

# KIC 009025600

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009025600-01	OBS	No	8.401466	136.718838	34.8	17.119	8.9	6.3	1.82	6669	1.23	874.11
009025600-02	OBS	No	4.202182	134.329240	30.4	21.024	9.5	8.9	1.82	6669	1.15	2201.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009025600-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009025600-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—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.

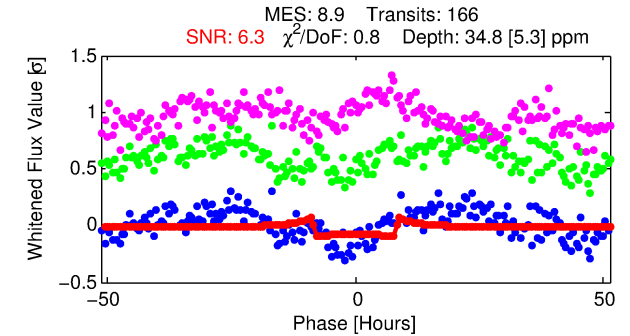
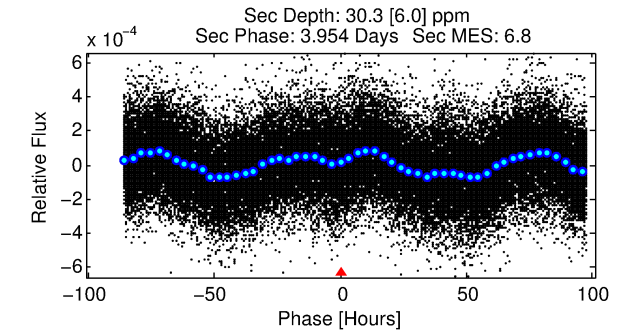
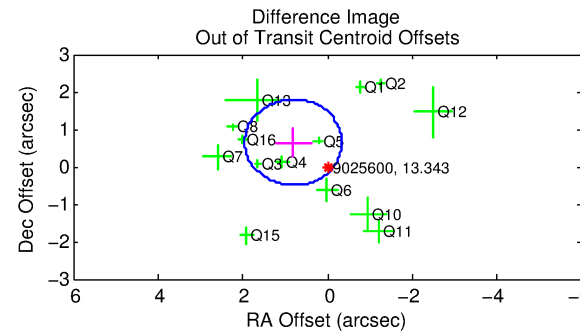
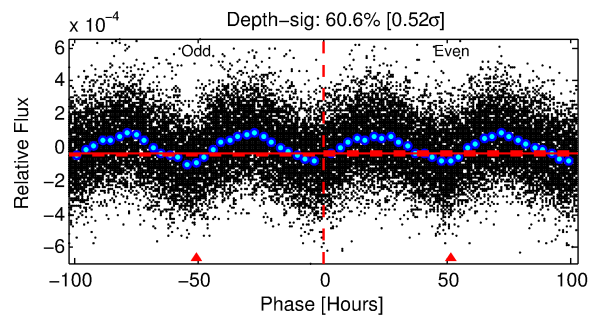
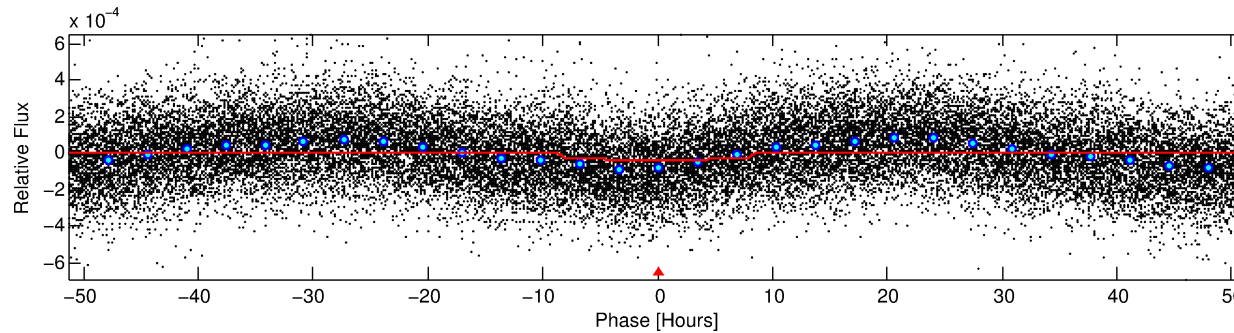
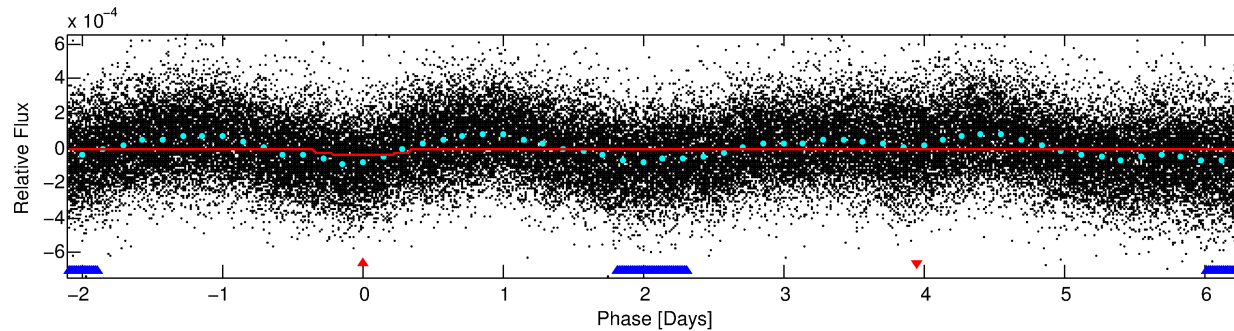
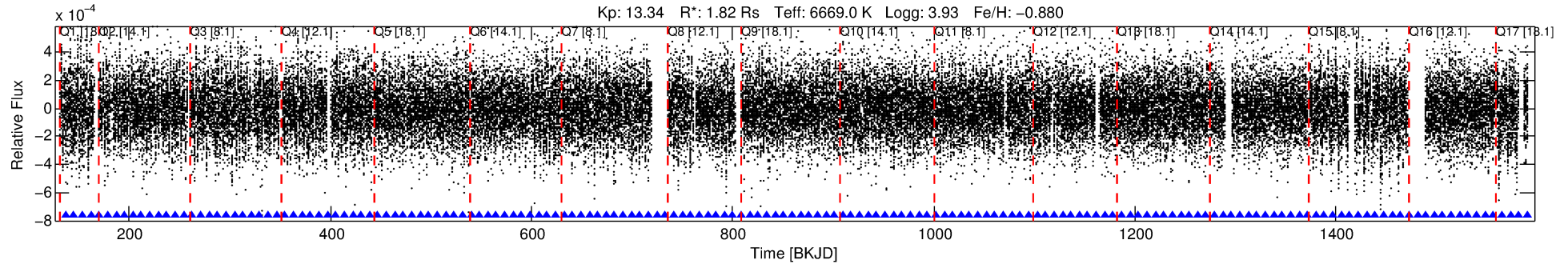
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009025600-01

No Significant Match Found

# DV One-Page Summary

KIC: 9025600 Candidate: 1 of 2 Period: 8.401 d



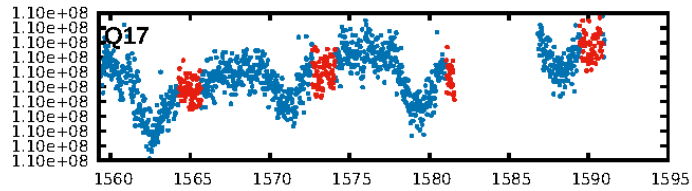
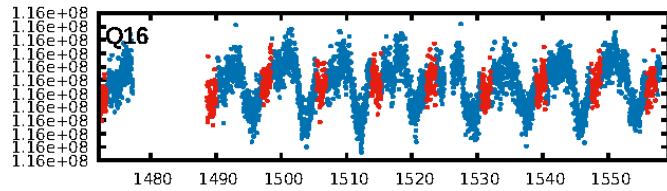
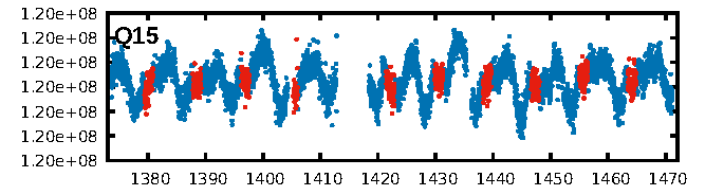
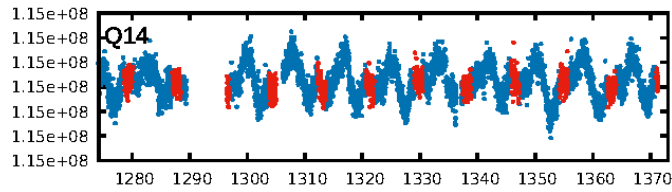
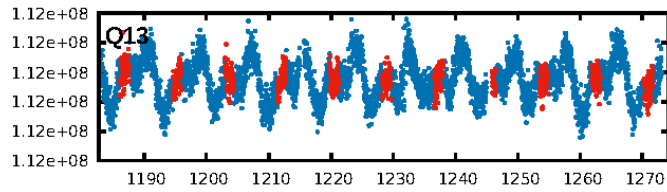
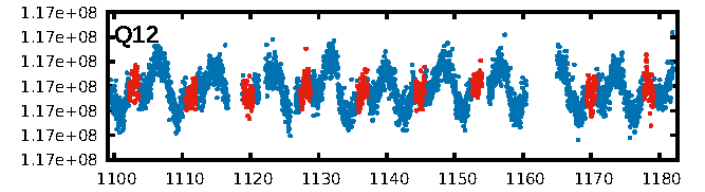
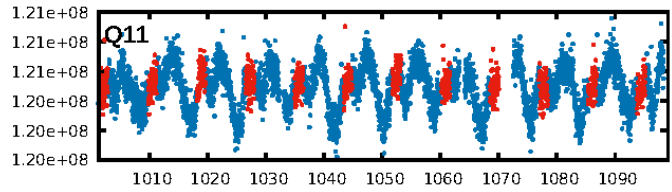
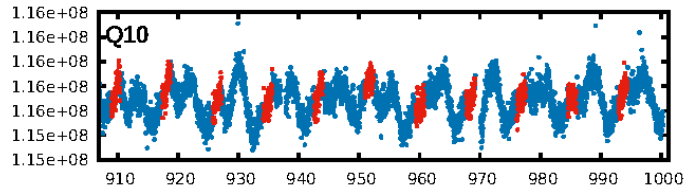
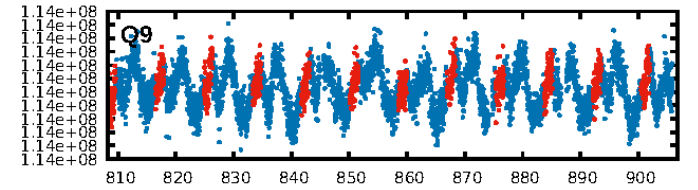
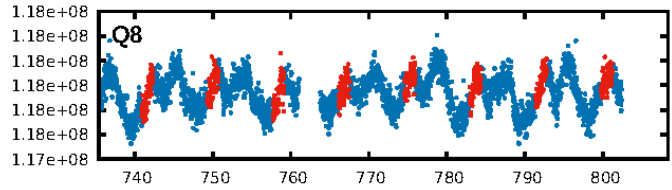
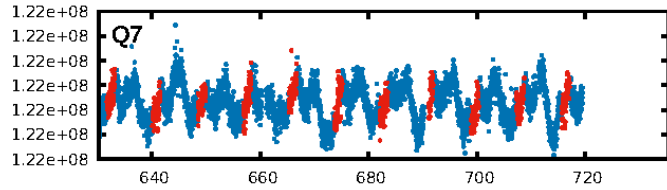
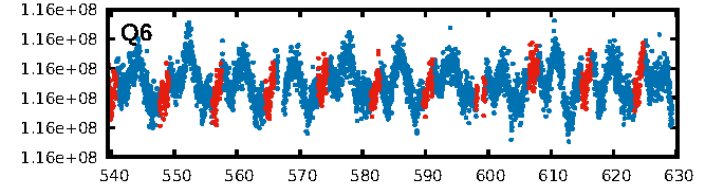
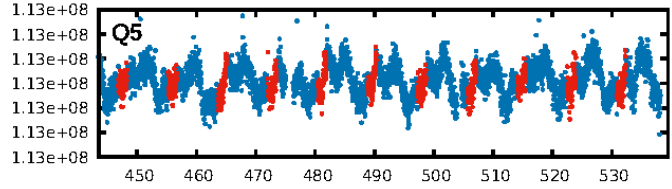
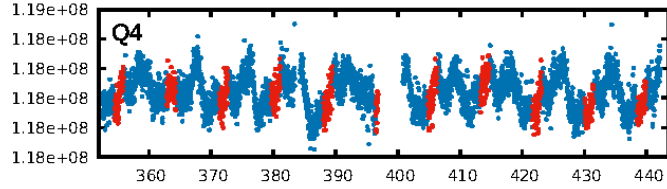
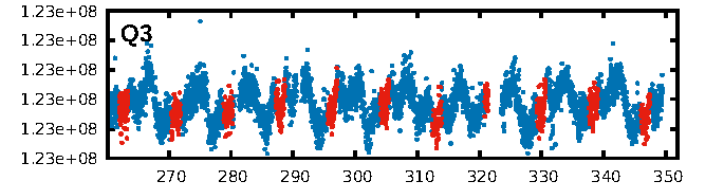
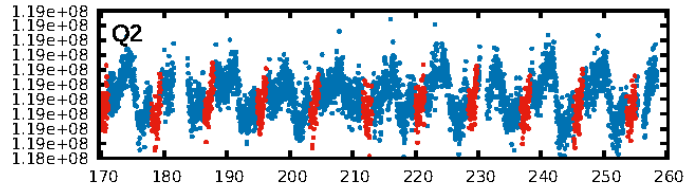
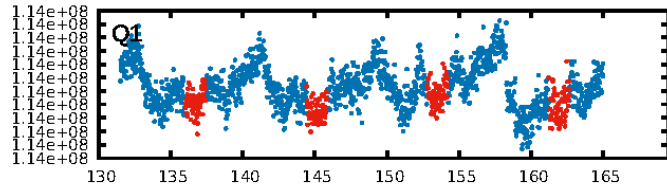
## DV Fit Results:

Period = 8.40147 [0.00016] d  
Epoch = 136.7188 [0.0138] BKJD  
Rp/R\* = 0.0062 [0.0009]  
a/R\* = 2.08 [1.06]  
b = 0.87 [0.18]  
Seff = 874.11 [451.68]  
Teff = 1386 [179] K  
Rp = 1.23 [0.43] Re  
a = 0.0818 [0.0254] AU  
Ag = 74.08 [44.88] [1.63 $\sigma$ ]  
Teffp = 6289 [580] K [8.08 $\sigma$ ]

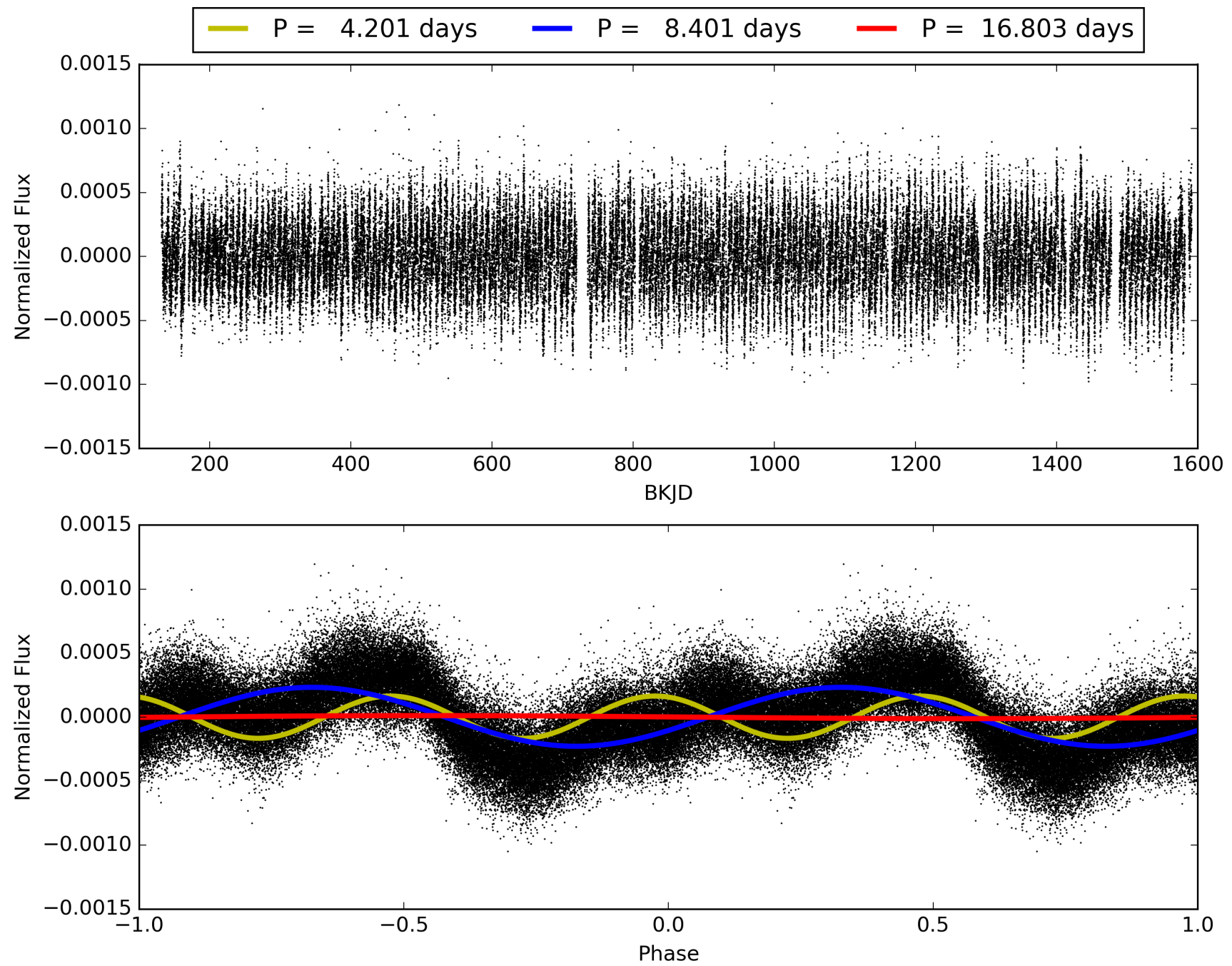
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.72 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.12e-11**  
RollingBand-fgt: 1.00 [158/158]  
GhostDiagnostic-chr: 11.9  
Centroid-sig: 1.8%  
Centroid-so: 1.476 arcsec [1.71 $\sigma$ ]  
OotOffset-rm: 1.039 arcsec [2.72 $\sigma$ ]  
OotOffset-st: 3/4/4/3 [14]  
**KicOffset-rm: 1.116 arcsec [3.26 $\sigma$ ]**  
KicOffset-st: 3/4/4/3 [14]  
DiffImageQuality-fgm: 0.50 [7/14]  
DiffImageOverlap-fno: 1.00 [17/17]

