

# KIC 009302543

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009302543-01	OBS	4272.01	1.214671	131.809402	126.4	7.228	13.9	11.9	3.28	6732	3.79	28167.95
009302543-02	OBS	No	168.896136	146.980295	2154.2	5.303	9.8	10.5	3.28	6732	27.91	39.10
009302543-03	OBS	No	51.178056	153.390023	651.1	1.470	9.5	3.0	3.28	6732	9.24	192.13
009302543-04	OBS	No	32.062512	139.838089	1364.6	2.483	10.0	10.1	3.28	6732	13.16	358.40
009302543-05	OBS	No	51.175646	153.599226	1675.6	2.147	9.8	9.5	3.28	6732	14.30	192.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009302543-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—CENT_SATURATED
009302543-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

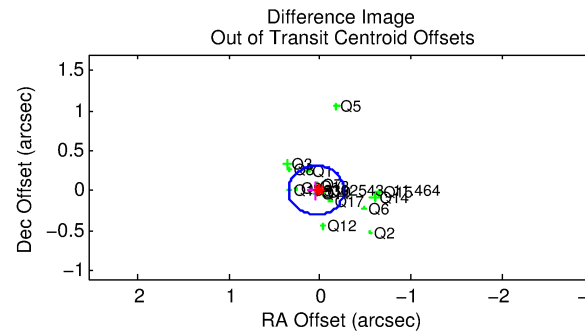
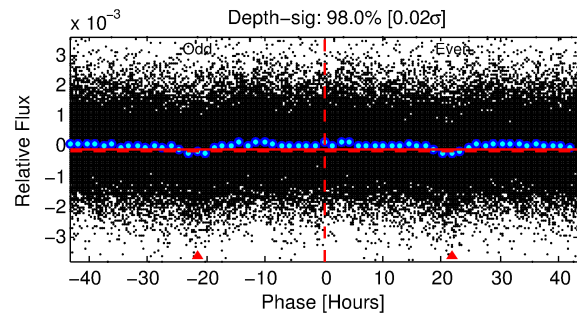
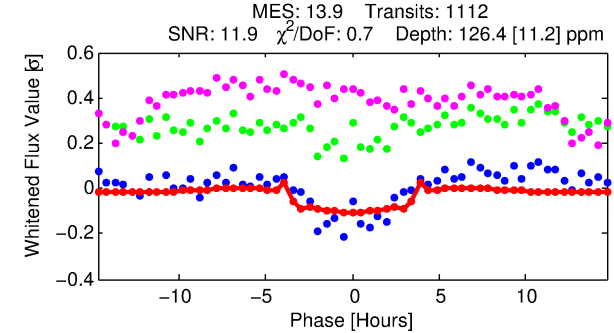
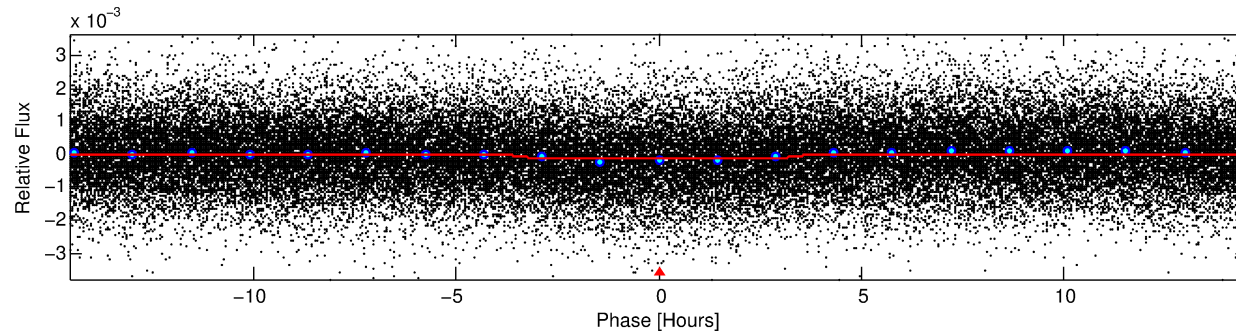
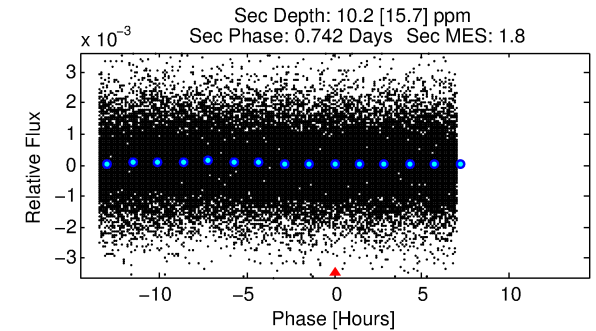
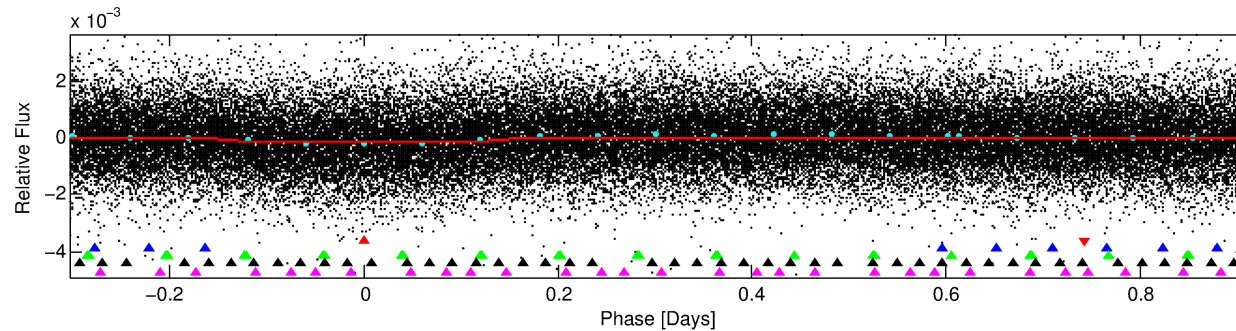
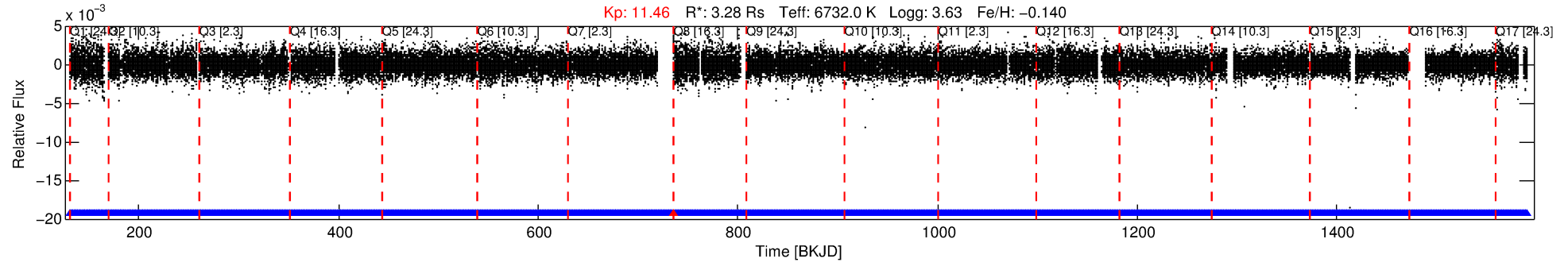
## Ephemeris Match Information For 009302543-01

No Significant Match Found

# DV One-Page Summary

KIC: 9302543 Candidate: 1 of 5 Period: 1.215 d

KOI: K04272.01 Corr: 0.924



## DV Fit Results:

Period = 1.21467 [0.00001] d  
Epoch = 131.8094 [0.0025] BKJD  
Rp/R\* = 0.0106 [0.0058]  
a/R\* = 1.37 [1.95]  
b = 0.44 [5.61]  
Seff = 28167.95 [27055.55]  
Teq = 3303 [793] K  
Rp = 3.79 [3.02] Re  
a = 0.0265 [0.0154] AU  
Ag = 0.27 [0.58] [-1.26σ]  
Teffp = 3692 [1753] K [0.20σ]

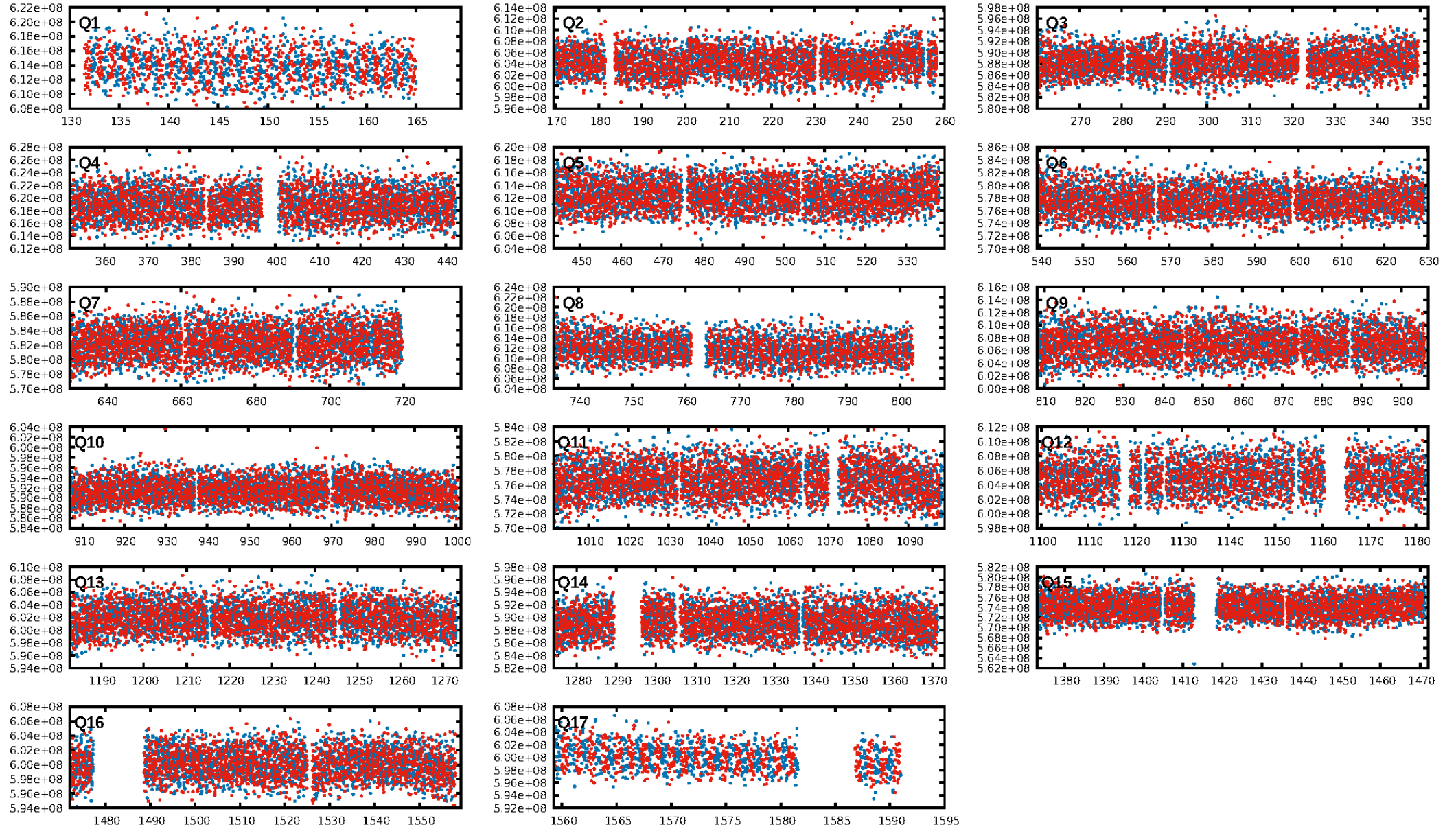
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [96.87σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.61e-27  
RollingBand-fgt: 1.00 [1061/1062]  
GhostDiagnostic-chr: 1.317  
Centroid-sig: 0.0%  
Centroid-so: 0.230 arcsec [3.72σ]  
OotOffset-rm: 0.041 arcsec [0.40σ]  
KicOffset-rm: 0.116 arcsec [1.07σ]  
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: 01-Feb-2016 13:21:19 Z

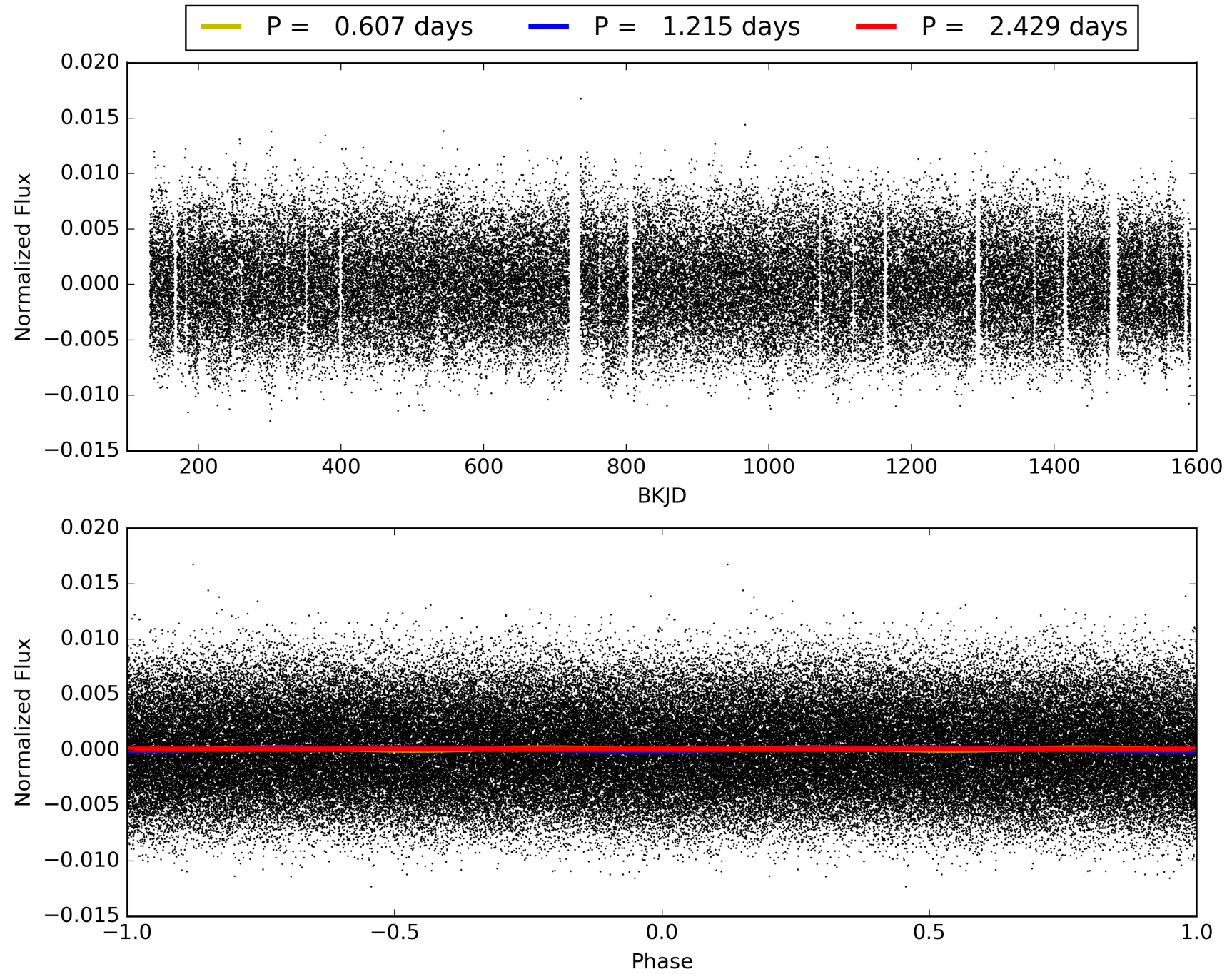
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009302543-01, PDC Light Curves





