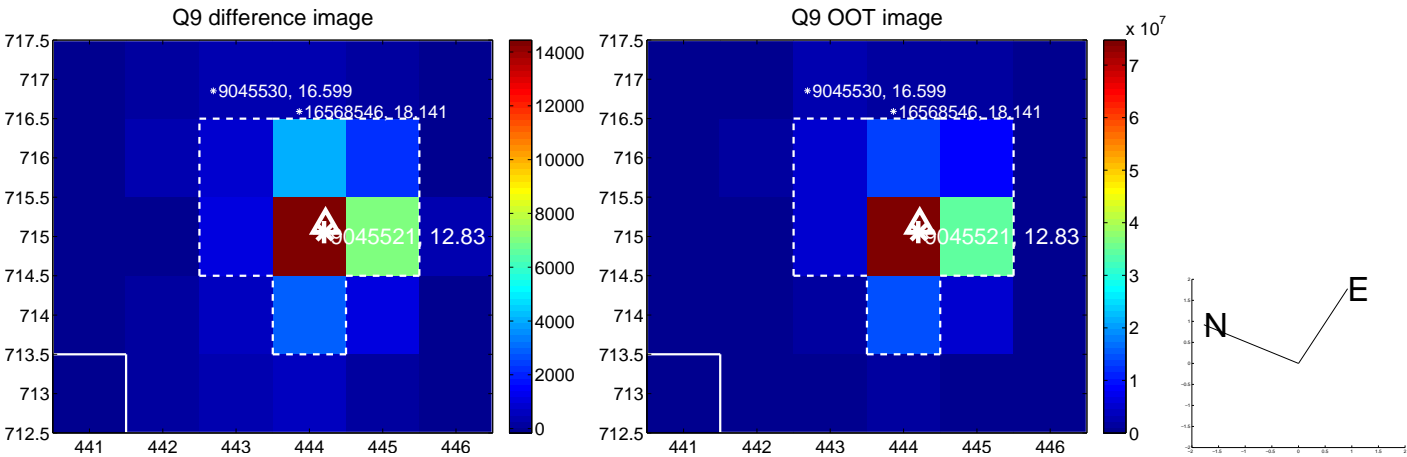
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



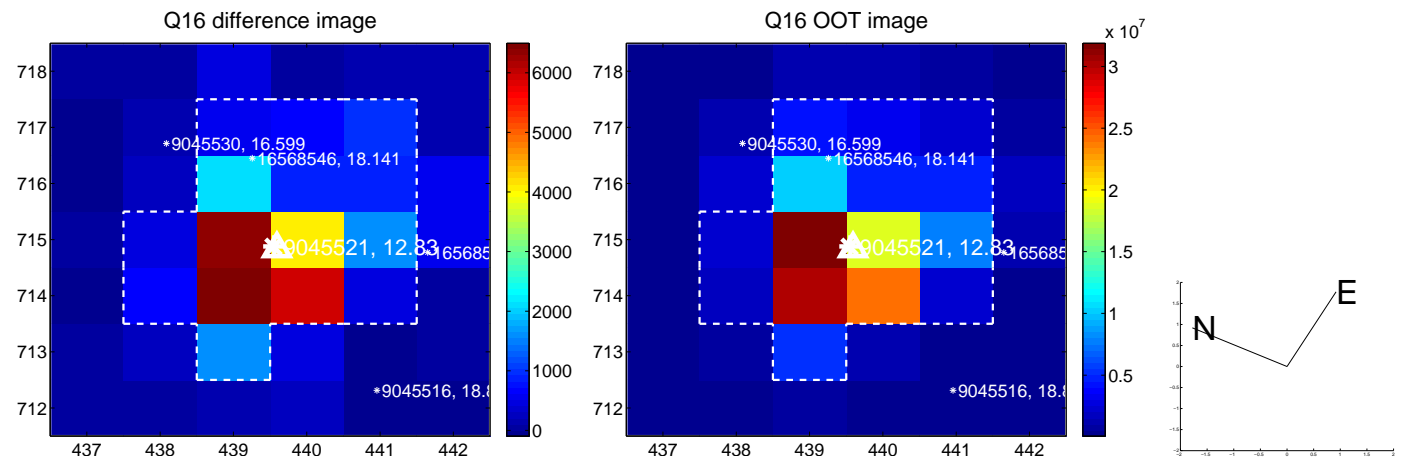
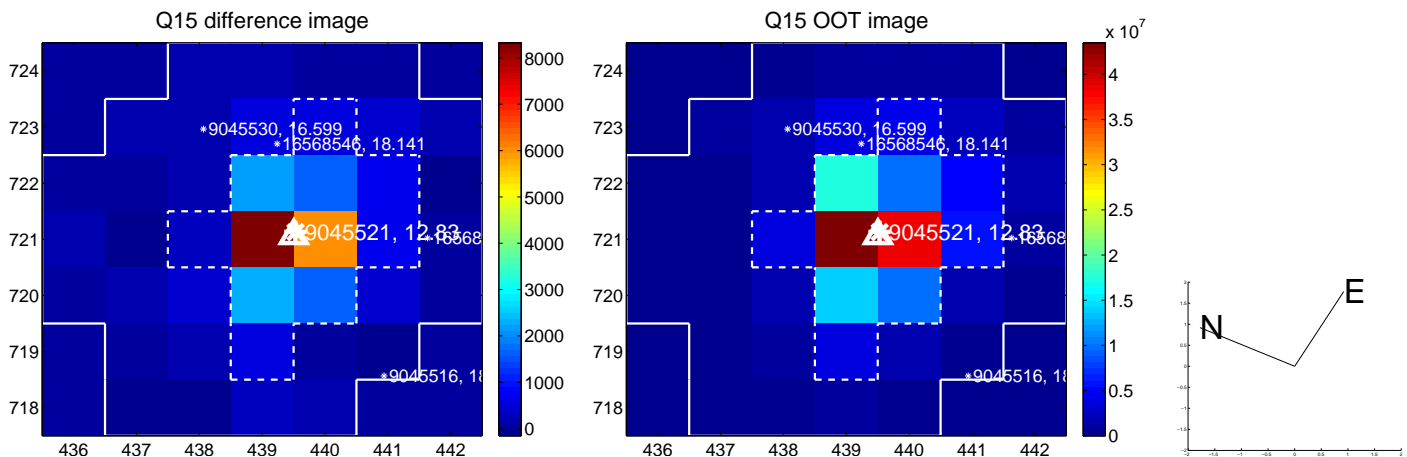
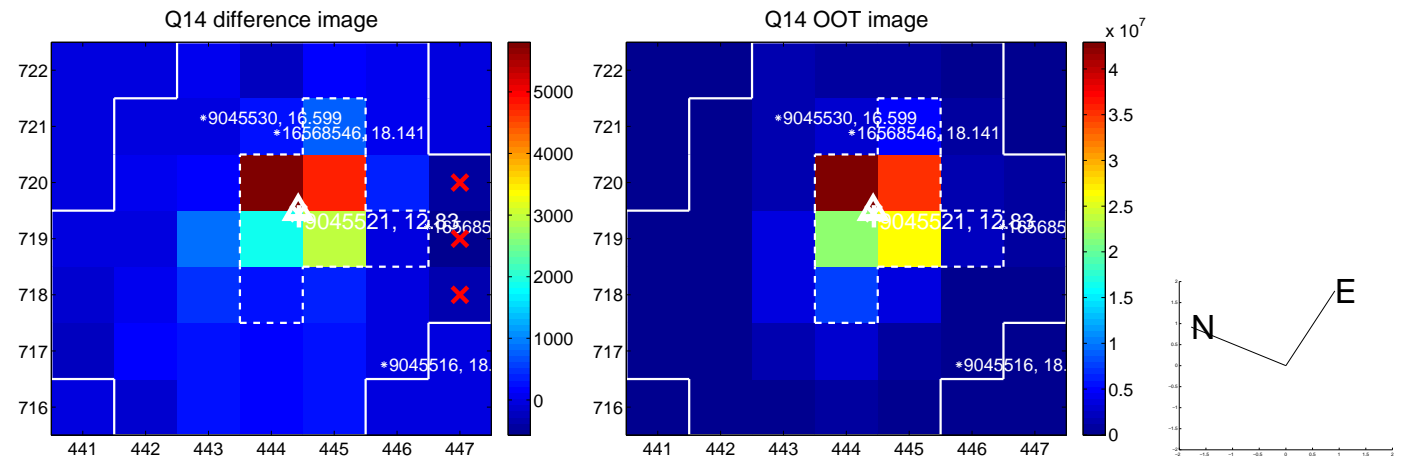
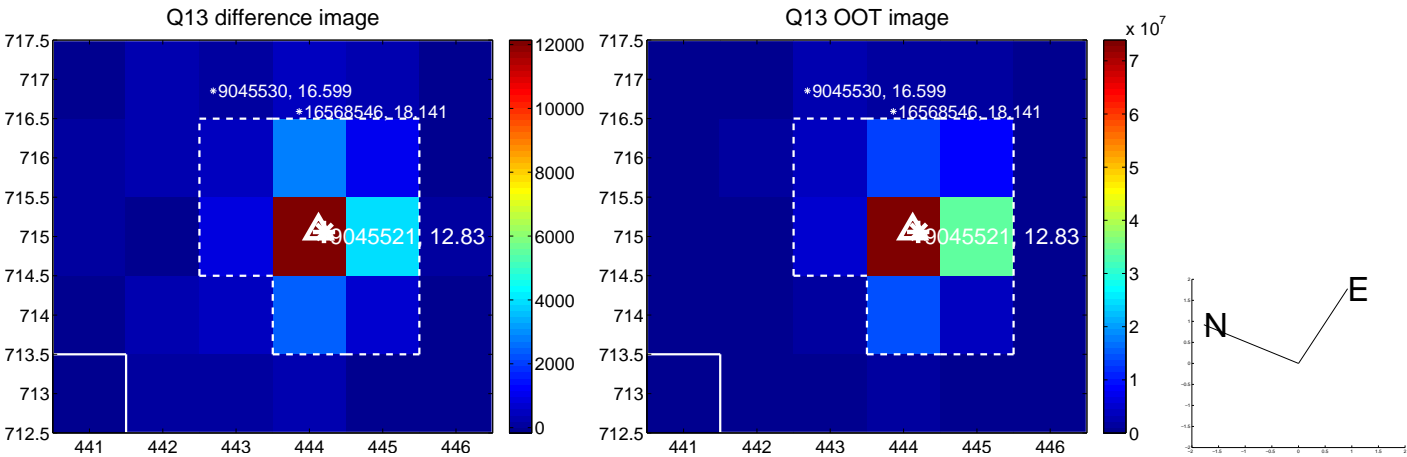
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



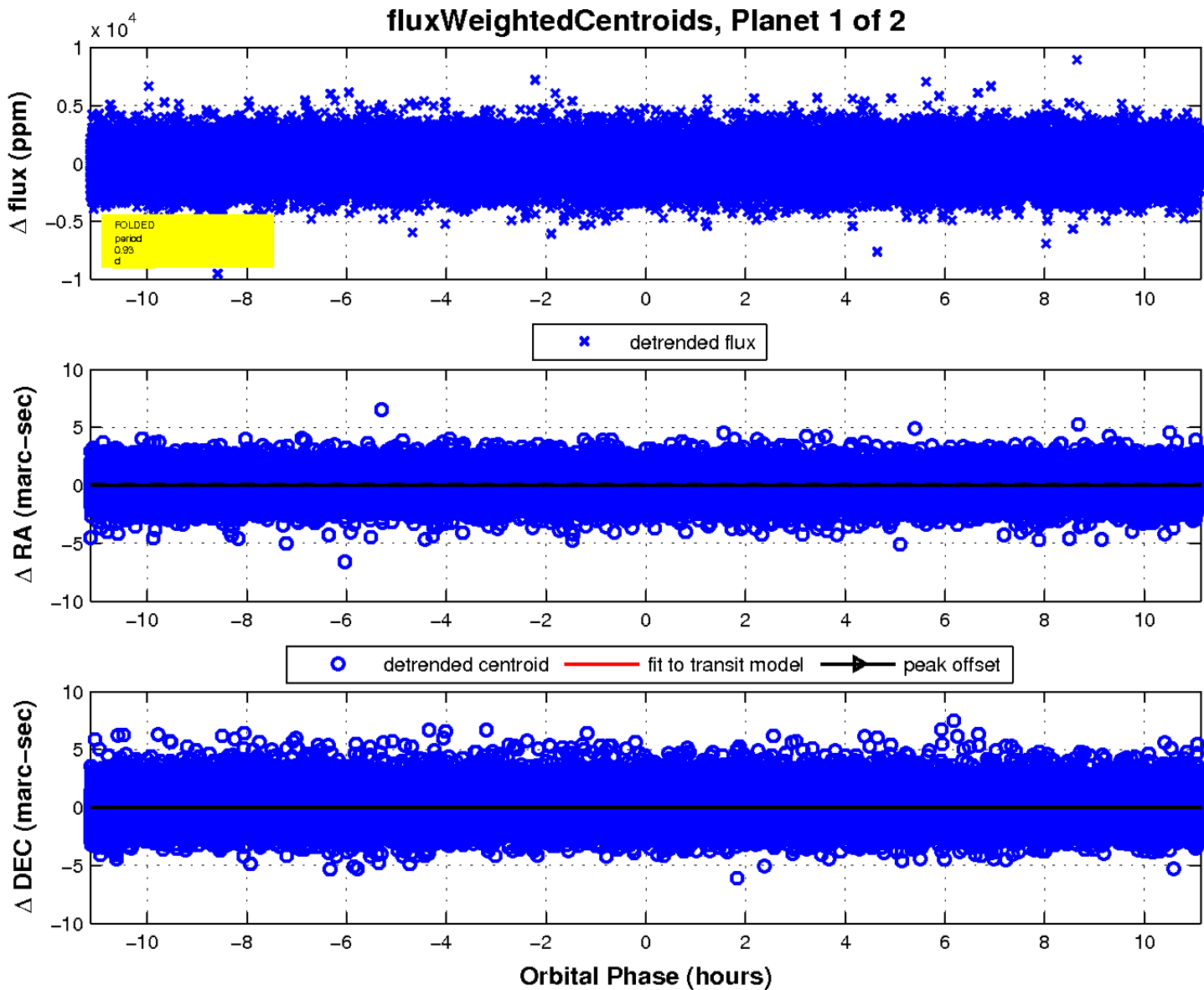
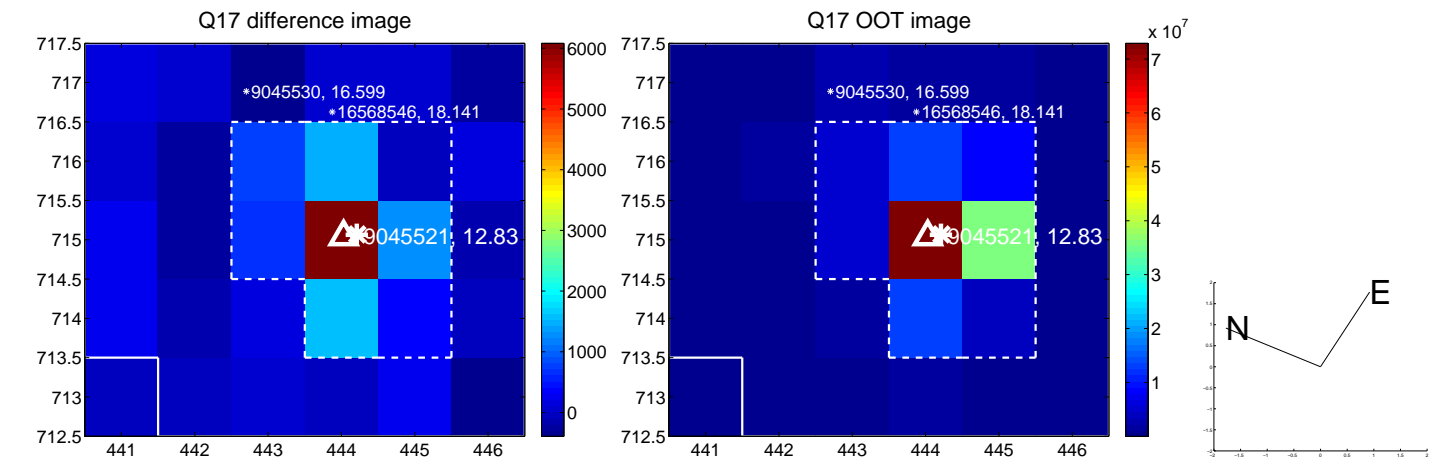
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