## TCE 009025600-01, PDC Light Curves

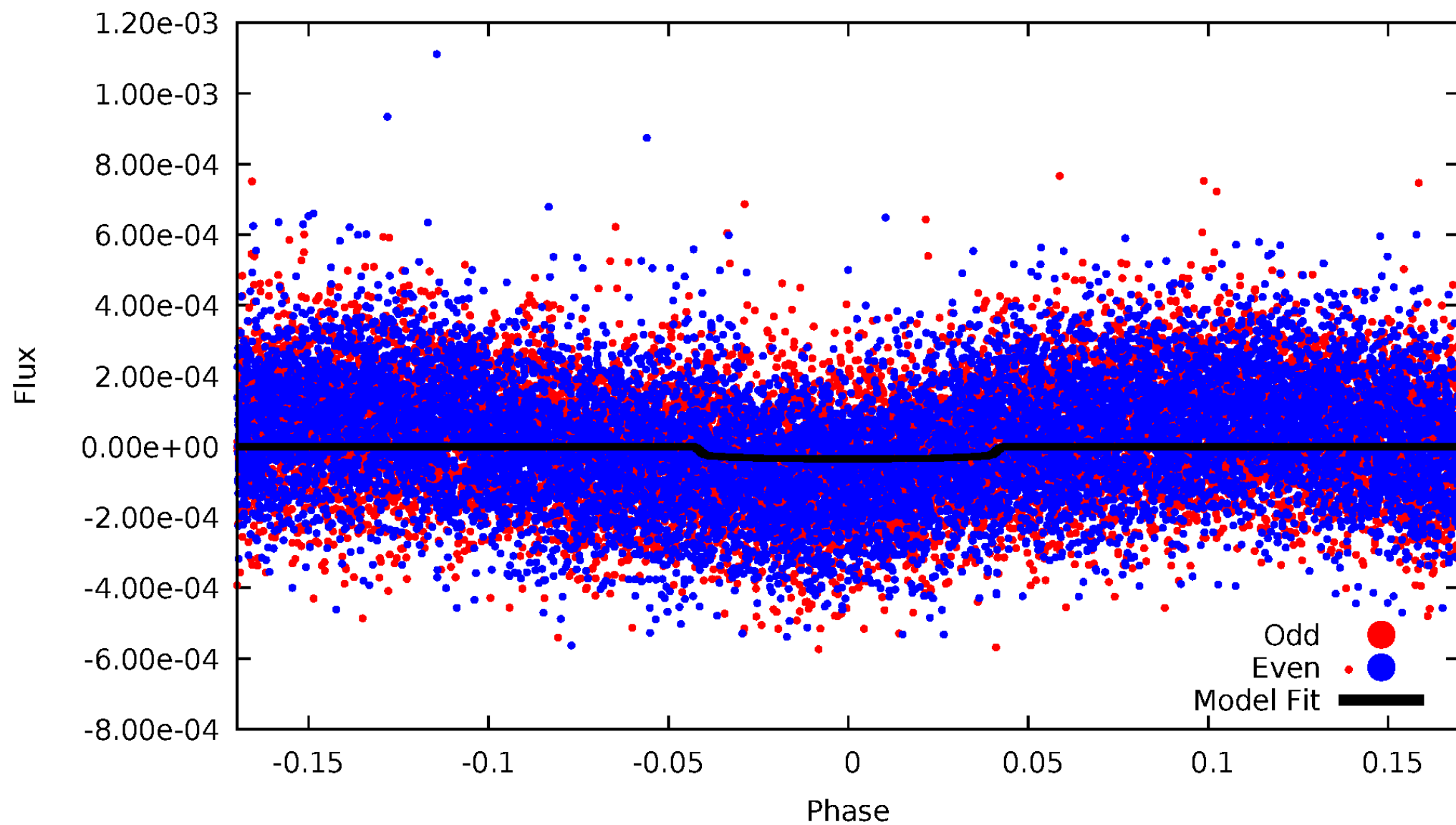


TCE 009025600-01



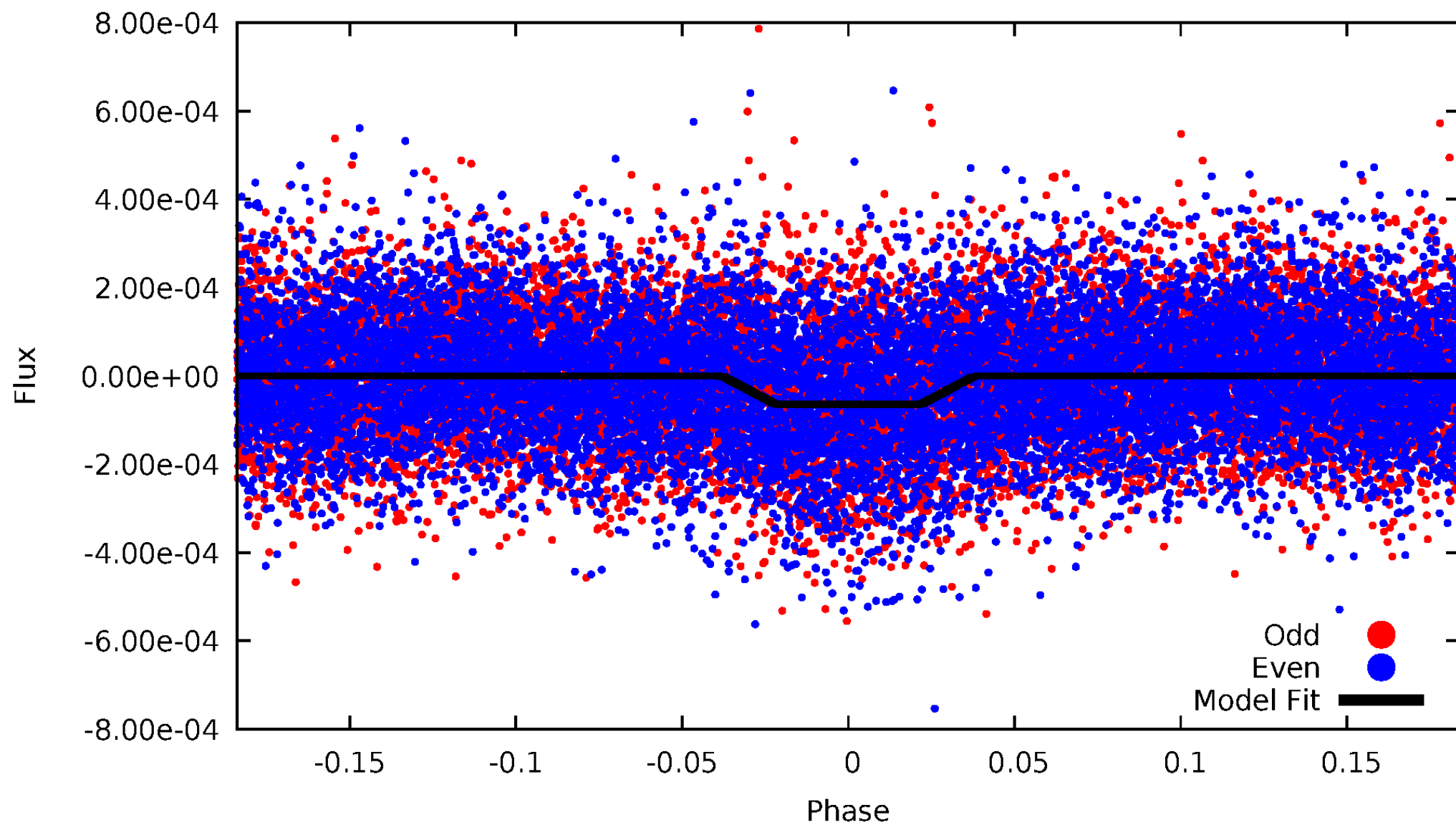
# DV Odd/Even

TCE 009025600-01



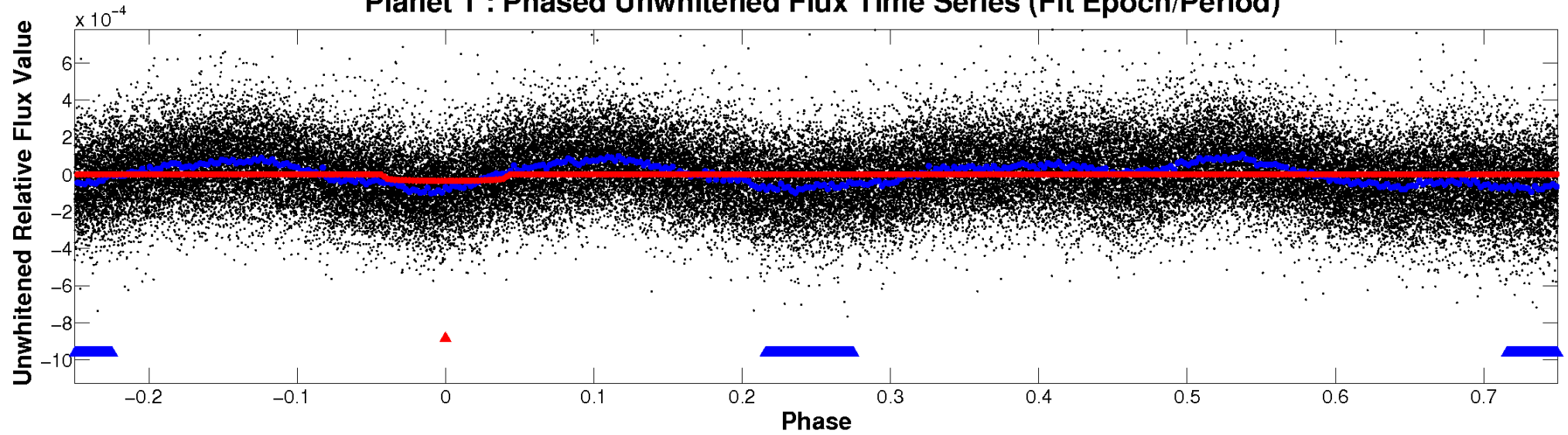
# ALT Odd/Even

TCE 009025600-01

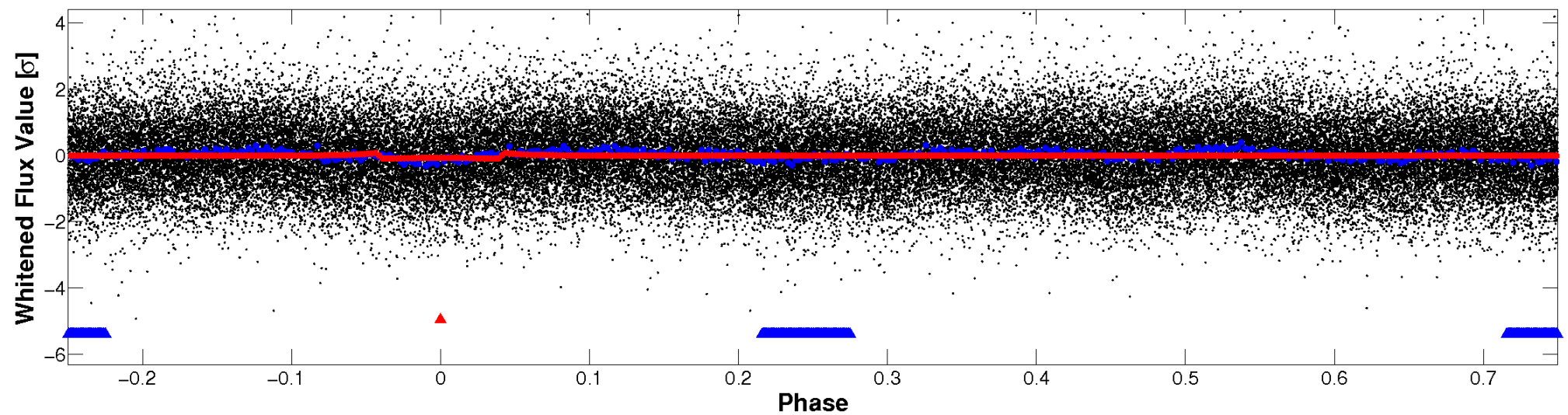


# Non-Whitened Vs. Whitened Light Curve

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

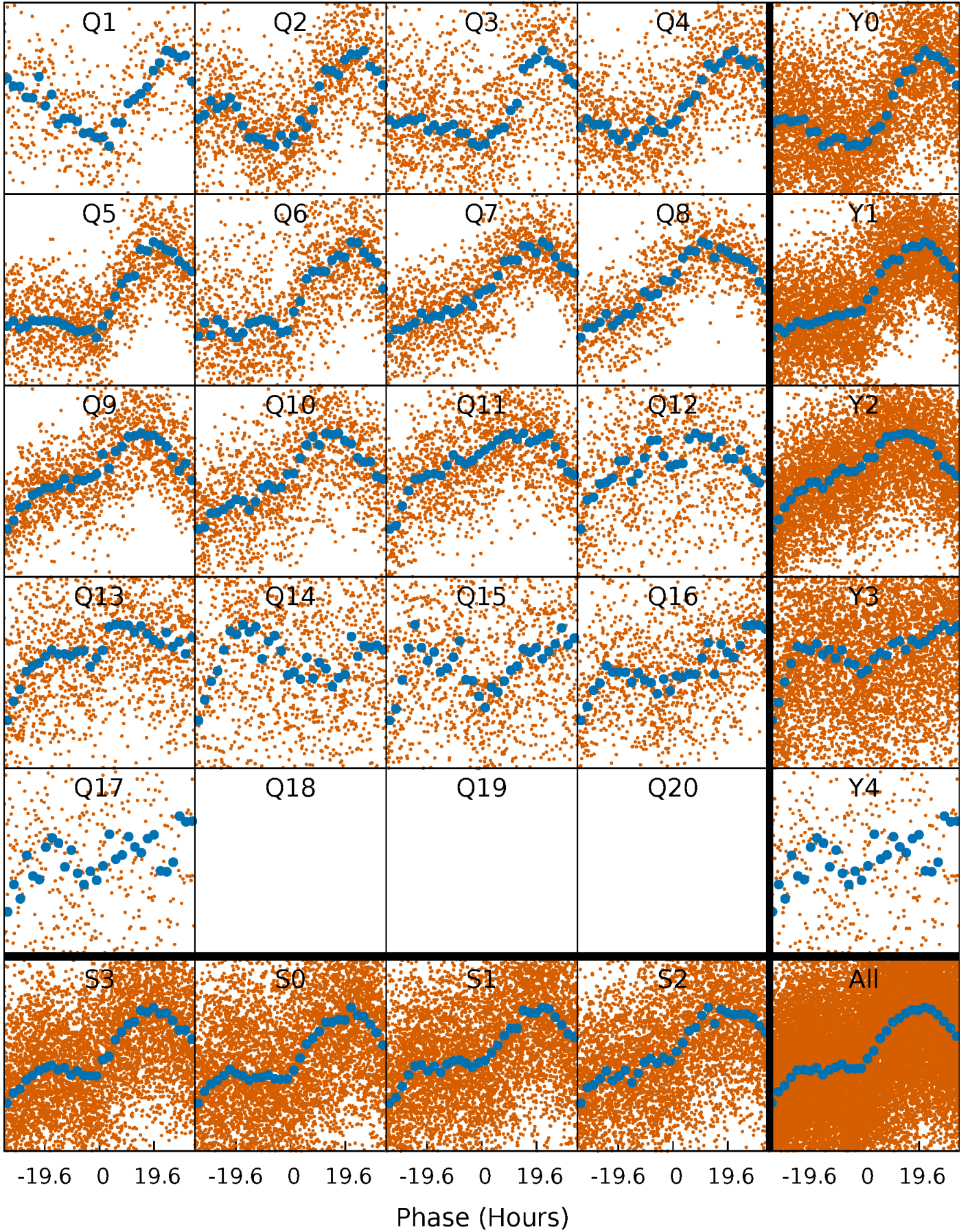


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



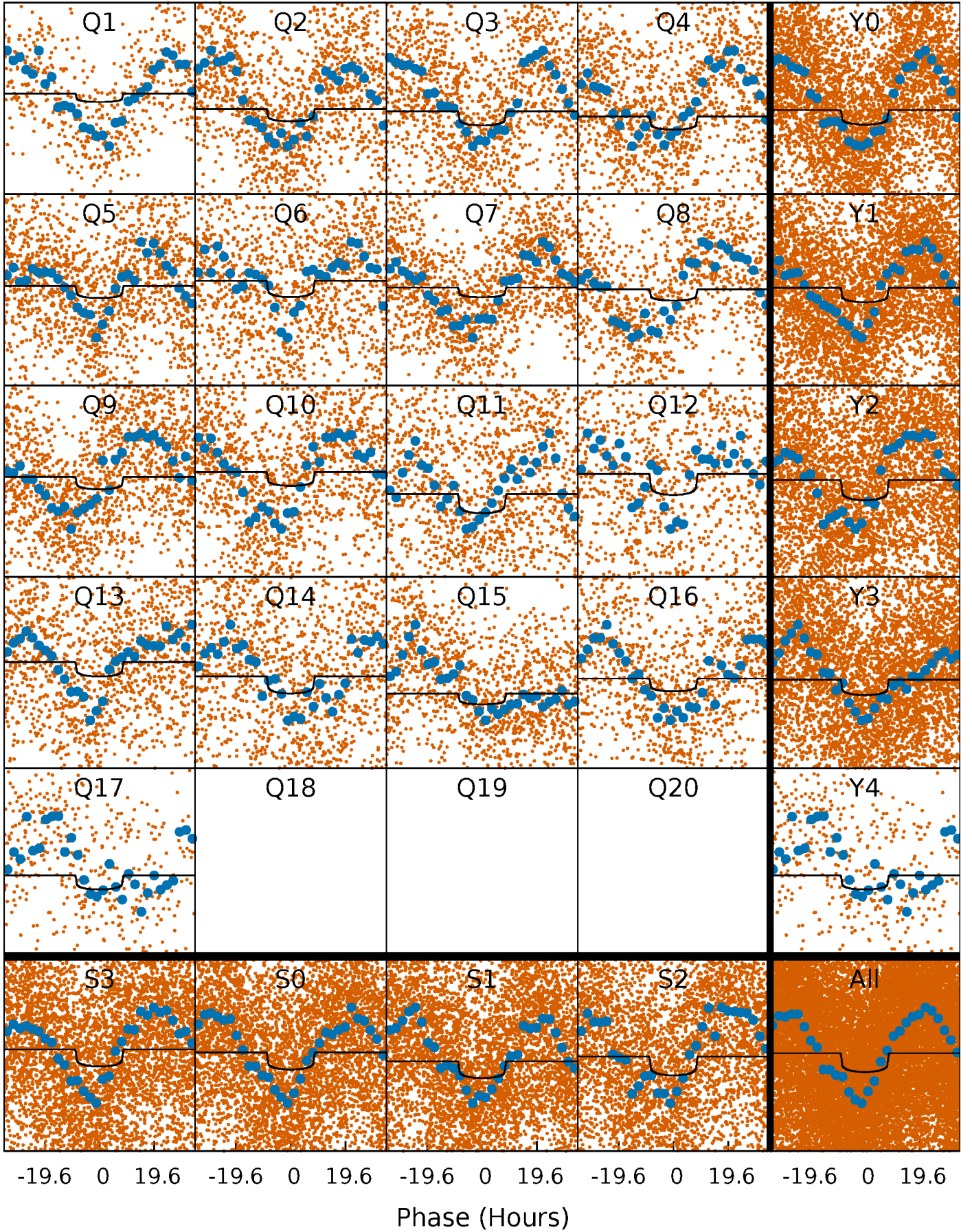
# PDC Quarter-Phased Transit Curves

TCE 009025600-01   P= 8.401466 Days    $T_0=136.718838$  (BKJD)