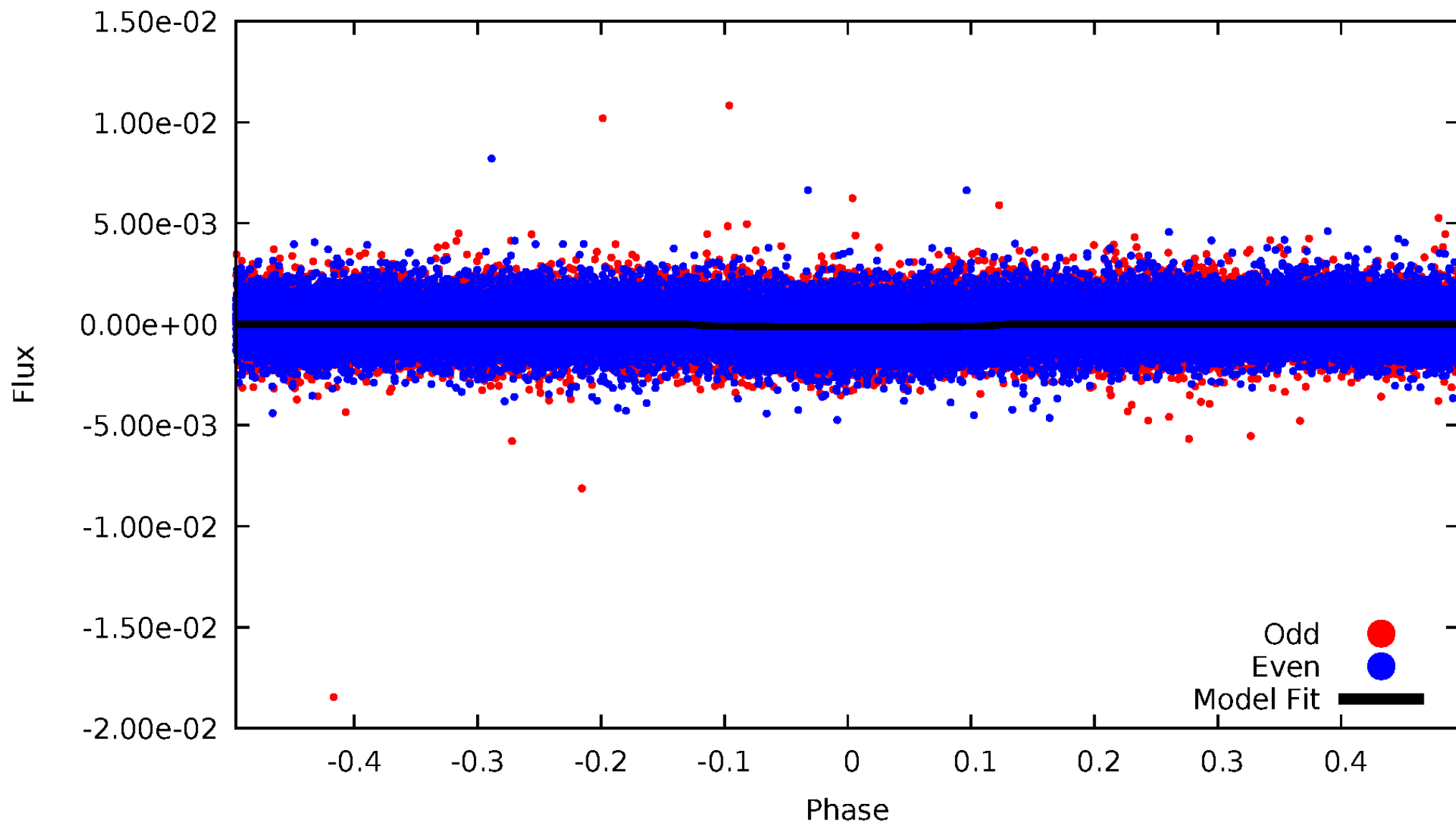
TCE 009302543-01





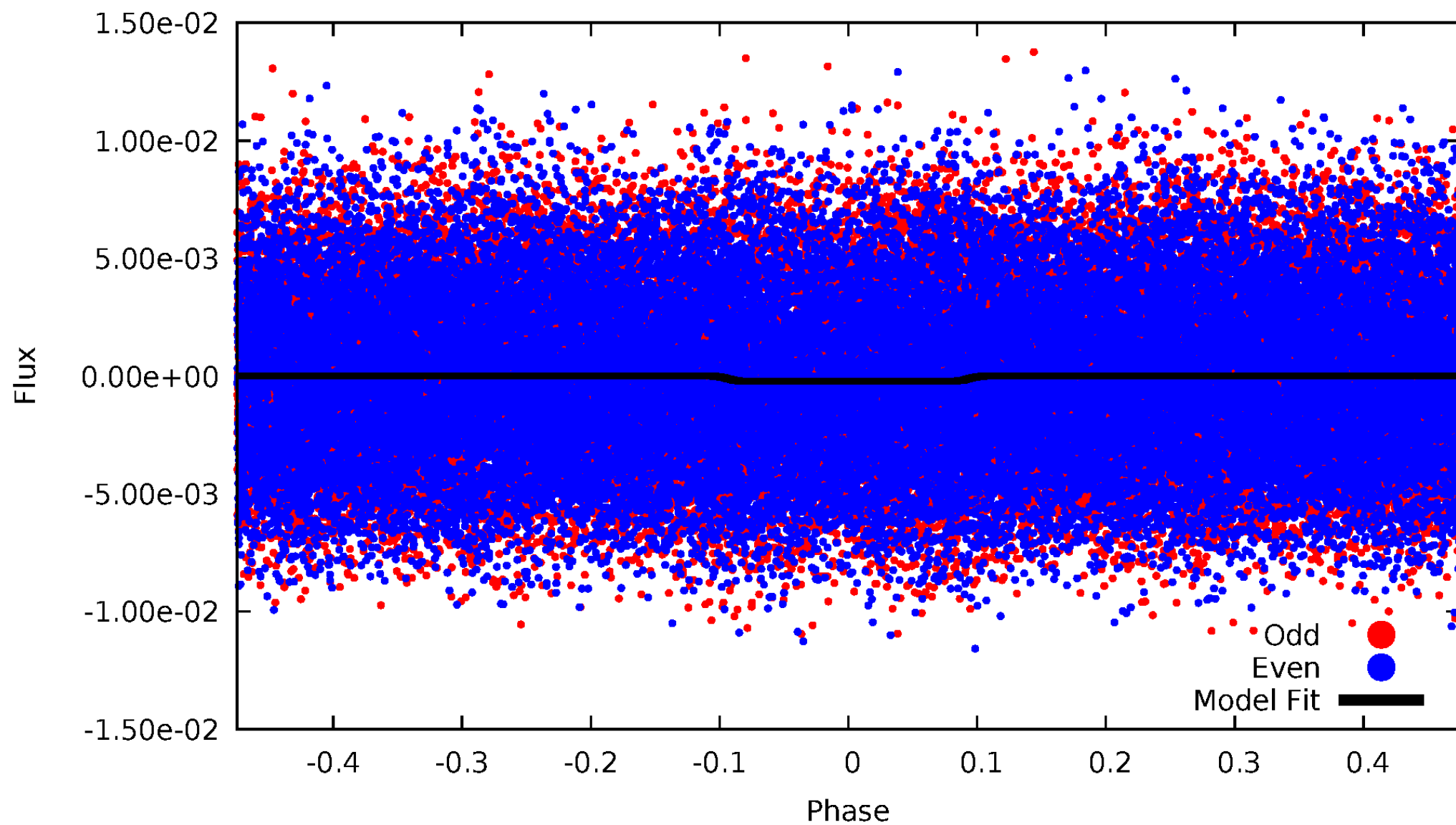
# DV Odd/Even

TCE 009302543-01



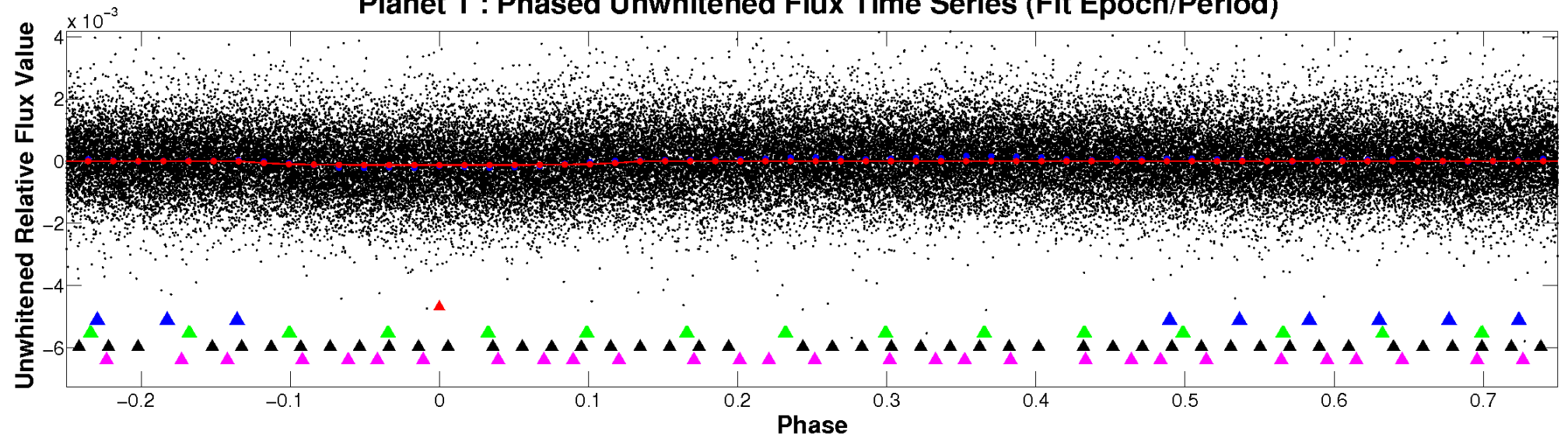
# ALT Odd/Even

TCE 009302543-01

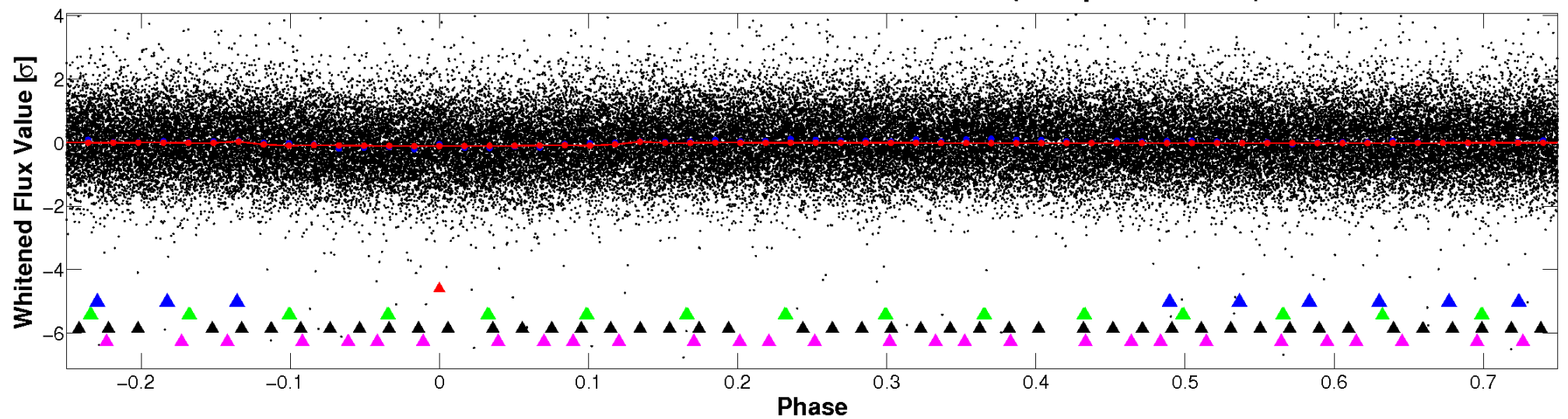


# Non-Whitened Vs. Whitened Light Curve

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



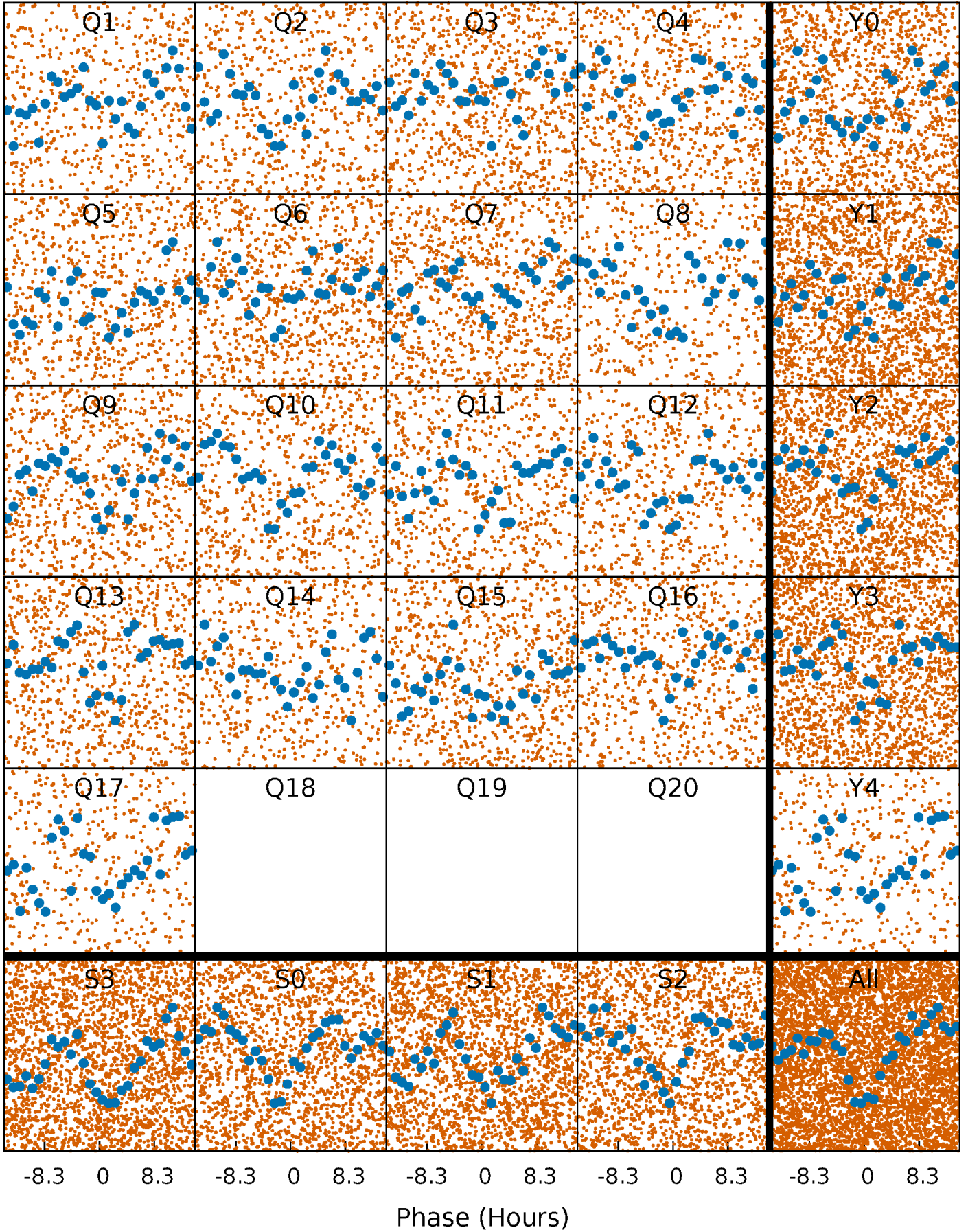
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





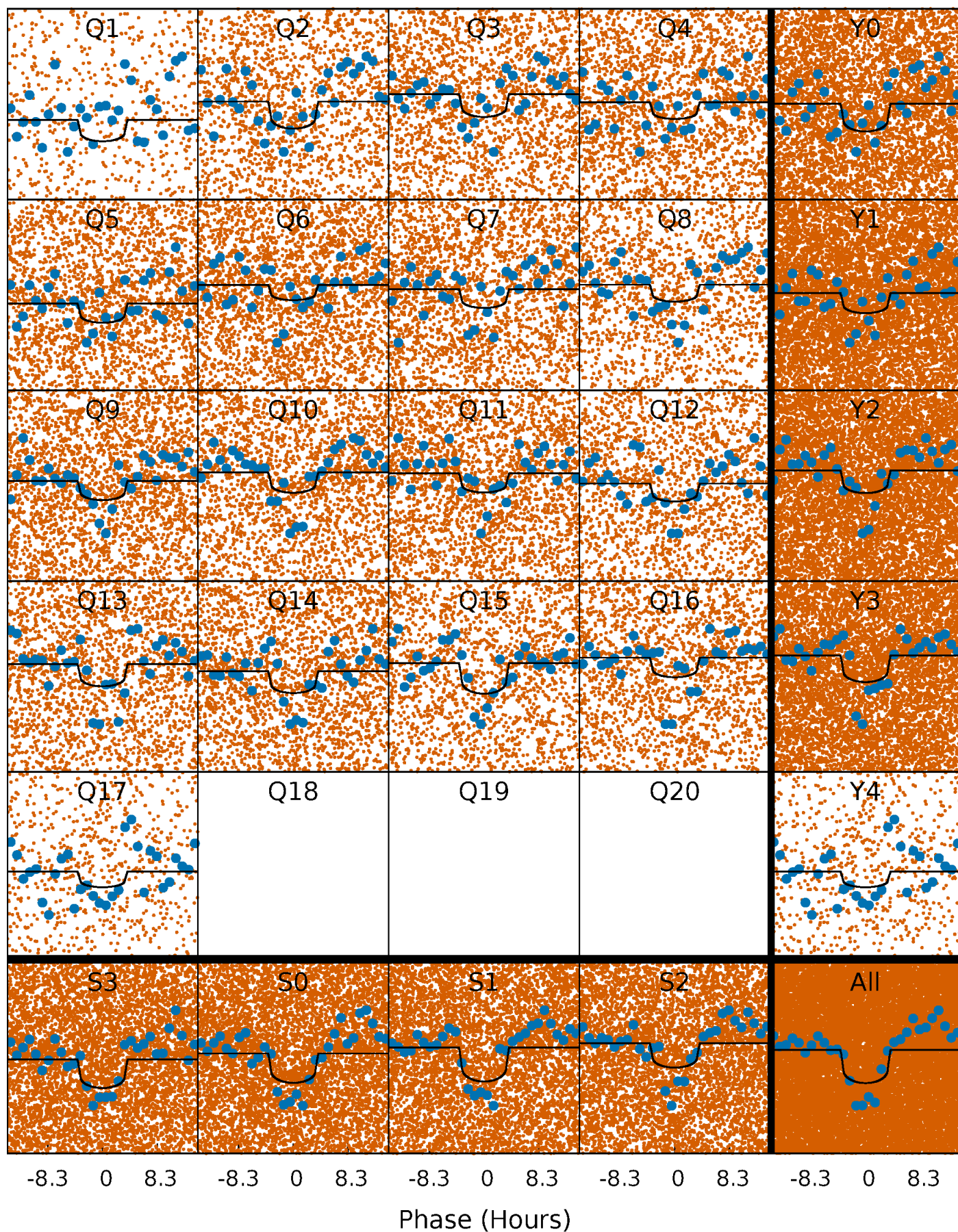
# PDC Quarter-Phased Transit Curves

TCE 009302543-01   P= 1.214671 Days    $T_0=131.809402$  (BKJD)



# DV Quarter-Phased Transit Curves

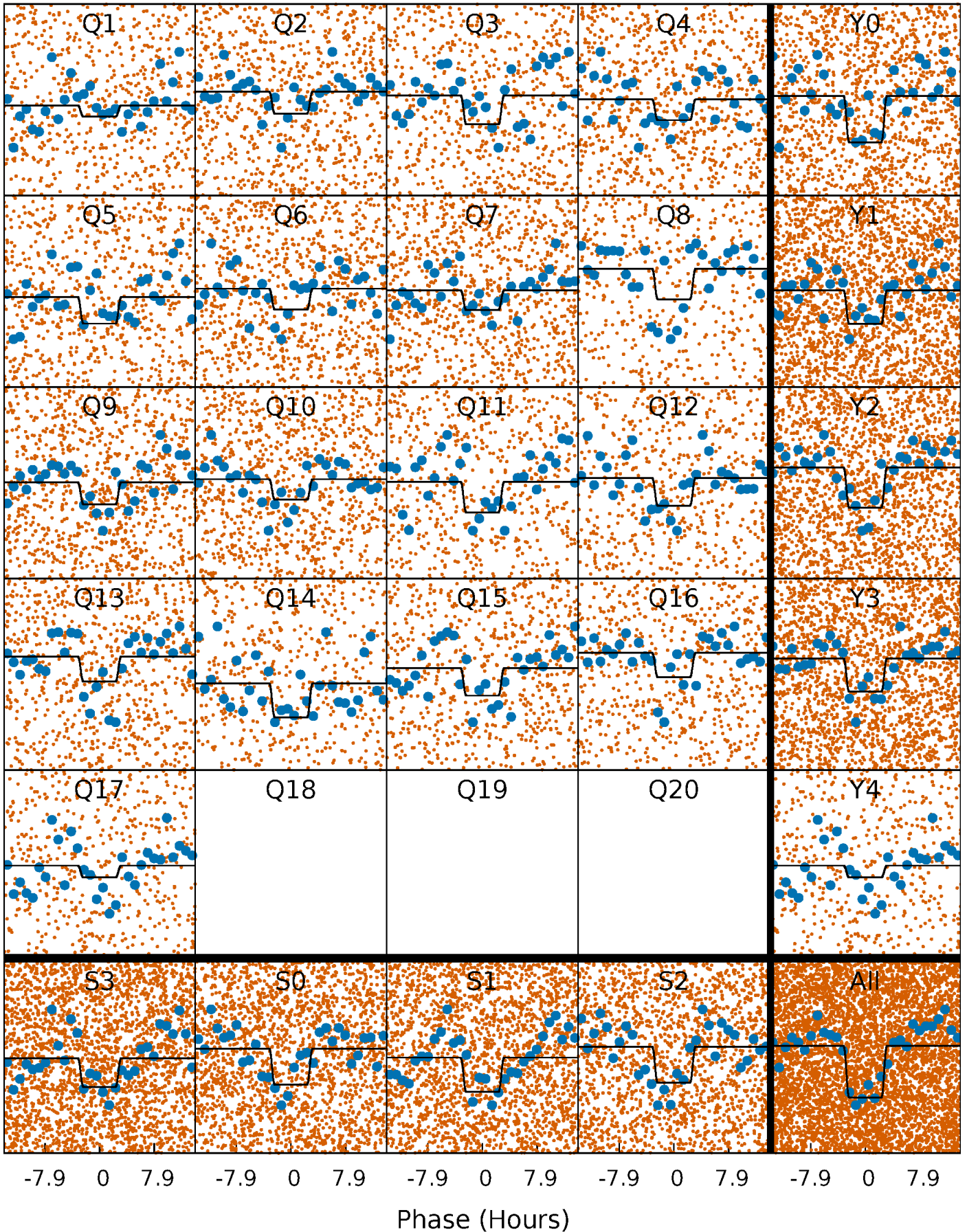
TCE 009302543-01 P= 1.214671 Days  $T_0=131.809402$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009302543-01 P= 1.214715 Days  $T_0=131.787766$  (BKJD)