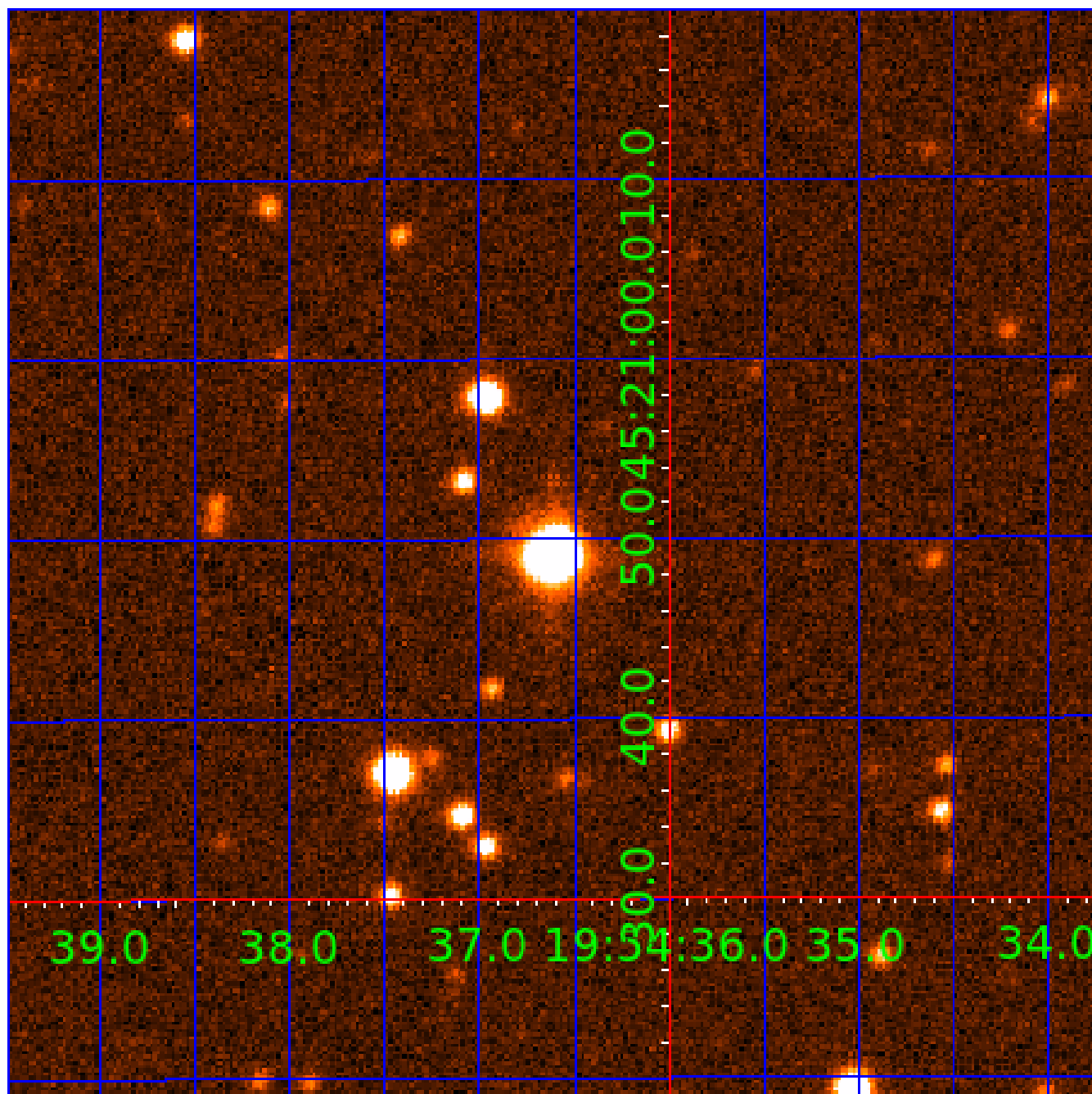


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009045521

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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009045521-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

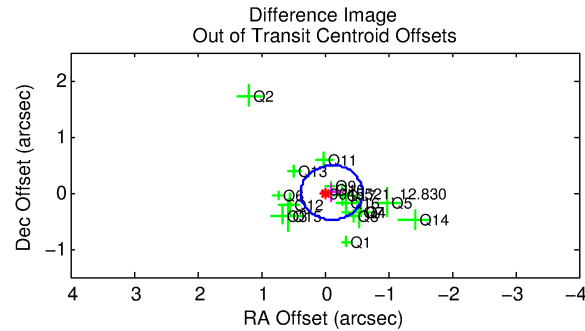
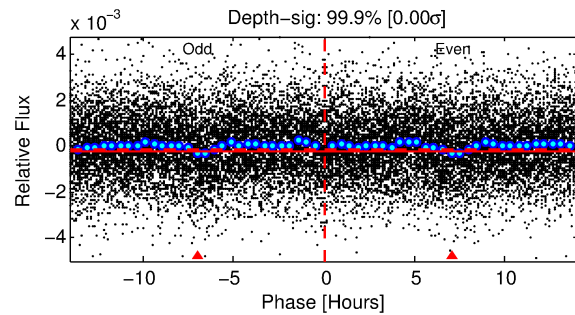
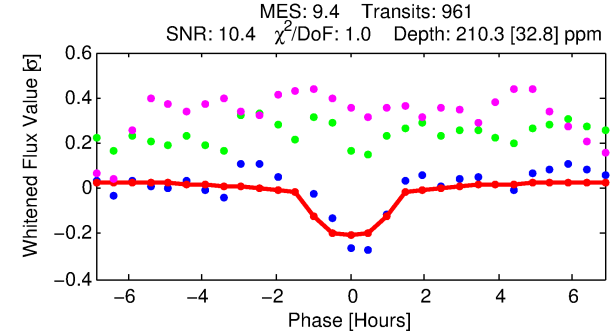
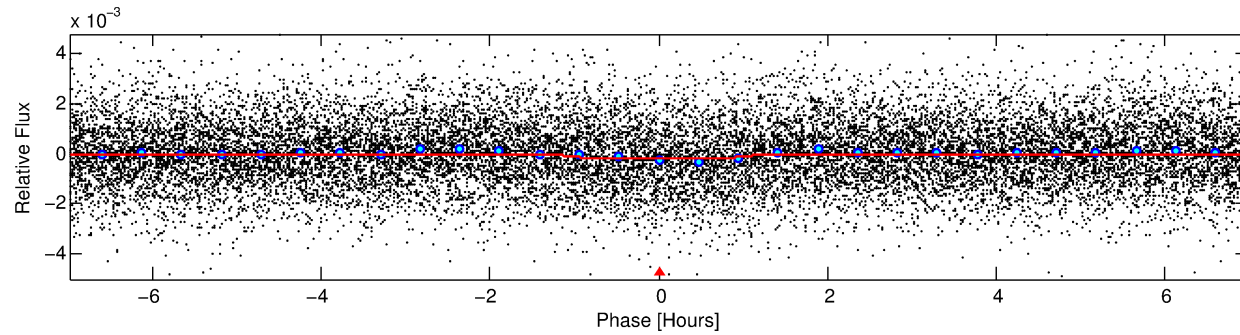
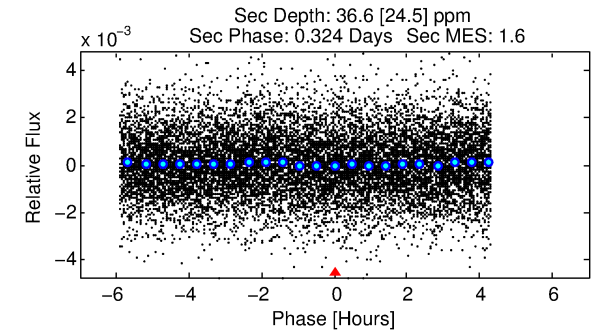
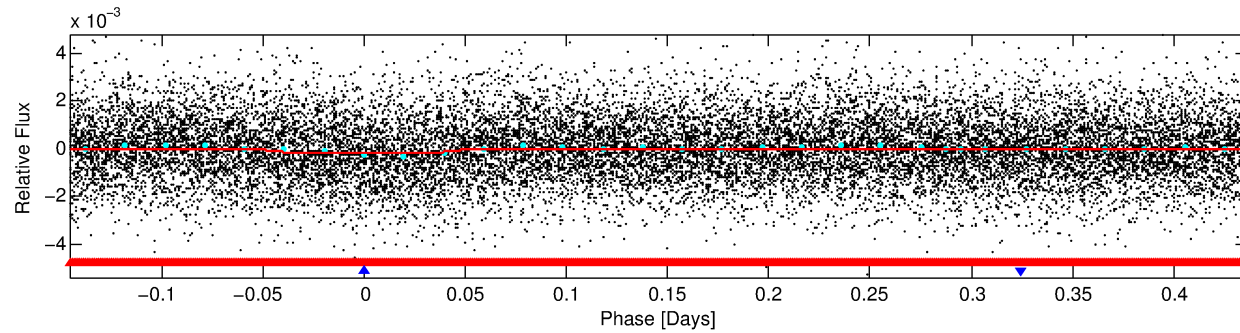
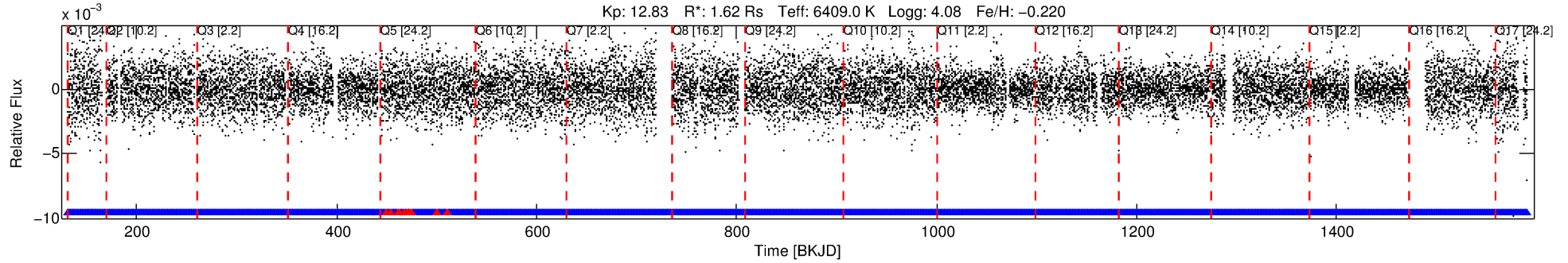
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009045521-02

No Significant Match Found

DV One-Page Summary

KIC: 9045521 Candidate: 2 of 2 Period: 0.582 d



DV Fit Results:

Period = 0.58228 [0.00001] d
Epoch = 131.7944 [0.0036] BKJD
Rp/R* = 0.0156 [0.0091]
a/R* = 1.29 [1.69]
b = 0.90 [0.69]
Seff = 19434.93 [9118.23]
Teff = 3011 [353] K
Rp = 2.76 [1.81] Re
a = 0.0143 [0.0041] AU
Ag = 0.54 [0.77] [-0.60σ]
Teffp = 3994 [1346] K [0.71σ]