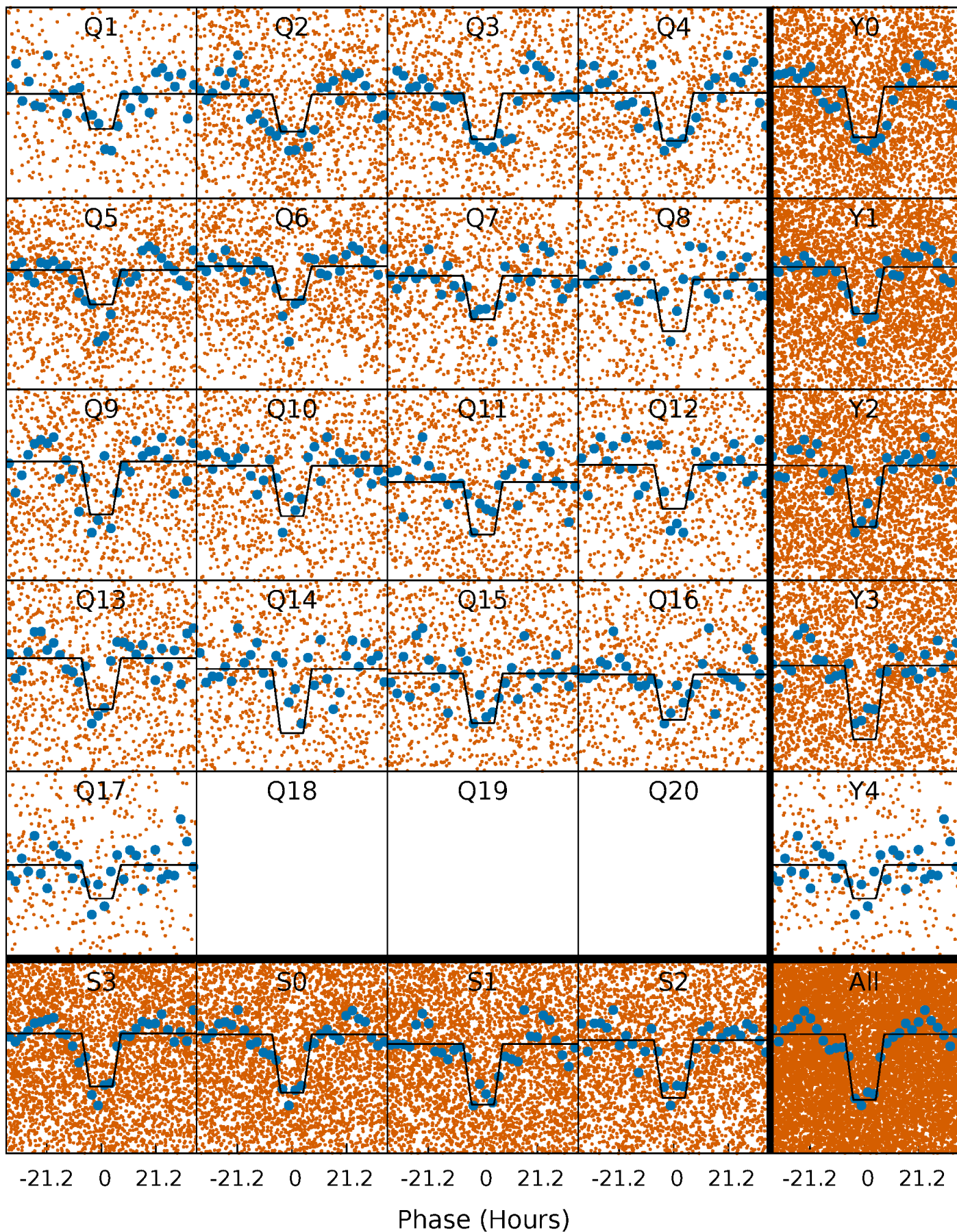
# DV Quarter-Phased Transit Curves

TCE 009025600-01     $P = 8.401466$  Days     $T_0 = 136.718838$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

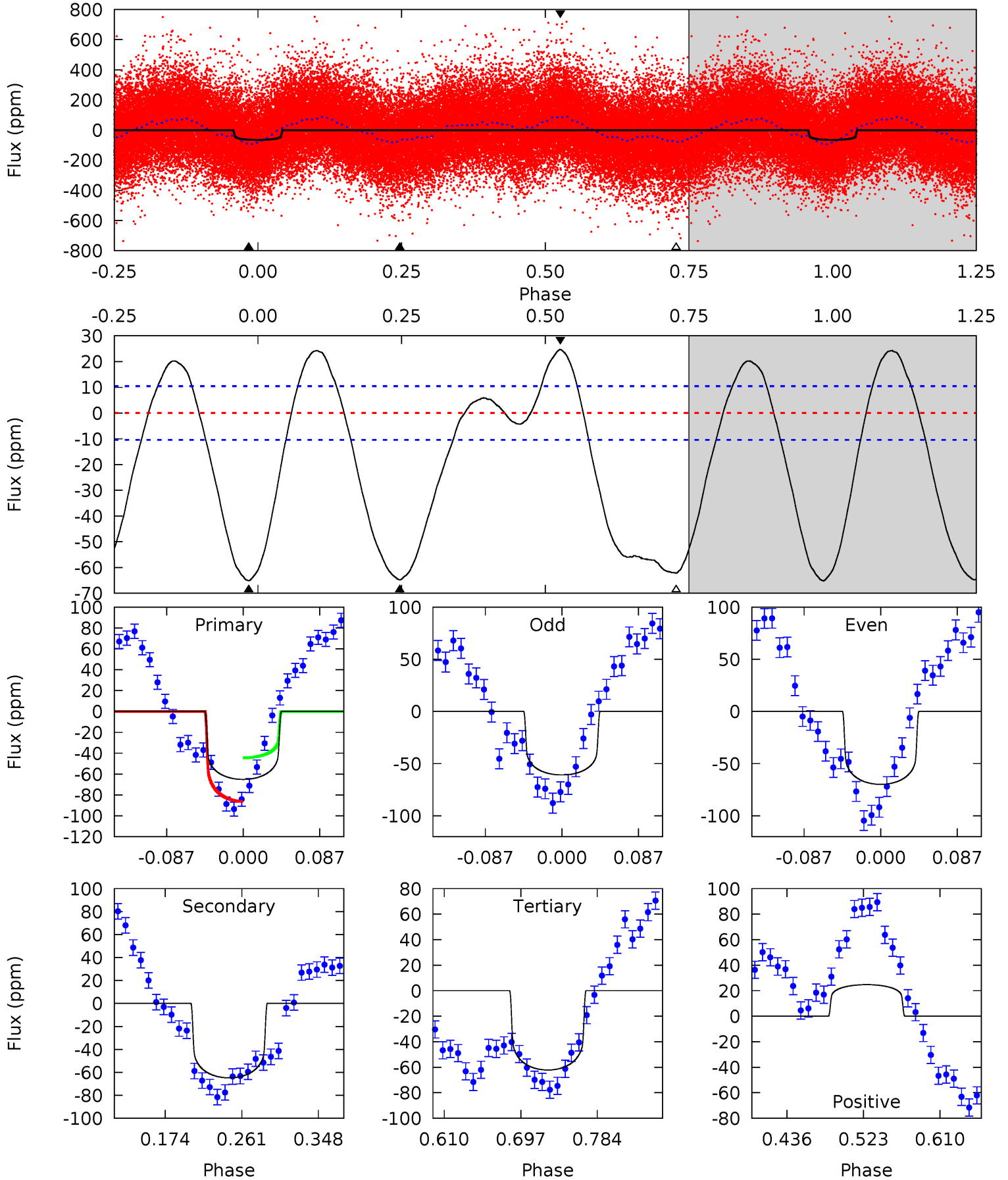
TCE 009025600-01 P= 8.401260 Days  $T_0=136.716231$  (BKJD)



# DV Model-Shift Uniqueness Test

009025600-01, P = 8.401466 Days, E = 128.317372 Days

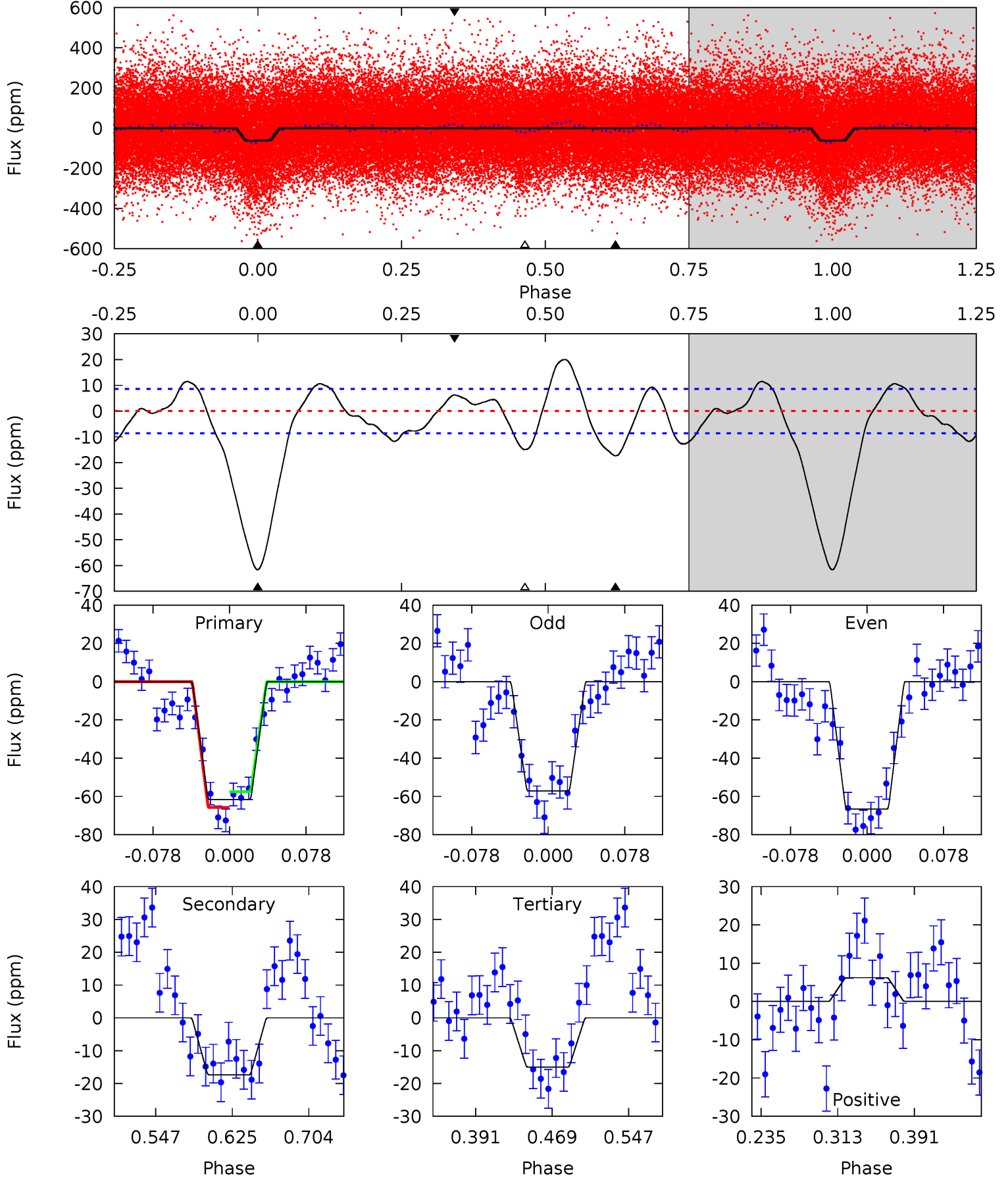
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.7	28.6	27.4	10.9	4.59	1.71	12.9	1.32	17.8	1.16	17.7	1.99	0.98	0.28	9.35



# Alt Model-Shift Uniqueness Test

009025600-01, P = 8.401260 Days, E = 128.314971 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.1	9.32	8.03	3.33	4.62	1.76	4.31	25.1	29.7	1.29	5.99	2.55	1.10	0.25	2.21



### Stellar Parameters For KIC 009025600

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6669^{+204}_{-224}$	$3.934^{+0.294}_{-0.105}$	$-0.880^{+0.350}_{-0.300}$	$1.817^{+0.386}_{-0.580}$	$1.035^{+0.149}_{-0.134}$	$0.243^{+0.479}_{-0.091}$
	+3%/-3%	+7%/-3%	+40%/-34%	+21%/-32%	+14%/-13%	+197%/-38%
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 009025600-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-65 \pm 2$	$1.17^{+0.26}_{-0.24}$	$1902^{+127}_{-163}$	$7753^{+831}_{-658}$	$177^{+96}_{-57}$
Alt.	$-17 \pm 2$	$1.54^{+0.29}_{-0.30}$	$1902^{+125}_{-162}$	$4876^{+292}_{-276}$	$27^{+13}_{-8}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

$A_{\text{obs}}$  = 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

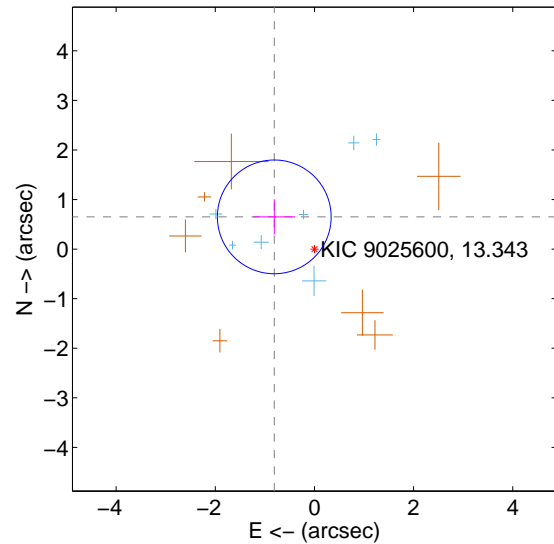
Supplemental centroid analysis for 009025600-01. Kepler magnitude: 13.34. Transit SNR 6.35

There are 7 quarters with good PRF difference image offsets

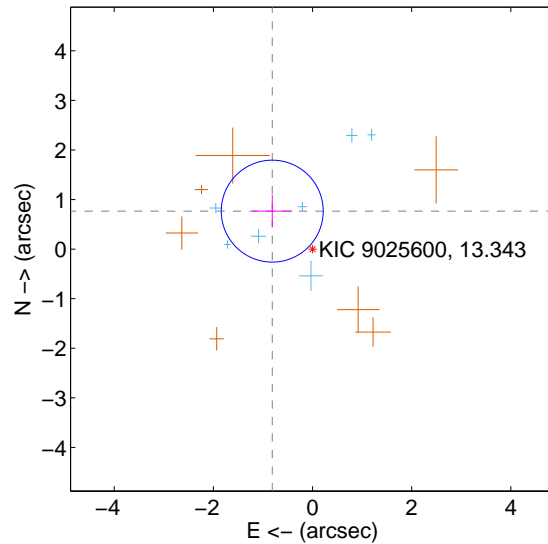
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.039 \pm 0.382$	2.72	$0.810 \pm 0.425$	$0.650 \pm 0.356$
PRF-fit source offset from KIC position	<b><math>1.116 \pm 0.343</math></b>	<b>3.26</b>	$0.812 \pm 0.403$	$0.766 \pm 0.324$
photometric centroid source offset	$1.48 \pm 0.86$	1.71	$1.02 \pm 0.82$	$-1.06 \pm 0.91$

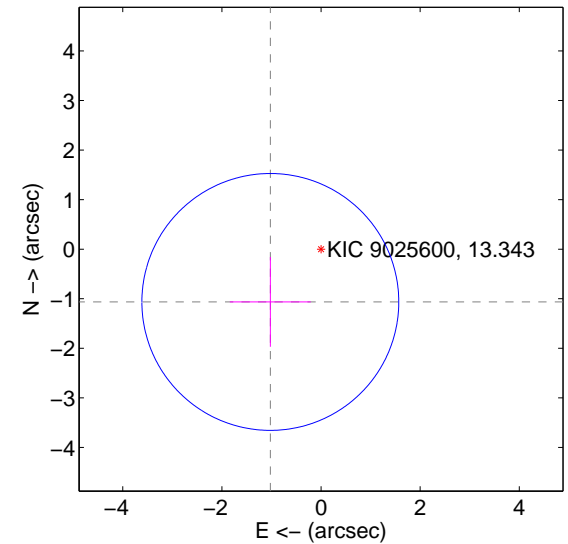
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