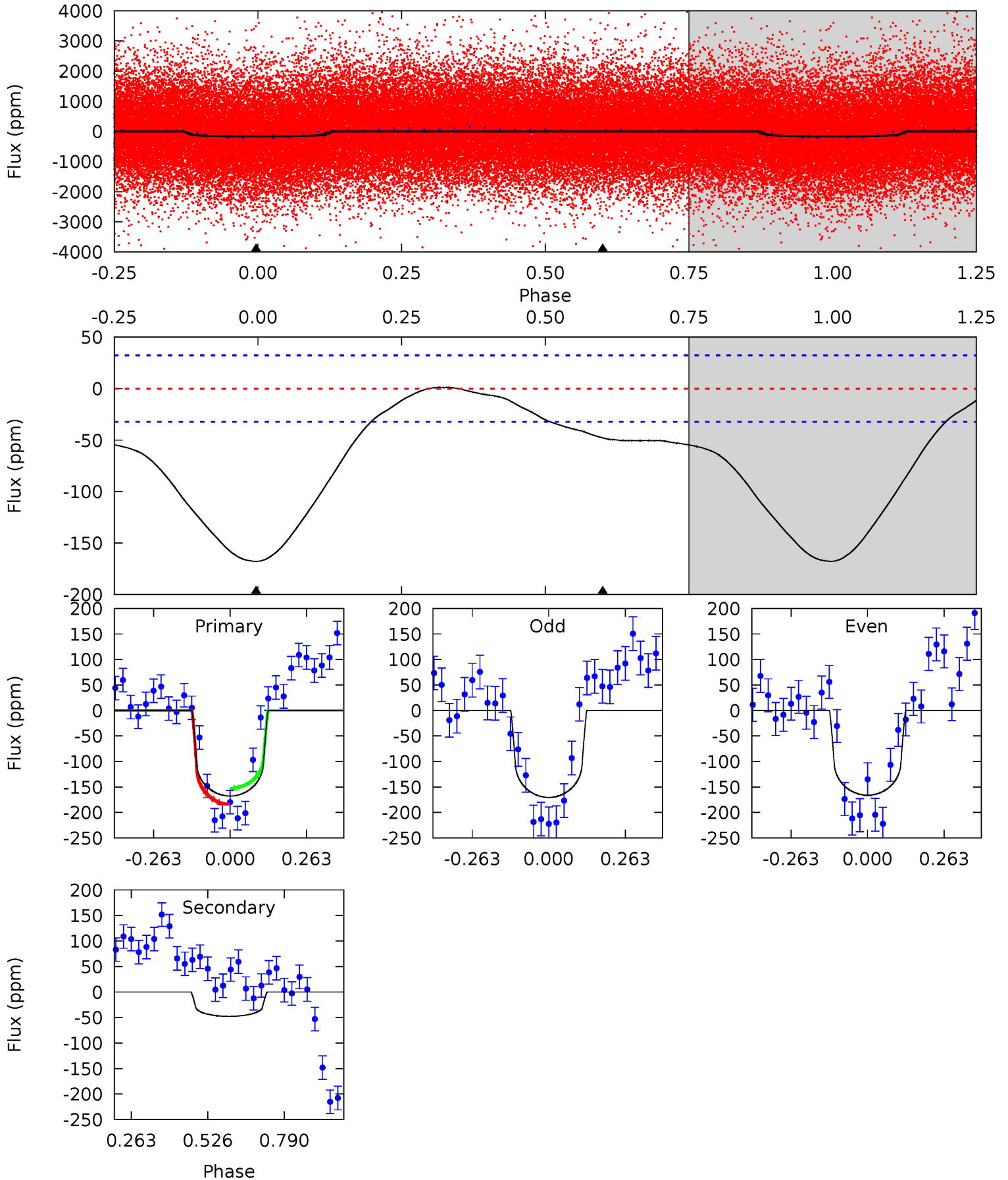




# DV Model-Shift Uniqueness Test

009302543-01, P = 1.214671 Days, E = 130.594731 Days

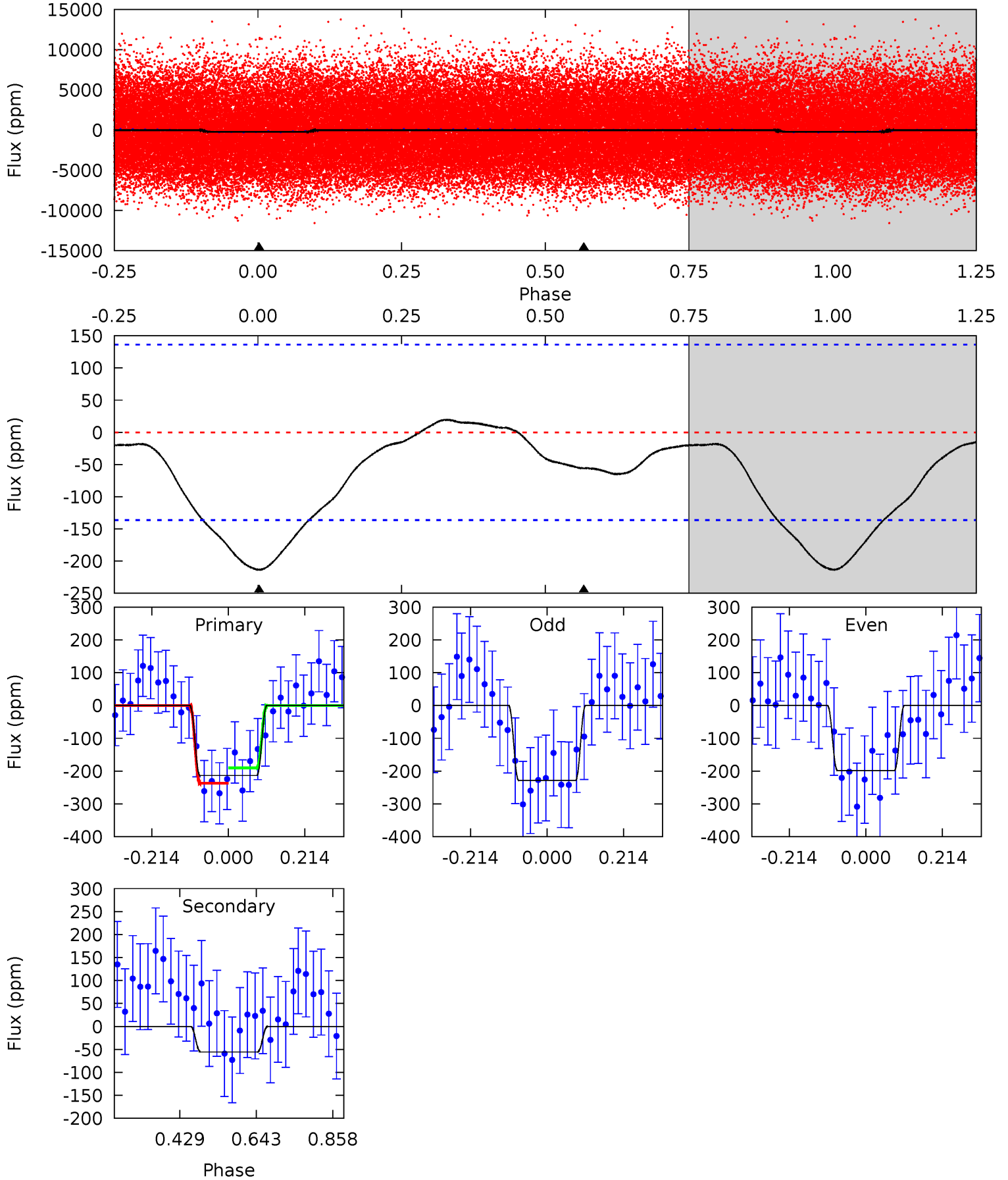
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.6	6.45	0	0	4.36	1.12	0.53	22.6	22.6	6.45	6.45	0.29	1.06	0.01	2.10



# Alt Model-Shift Uniqueness Test

009302543-01, P = 1.214715 Days, E = 130.573051 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
6.90	1.80	0	0	4.40	1.24	0.49	6.90	6.90	1.80	1.80	0.48	1.01	0.08	0.75



### Stellar Parameters For KIC 009302543

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6732^{+184}_{-225}$	$3.632^{+0.567}_{-0.063}$	$-0.140^{+0.300}_{-0.300}$	$3.276^{+0.444}_{-1.885}$	$1.676^{+0.197}_{-0.460}$	$0.067^{+0.472}_{-0.014}$
	+3%/-3%	+16%/-2%	+214%/-214%	+14%/-58%	+12%/-27%	+703%/-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 009302543-01 / KOI 4272.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-48 \pm 7$	$3.14^{+2.13}_{-1.75}$	$4387^{+333}_{-617}$	$5257^{+2639}_{-1242}$	$1.824^{+7.170}_{-1.174}$
Alt.	$-56 \pm 31$	$4.64^{+2.40}_{-1.94}$	$4427^{+309}_{-610}$	$4381^{+1394}_{-6670}$	$0.895^{+2.071}_{-0.601}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$



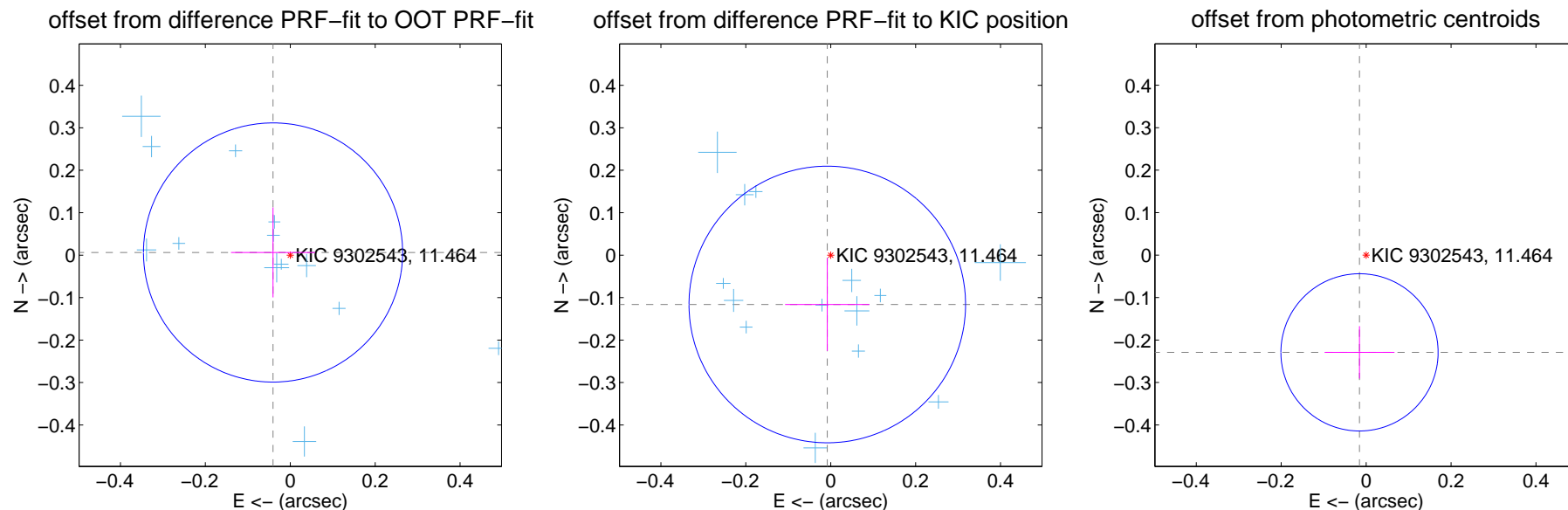
## DV Centroid Data

Supplemental centroid analysis for 009302543-01. **Kepler magnitude: 11.46.** Transit SNR 11.87

There are 17 quarters with good PRF difference image offsets

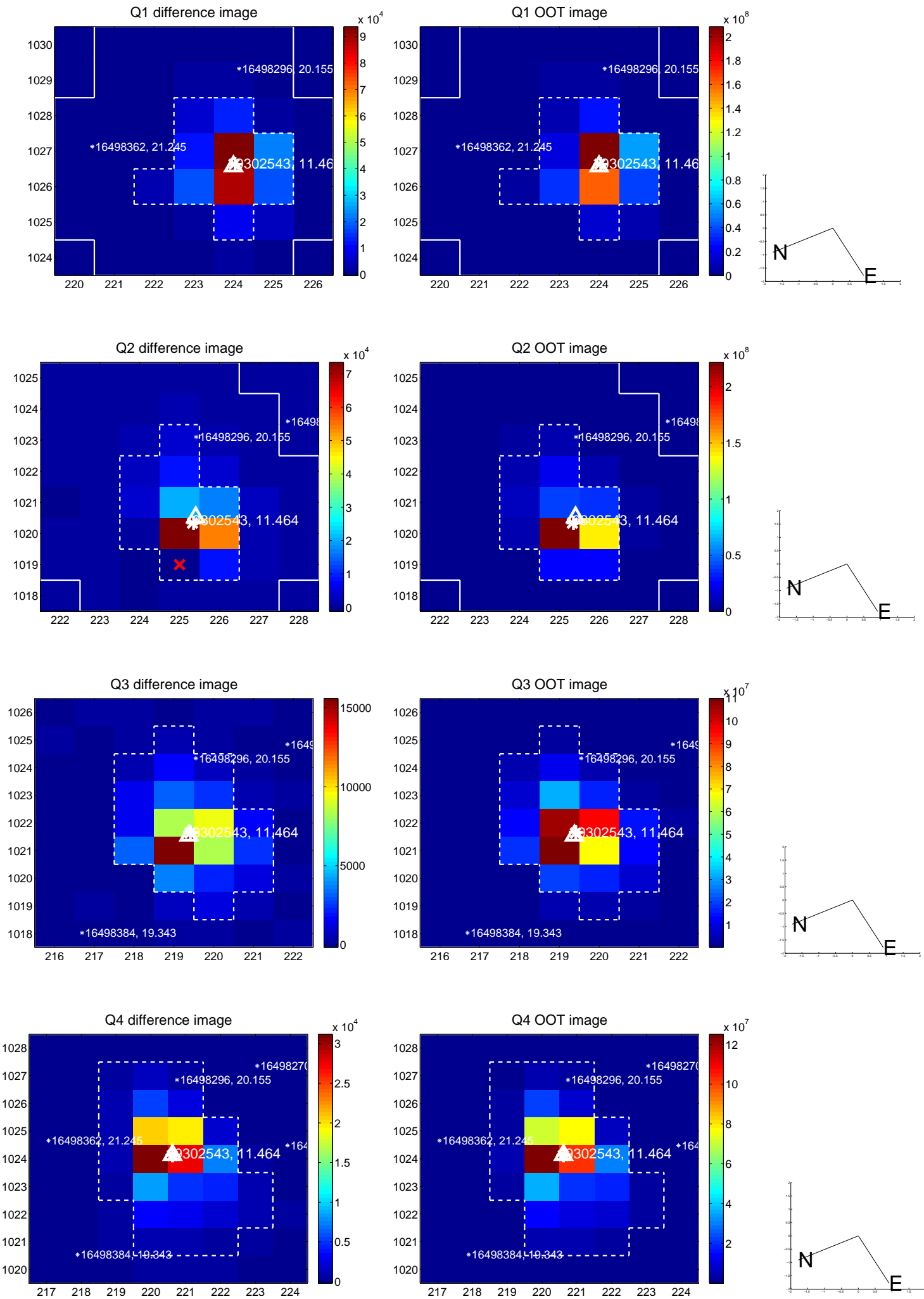
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.041 \pm 0.102$	0.40	$0.041 \pm 0.099$	$0.006 \pm 0.106$
PRF-fit source offset from KIC position	$0.116 \pm 0.109$	1.07	$0.008 \pm 0.099$	$-0.116 \pm 0.109$
photometric centroid source offset	<b><math>0.23 \pm 0.06</math></b>	<b>3.72</b>	$0.02 \pm 0.08$	$-0.23 \pm 0.06$