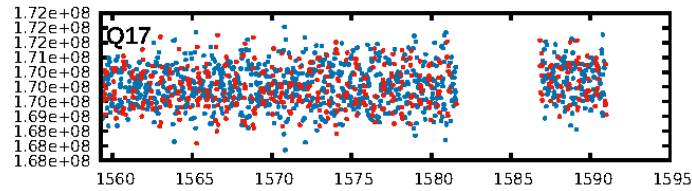
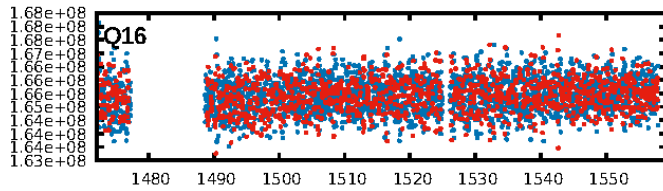
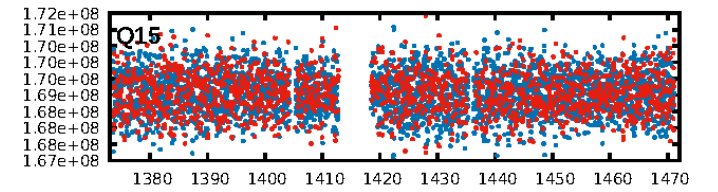
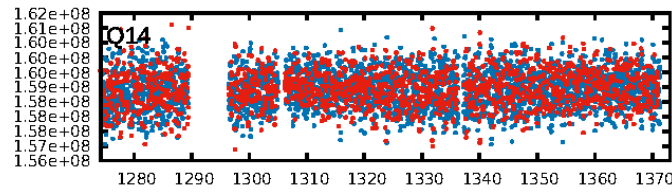
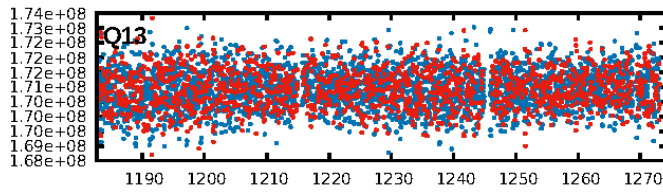
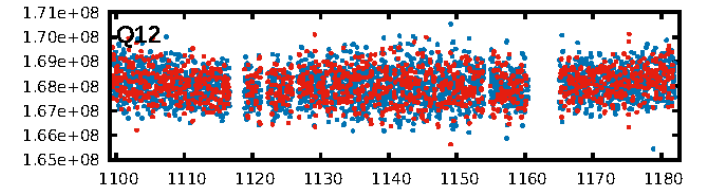
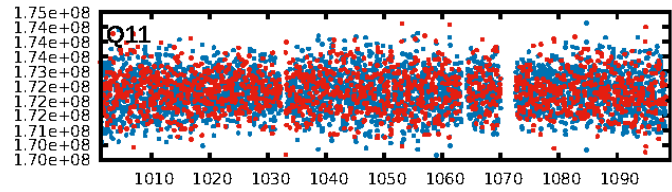
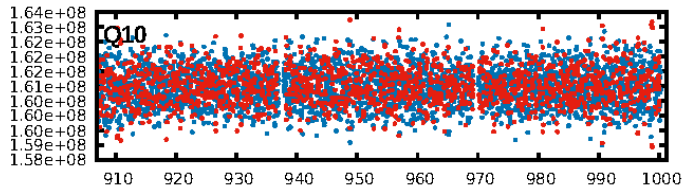
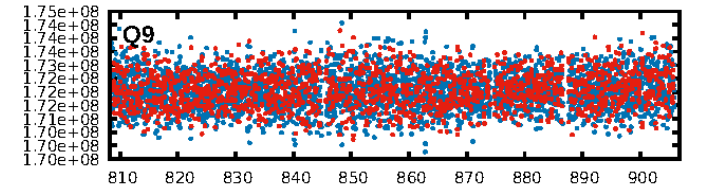
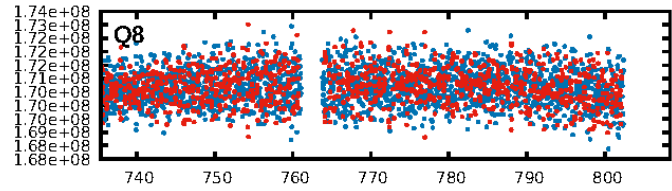
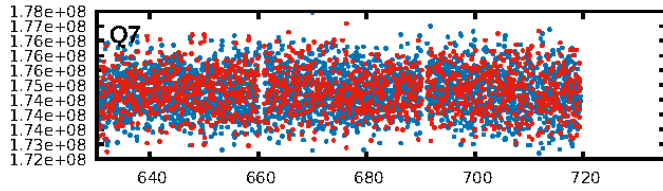
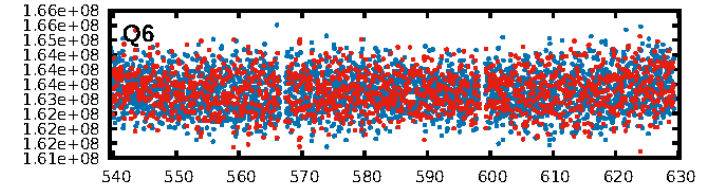
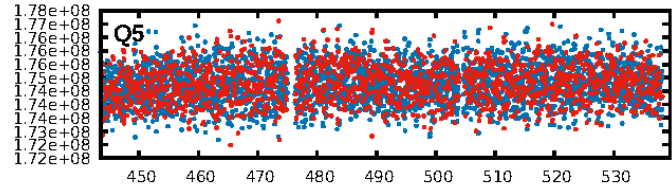
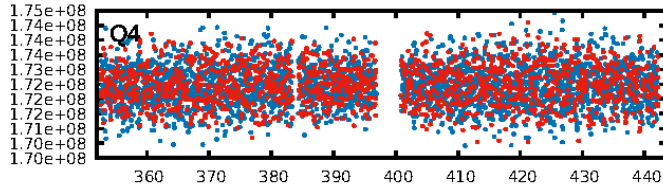
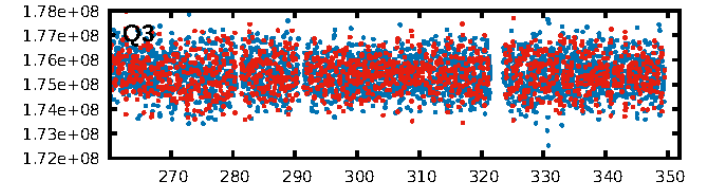
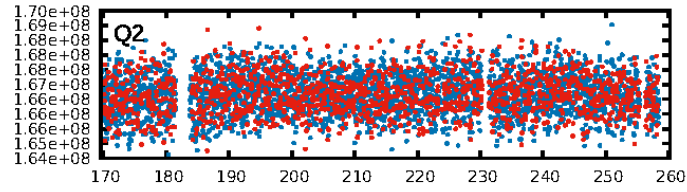
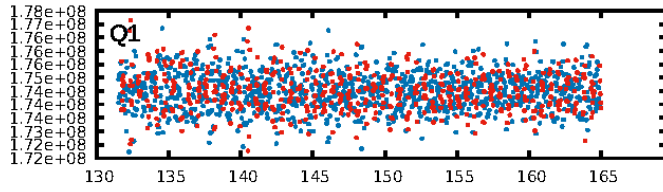
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 87.2% [1.52σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.86e-23
RollingBand-fgt: 0.99 [907/918]
GhostDiagnostic-chr: -1.676
Centroid-sig: 77.6%
Centroid-so: 0.042 arcsec [0.35σ]
OotOffset-rm: 0.110 arcsec [0.68σ]
KicOffset-rm: 0.234 arcsec [1.12σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
DiffImageOverlap-fno: 1.00 [17/17]

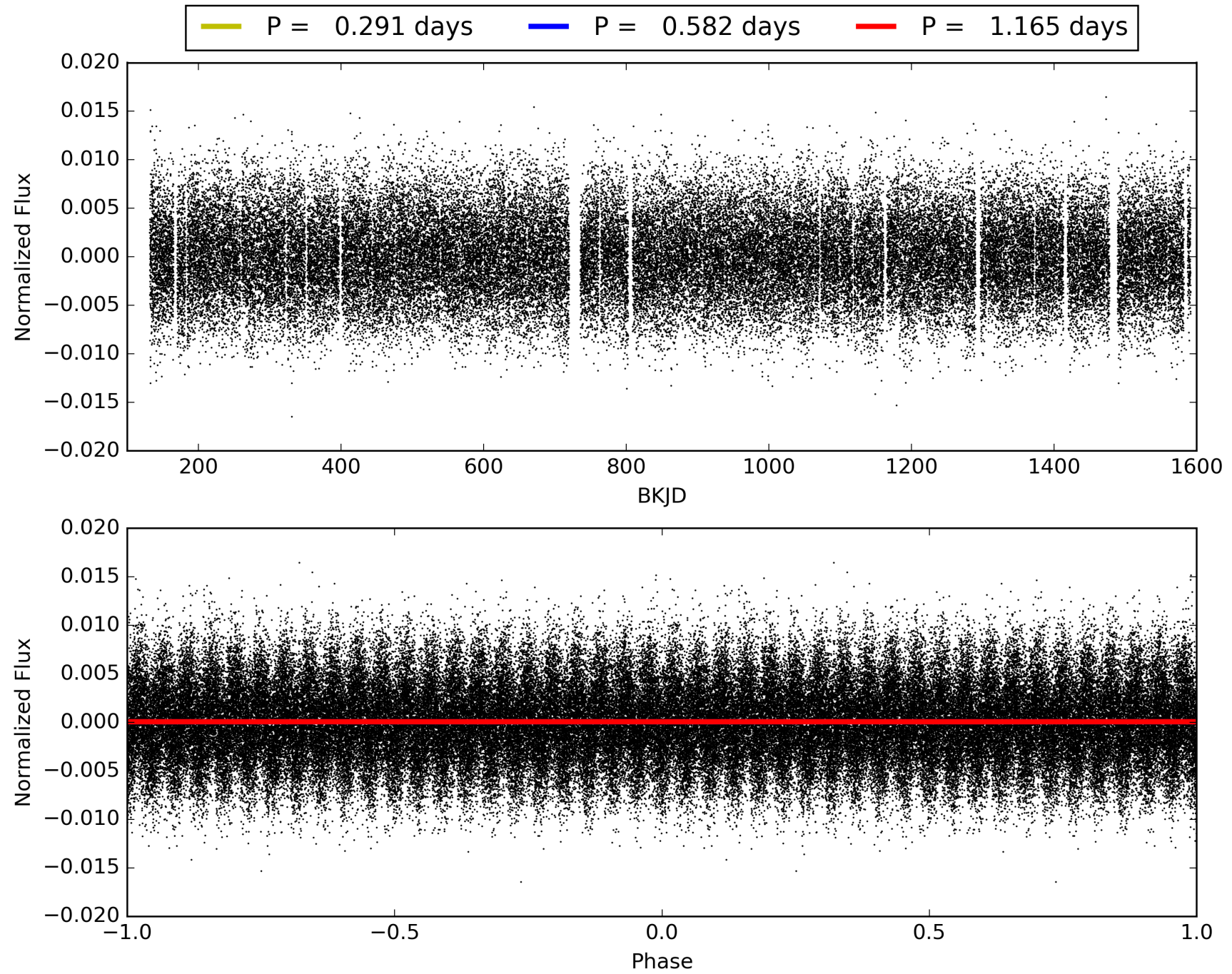
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:02:33 Z