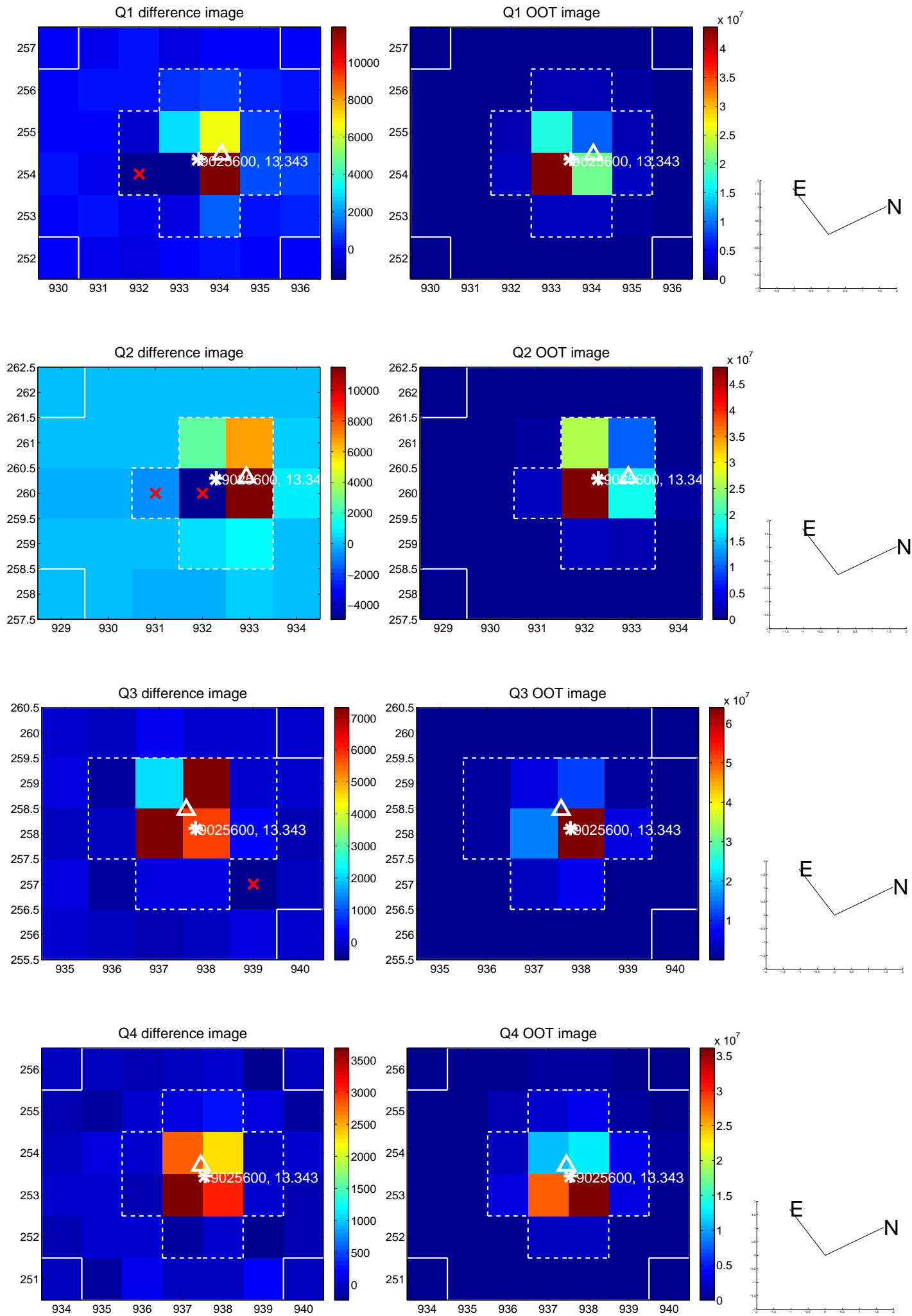


offset from photometric centroids

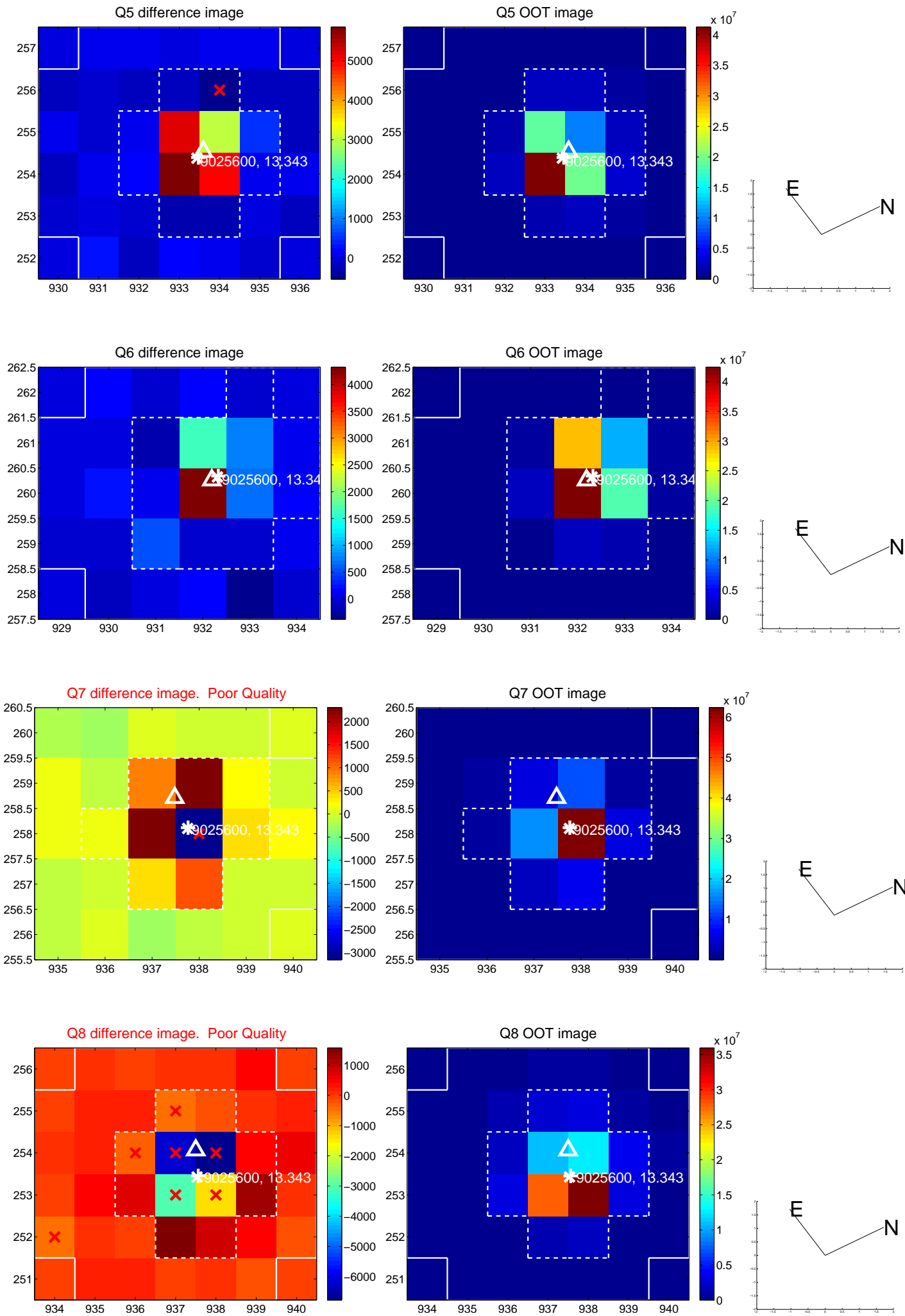


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

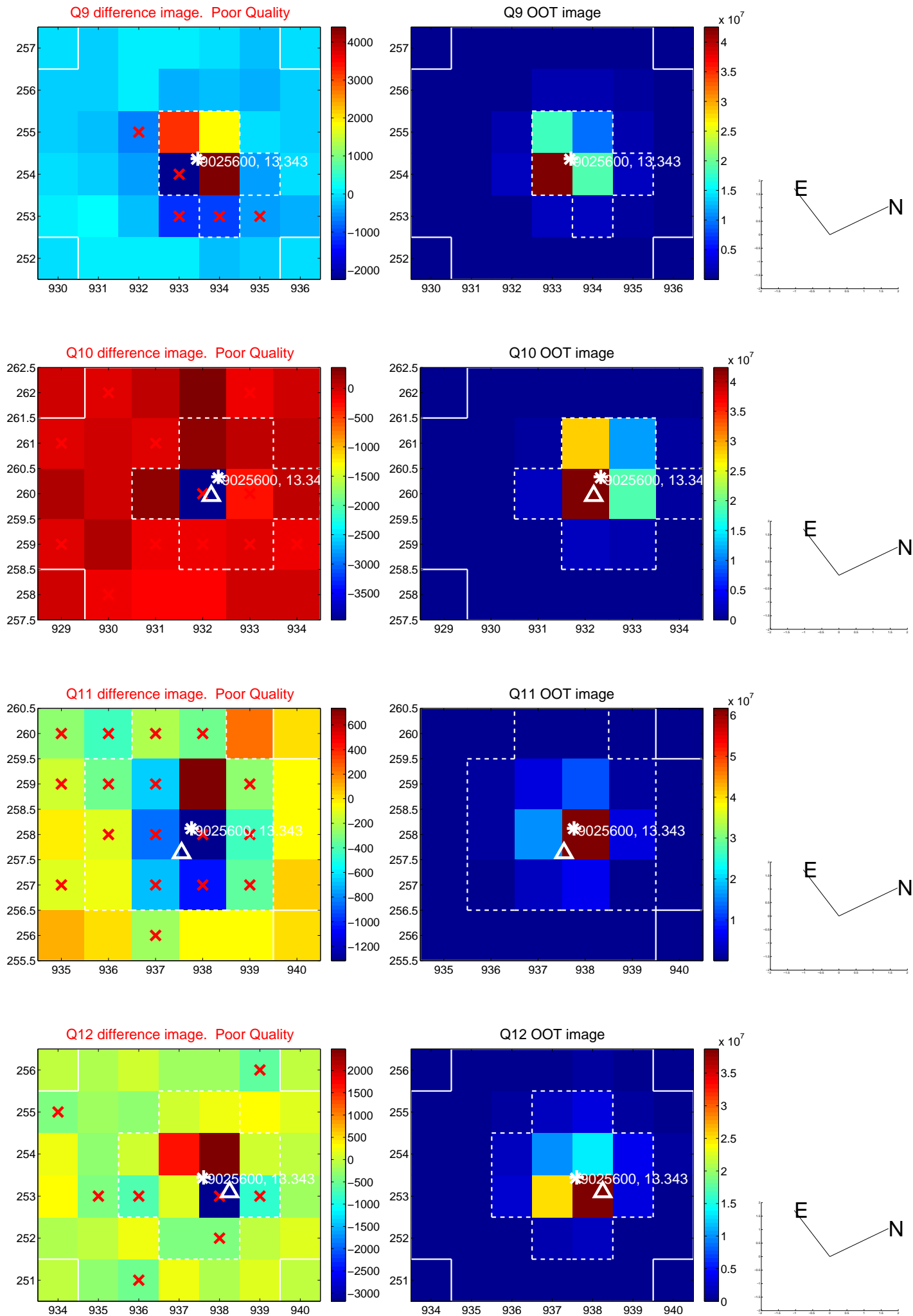
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



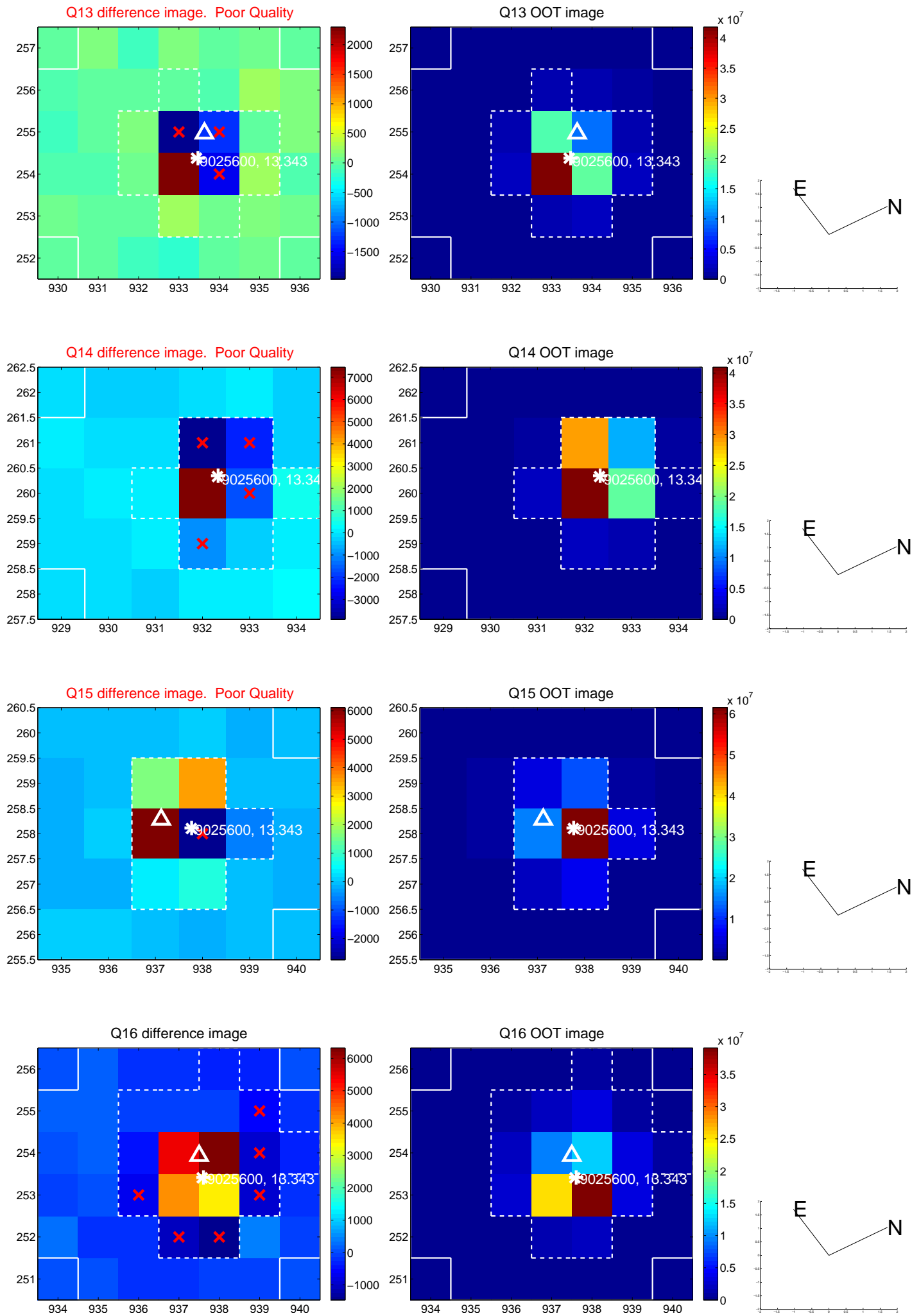
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



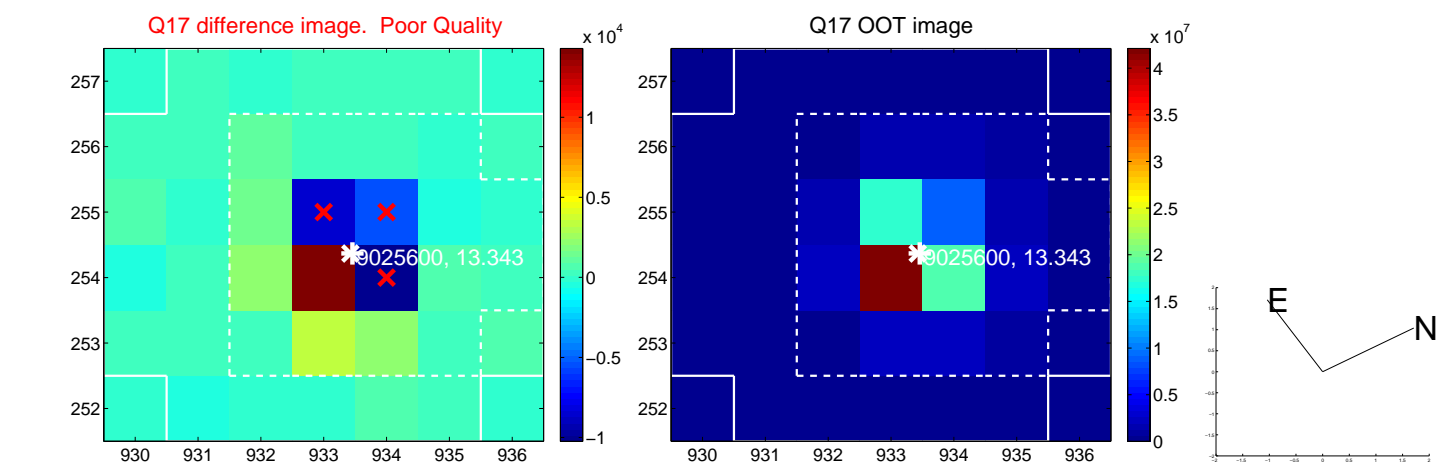
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



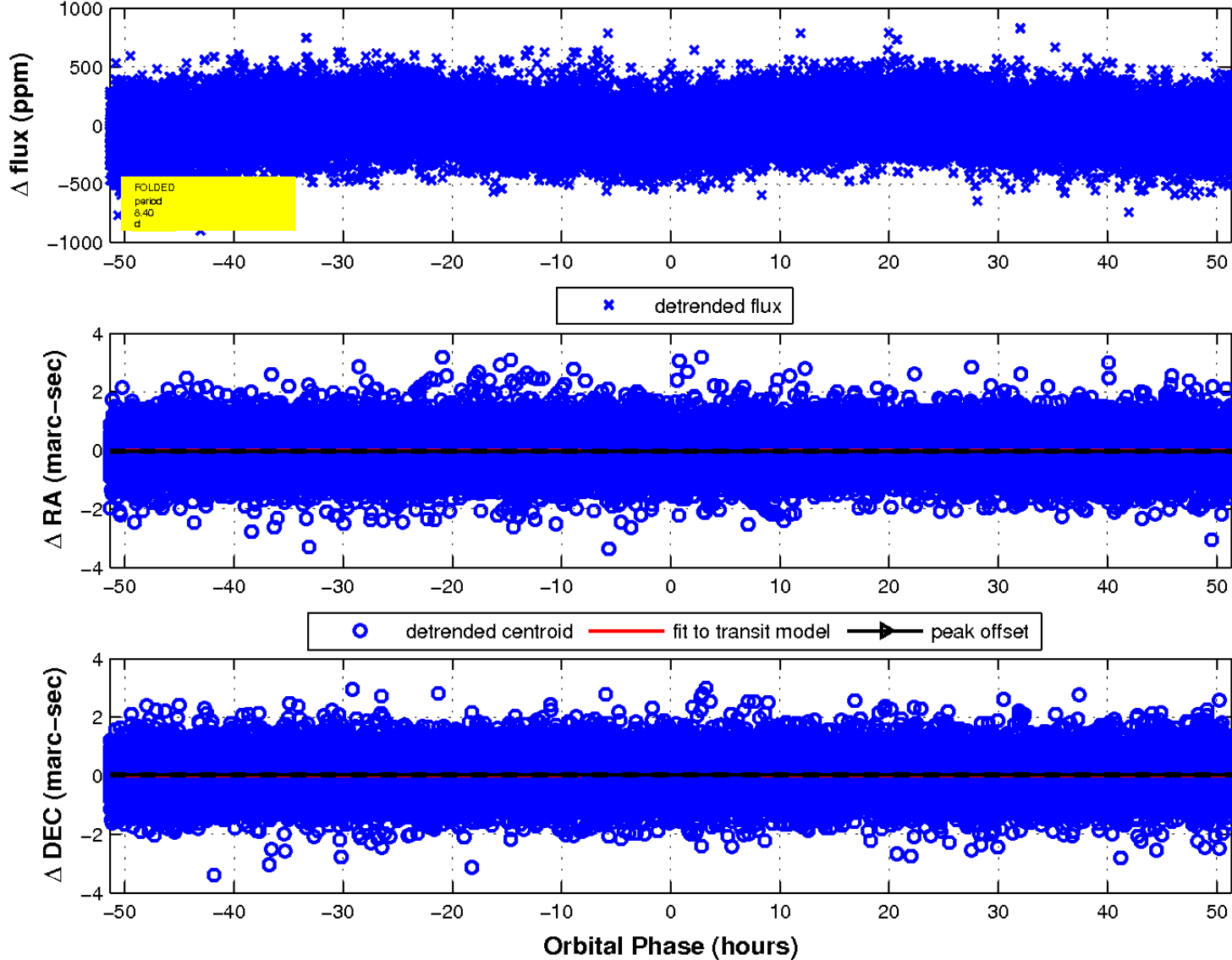
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

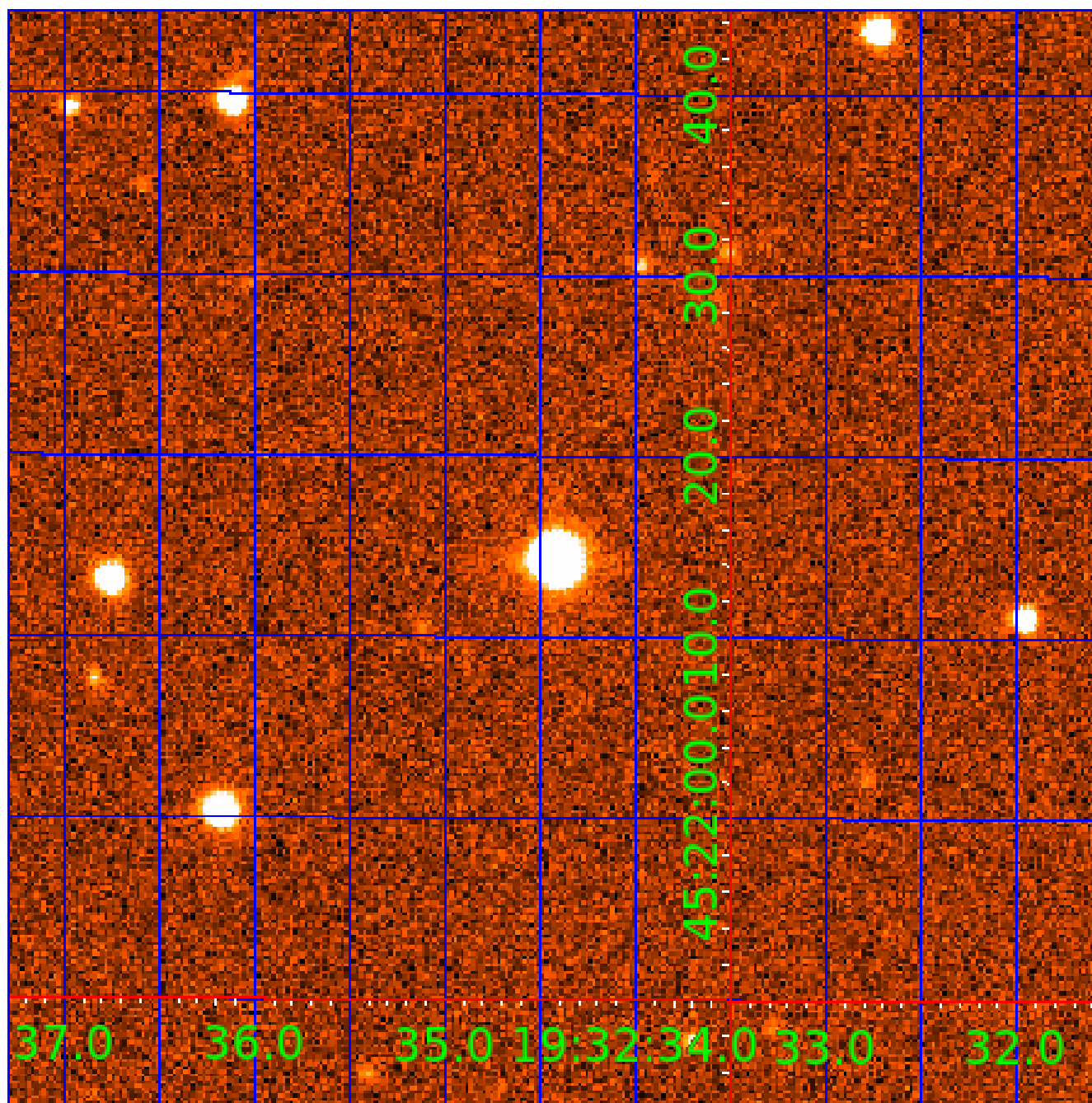


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 009025600

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009025600-01	OBS	No	8.401466	136.718838	34.8	17.119	8.9	6.3	1.82	6669	1.23	874.11
009025600-02	OBS	No	4.202182	134.329240	30.4	21.024	9.5	8.9	1.82	6669	1.15	2201.61

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009025600-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009025600-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—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.