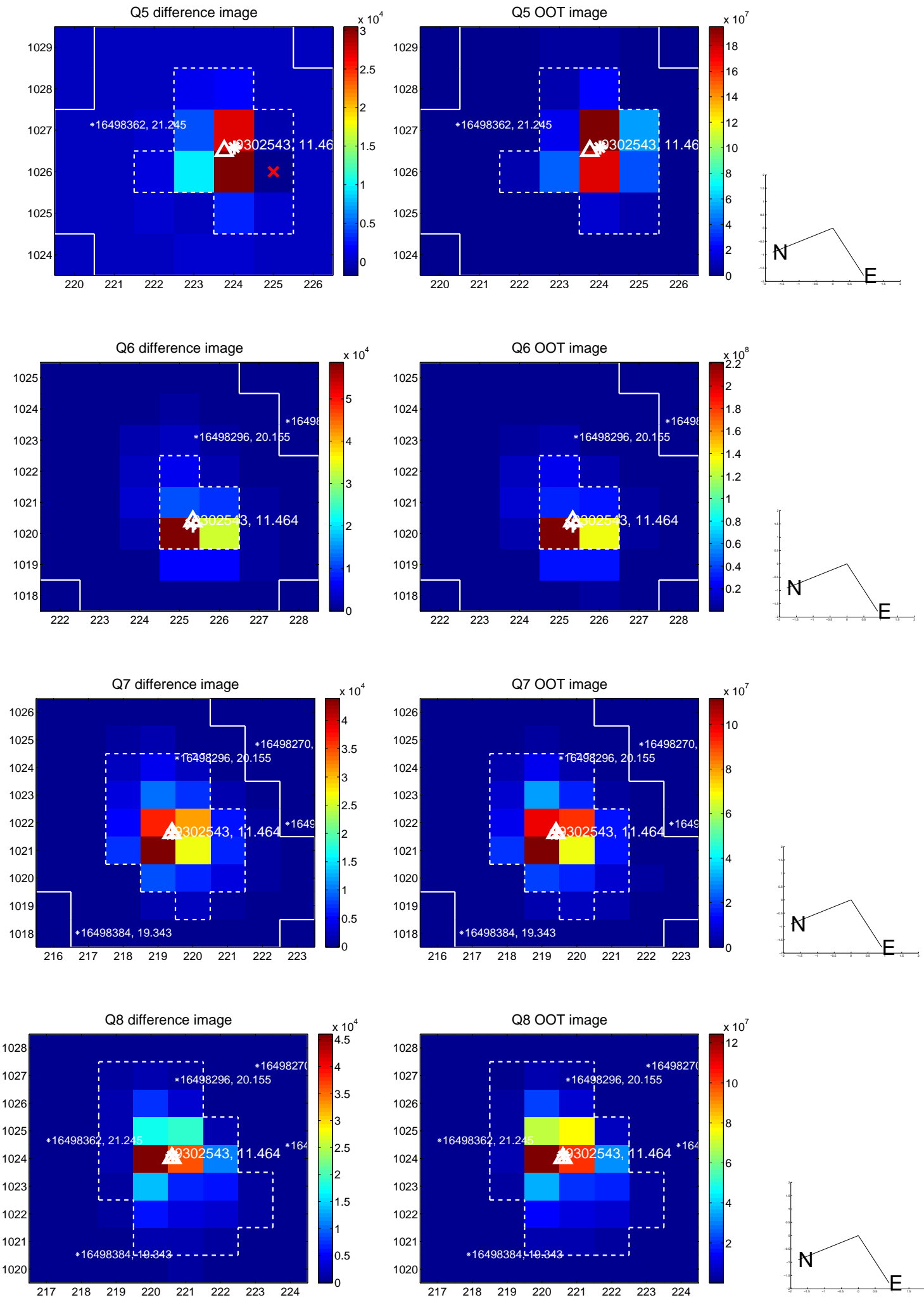


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

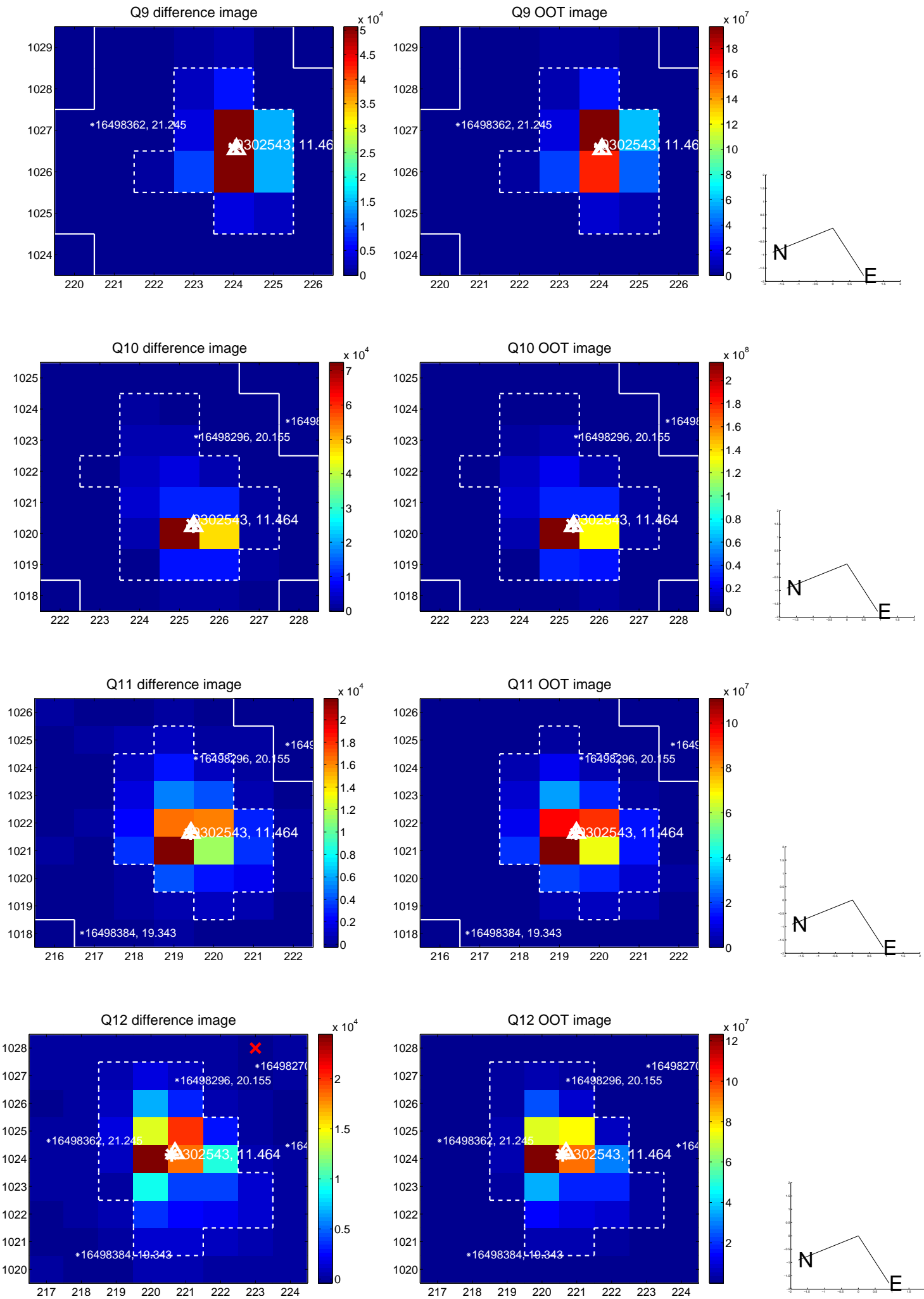


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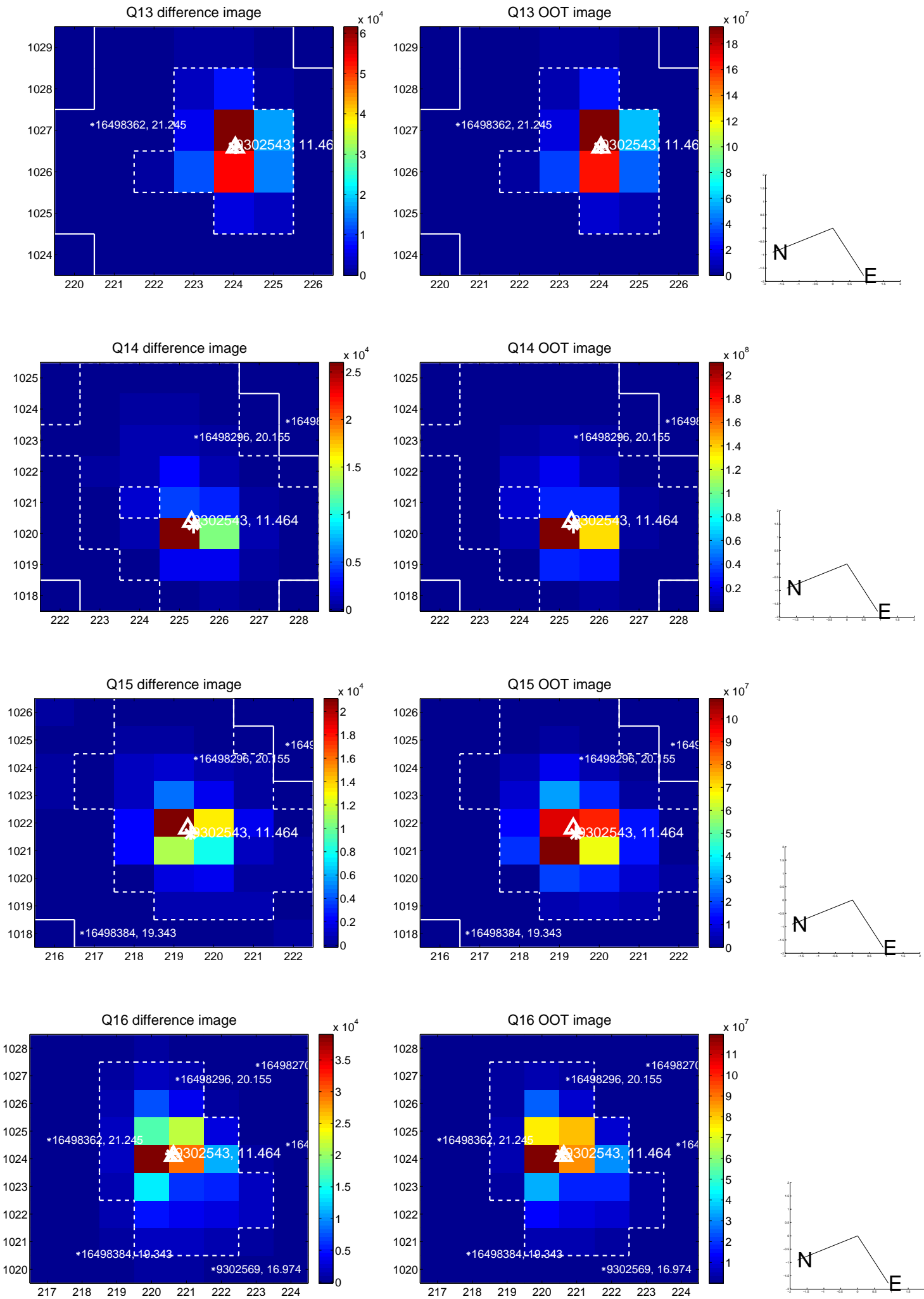




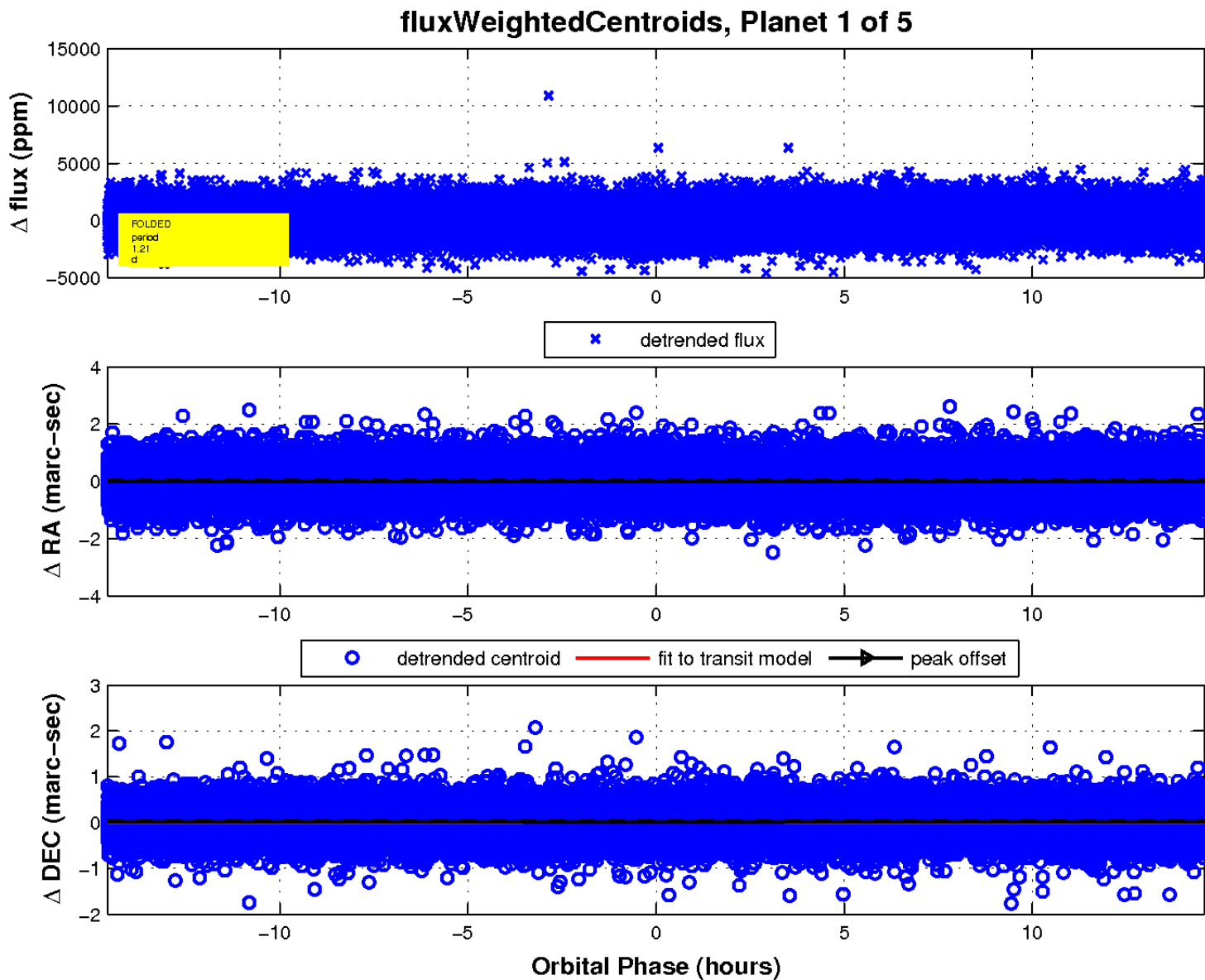
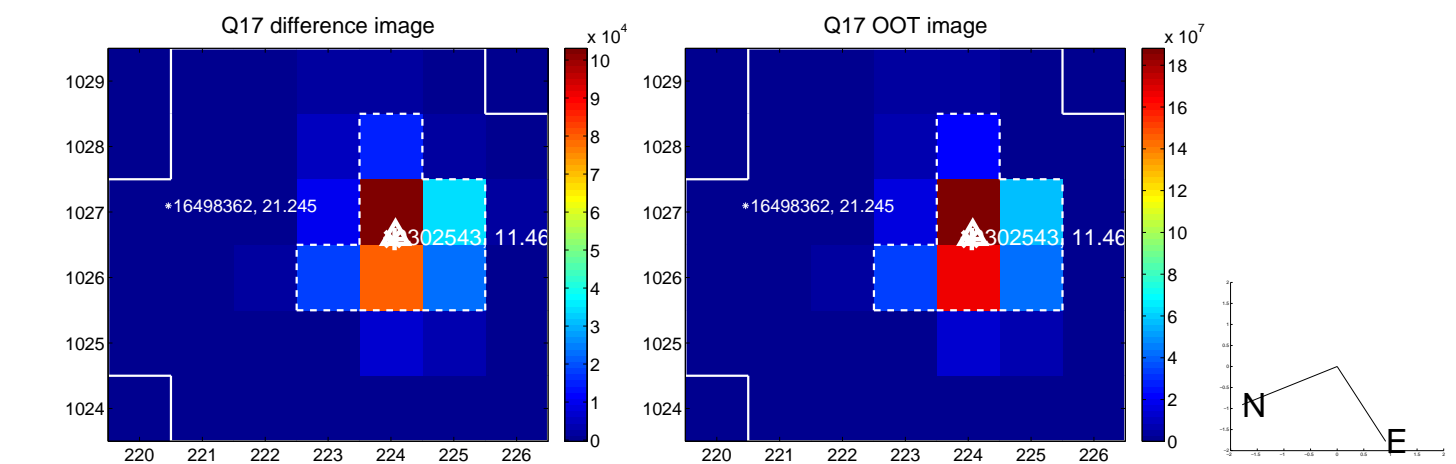
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

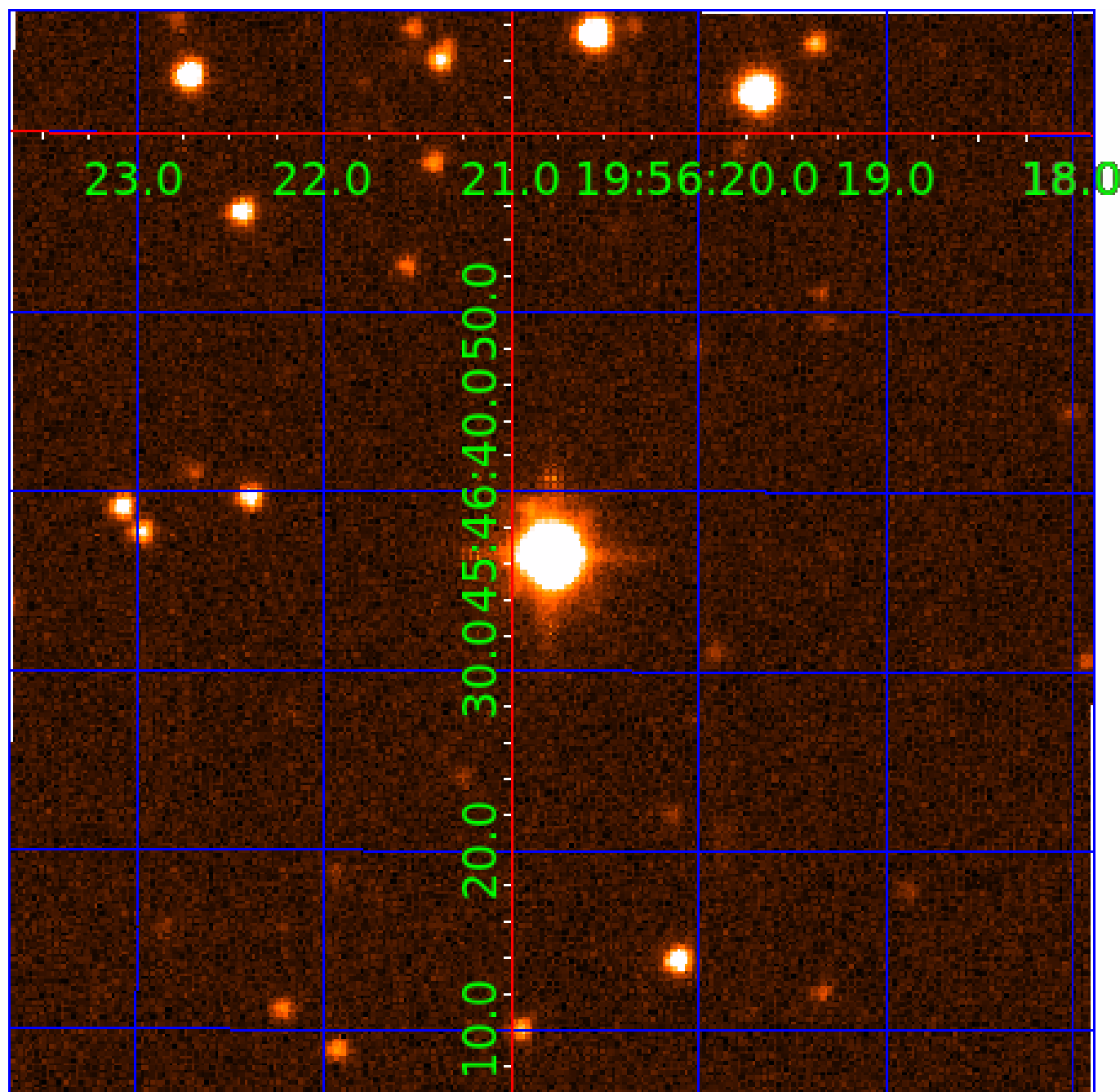


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009302543

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009302543-01	OBS	4272.01	1.214671	131.809402	126.4	7.228	13.9	11.9	3.28	6732	3.79	28167.95
009302543-02	OBS	No	168.896136	146.980295	2154.2	5.303	9.8	10.5	3.28	6732	27.91	39.10
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009302543-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—CENT_SATURATED
009302543-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