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

TCE 009045521-02, PDC Light Curves

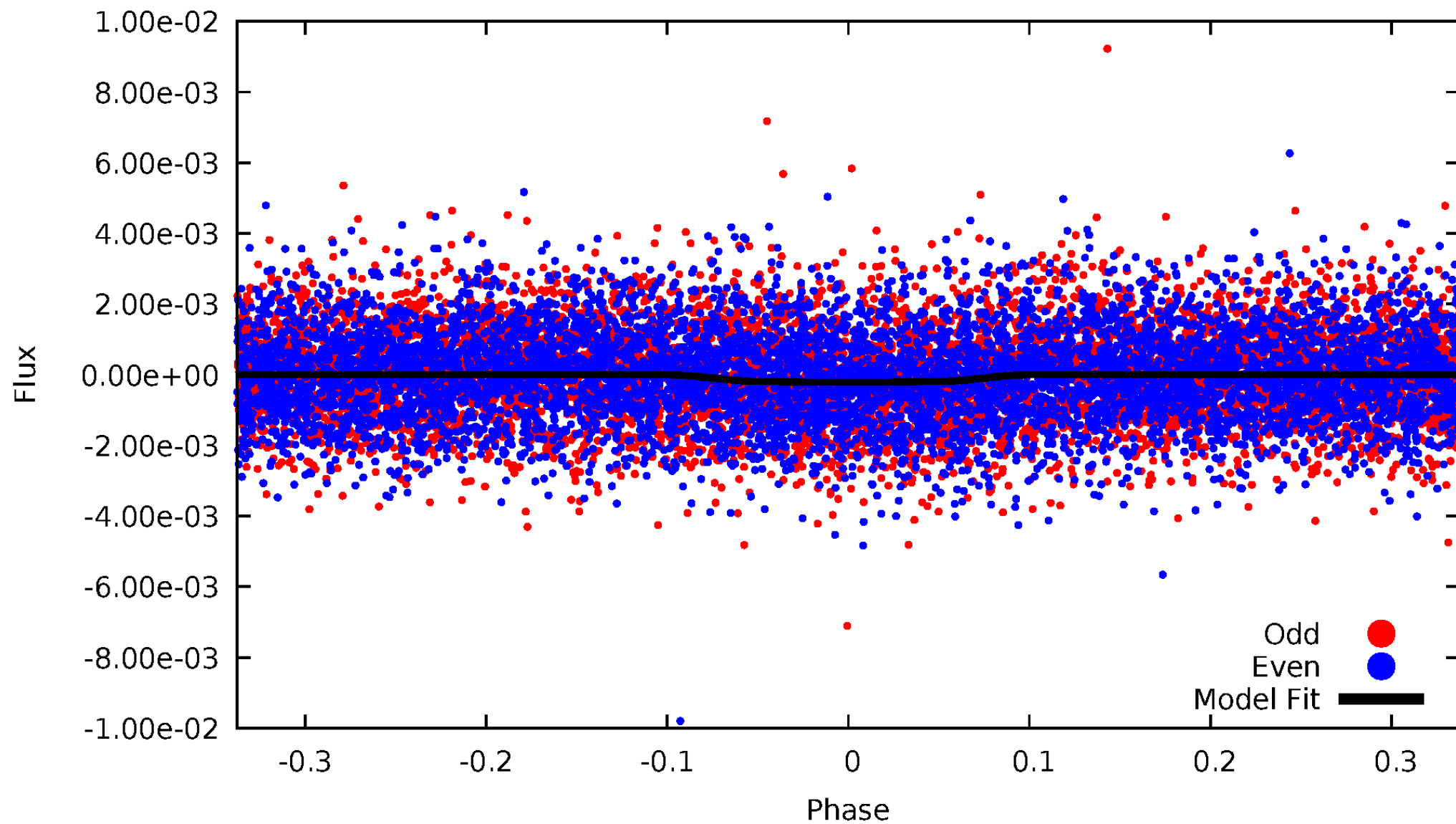


TCE 009045521-02



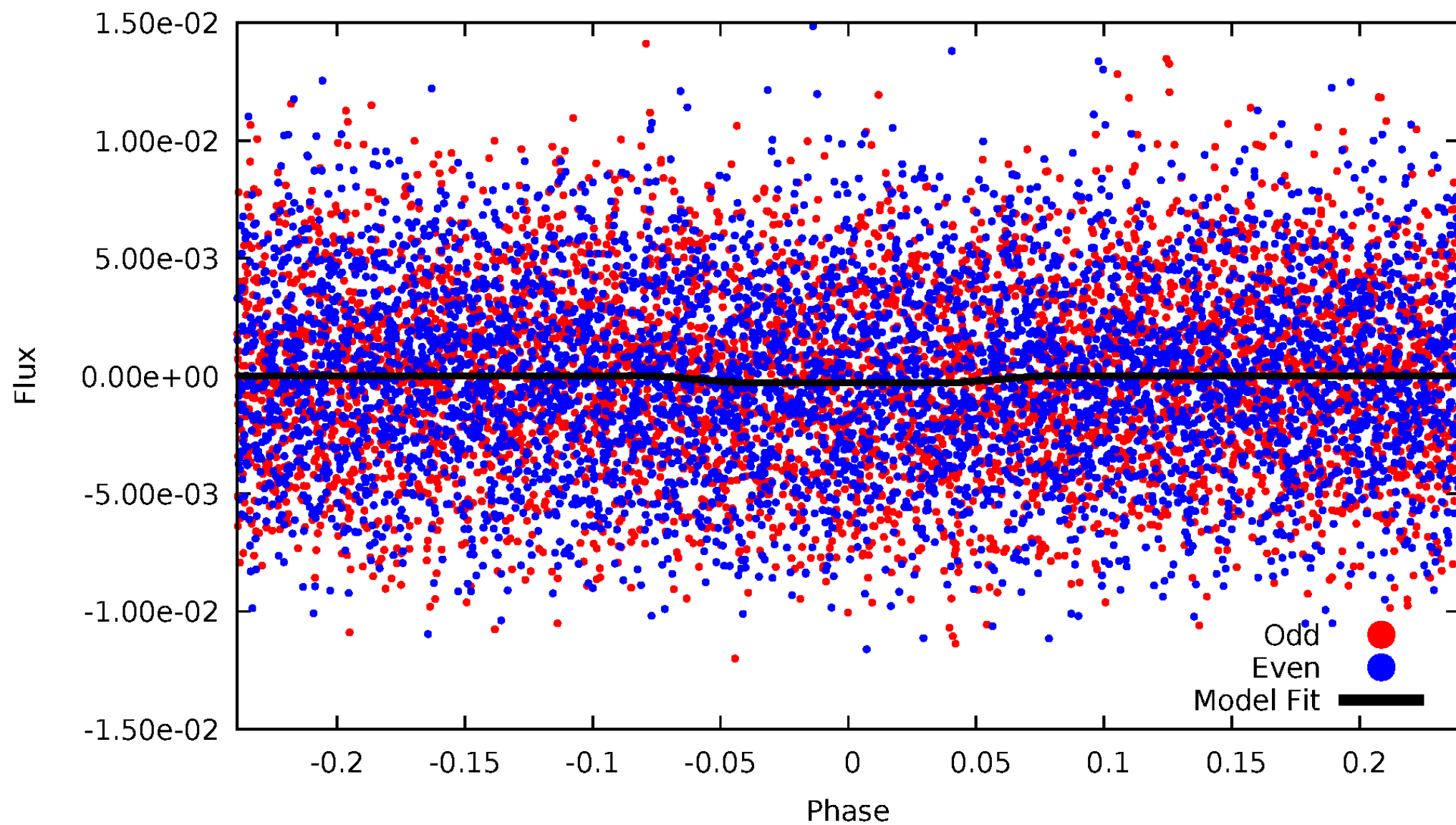
DV Odd/Even

TCE 009045521-02



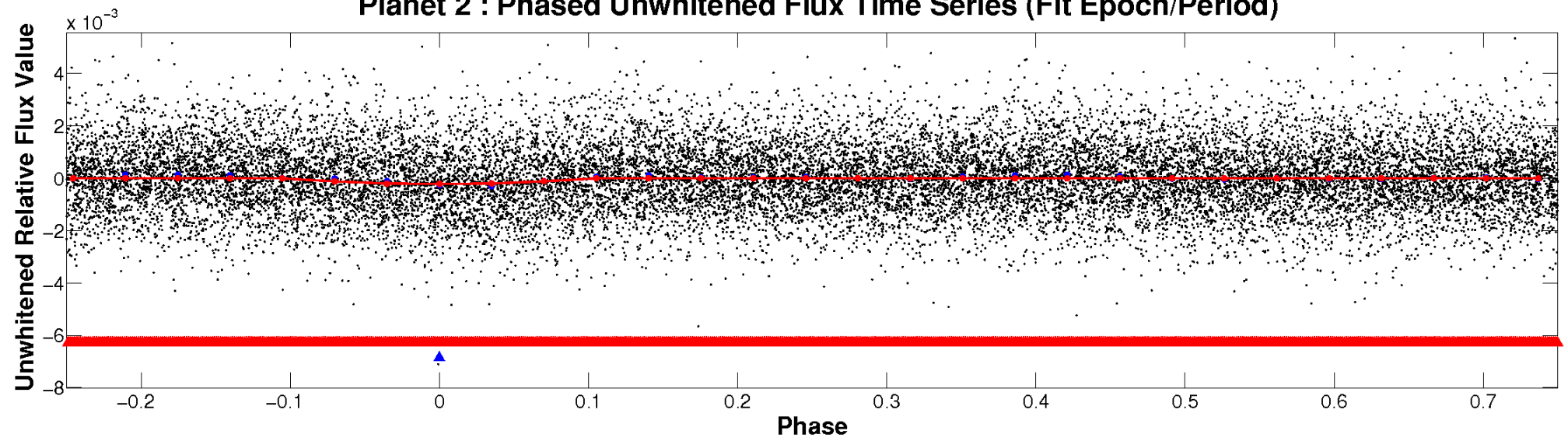
ALT Odd/Even

TCE 009045521-02

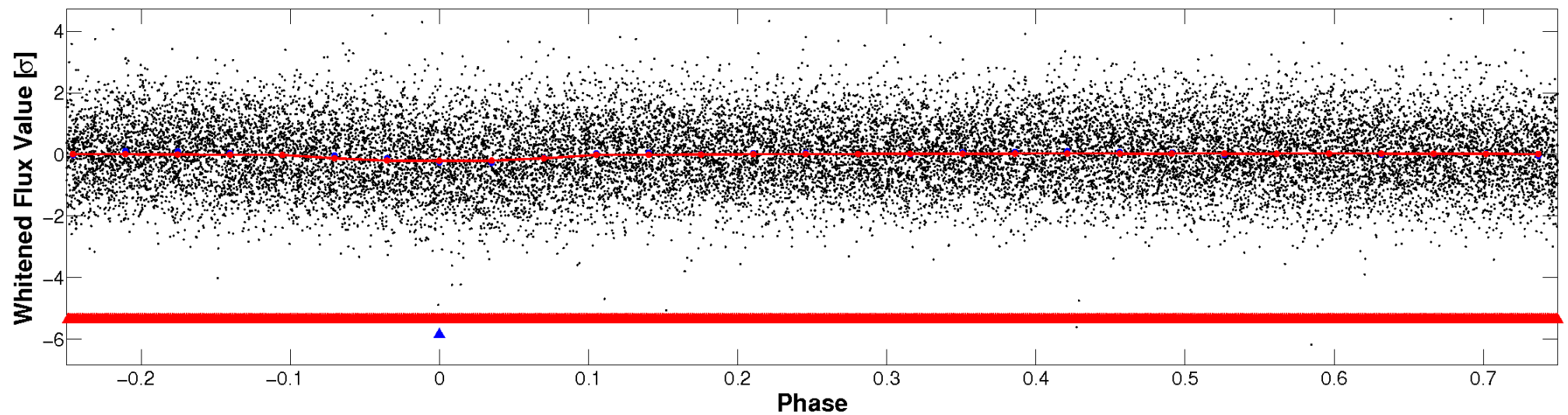


Non-Whitened Vs. Whitened Light Curve

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

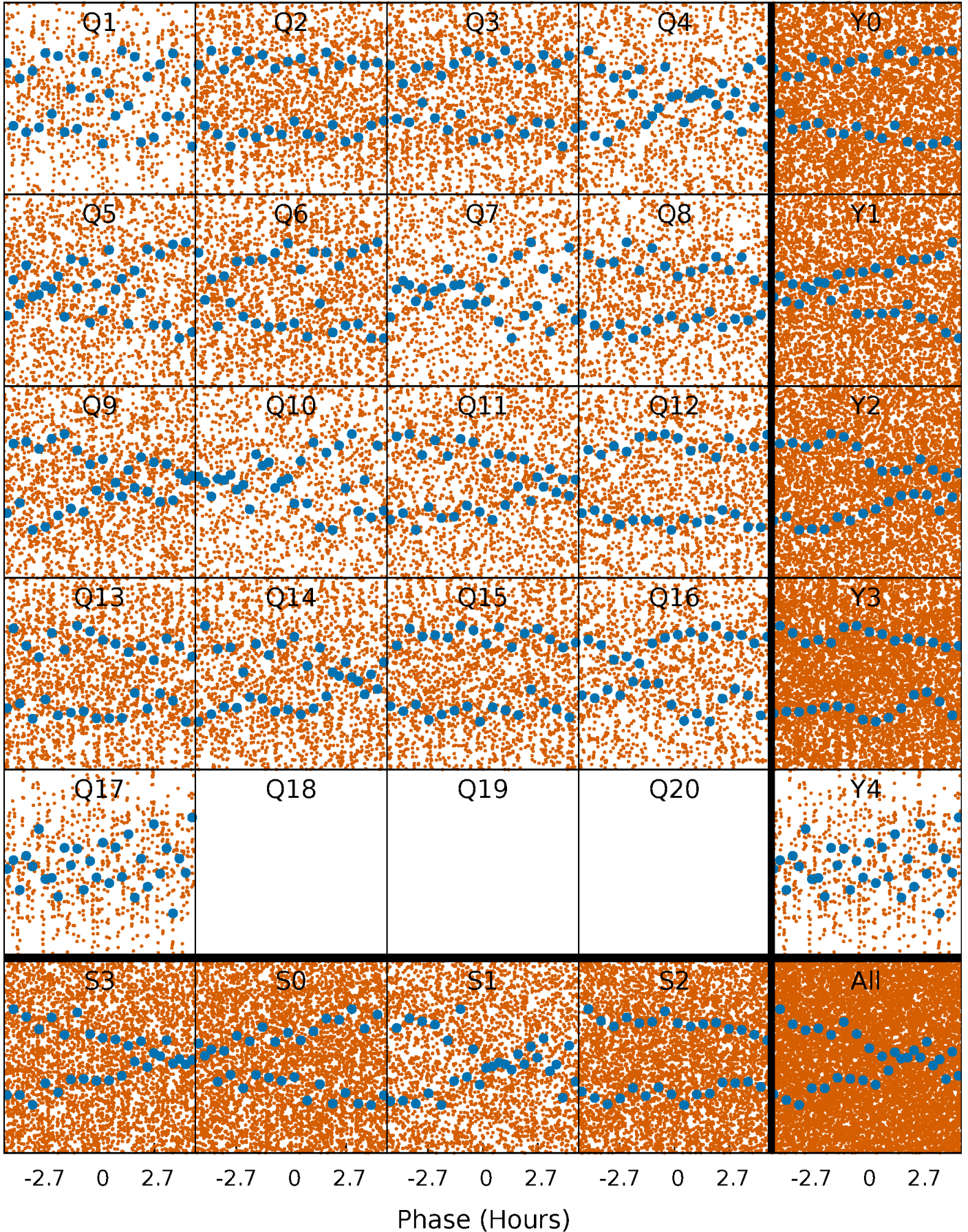


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



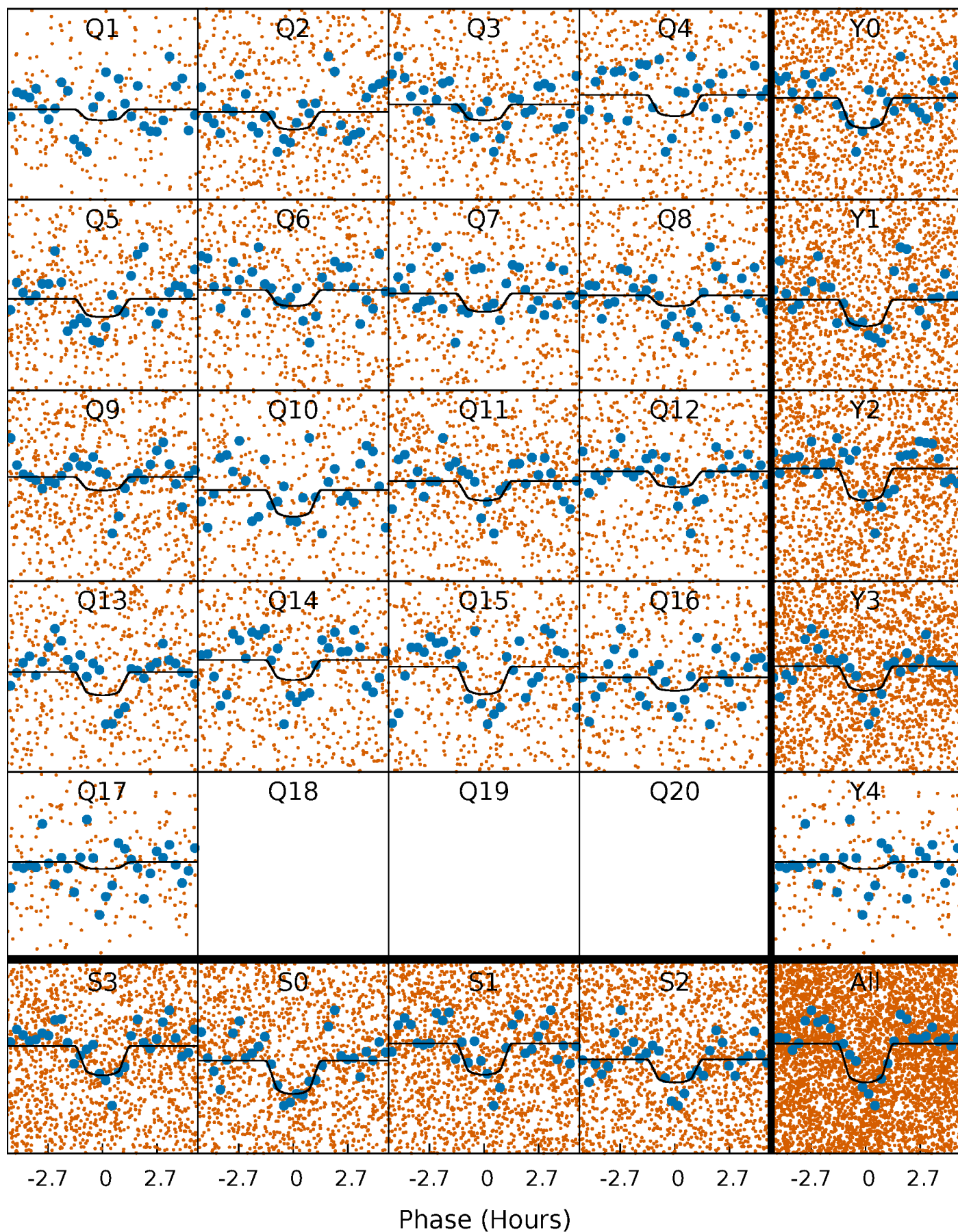
PDC Quarter-Phased Transit Curves

TCE 009045521-02 P= 0.582277 Days $T_0=131.794413$ (BKJD)