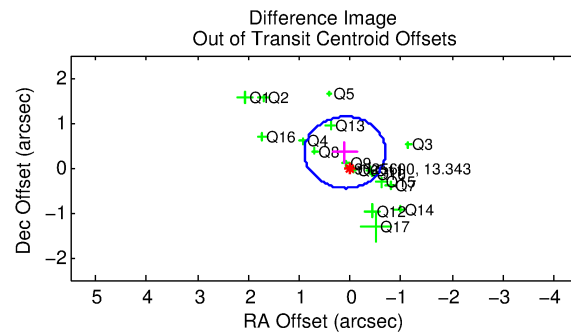
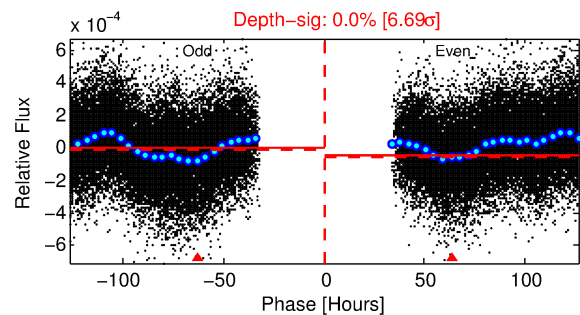
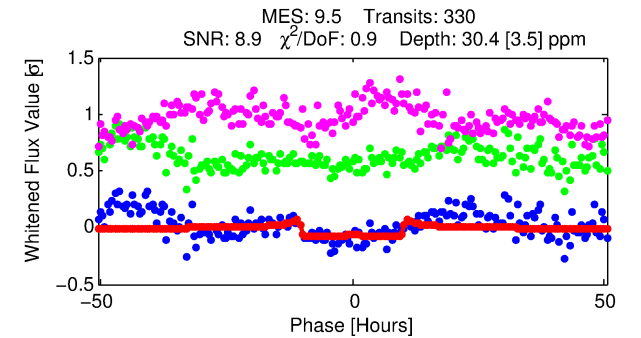
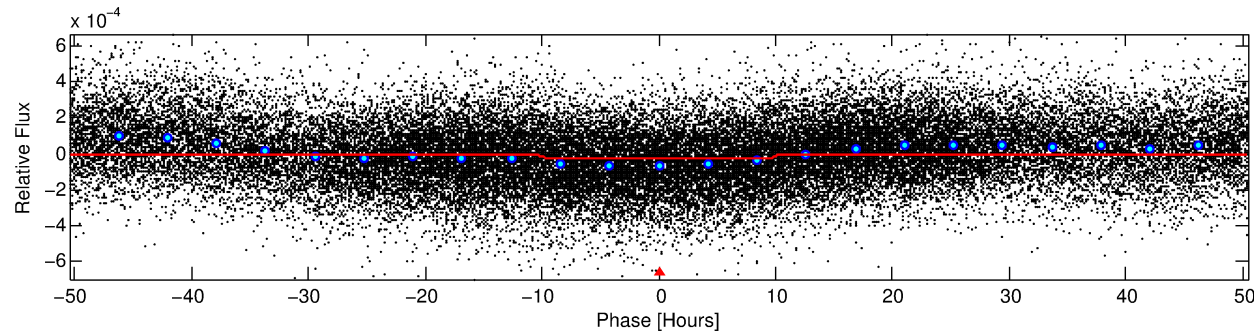
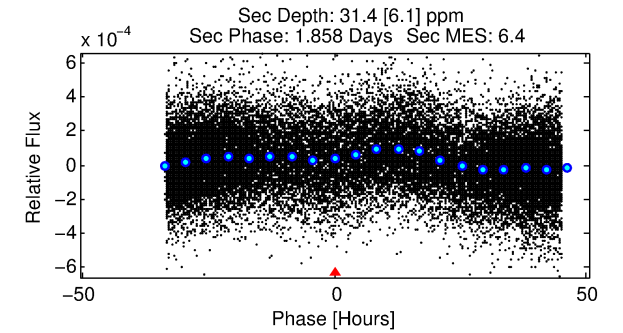
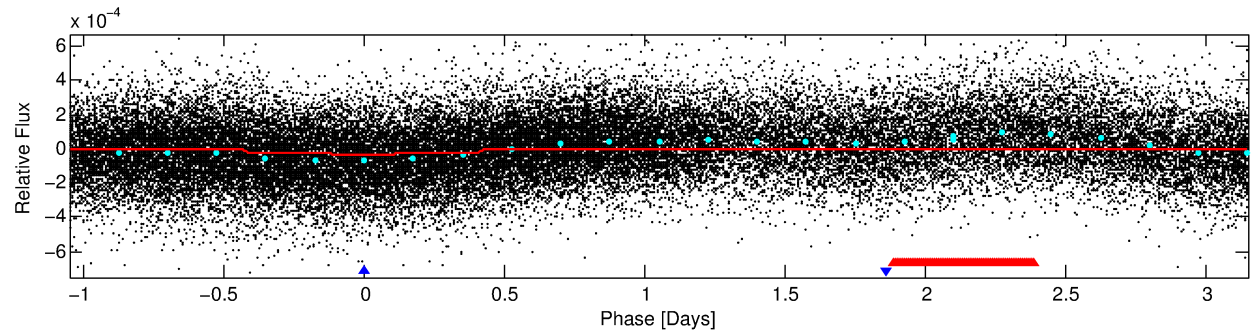
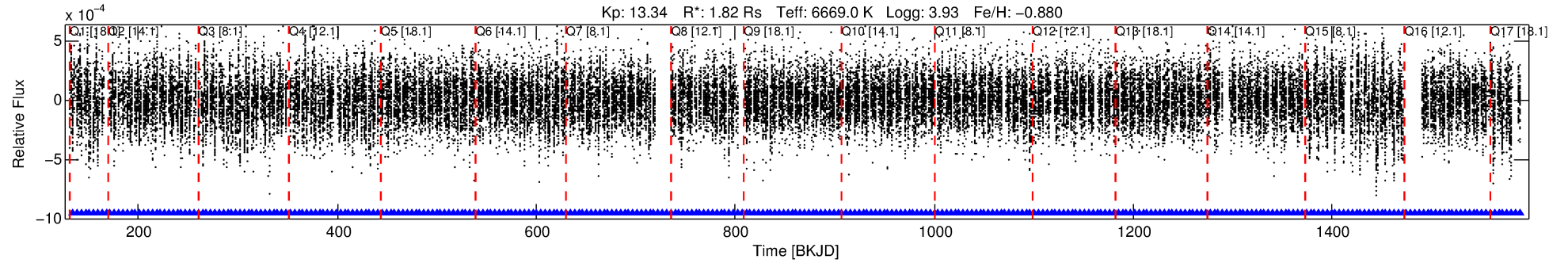
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009025600-02

No Significant Match Found

# DV One-Page Summary

KIC: 9025600 Candidate: 2 of 2 Period: 4.202 d



## DV Fit Results:

Period = 4.20218 [0.00006] d  
Epoch = 134.3292 [0.0104] BKJD  
Rp/R\* = 0.0058 [0.0006]  
a/R\* = 1.19 [0.19]  
b = 0.88 [0.14]  
Seff = 2201.61 [1137.65]  
Teq = 1747 [226] K  
Rp = 1.15 [0.39] Re  
a = 0.0516 [0.0160] AU  
Ag = 34.73 [20.12] [1.68σ]  
Teffp = 6556 [531] K [8.34σ]

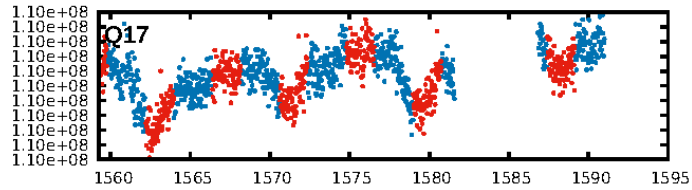
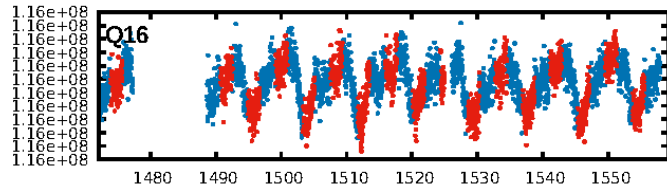
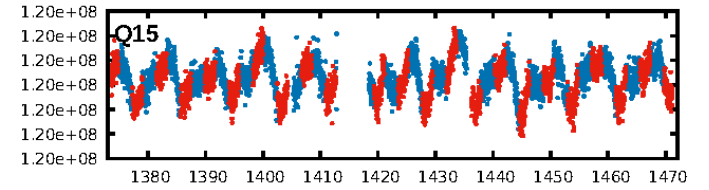
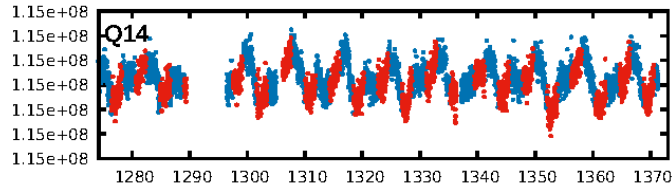
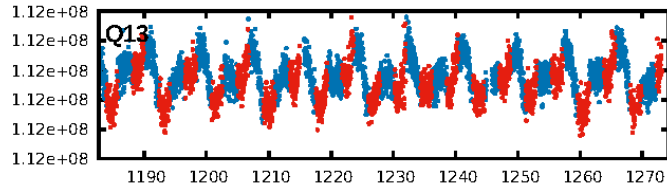
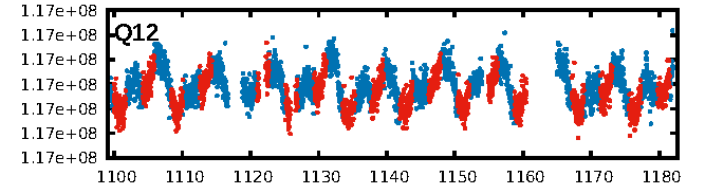
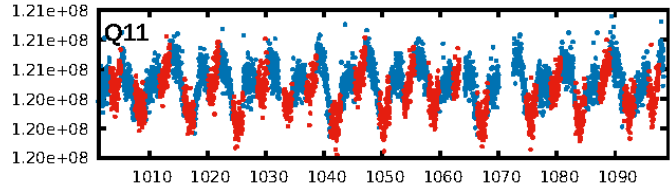
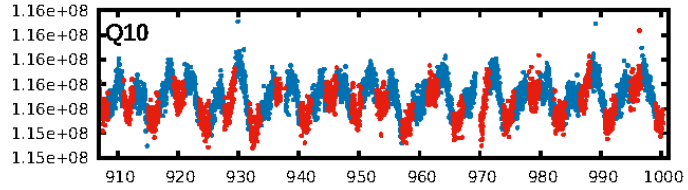
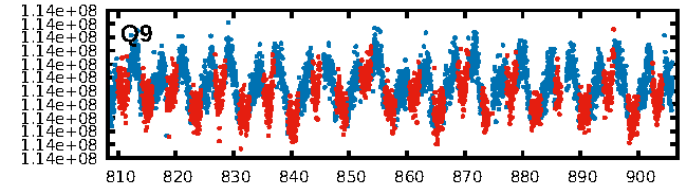
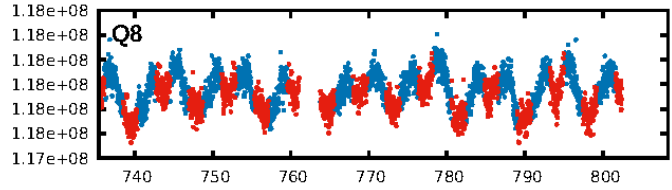
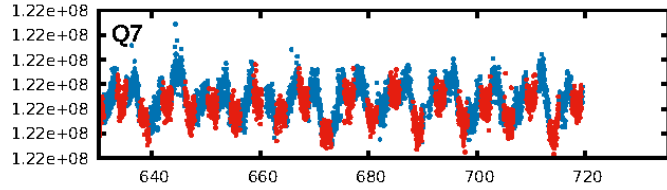
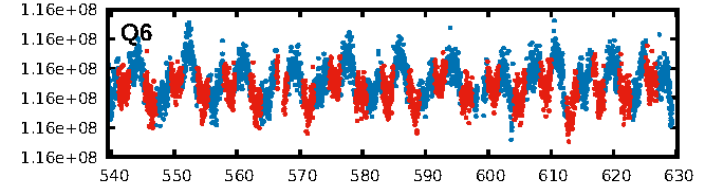
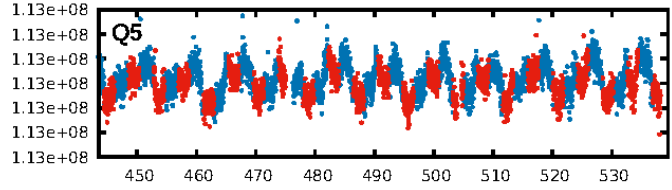
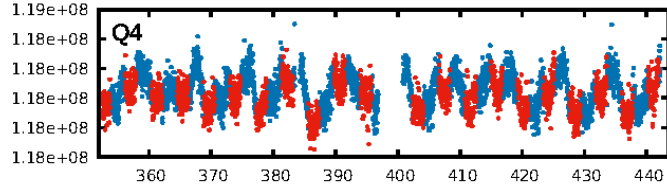
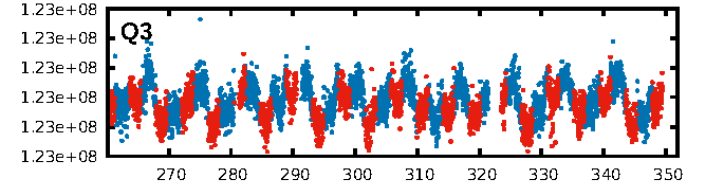
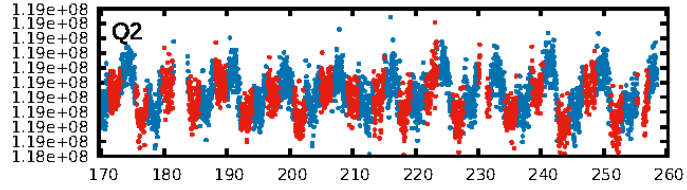
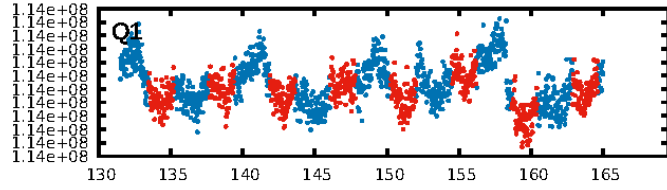
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [3.72σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.60e-14  
RollingBand-fgt: 1.00 [315/315]  
GhostDiagnostic-chr: 3.802  
Centroid-sig: 36.2%  
Centroid-so: 0.663 arcsec [1.09σ]  
OotOffset-rm: 0.353 arcsec [1.33σ]  
KicOffset-rm: 0.398 arcsec [1.57σ]  
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]

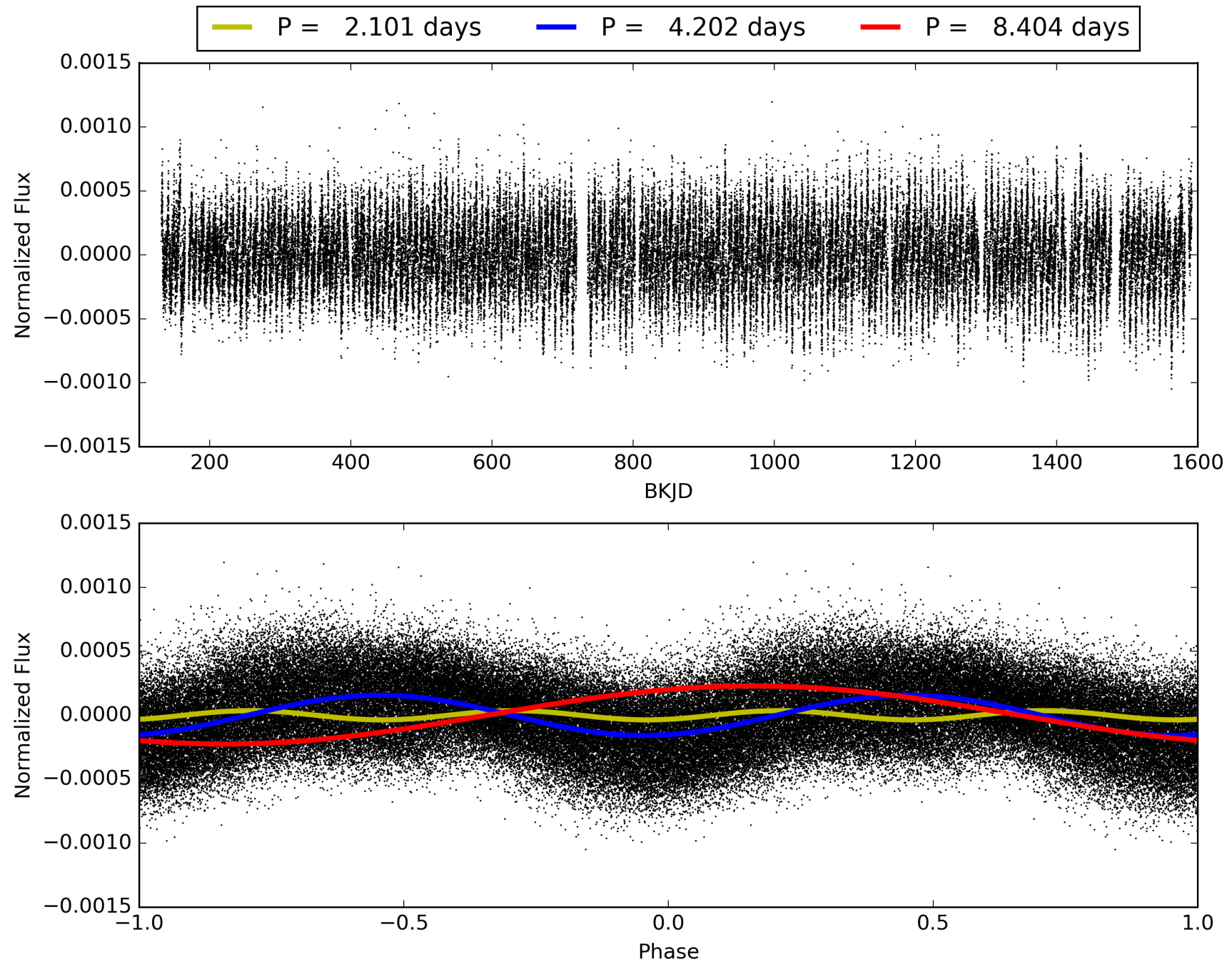
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:01:41 Z