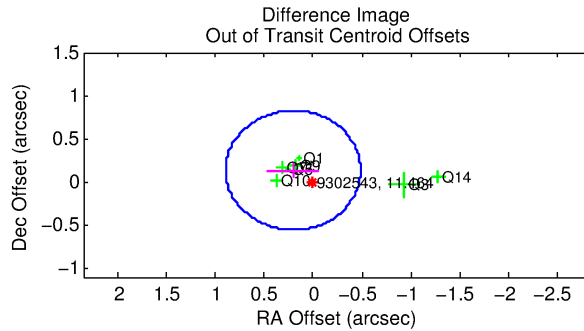
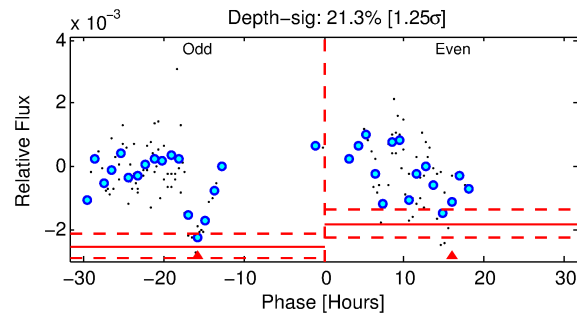
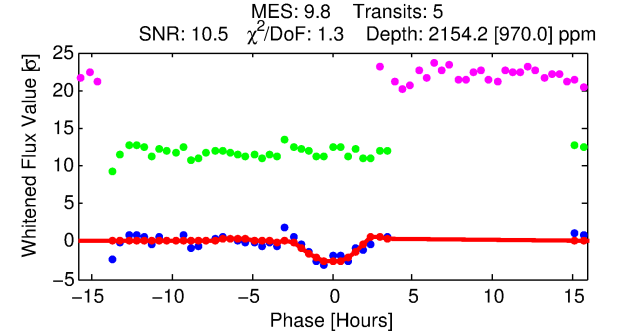
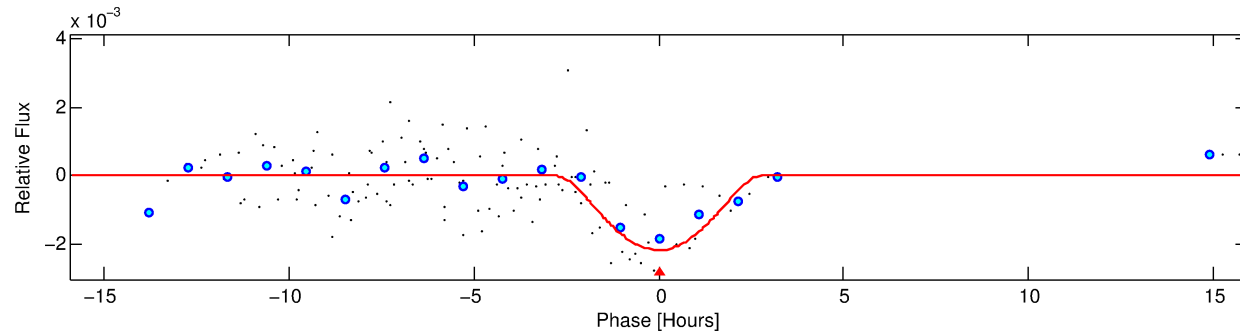
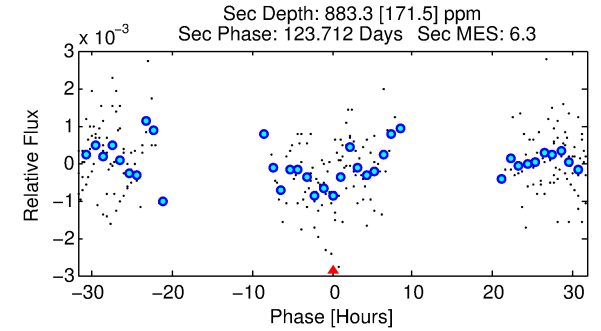
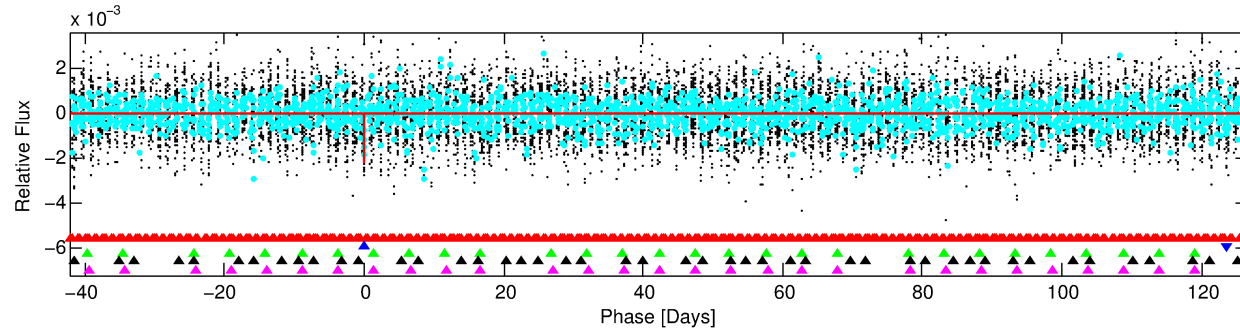
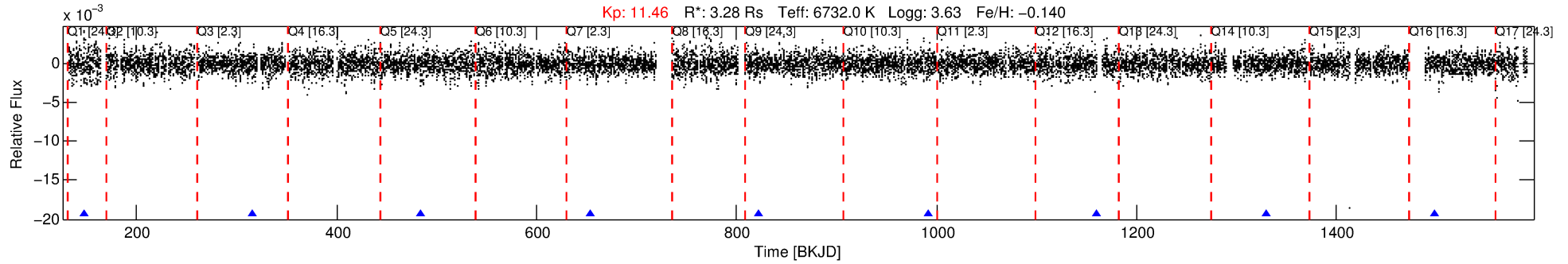
## Ephemeris Match Information For 009302543-02

No Significant Match Found

# DV One-Page Summary

KIC: 9302543 Candidate: 2 of 5 Period: 168.896 d

KOI: K04272 Corr: No Ephemeris Match



## DV Fit Results:

Period = 168.89614 [0.00650] d  
Epoch = 146.9803 [0.0105] BKJD  
Rp/R\* = 0.0781 [0.2817]  
a/R\* = 98.09 [77.42]  
b = 1.00 [0.43]  
Seff = 39.10 [37.56]  
Teq = 638 [153] K  
Rp = 27.91 [101.97] Re  
a = 0.7107 [0.4123] AU  
Ag = 315.16 [2295.00] [0.14σ]  
Teffp = 4154 [7499] K [0.47σ]

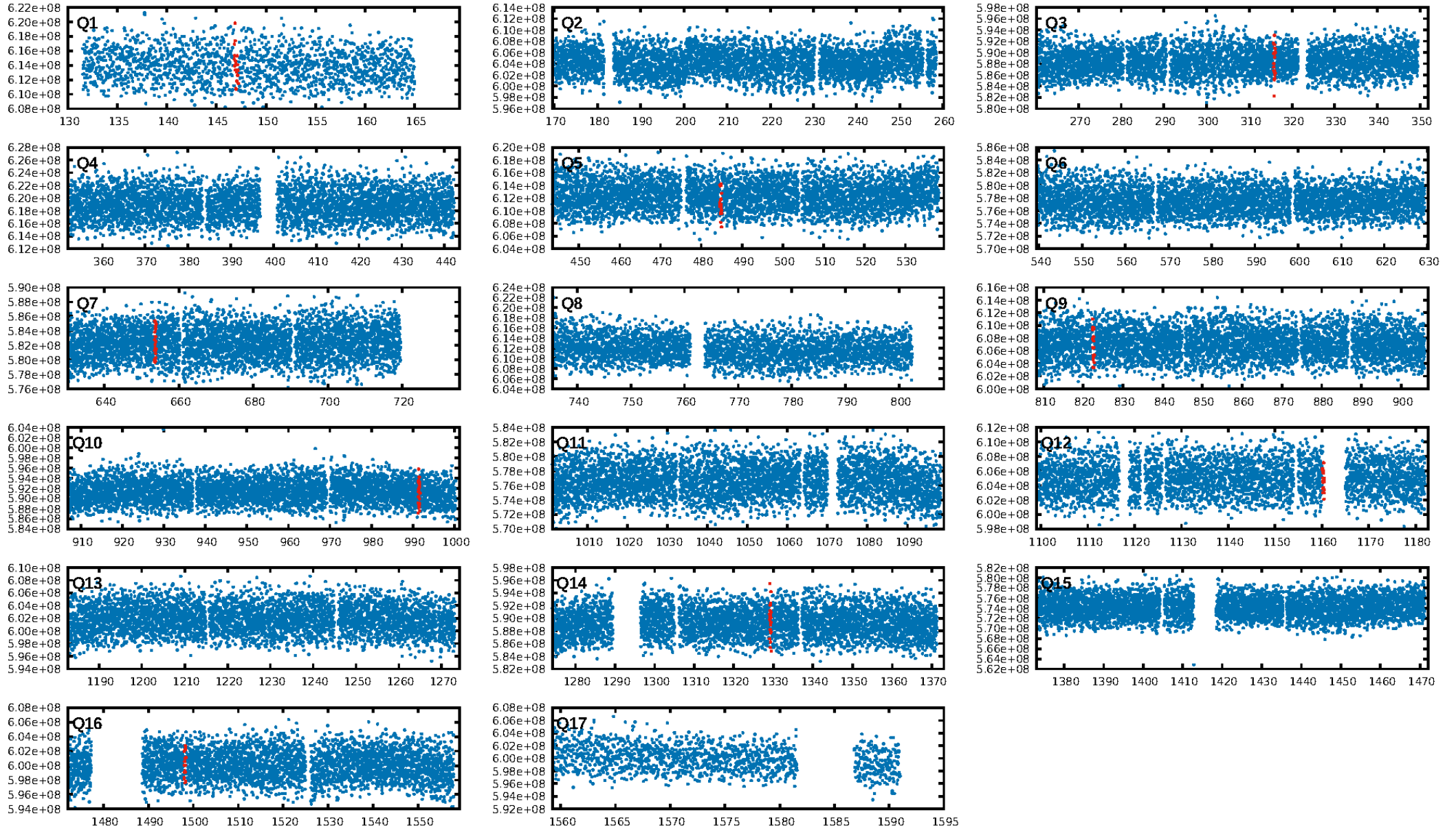
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [513.37σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 11.5%  
ModelChiSquareGof-sig: 99.7%  
Bootstrap-pfa: 1.51e-09  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.3469  
Centroid-sig: 16.5%  
Centroid-so: 0.185 arcsec [2.51σ]  
OotOffset-rm: 0.246 arcsec [1.07σ]  
KicOffset-rm: 0.257 arcsec [1.06σ]  
OotOffset-st: 2/2/0/3 [7]  
KicOffset-st: 2/2/0/3 [7]  
DiffImageQuality-fgm: 0.71 [5/7]  
DiffImageOverlap-fno: 0.00 [0/7]

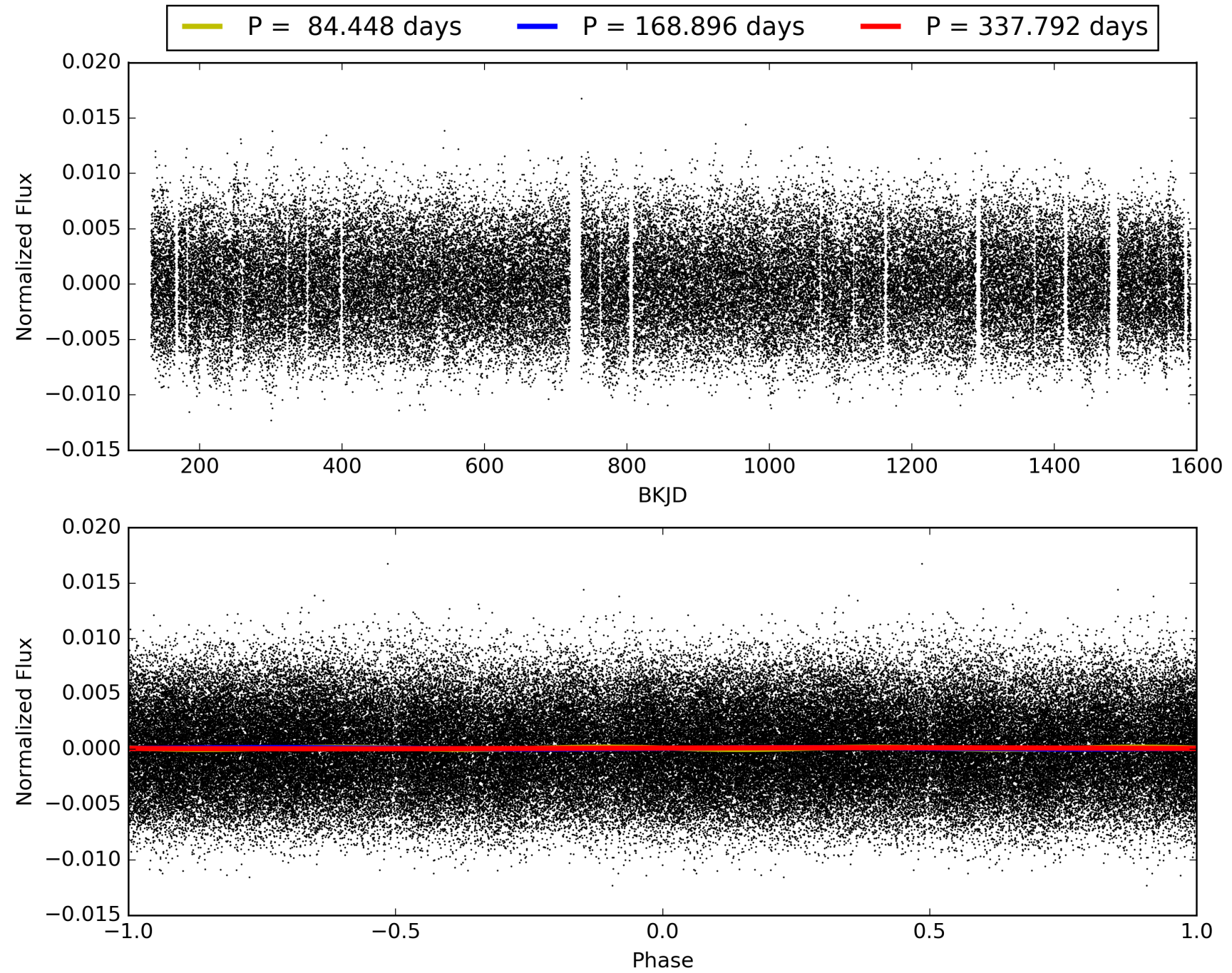
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:30 Z