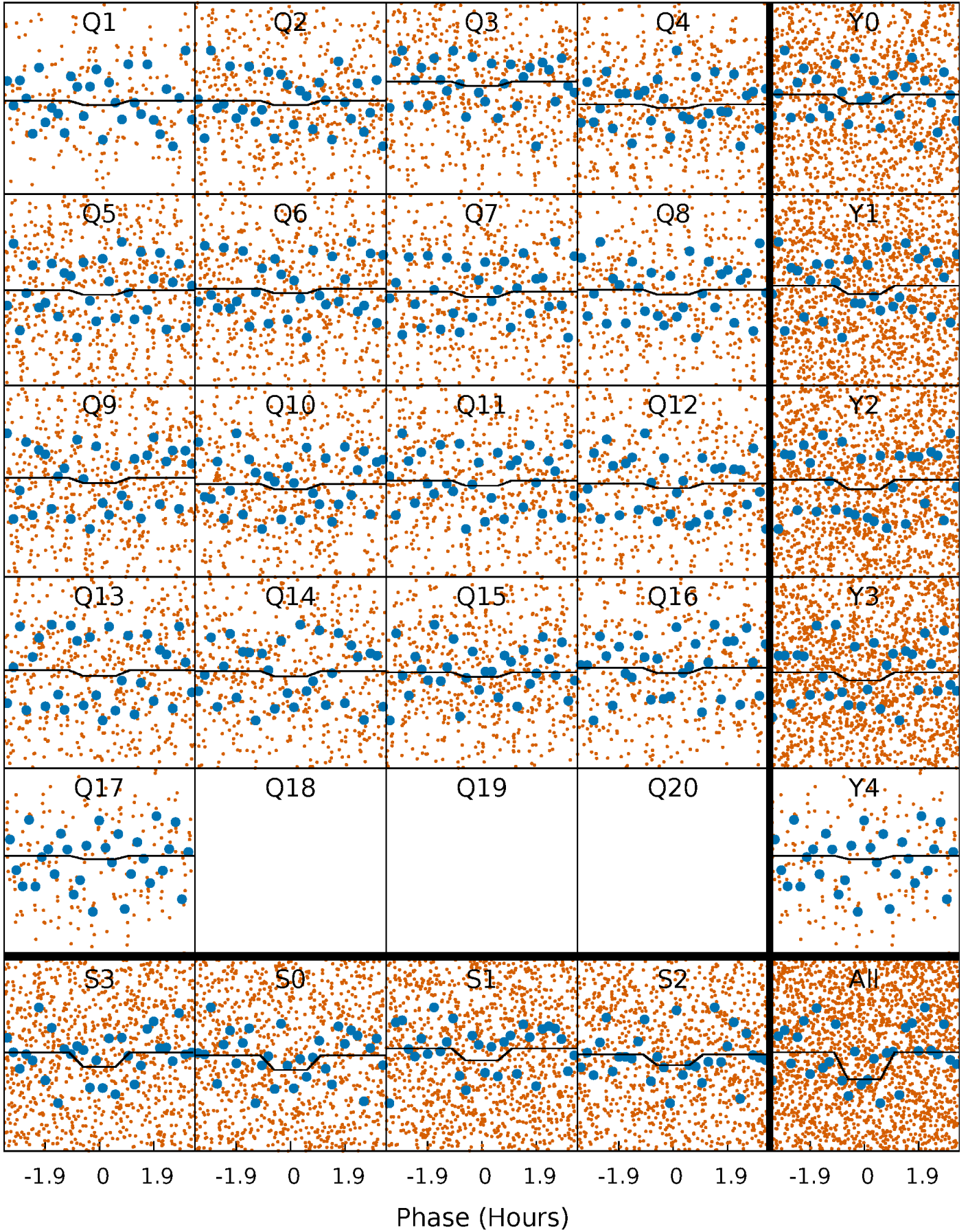
DV Quarter-Phased Transit Curves

TCE 009045521-02 P= 0.582277 Days $T_0=131.794413$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

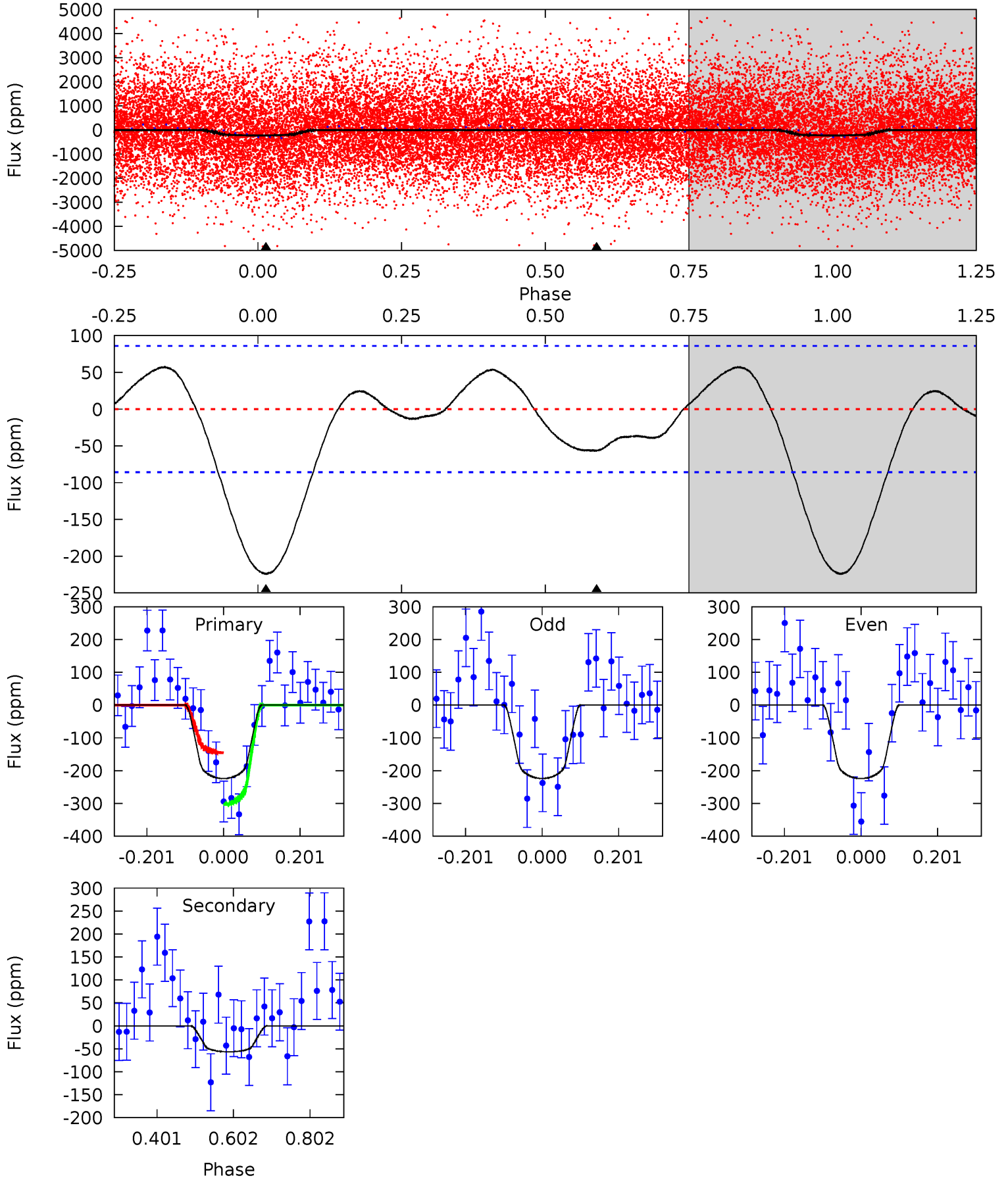
TCE 009045521-02 P= 0.582288 Days $T_0=131.795777$ (BKJD)



DV Model-Shift Uniqueness Test

009045521-02, P = 0.582277 Days, E = 131.212136 Days

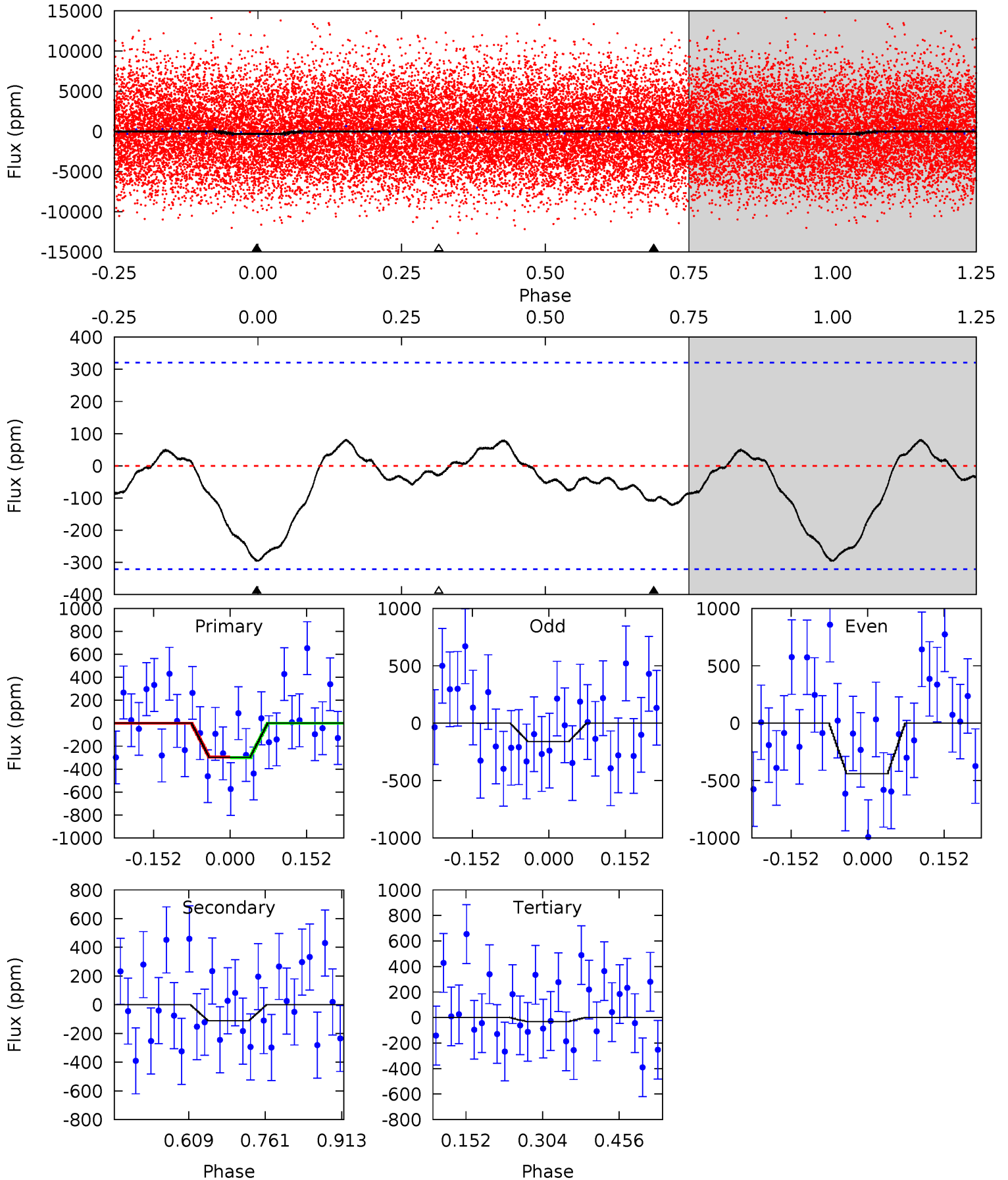
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	2.91	0	0	4.42	1.28	1.11	11.5	11.5	2.91	2.91	0.00	0.91	0.20	4.06



Alt Model-Shift Uniqueness Test

009045521-02, P = 0.582288 Days, E = 131.213489 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.15	1.55	0.45	0	4.48	1.43	0.57	3.70	4.15	1.10	1.55	1.95	0.72	0.22	0.04