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

## TCE 009025600-02, PDC Light Curves

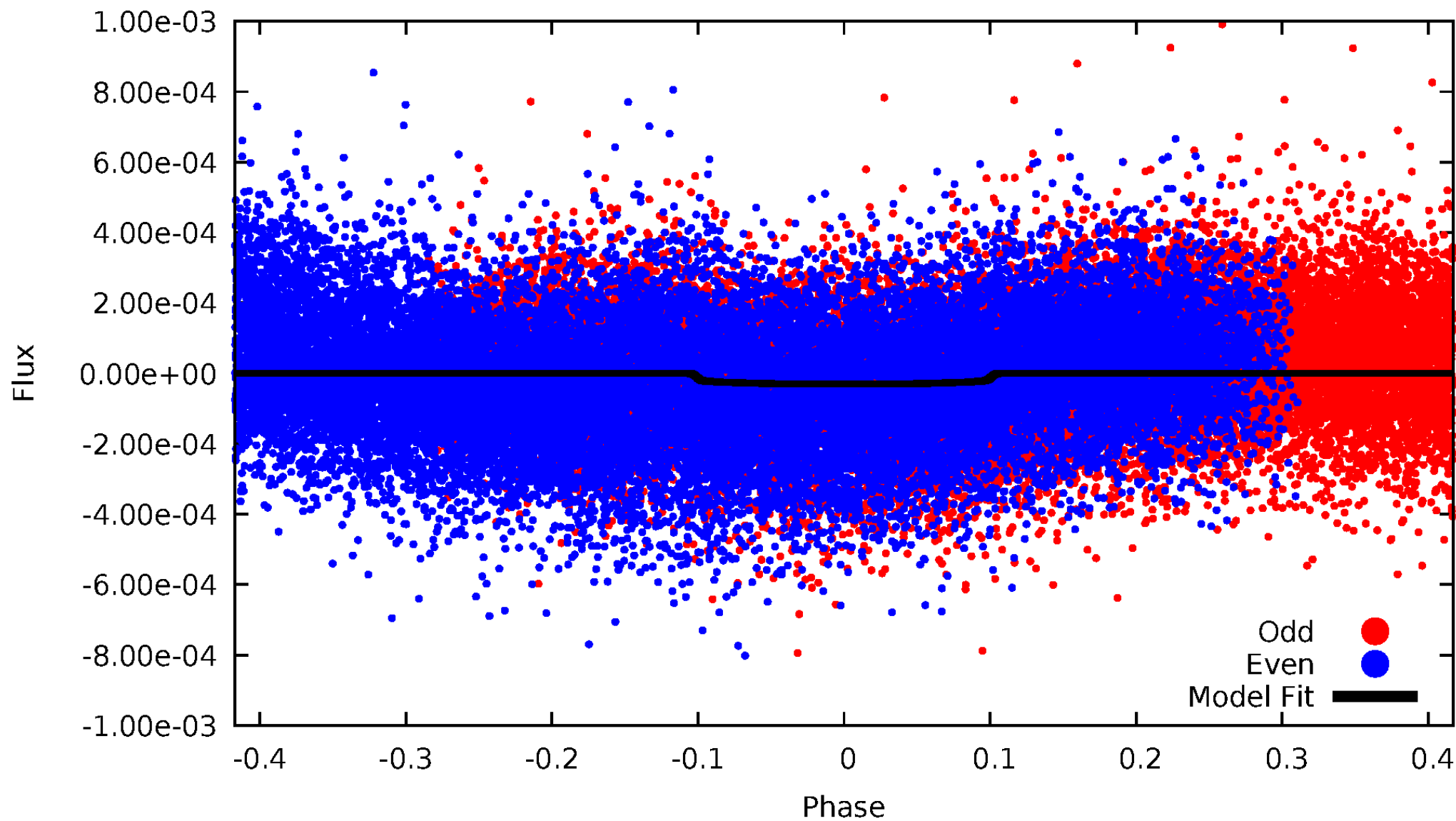


TCE 009025600-02



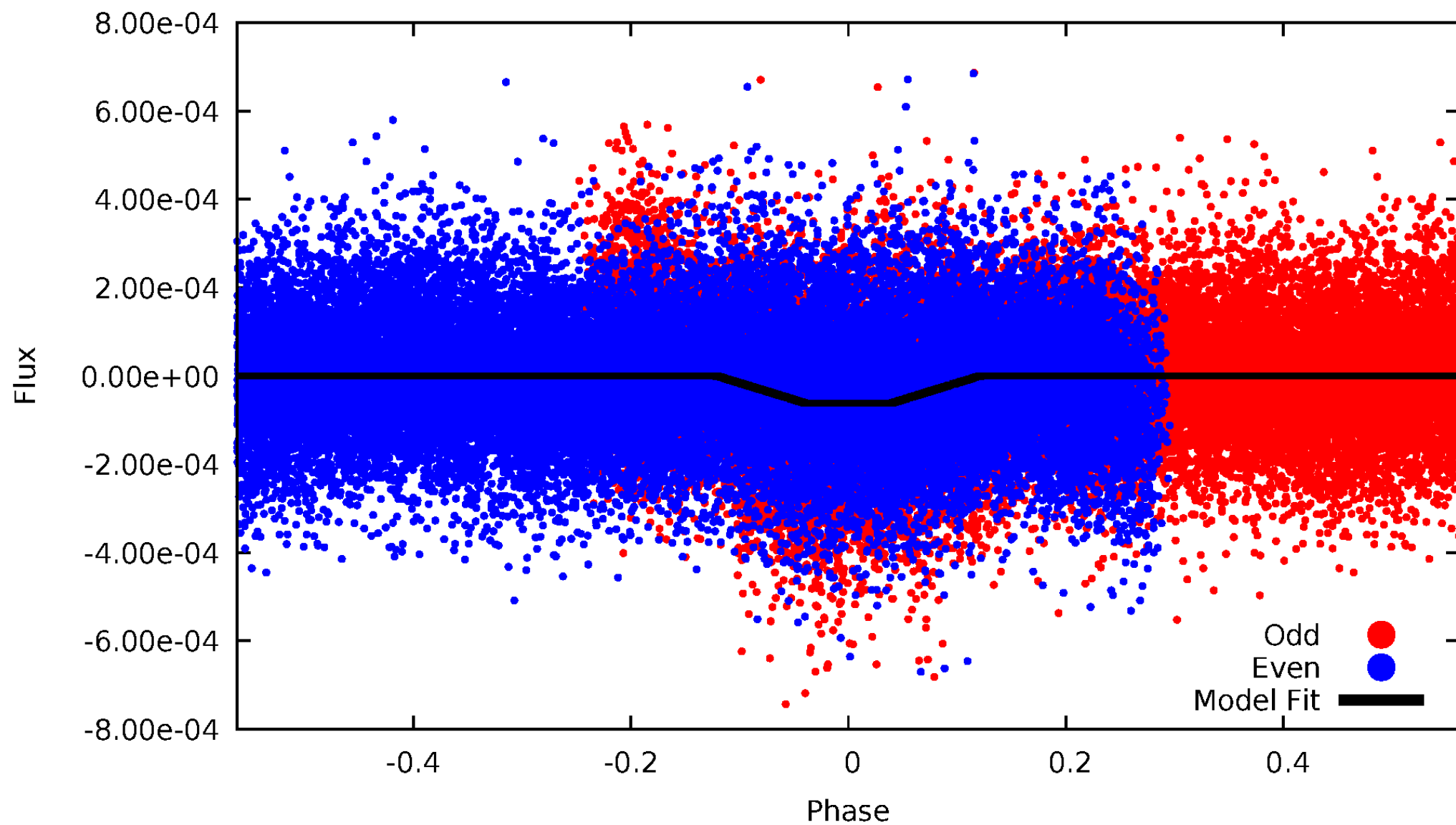
# DV Odd/Even

TCE 009025600-02



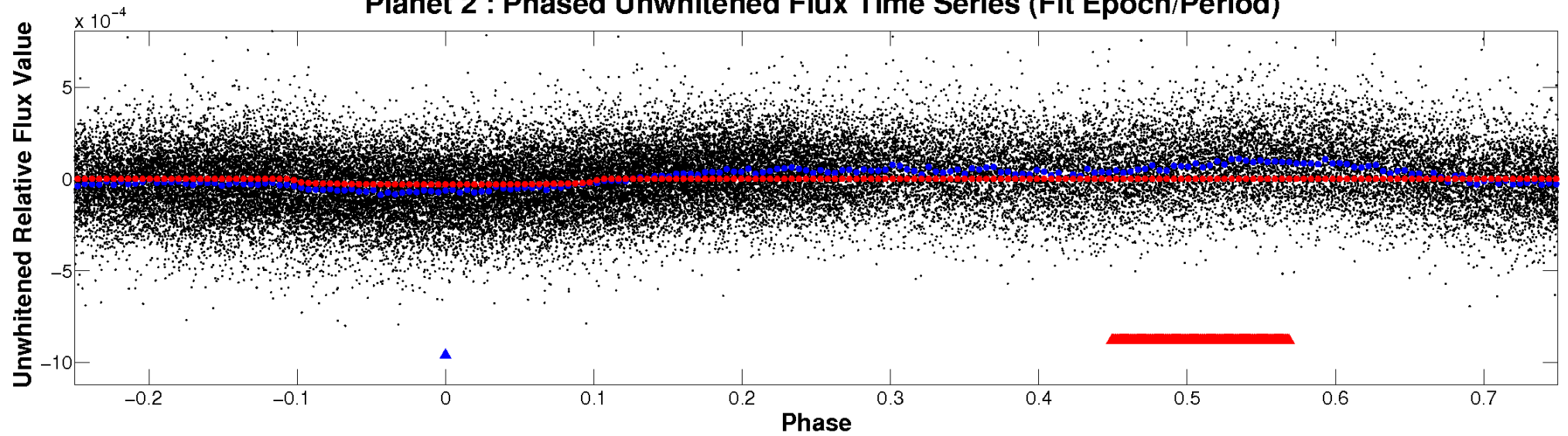
# ALT Odd/Even

TCE 009025600-02

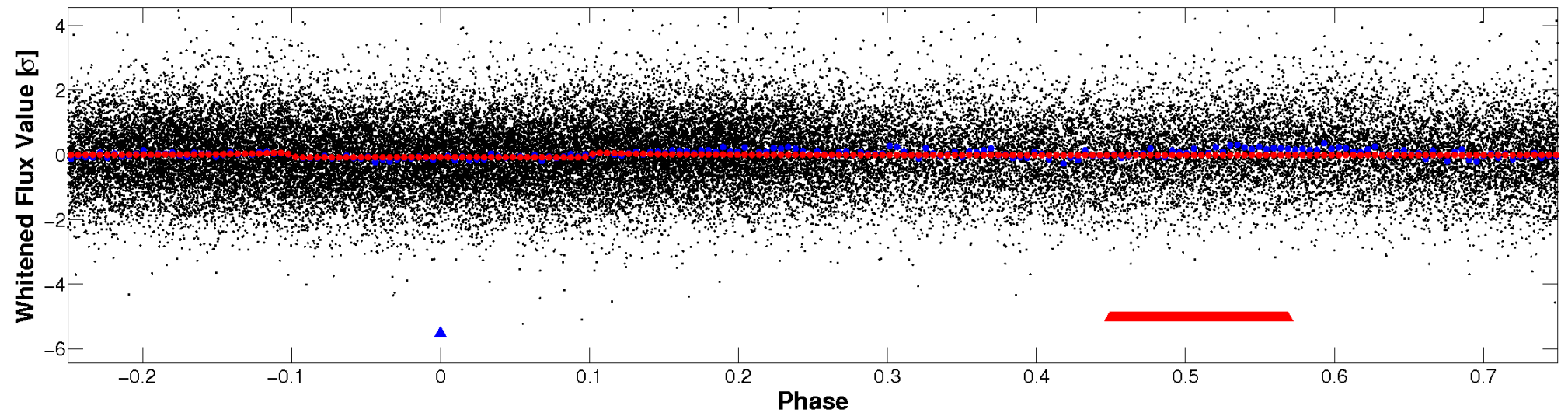


# Non-Whitened Vs. Whitened Light Curve

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

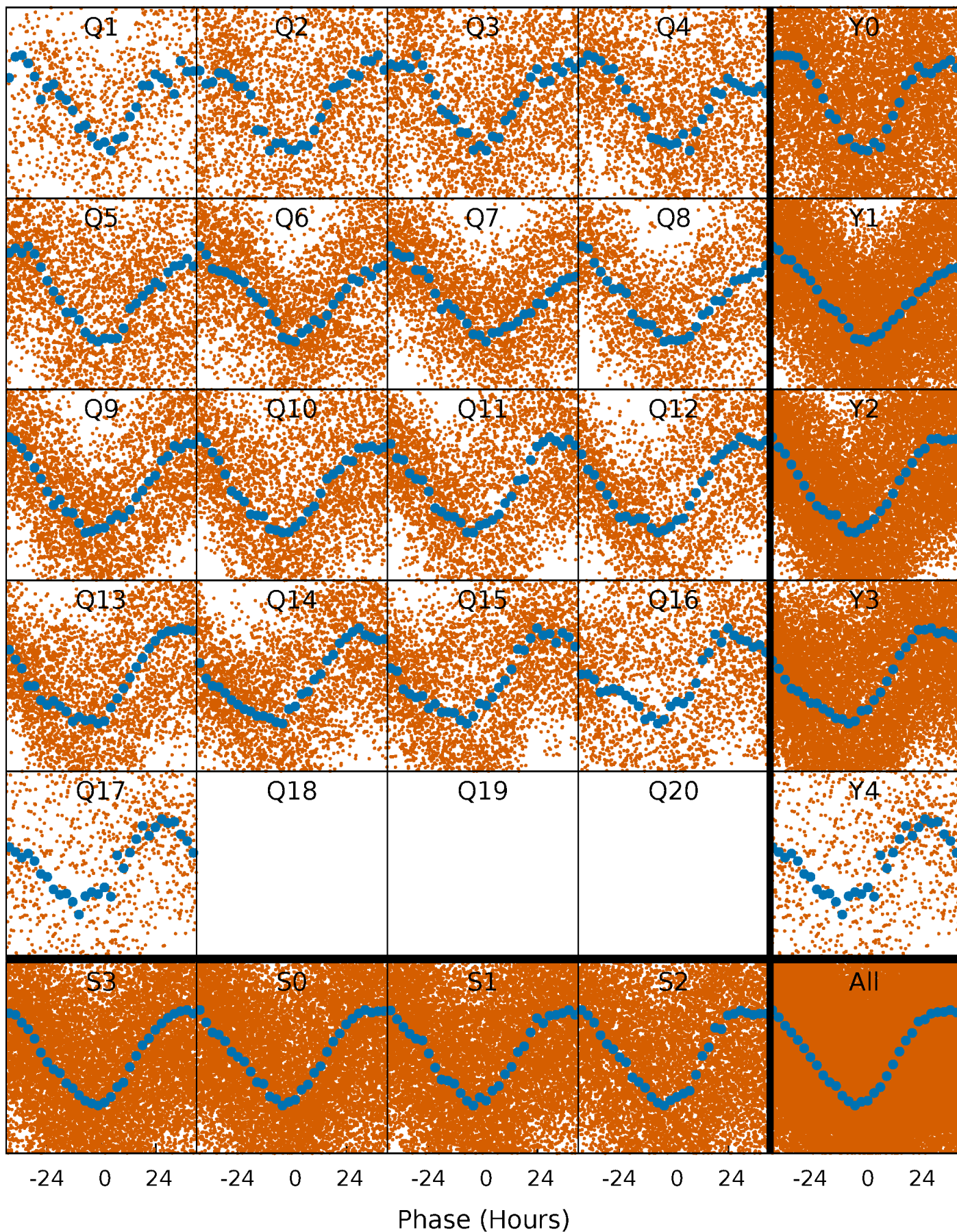


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



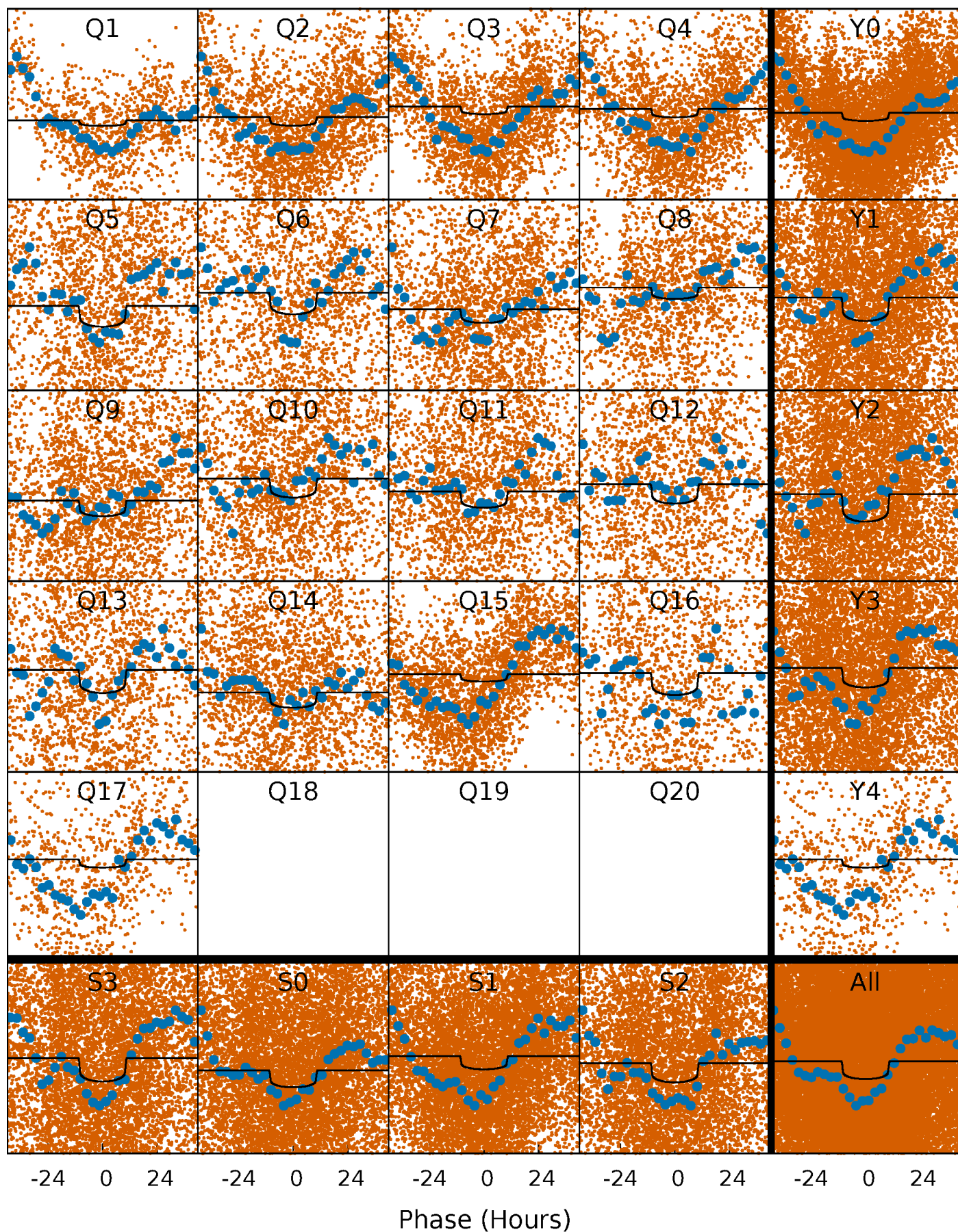
# PDC Quarter-Phased Transit Curves

TCE 009025600-02   P= 4.202182 Days    $T_0=134.329240$  (BKJD)