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

# TCE 009302543-02, PDC Light Curves



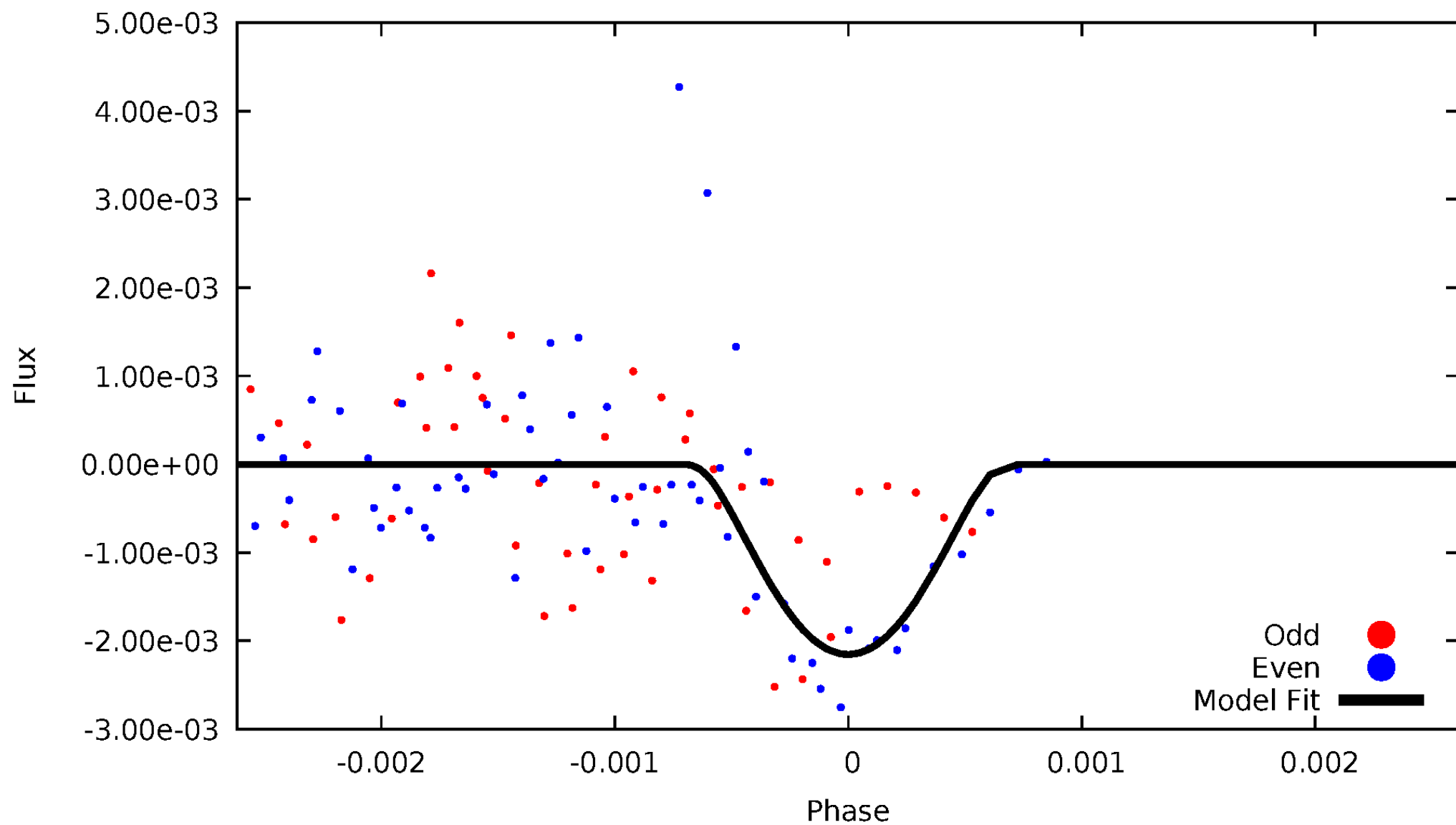
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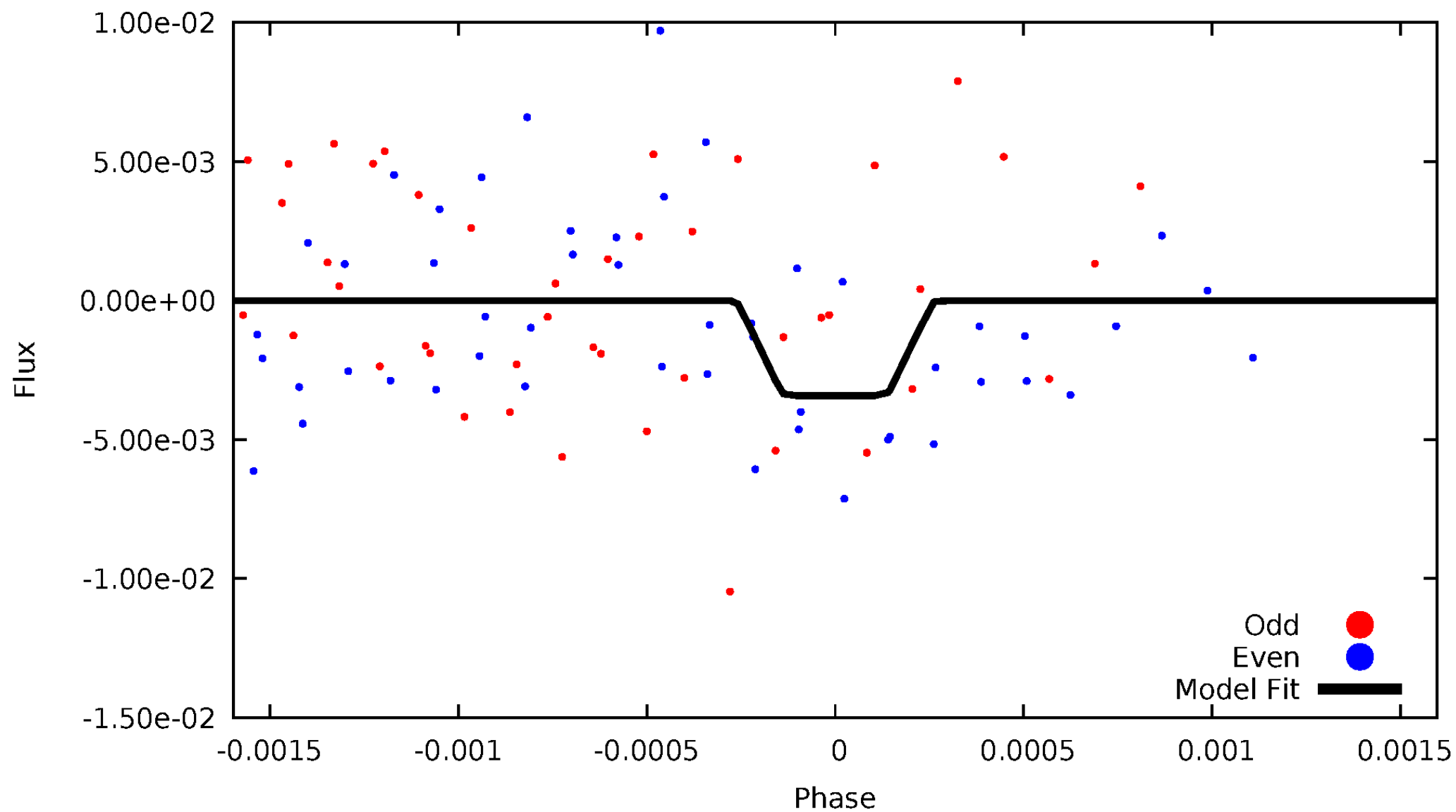
# DV Odd/Even

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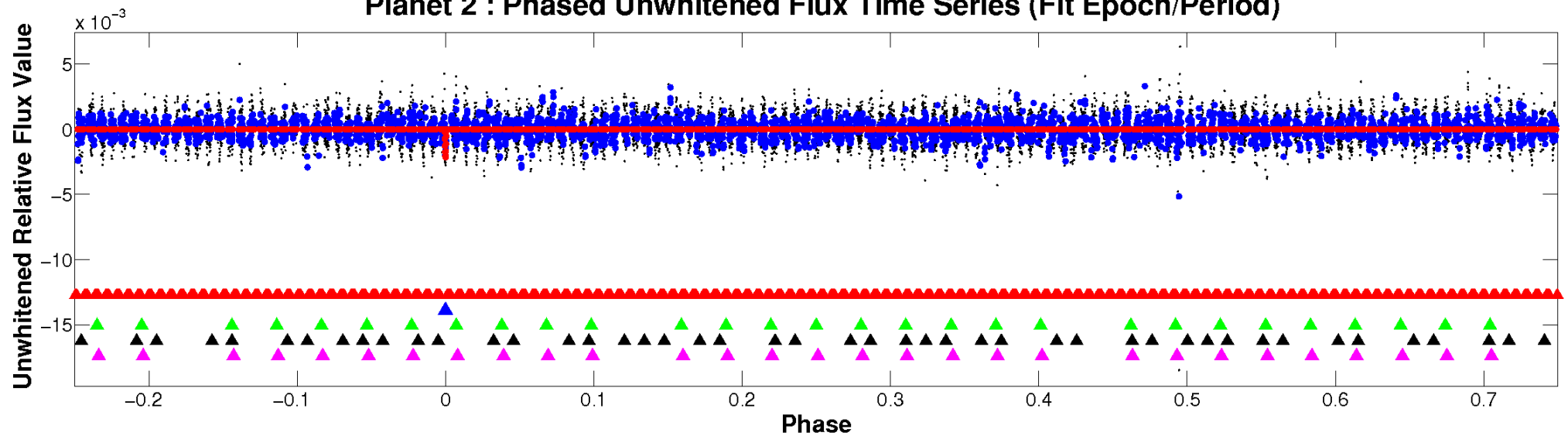
# ALT Odd/Even

TCE 009302543-02

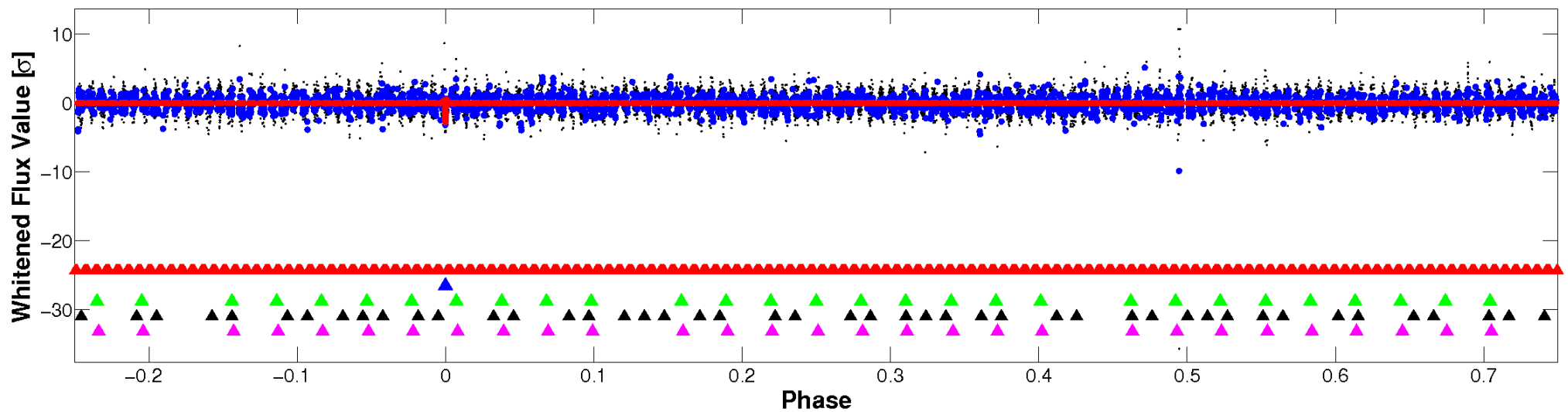


# Non-Whitened Vs. Whitened Light Curve

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

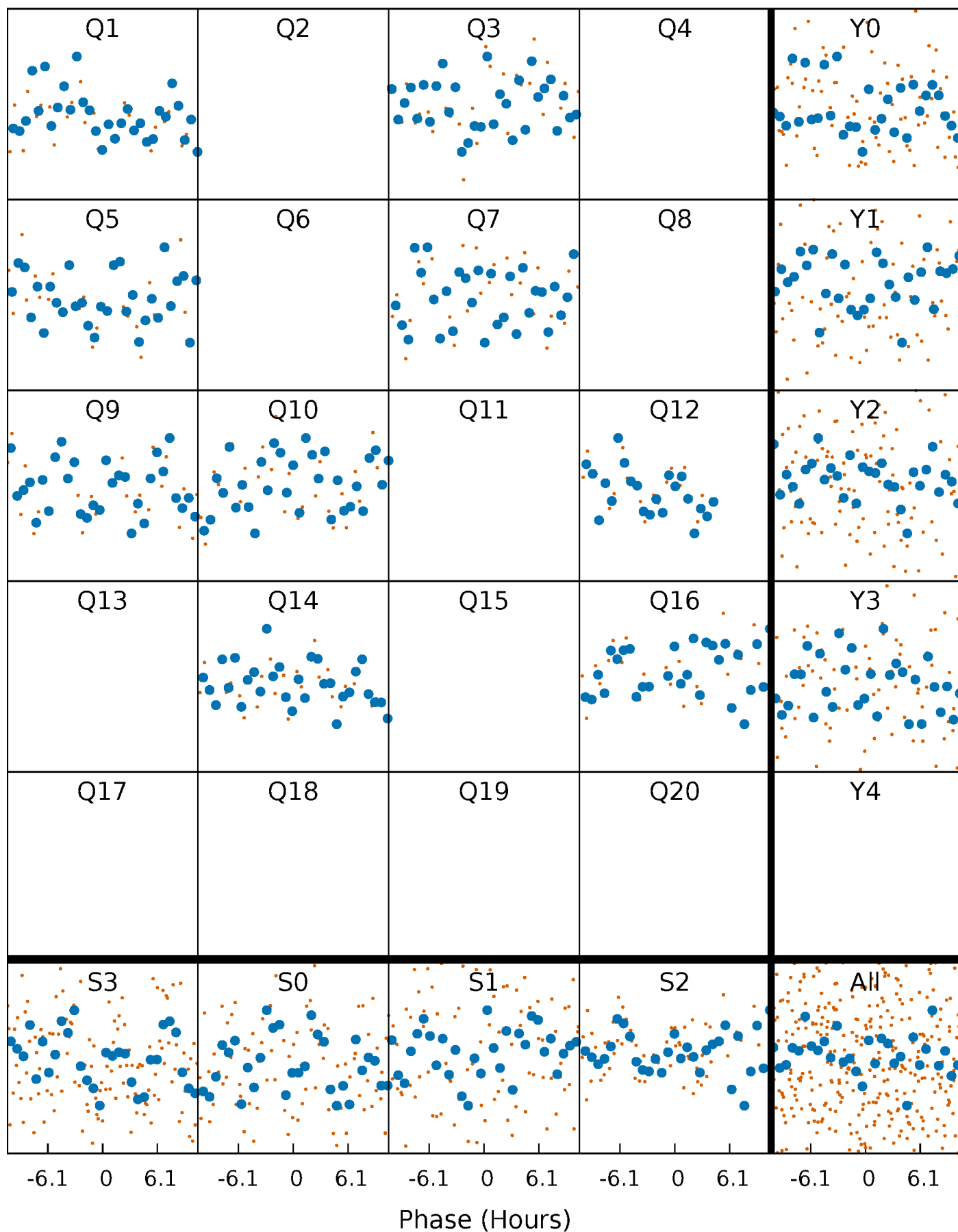


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

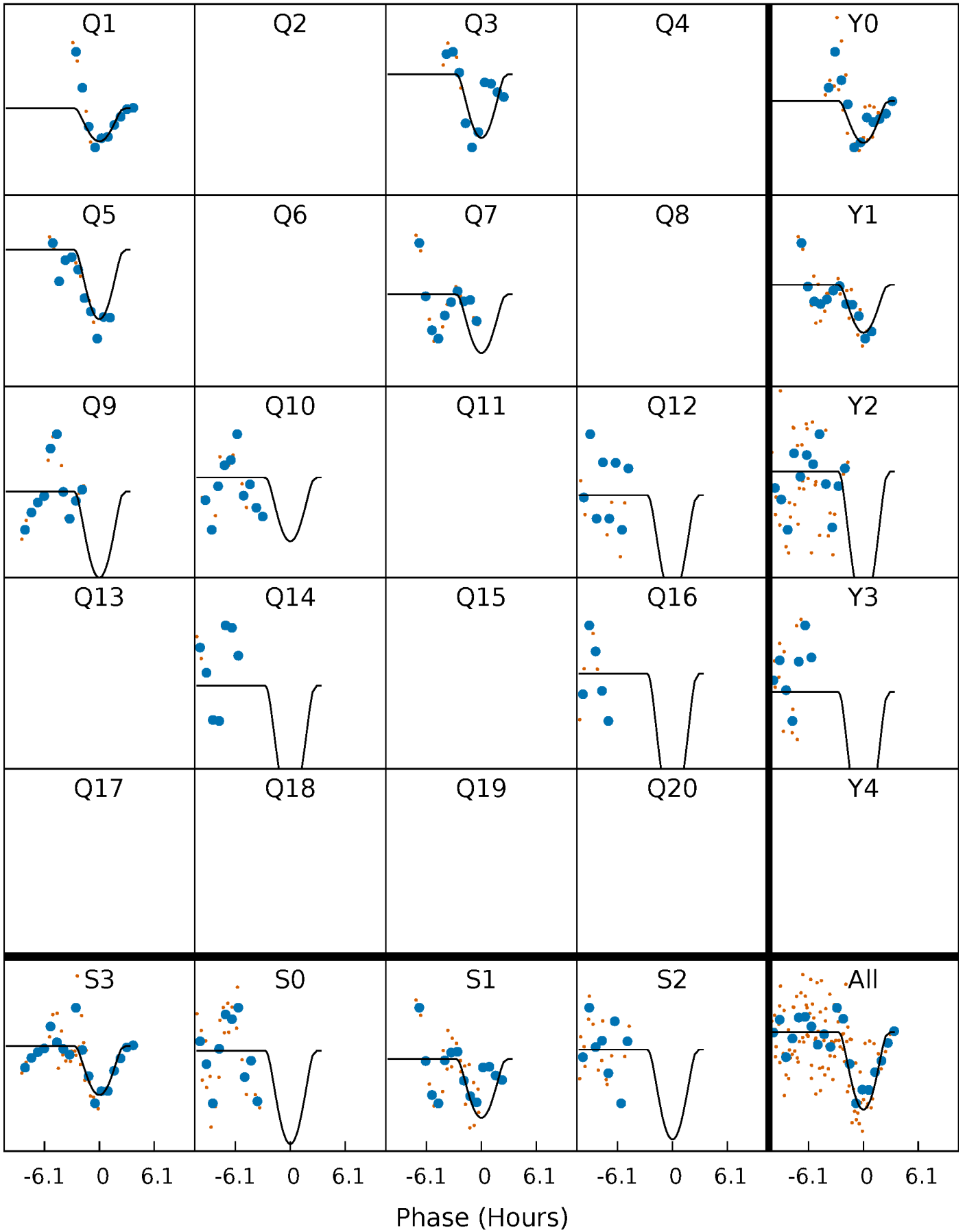
TCE 009302543-02 P=168.896137 Days  $T_0=146.980295$  (BKJD)





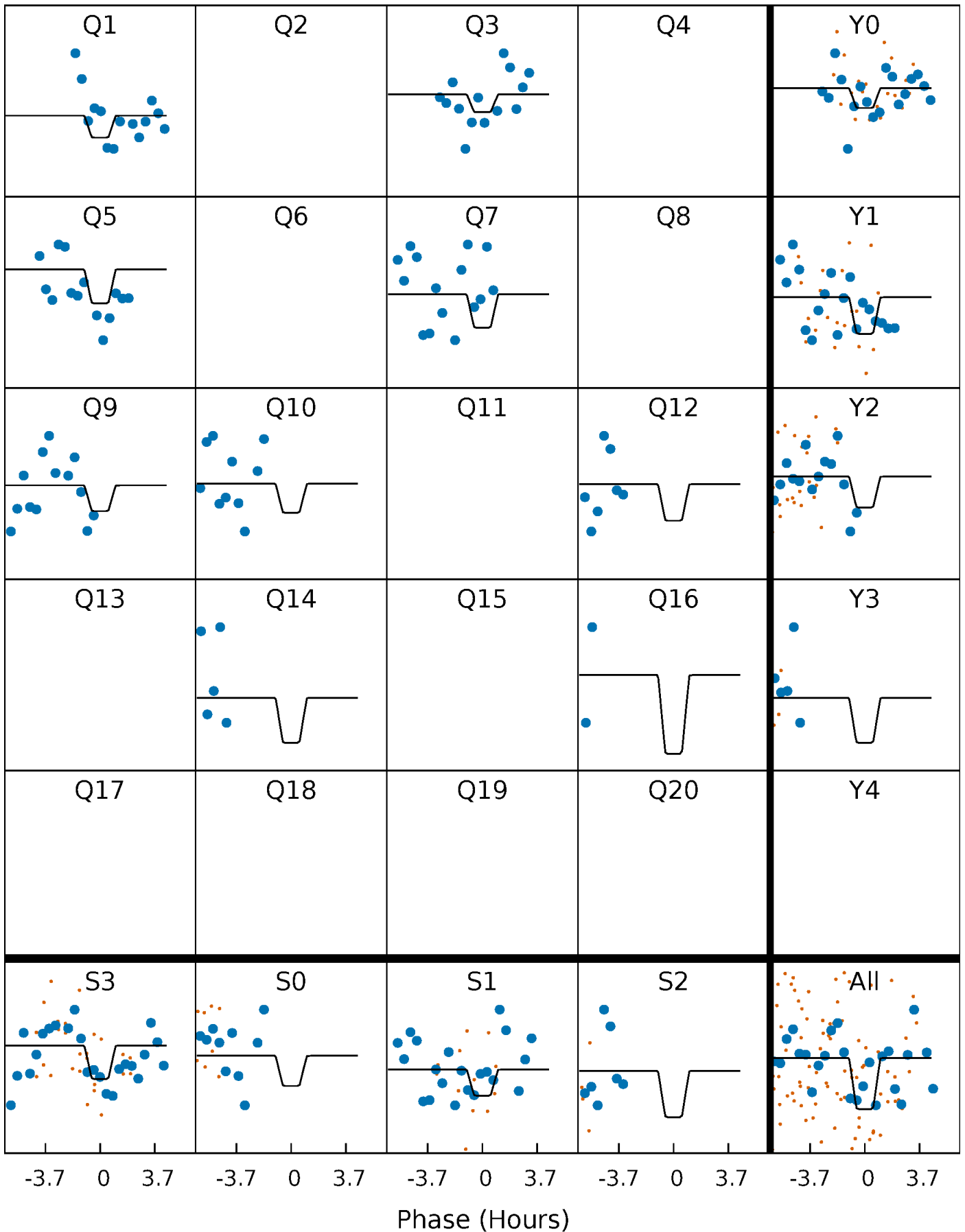
# DV Quarter-Phased Transit Curves

TCE 009302543-02     $P=168.896137$  Days     $T_0=146.980295$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