Stellar Parameters For KIC 009045521

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6409^{+162}_{-194}	$4.079^{+0.264}_{-0.154}$	$-0.220^{+0.250}_{-0.300}$	$1.622^{+0.444}_{-0.494}$	$1.151^{+0.192}_{-0.157}$	$0.380^{+0.686}_{-0.176}$
	+3%/-3%	+6%/-4%	+114%/-136%	+27%/-30%	+17%/-14%	+181%/-46%
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 009045521-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-57 ± 19	$2.78^{+1.56}_{-1.49}$	4160^{+313}_{-337}	4118^{+2010}_{-6197}	$0.803^{+2.878}_{-0.507}$
Alt.	-111 ± 72	$2.85^{+1.80}_{-1.43}$	4172^{+317}_{-363}	4681^{+2277}_{-2063}	$1.256^{+4.558}_{-0.933}$

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 $A_{obs} \gg 1.0$

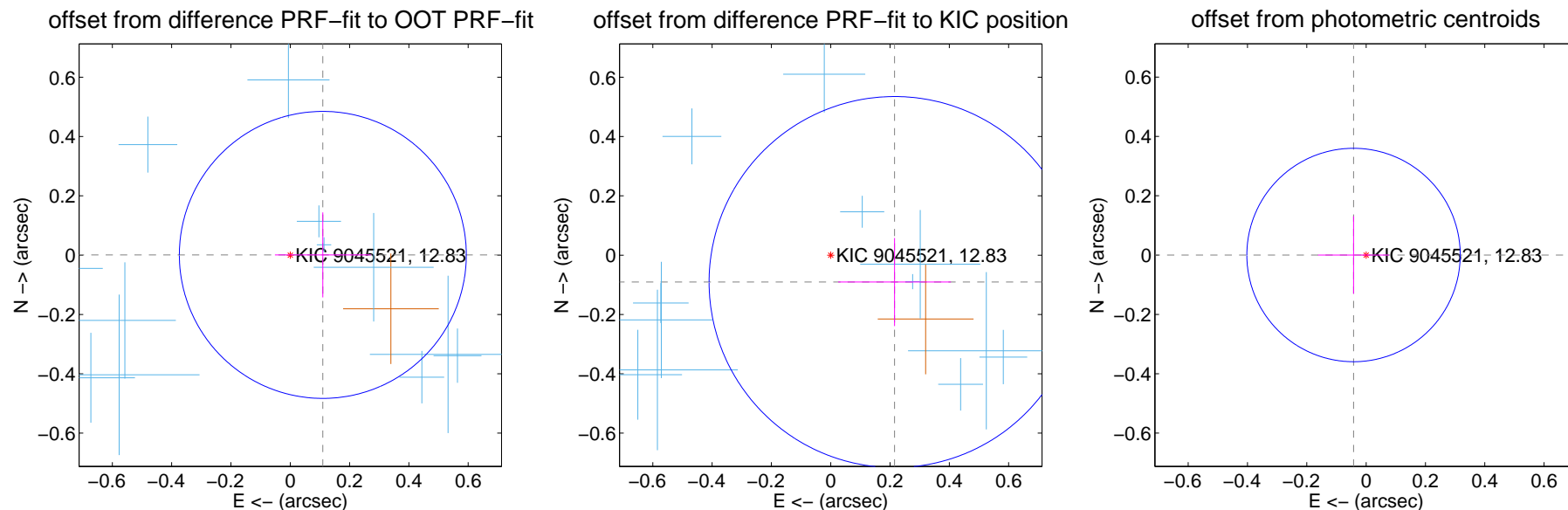
DV Centroid Data

Supplemental centroid analysis for 009045521-02. Kepler magnitude: 12.83. Transit SNR 10.38

There are 16 quarters with good PRF difference image offsets

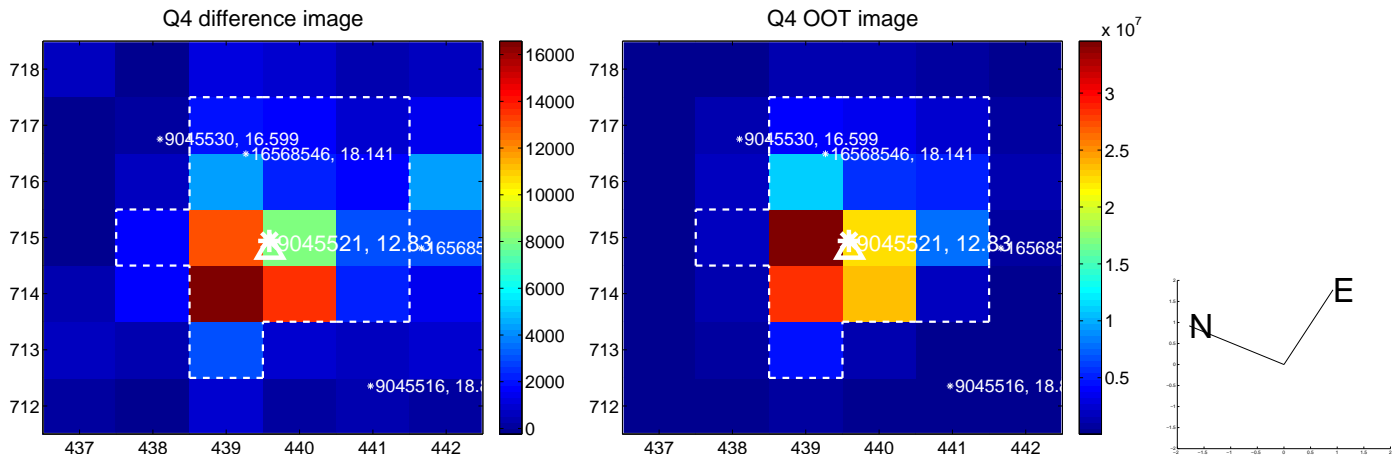
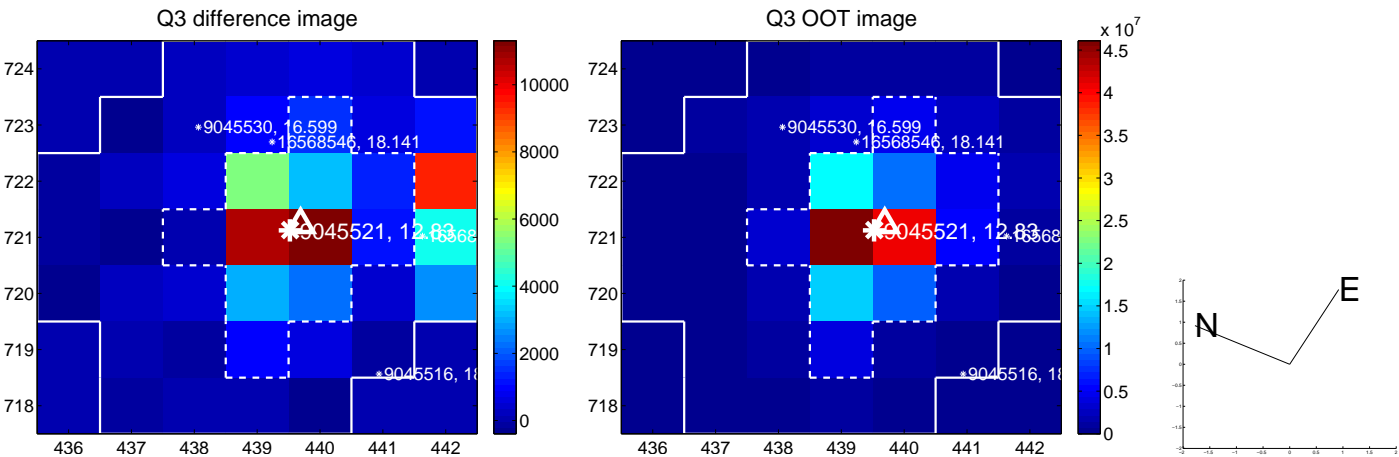
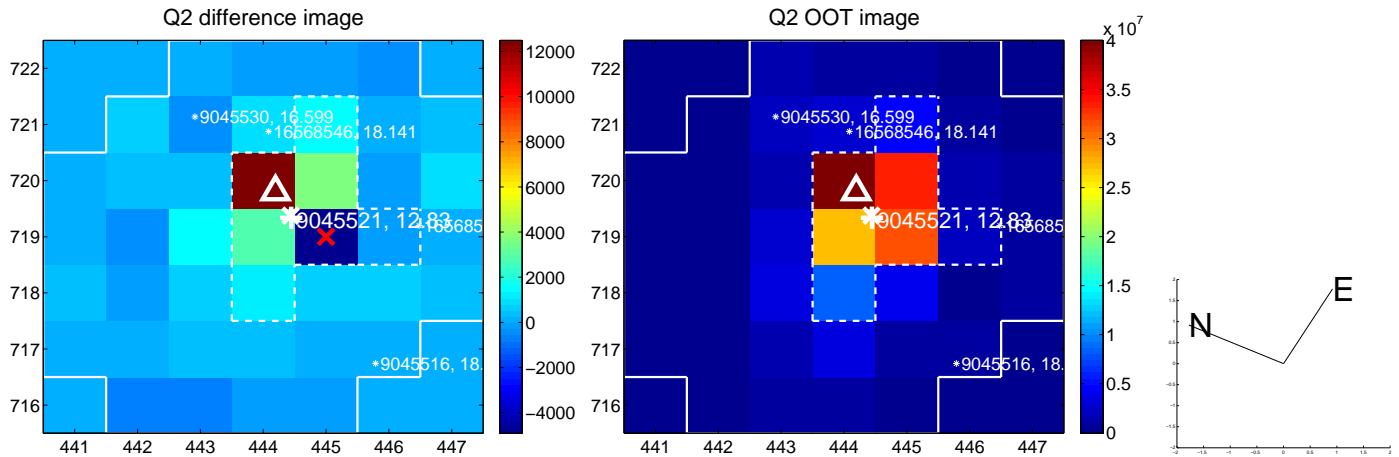
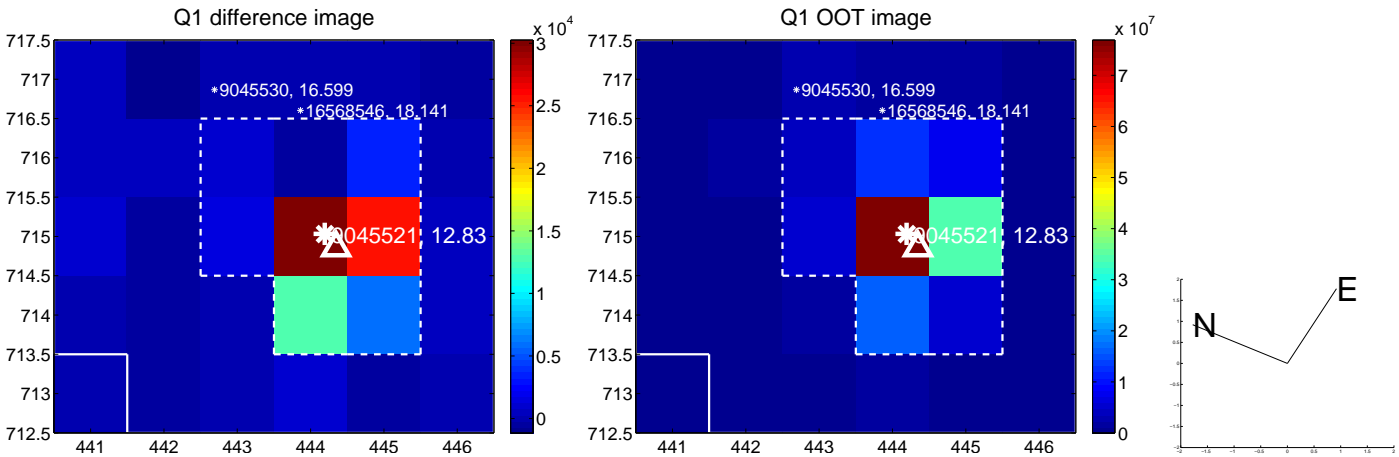
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.110 ± 0.161	0.68	-0.110 ± 0.162	0.001 ± 0.143
PRF-fit source offset from KIC position	0.234 ± 0.209	1.12	-0.215 ± 0.190	-0.091 ± 0.148
photometric centroid source offset	0.04 ± 0.12	0.35	0.04 ± 0.12	0.00 ± 0.13