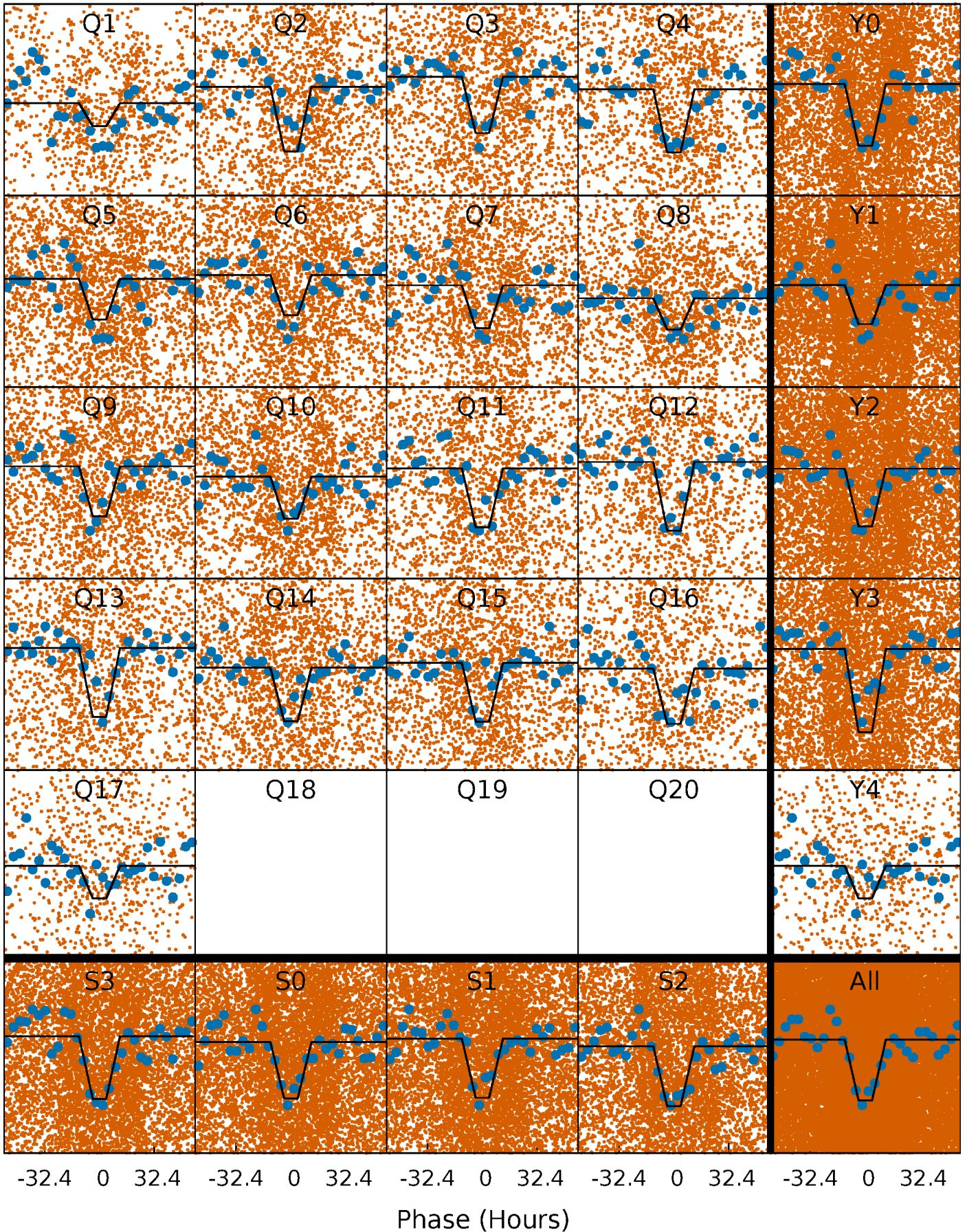
# DV Quarter-Phased Transit Curves

TCE 009025600-02     $P = 4.202182$  Days     $T_0 = 134.329240$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

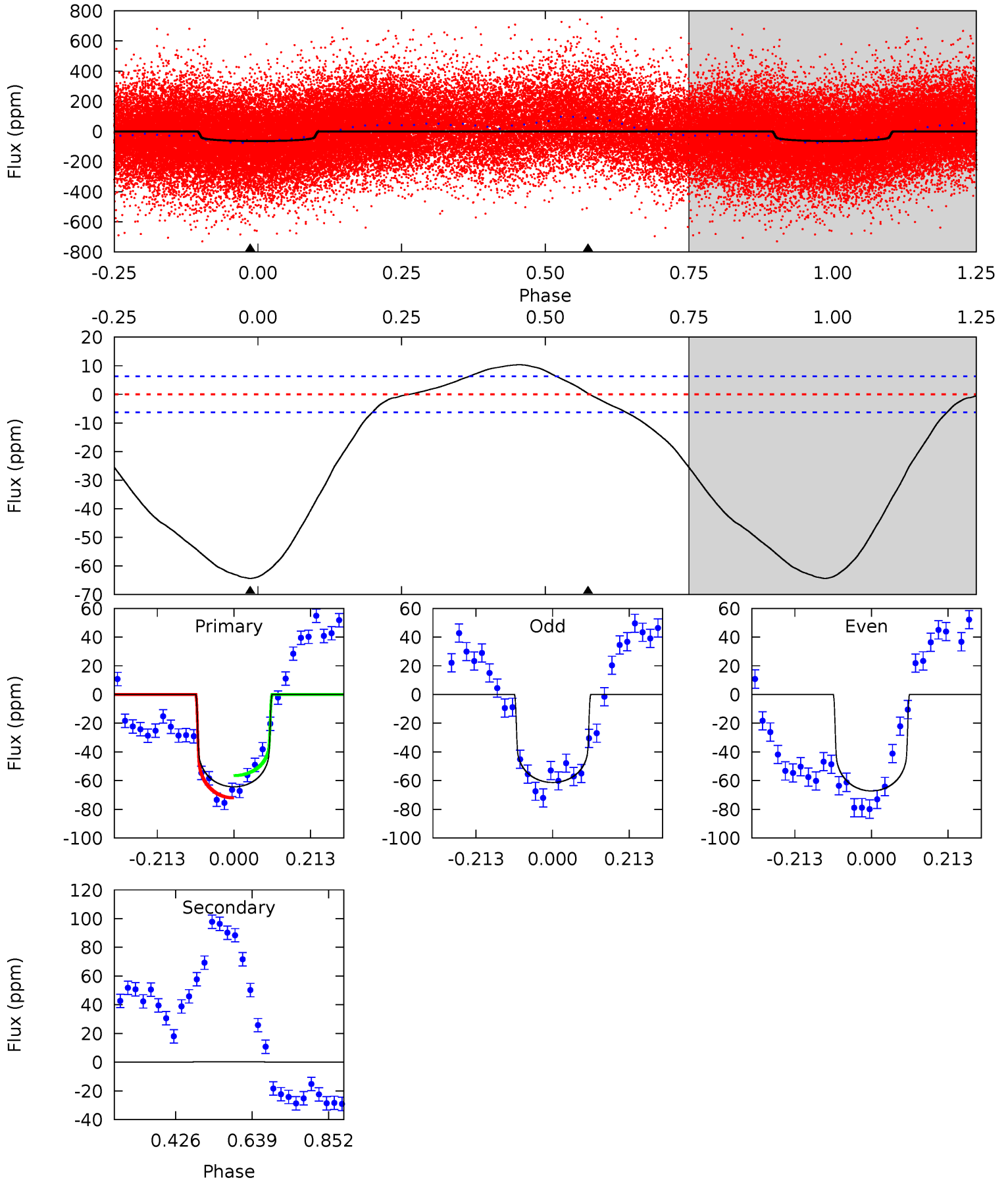
TCE 009025600-02     $P = 4.201507$  Days     $T_0 = 134.394305$  (BKJD)



# DV Model-Shift Uniqueness Test

009025600-02, P = 4.202182 Days, E = 130.127058 Days

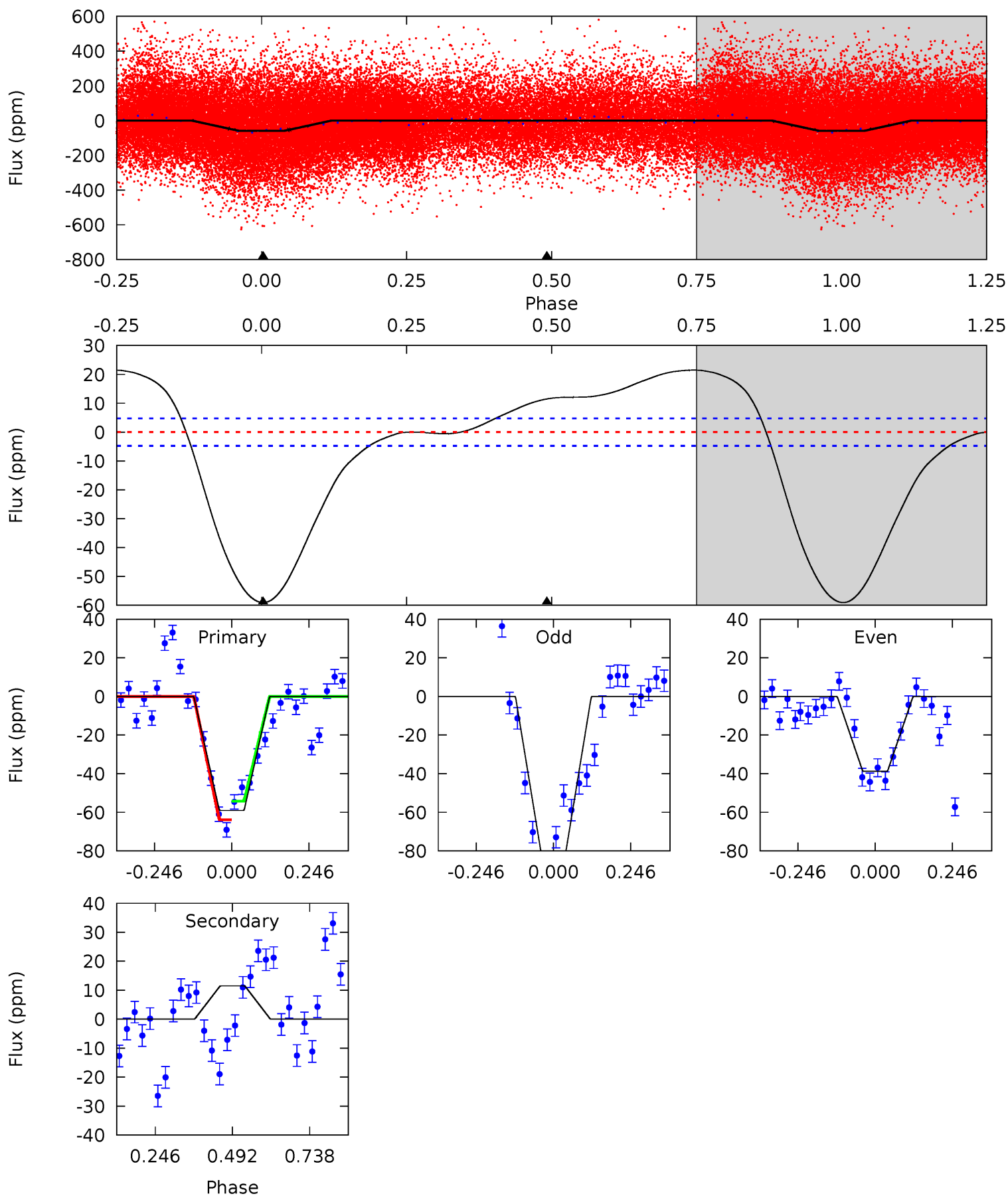
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
45.0	-0.24	0	0	4.40	1.25	2.02	45.0	45.0	-0.24	-0.24	2.12	1.20	0.14	5.53



# Alt Model-Shift Uniqueness Test

009025600-02, P = 4.201507 Days, E = 130.192798 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
54.4	-10.6	0	0	4.37	1.16	9.91	54.4	54.4	-10.6	-10.6	19.4	1.00	0.27	4.44



### Stellar Parameters For KIC 009025600

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6669^{+204}_{-224}$	$3.934^{+0.294}_{-0.105}$	$-0.880^{+0.350}_{-0.300}$	$1.817^{+0.386}_{-0.580}$	$1.035^{+0.149}_{-0.134}$	$0.243^{+0.479}_{-0.091}$
	+3%/-3%	+7%/-3%	+40%/-34%	+21%/-32%	+14%/-13%	+197%/-38%
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 009025600-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1$	$1.10^{+0.20}_{-0.21}$	$2390^{+164}_{-193}$	$-2996^{+6261}_{-735}$	$-0.365^{+1.778}_{-1.934}$
Alt.	$11 \pm 1$	$1.51^{+0.24}_{-0.26}$	$2387^{+166}_{-185}$	$-4569^{+196}_{-213}$	$-7.469^{+1.926}_{-3.100}$

$T_{max}$  = 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

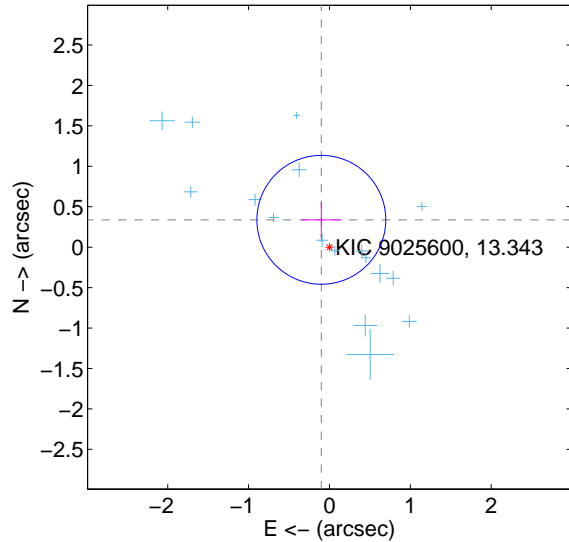
Supplemental centroid analysis for 009025600-02. Kepler magnitude: 13.34. Transit SNR 8.87

There are 17 quarters with good PRF difference image offsets

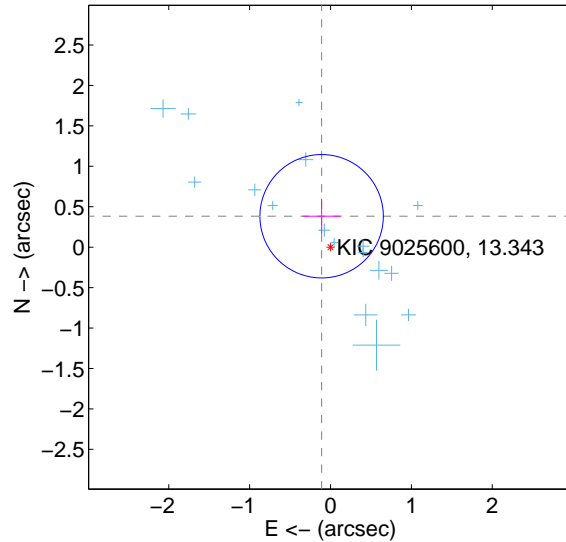
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.353 \pm 0.266$	1.33	$0.101 \pm 0.247$	$0.338 \pm 0.221$
PRF-fit source offset from KIC position	$0.398 \pm 0.254$	1.57	$0.110 \pm 0.233$	$0.383 \pm 0.216$
photometric centroid source offset	$0.66 \pm 0.61$	1.09	$-0.62 \pm 0.60$	$-0.22 \pm 0.67$

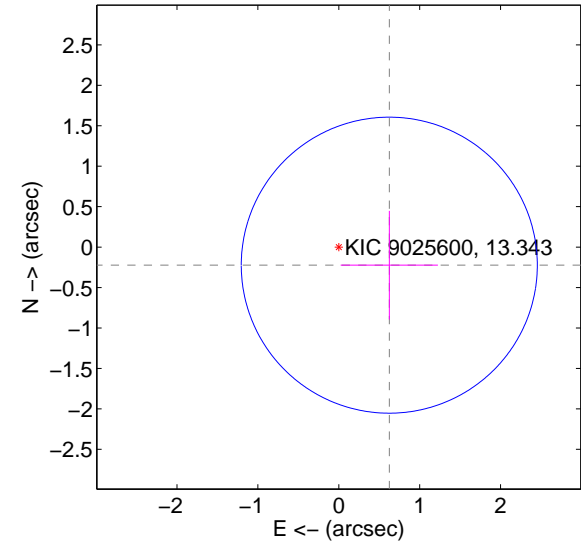
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