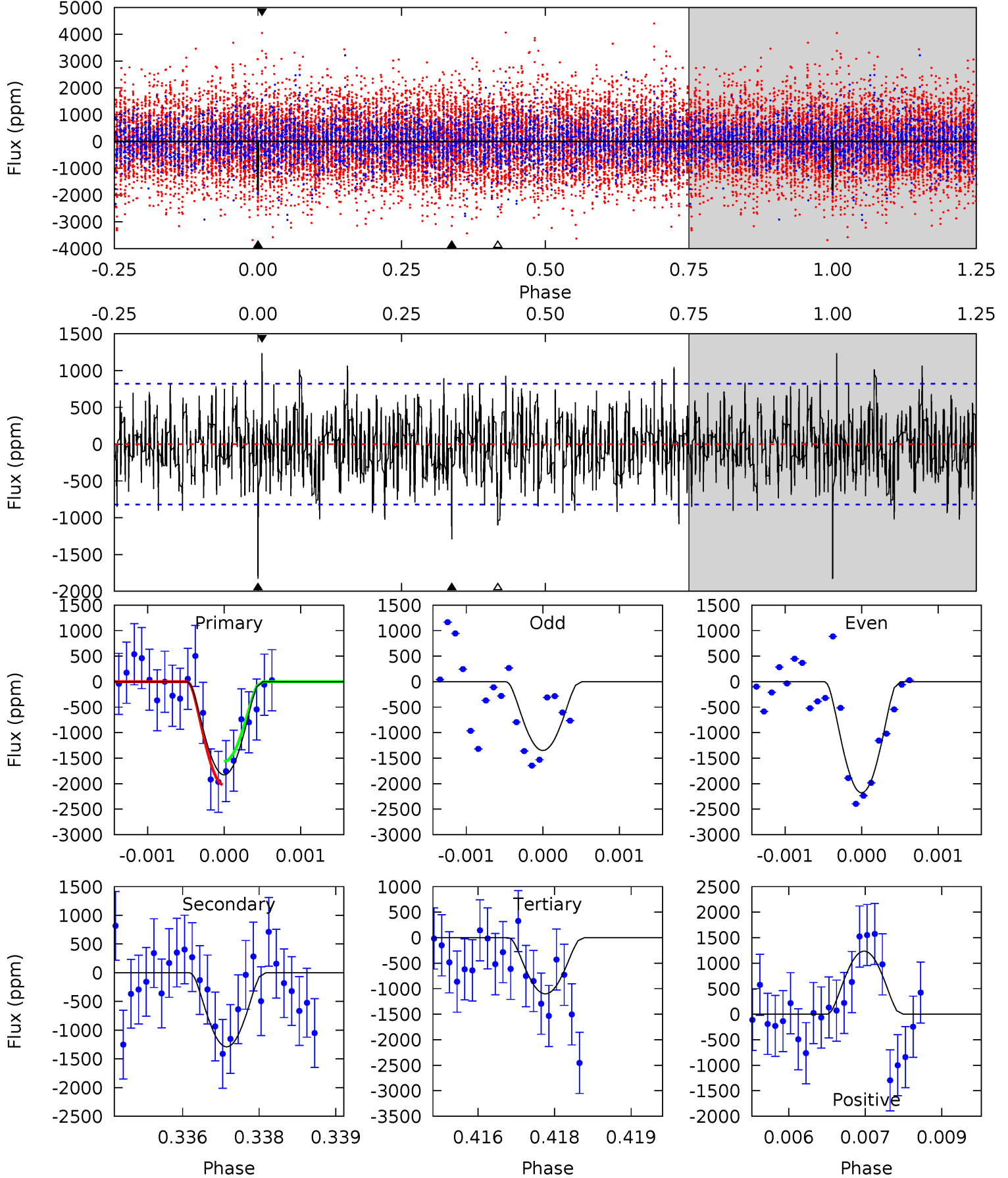
TCE 009302543-02 P=168.892841 Days  $T_0=146.936416$  (BKJD)



# DV Model-Shift Uniqueness Test

009302543-02, P = 168.896137 Days, E = 146.980295 Days

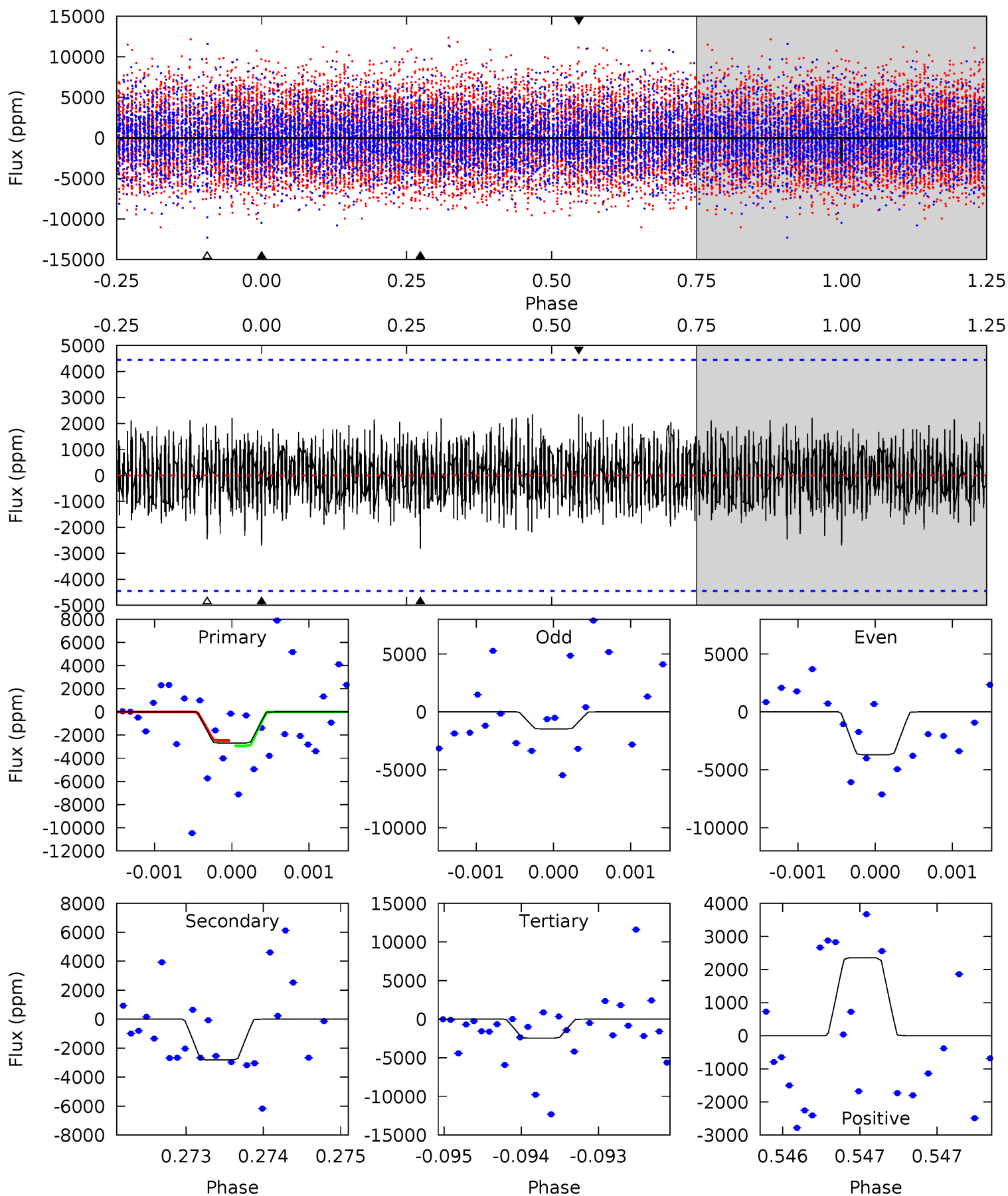
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	8.47	7.23	8.11	5.39	3.19	2.22	4.77	3.88	1.24	0.36	2.71	0.86	0.40	1.43



# Alt Model-Shift Uniqueness Test

009302543-02, P = 168.892841 Days, E = 146.936416 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
3.35	3.51	3.06	2.94	5.55	3.44	0.91	0.29	0.41	0.45	0.58	1.36	0.74	0.46	0.29





### Stellar Parameters For KIC 009302543

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6732^{+184}_{-225}$	$3.632^{+0.567}_{-0.063}$	$-0.140^{+0.300}_{-0.300}$	$3.276^{+0.444}_{-1.885}$	$1.676^{+0.197}_{-0.460}$	$0.067^{+0.472}_{-0.014}$
	+3%/-3%	+16%/-2%	+214%/-214%	+14%/-58%	+12%/-27%	+703%/-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 009302543-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1291 \pm 153$	$61.99^{+79.12}_{-42.70}$	$856^{+57}_{-136}$	$3348^{+1674}_{-638}$	$92^{+852}_{-74}$
Alt.	$-2817 \pm 802$	$66.35^{+71.42}_{-45.57}$	$860^{+57}_{-121}$	$3658^{+2292}_{-667}$	$169^{+1673}_{-131}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

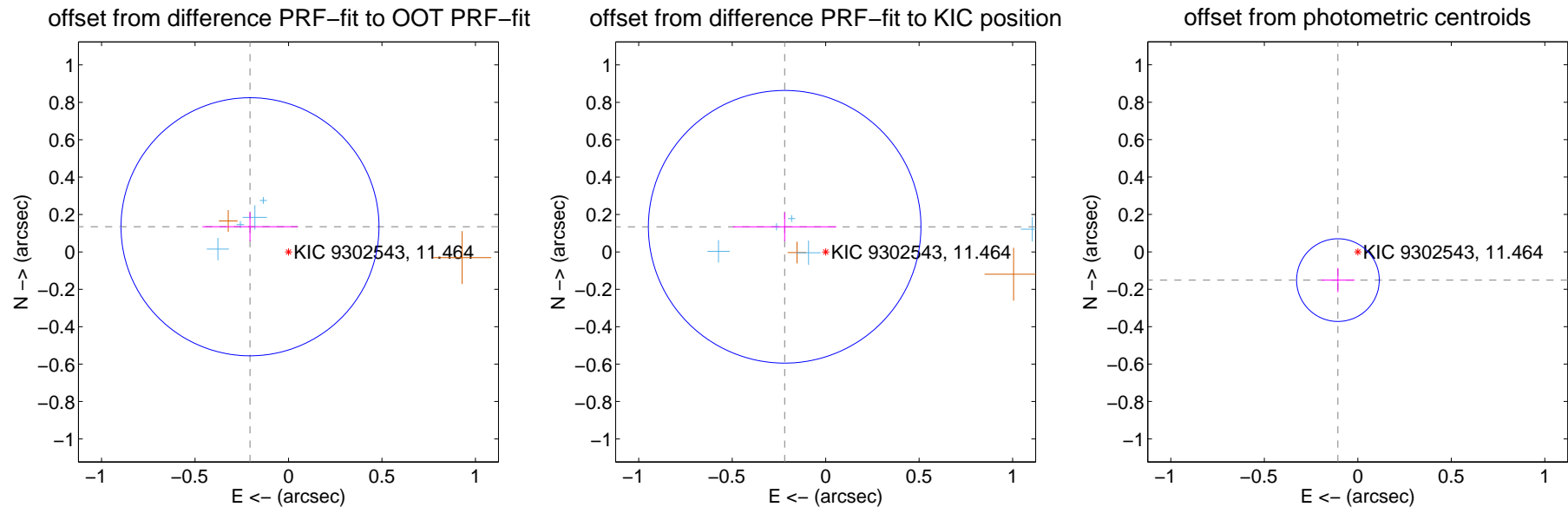
## DV Centroid Data

Supplemental centroid analysis for 009302543-02. **Kepler magnitude: 11.46.** Transit SNR 10.50

There are 5 quarters with good PRF difference image offsets

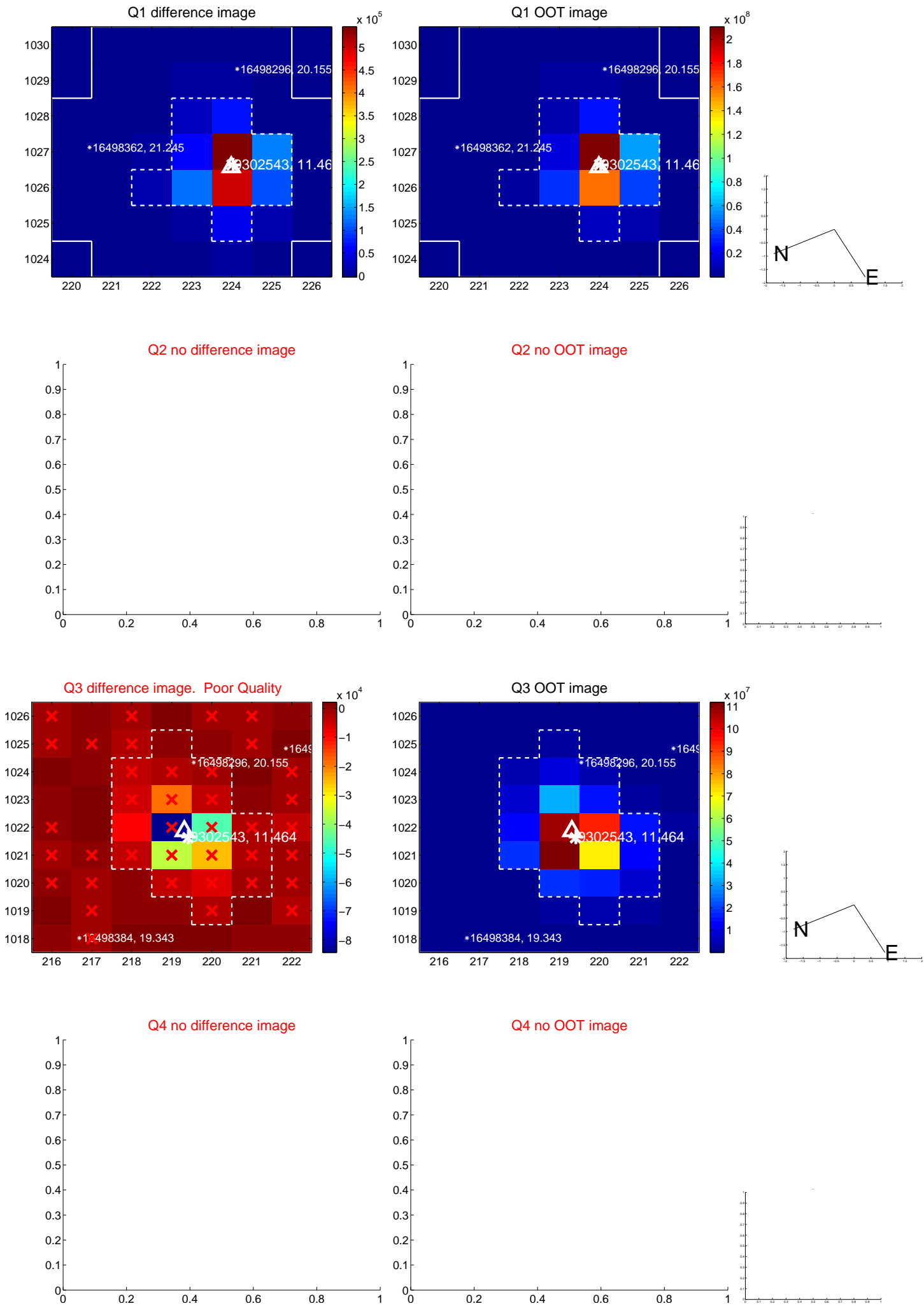
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.246 \pm 0.230$	1.07	$0.206 \pm 0.255$	$0.135 \pm 0.077$
PRF-fit source offset from KIC position	$0.257 \pm 0.243$	1.06	$0.219 \pm 0.277$	$0.134 \pm 0.077$
photometric centroid source offset	$0.18 \pm 0.07$	2.51	$0.11 \pm 0.09$	$-0.15 \pm 0.06$