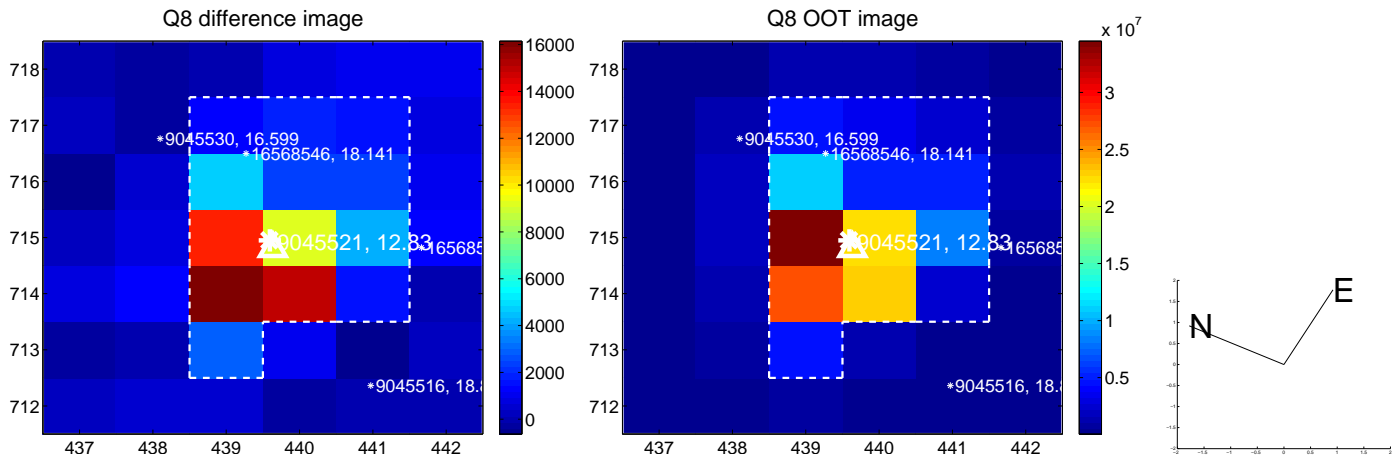
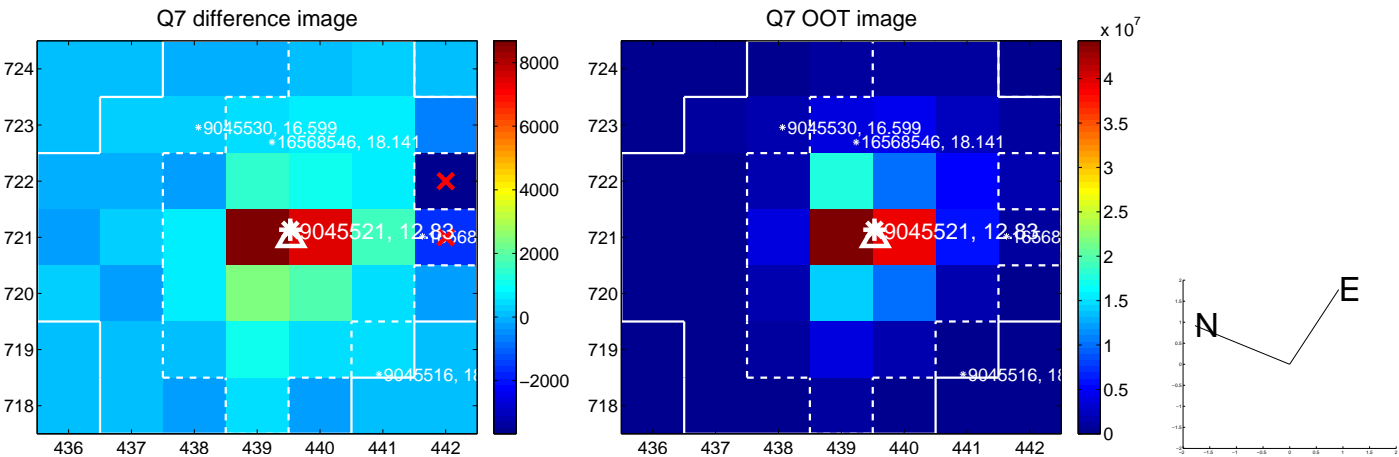
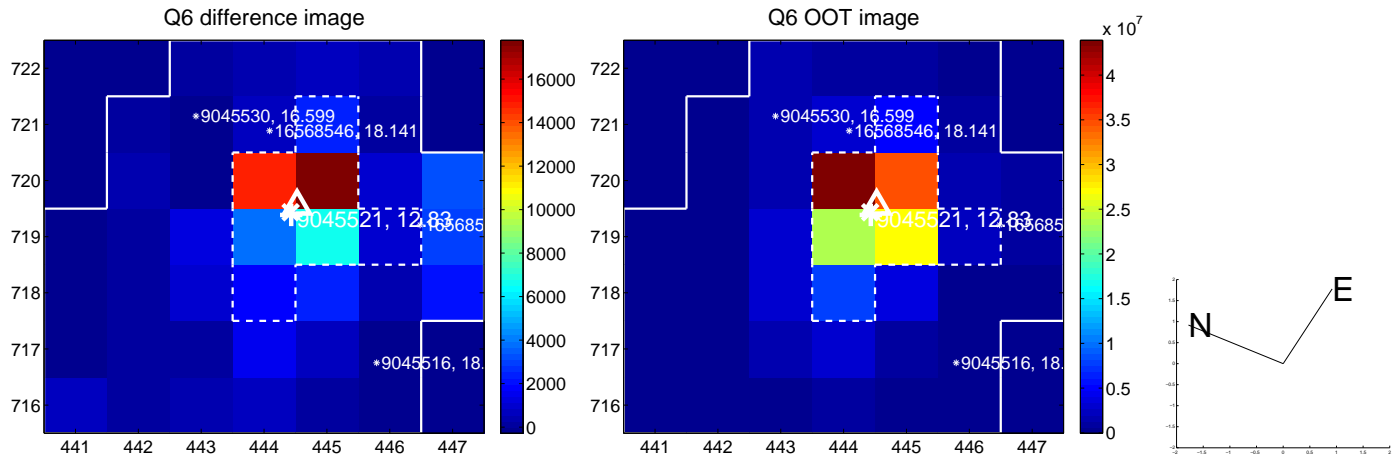
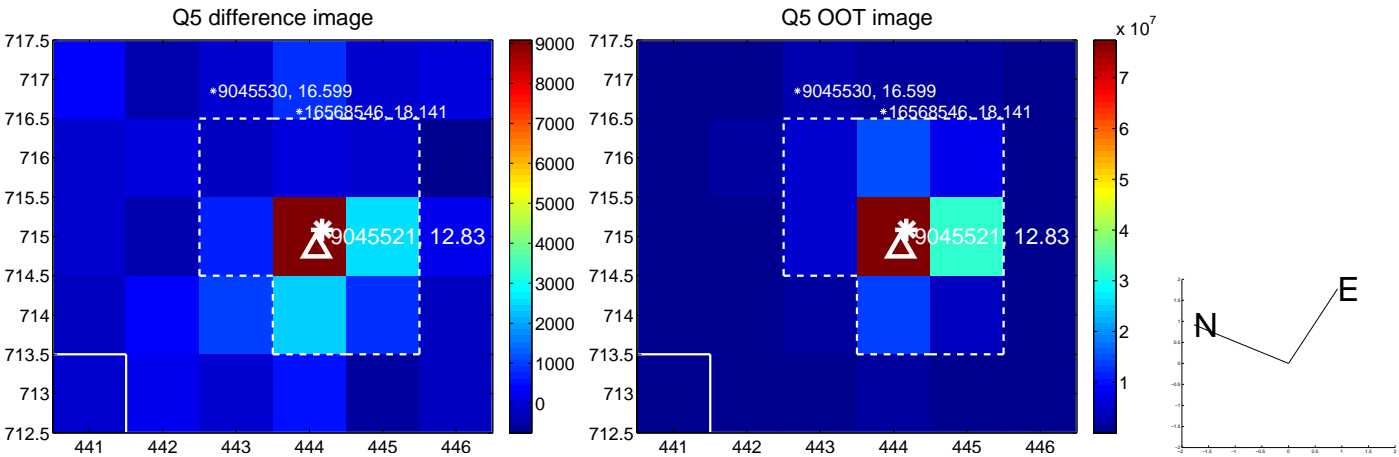


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

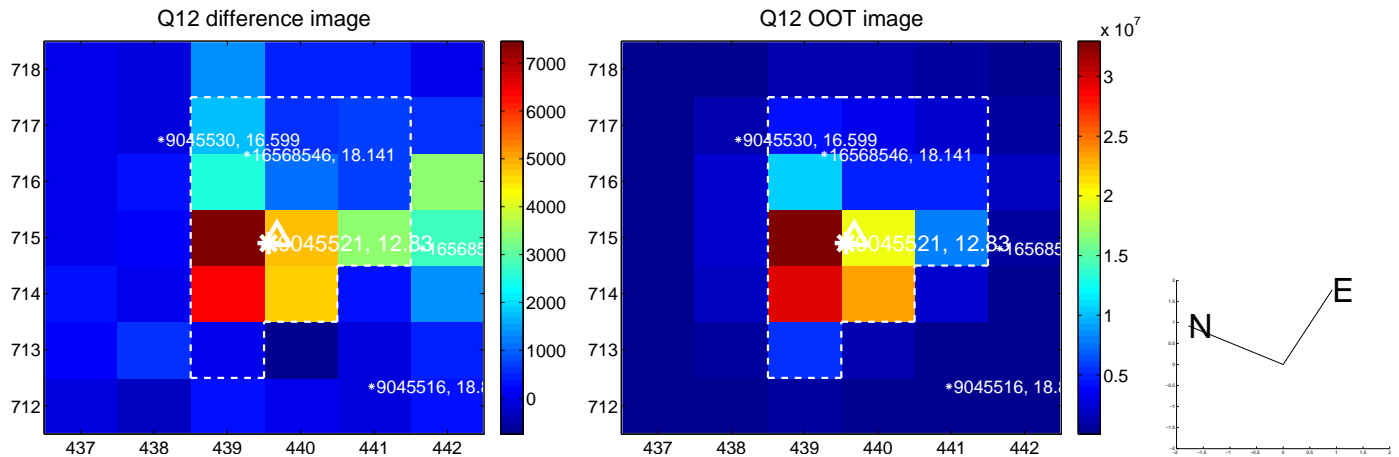
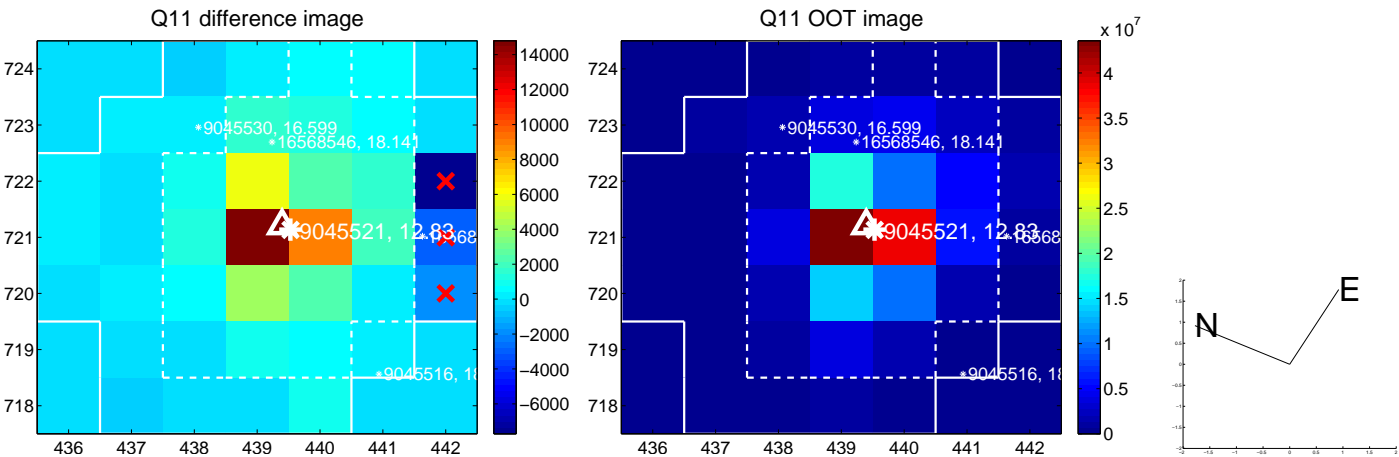
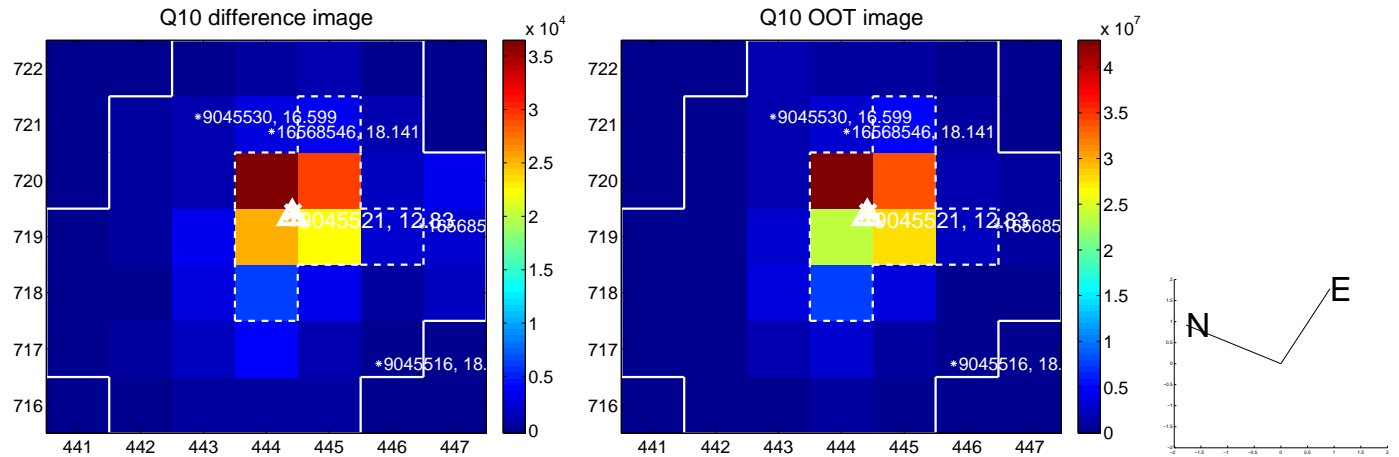
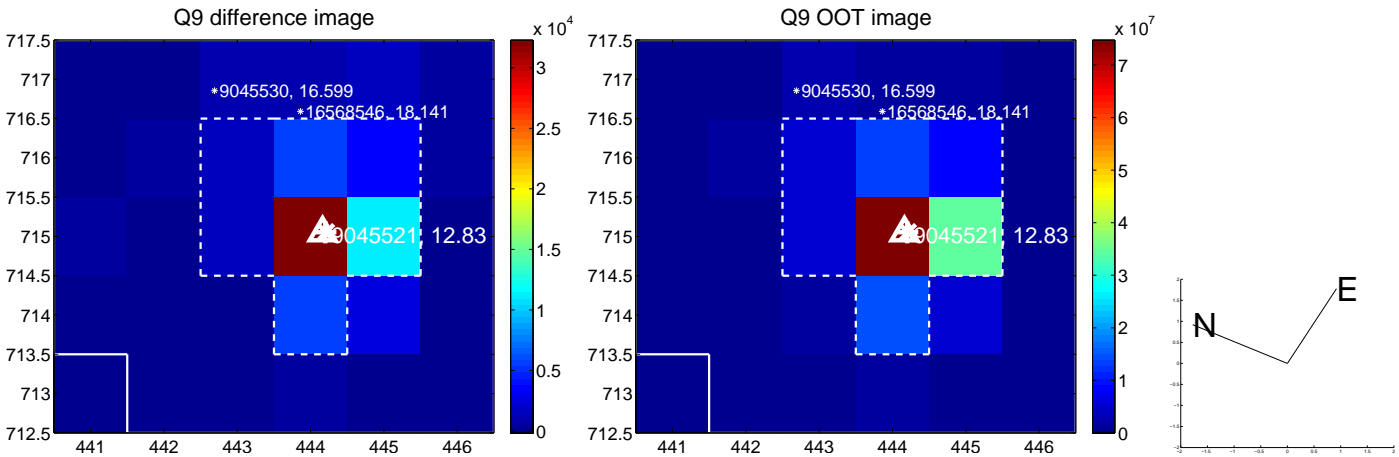
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