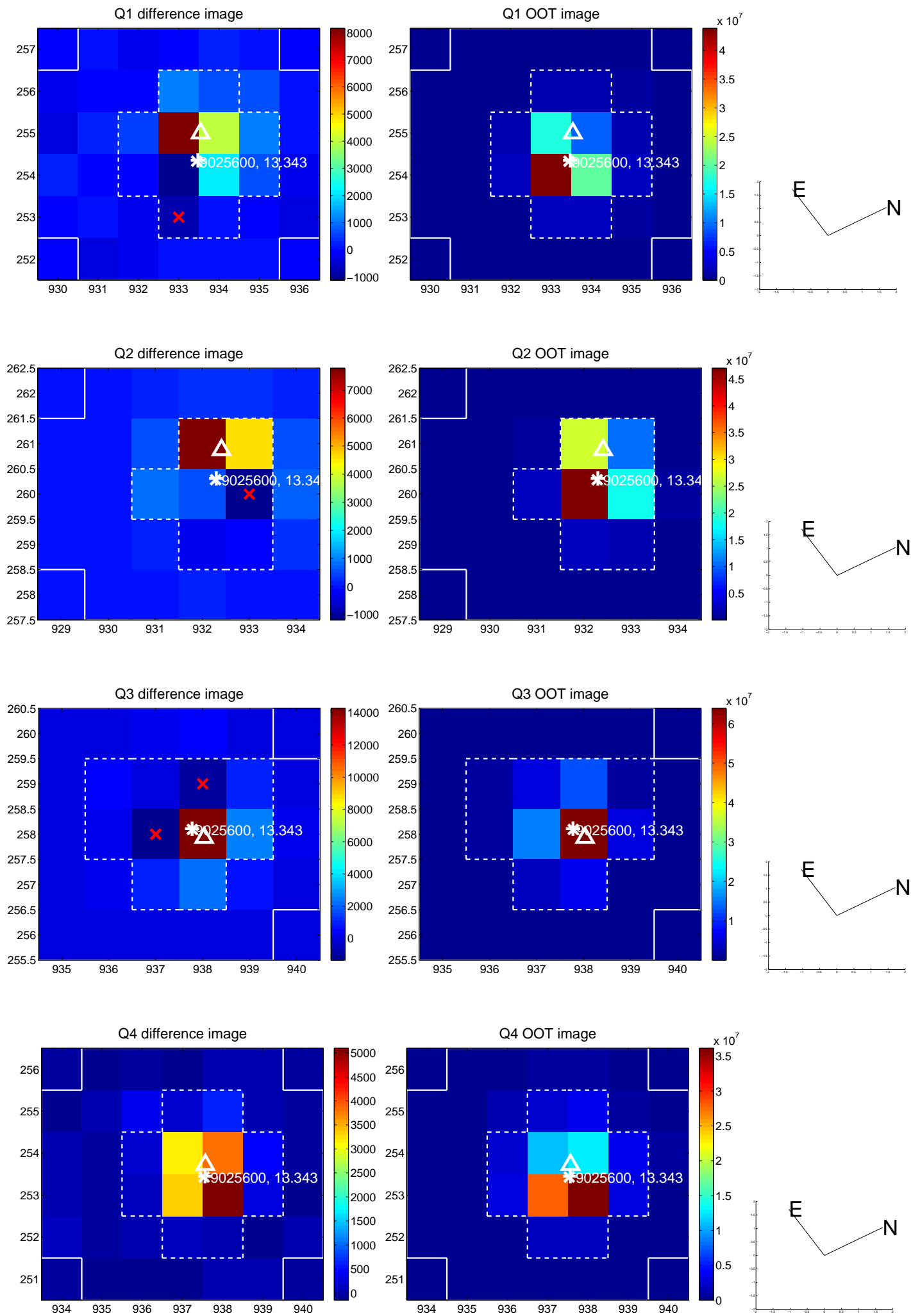


offset from photometric centroids

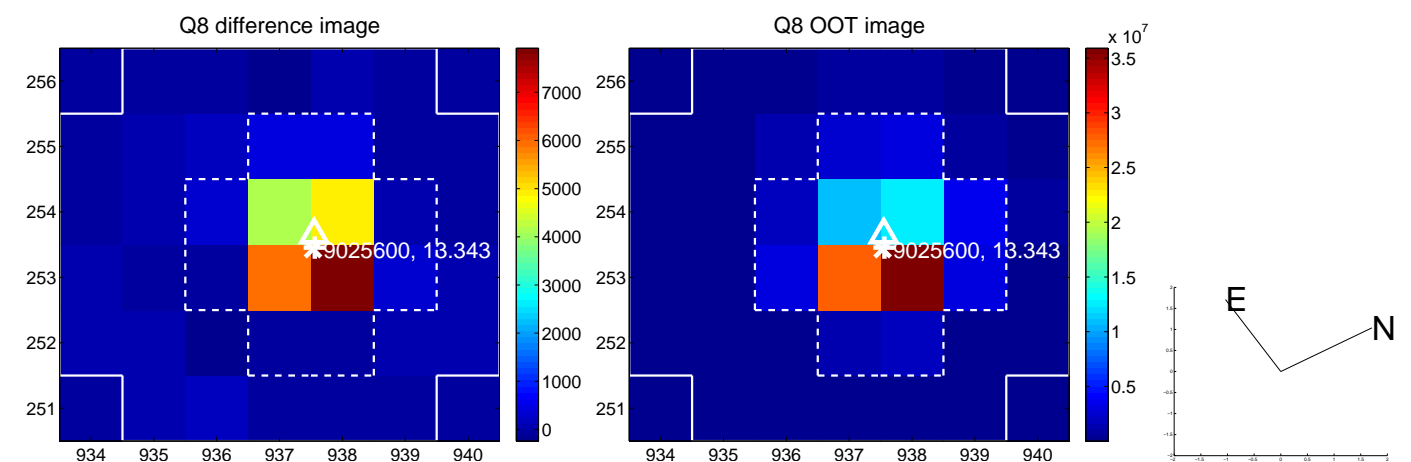
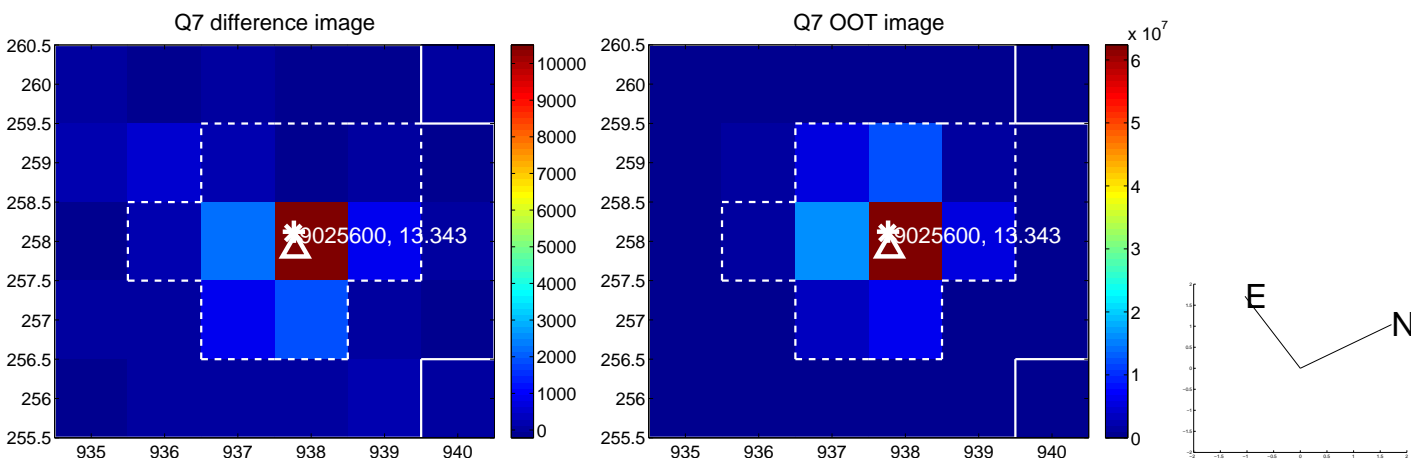
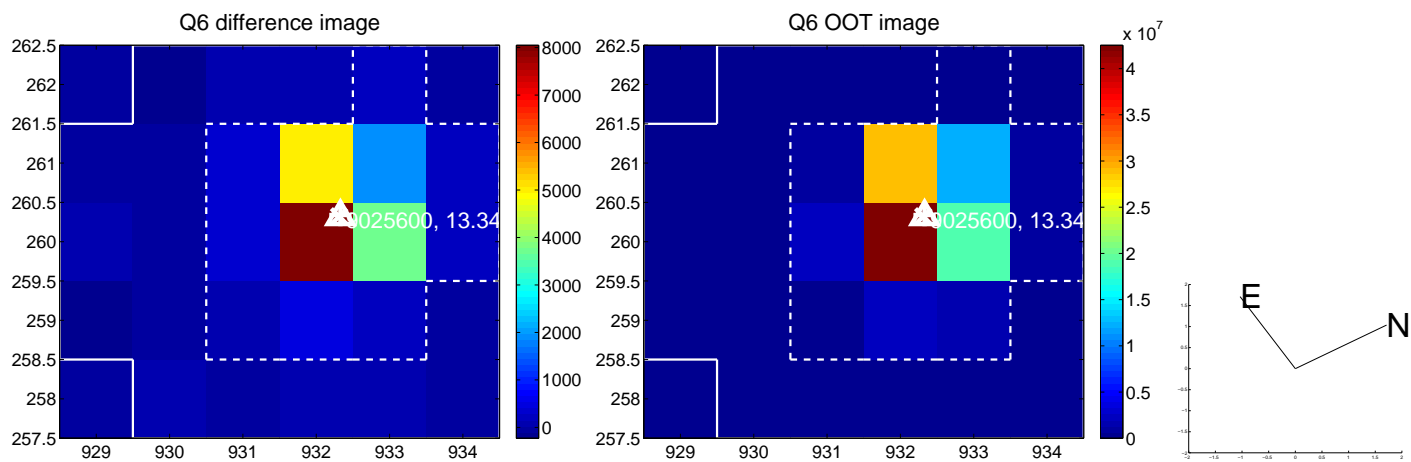
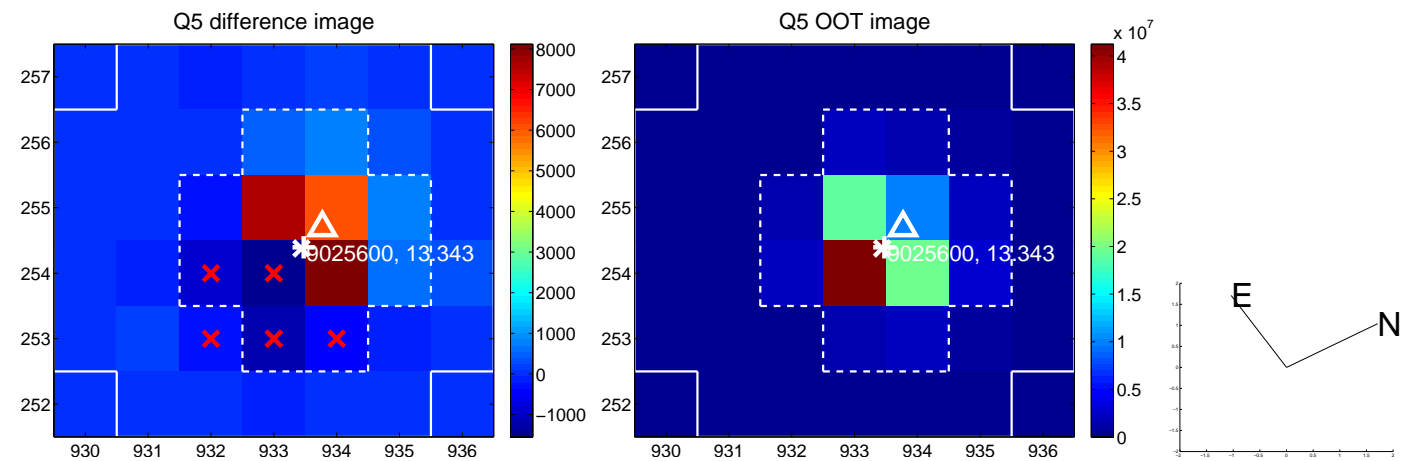


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

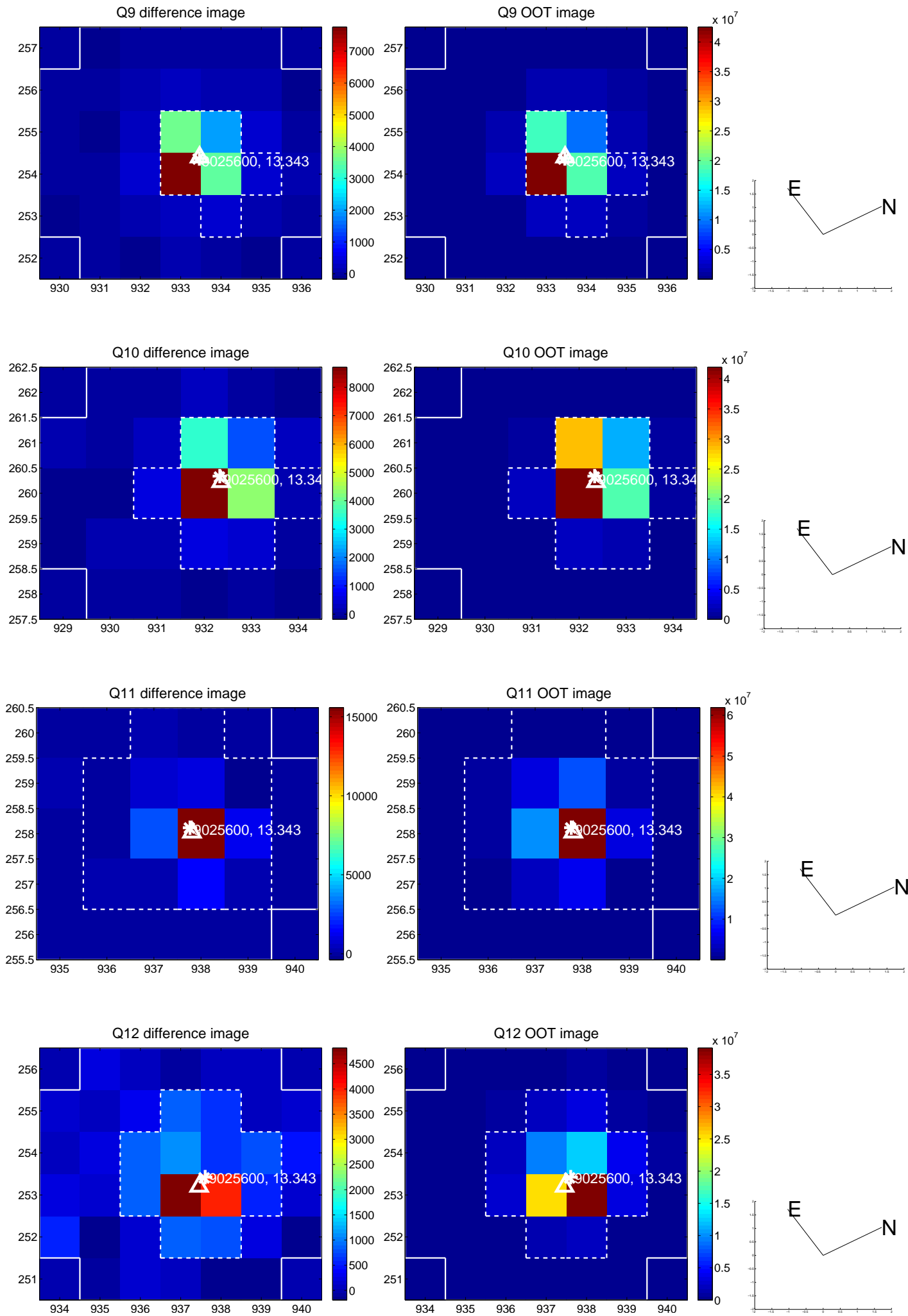
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



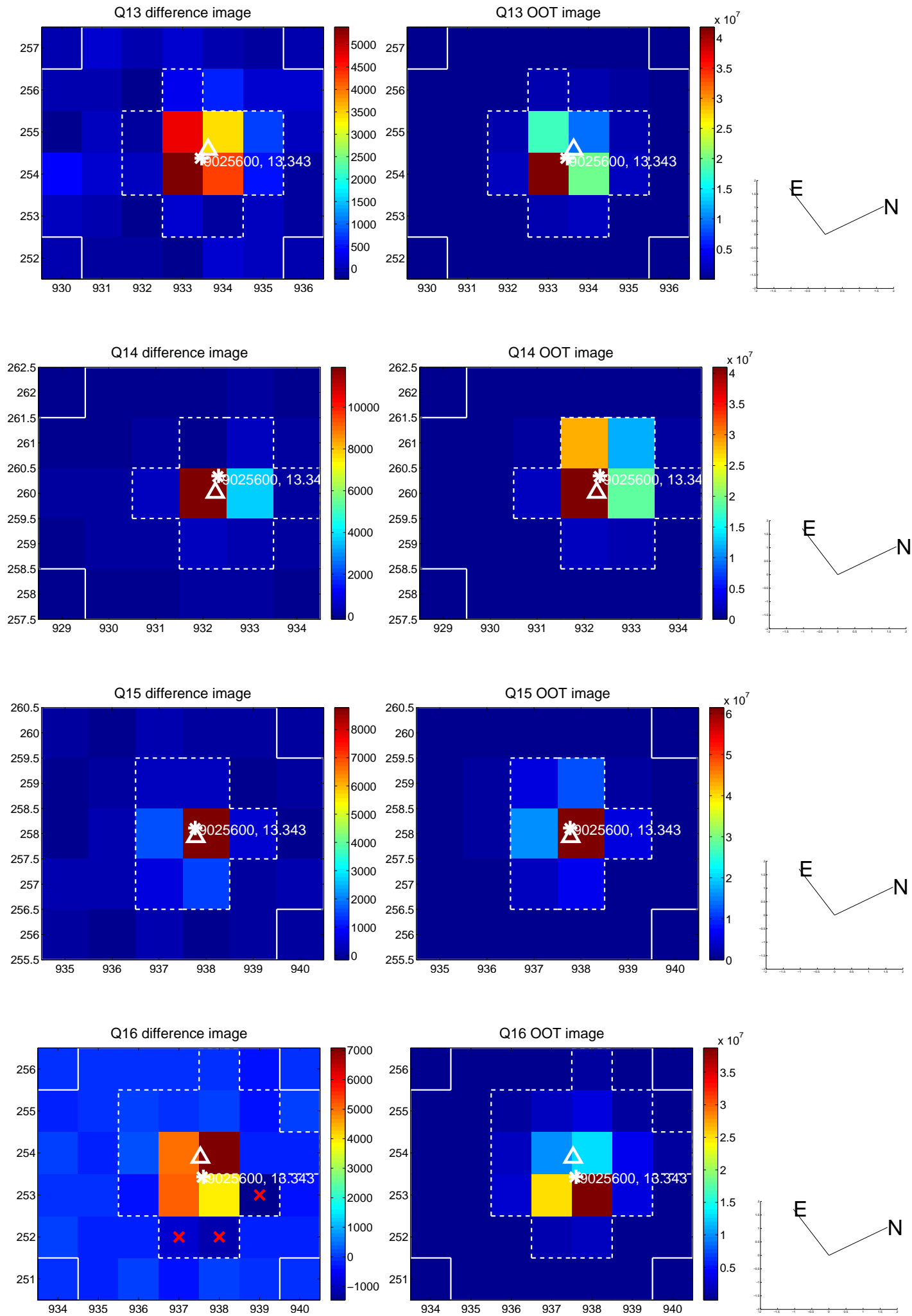
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



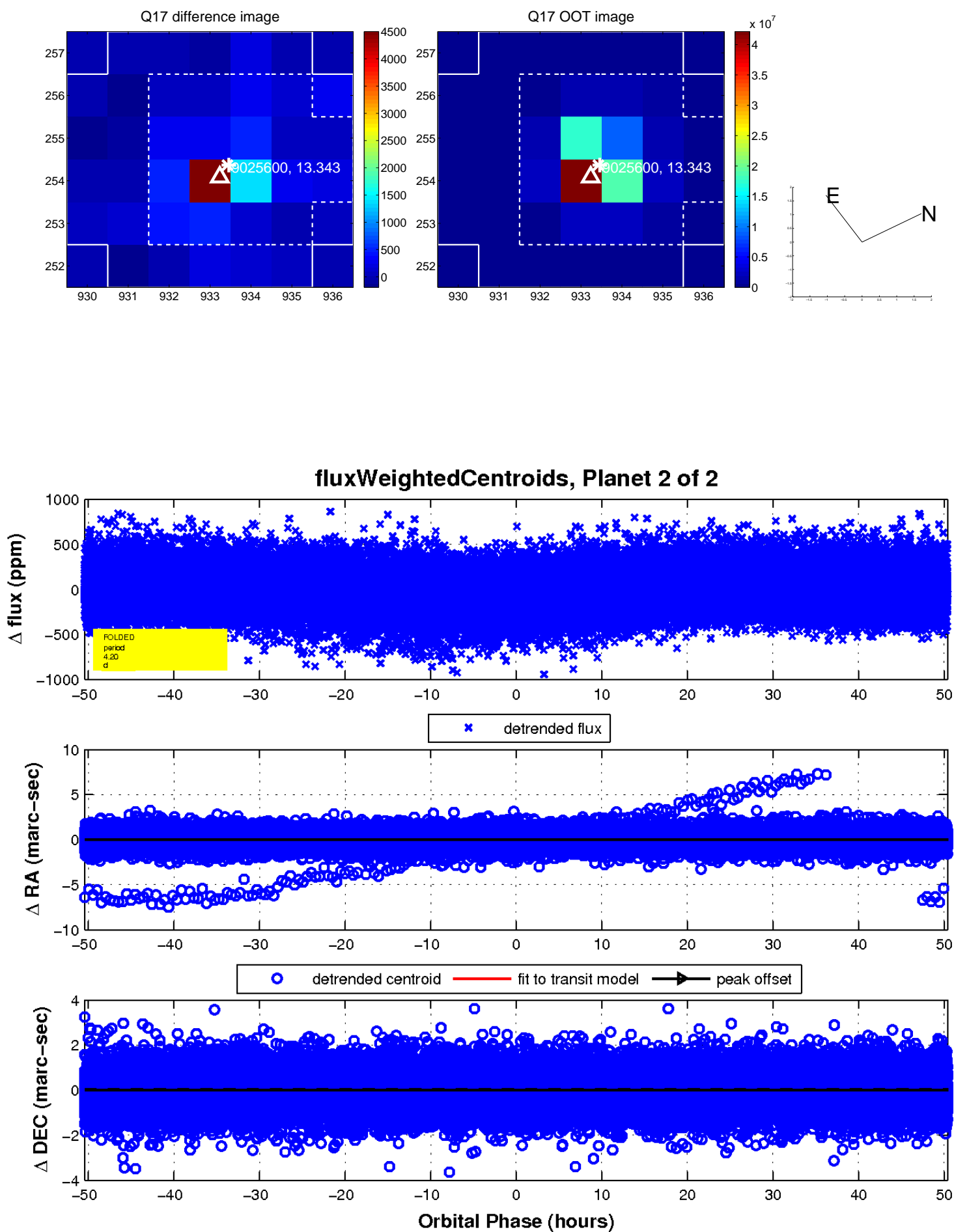
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