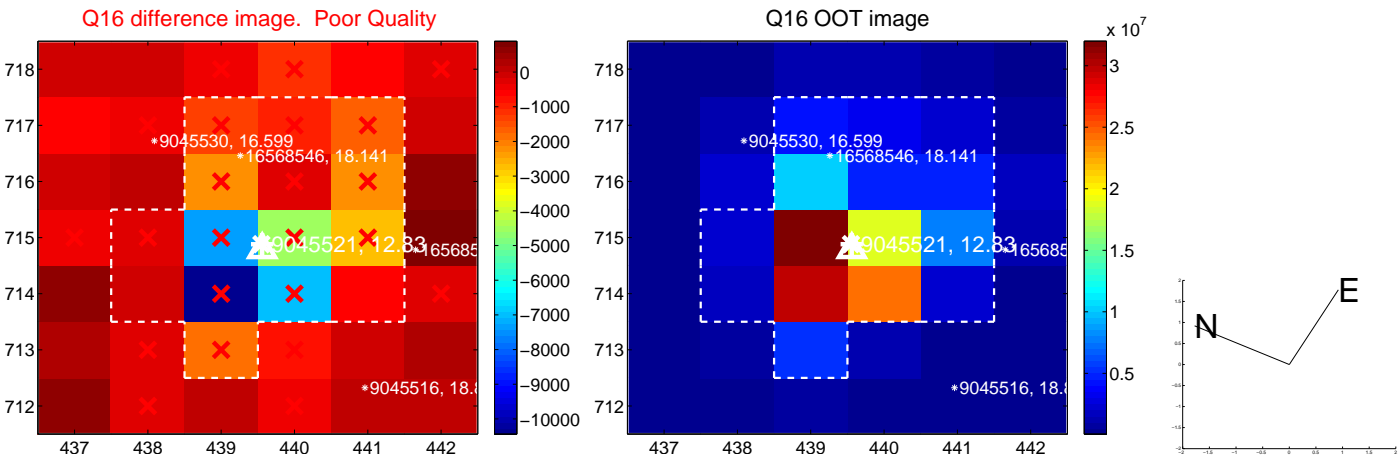
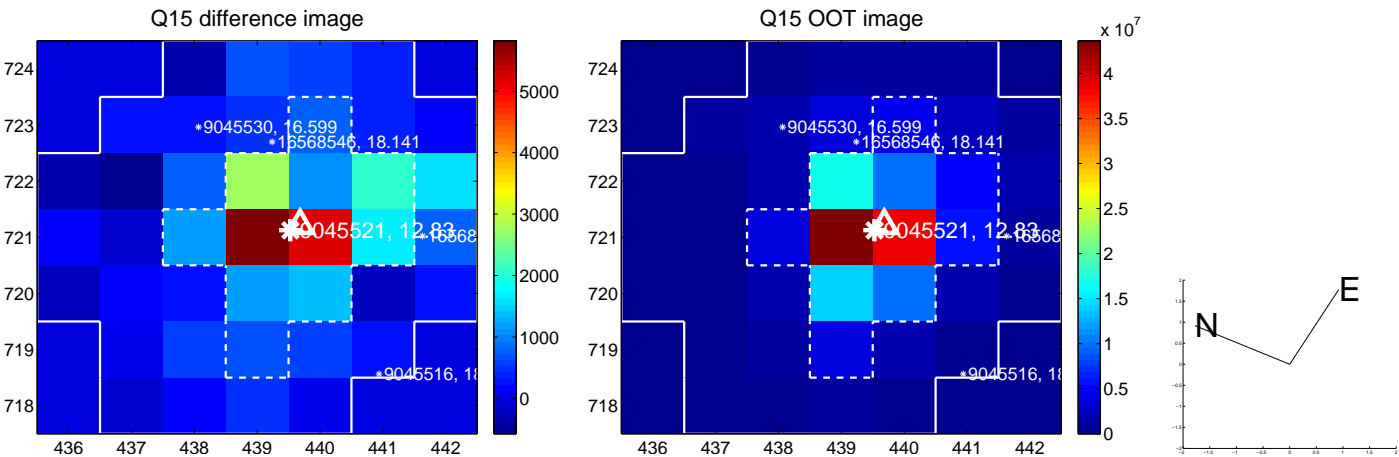
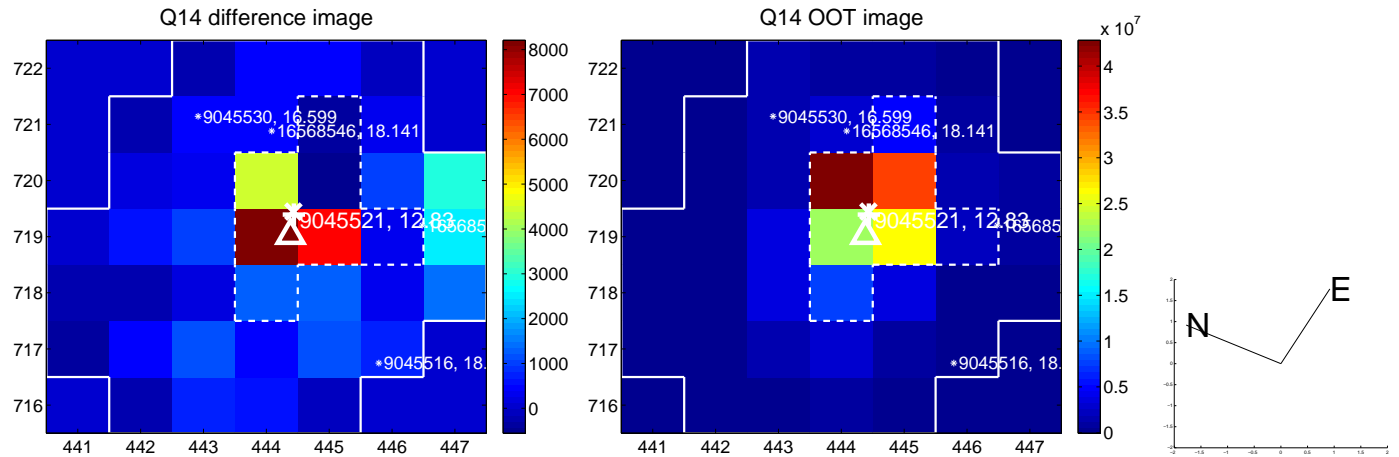
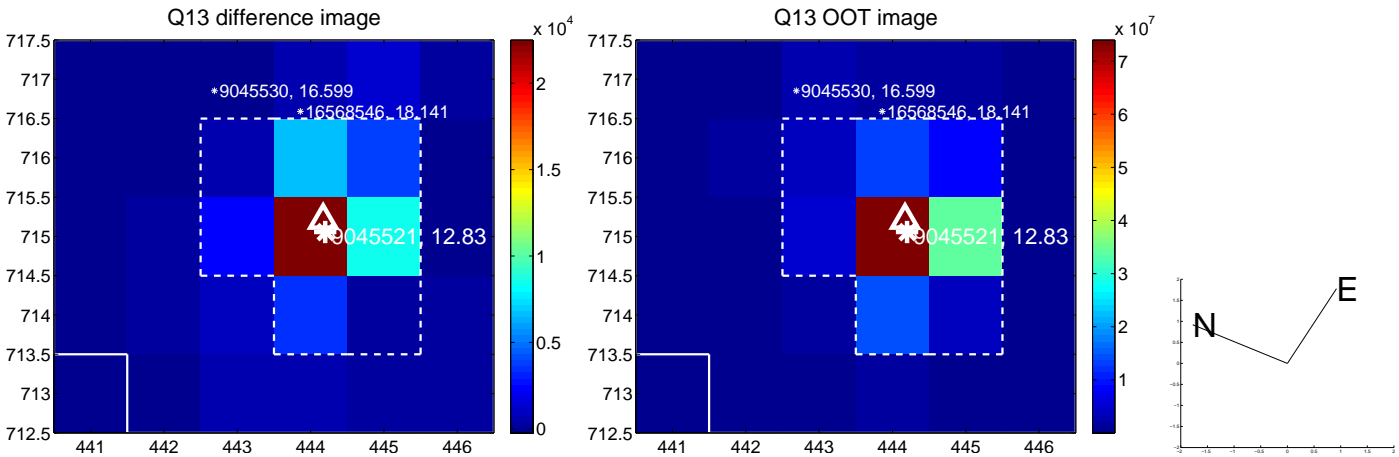
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



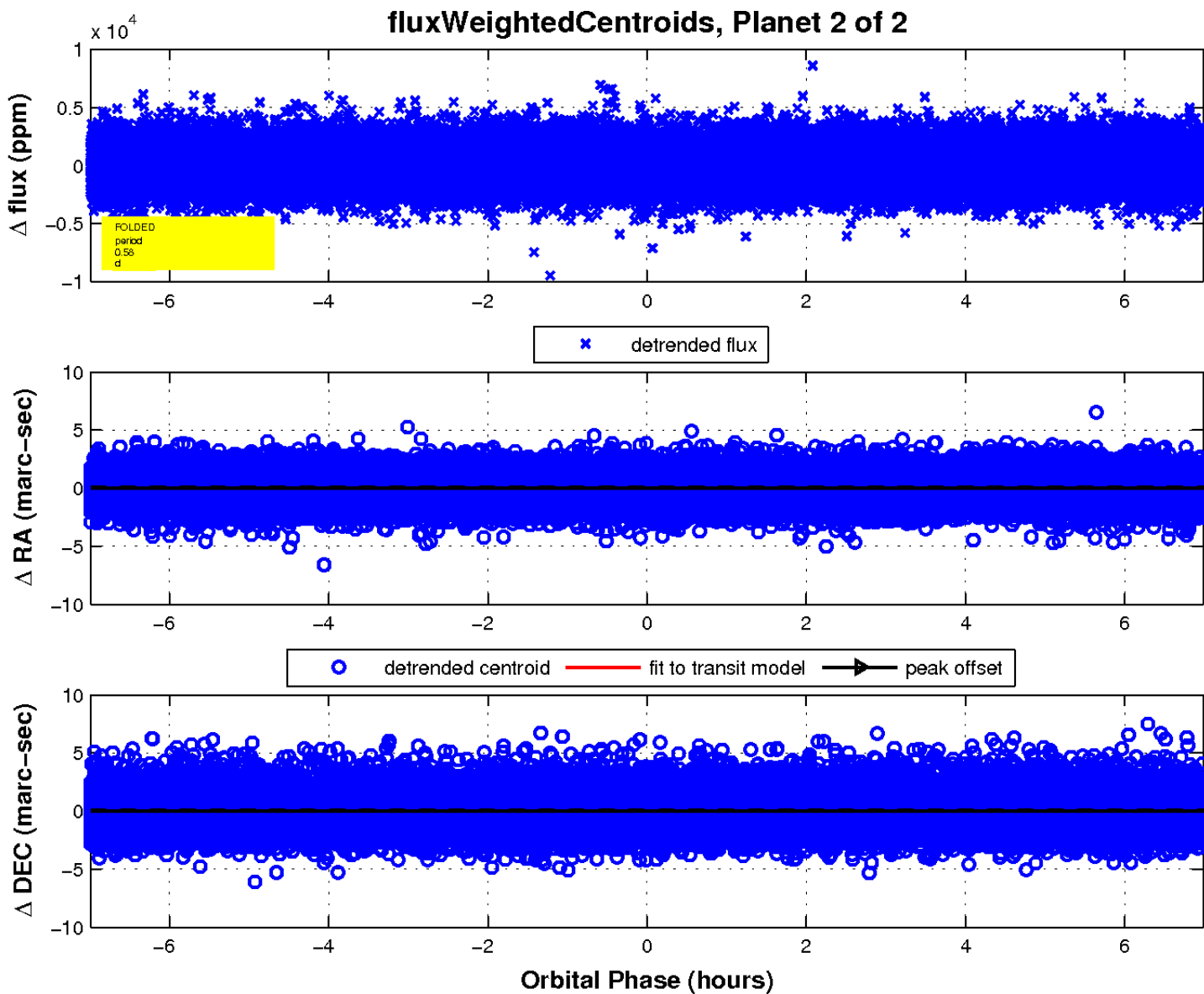
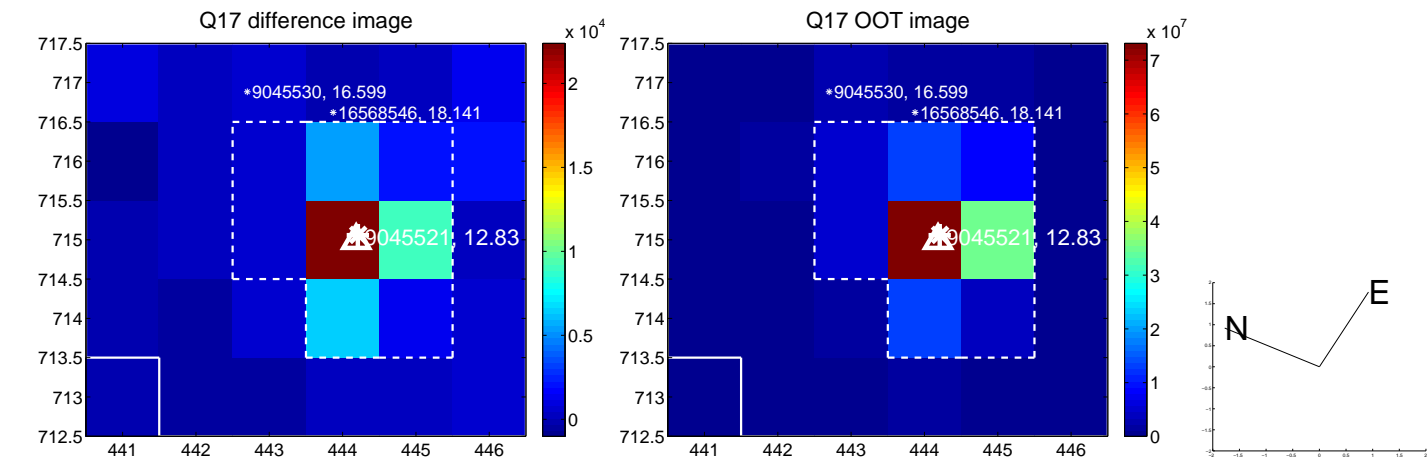
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