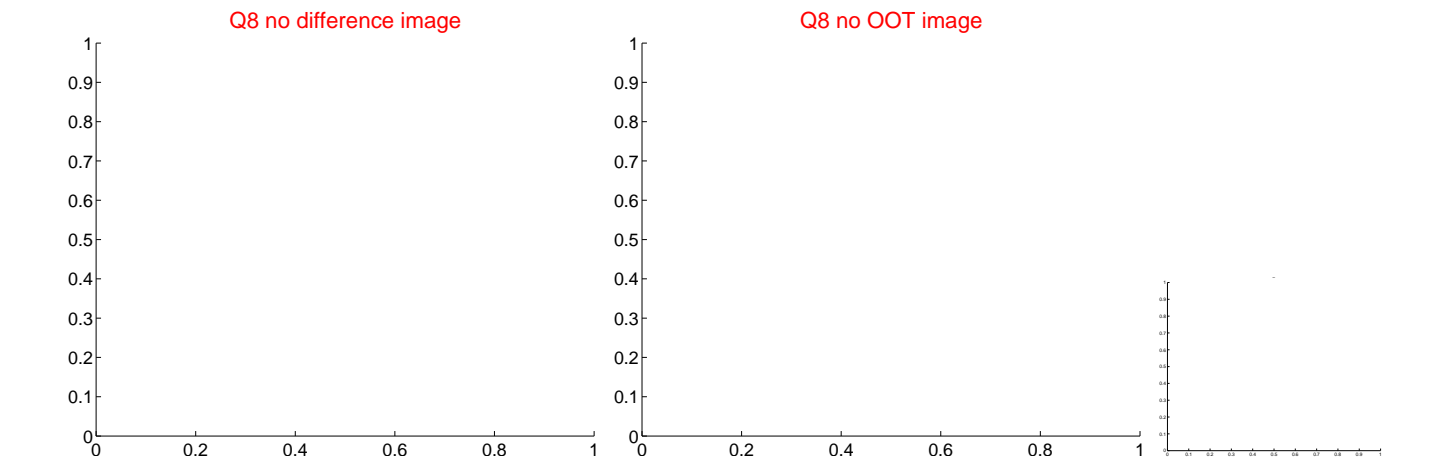
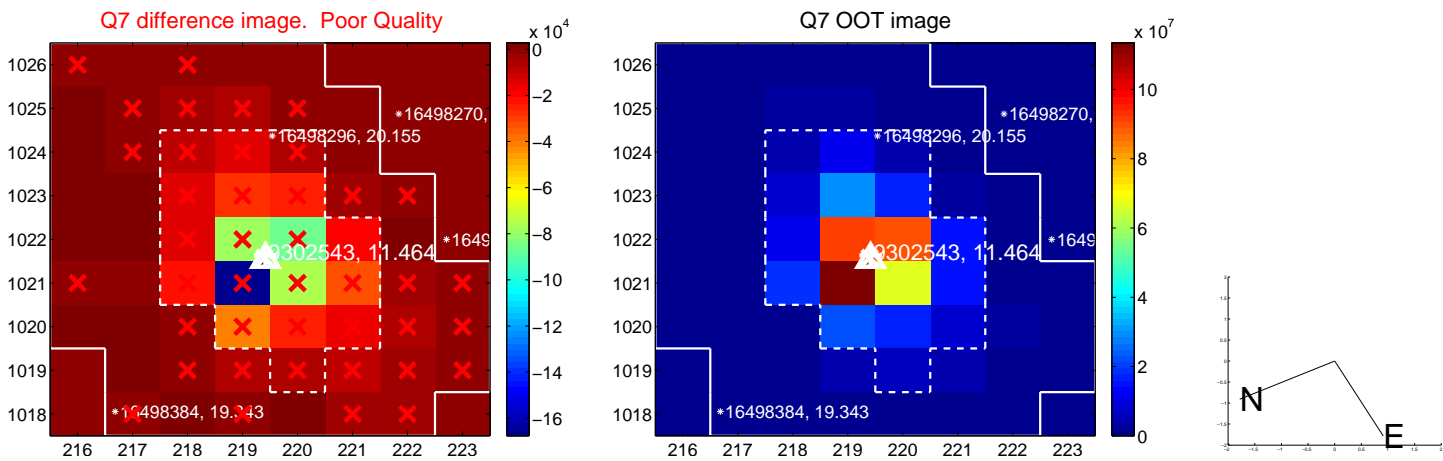
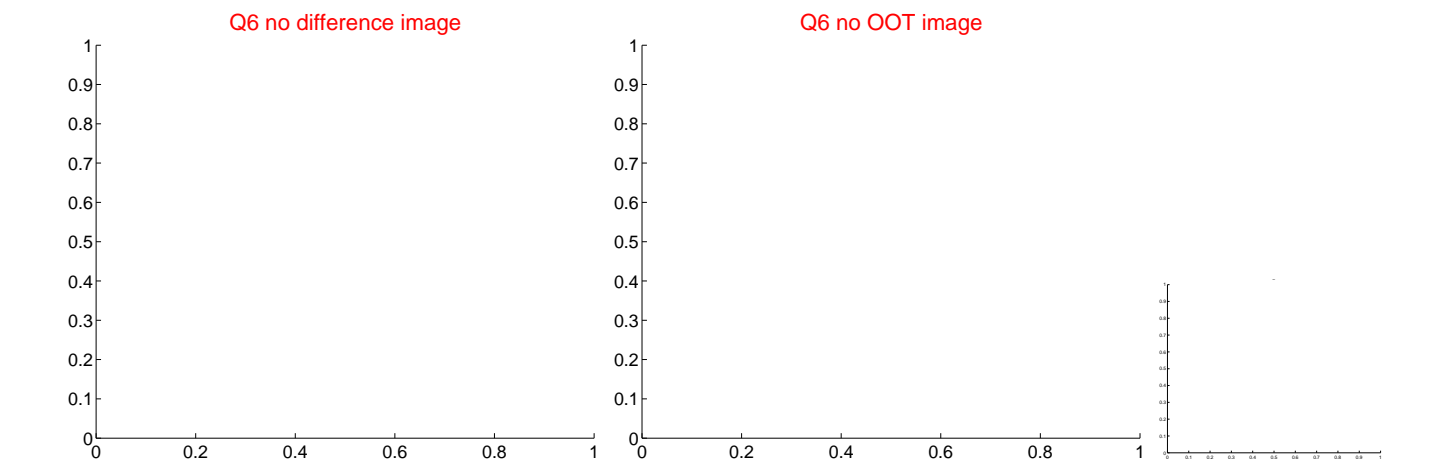
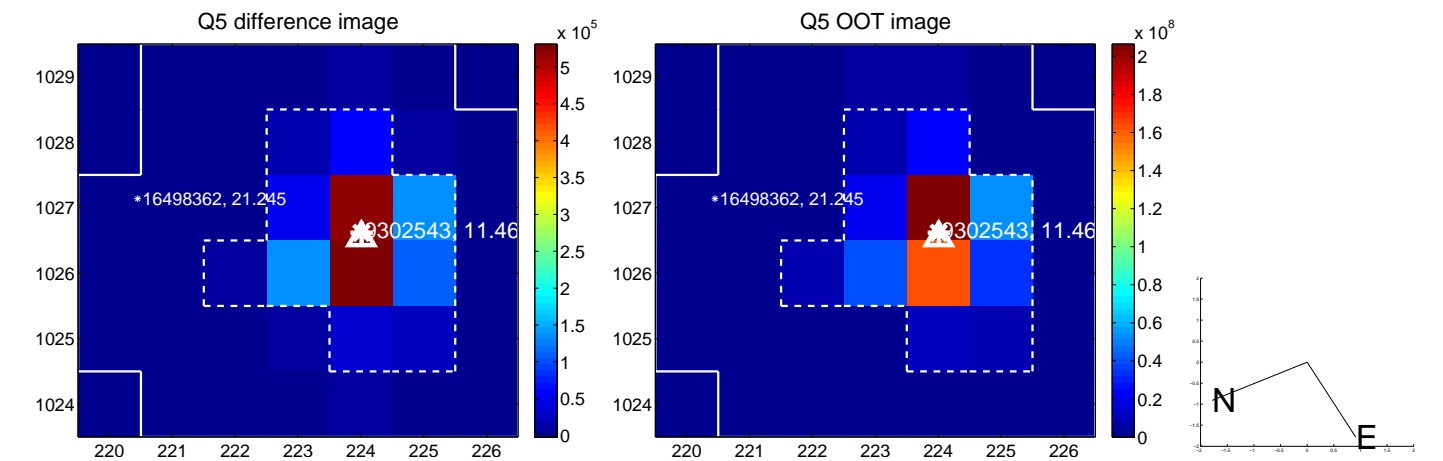


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

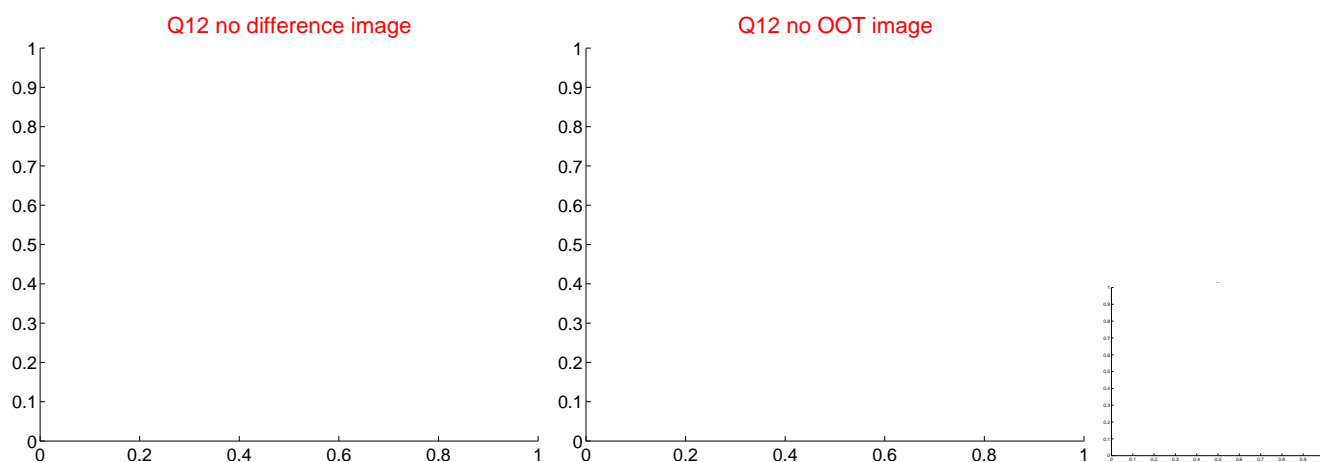
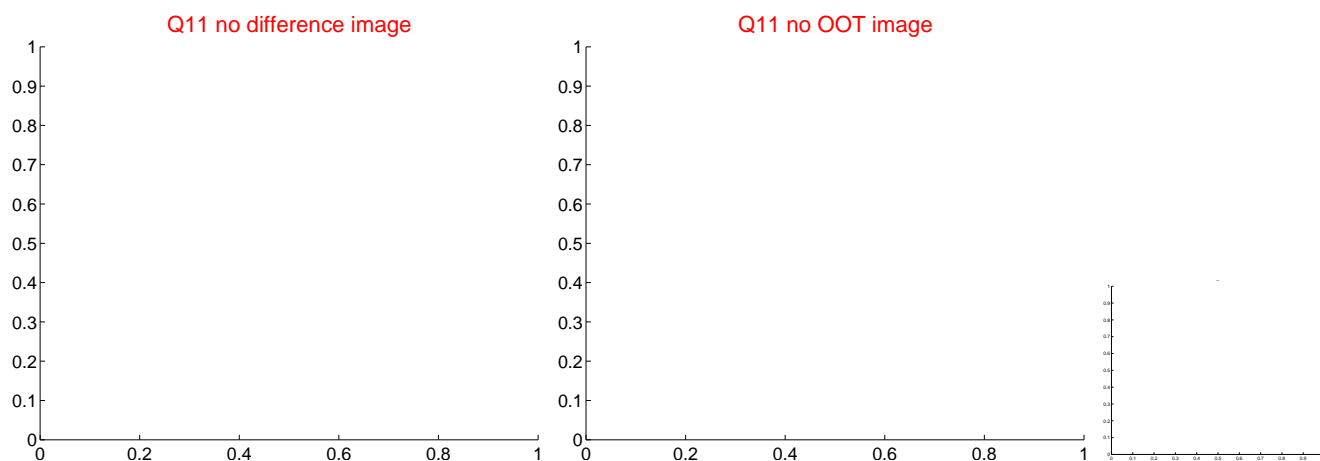
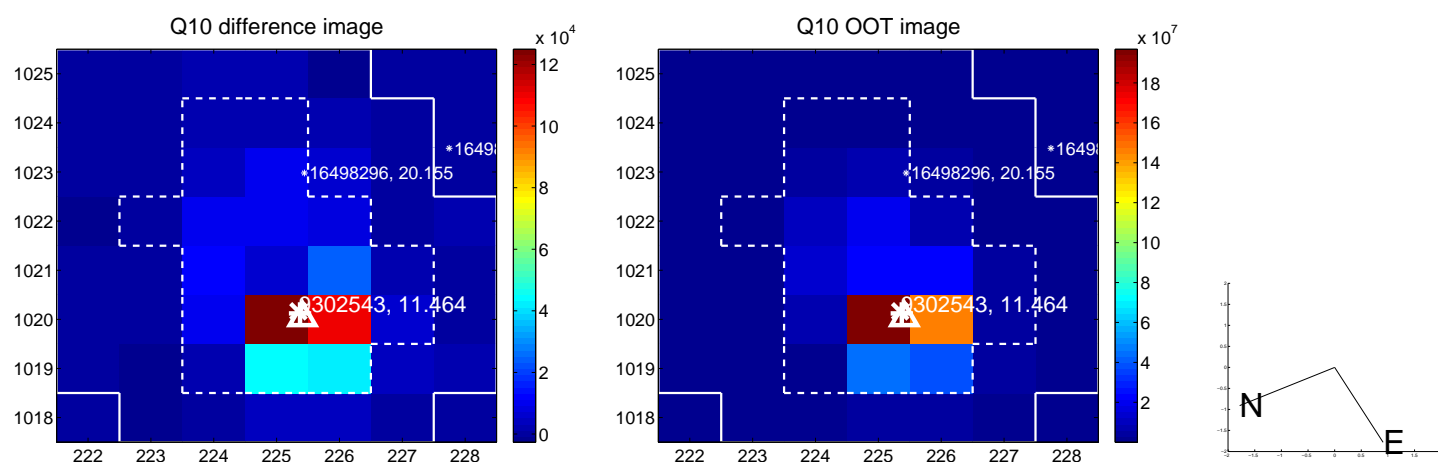
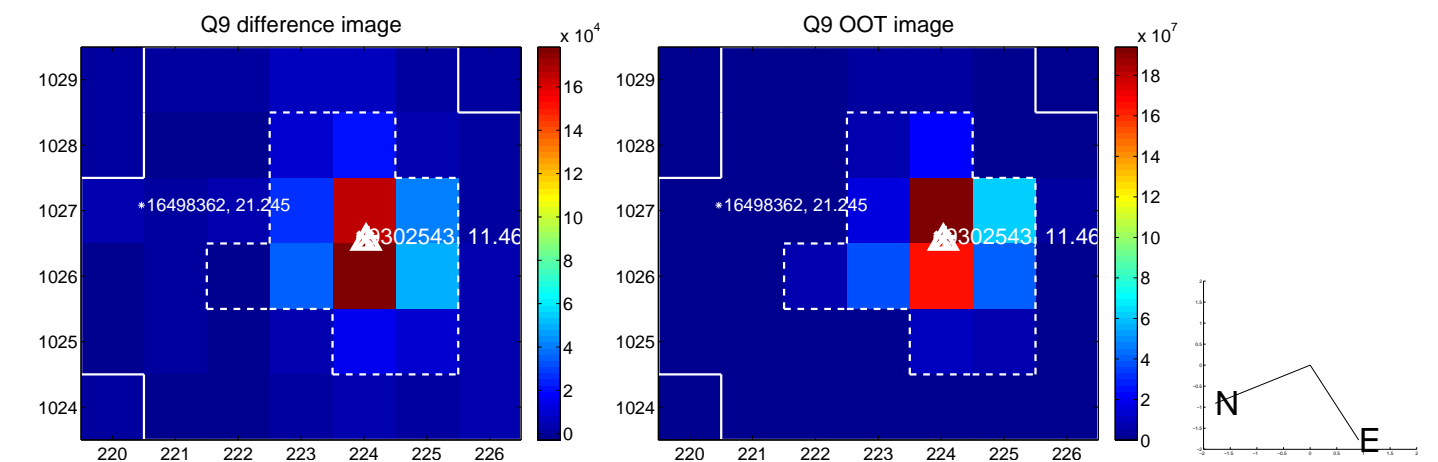
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



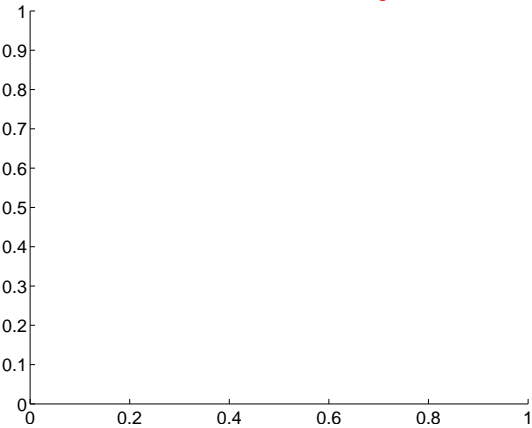
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



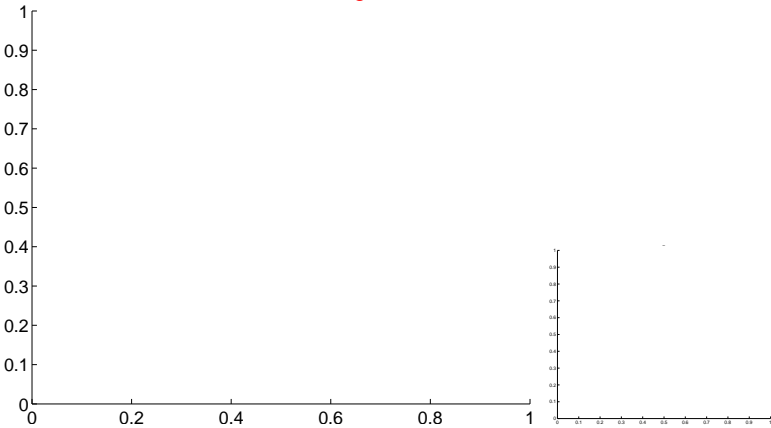


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

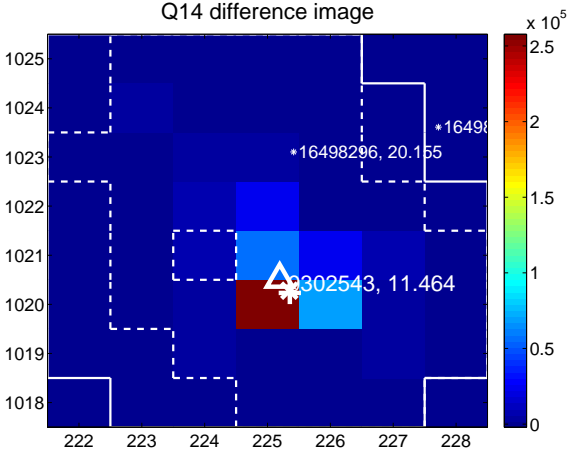
Q13 no difference image



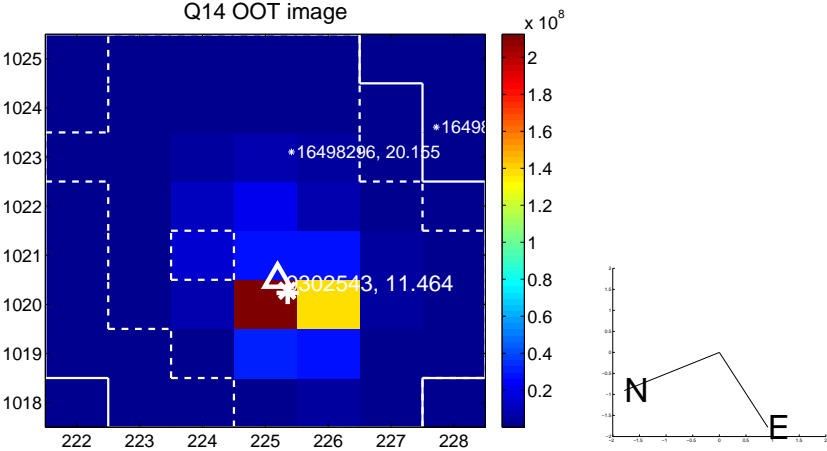
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



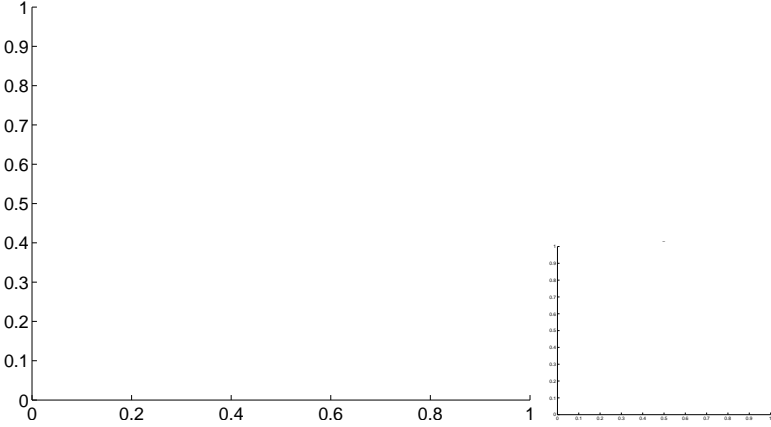
Q15 no OOT image



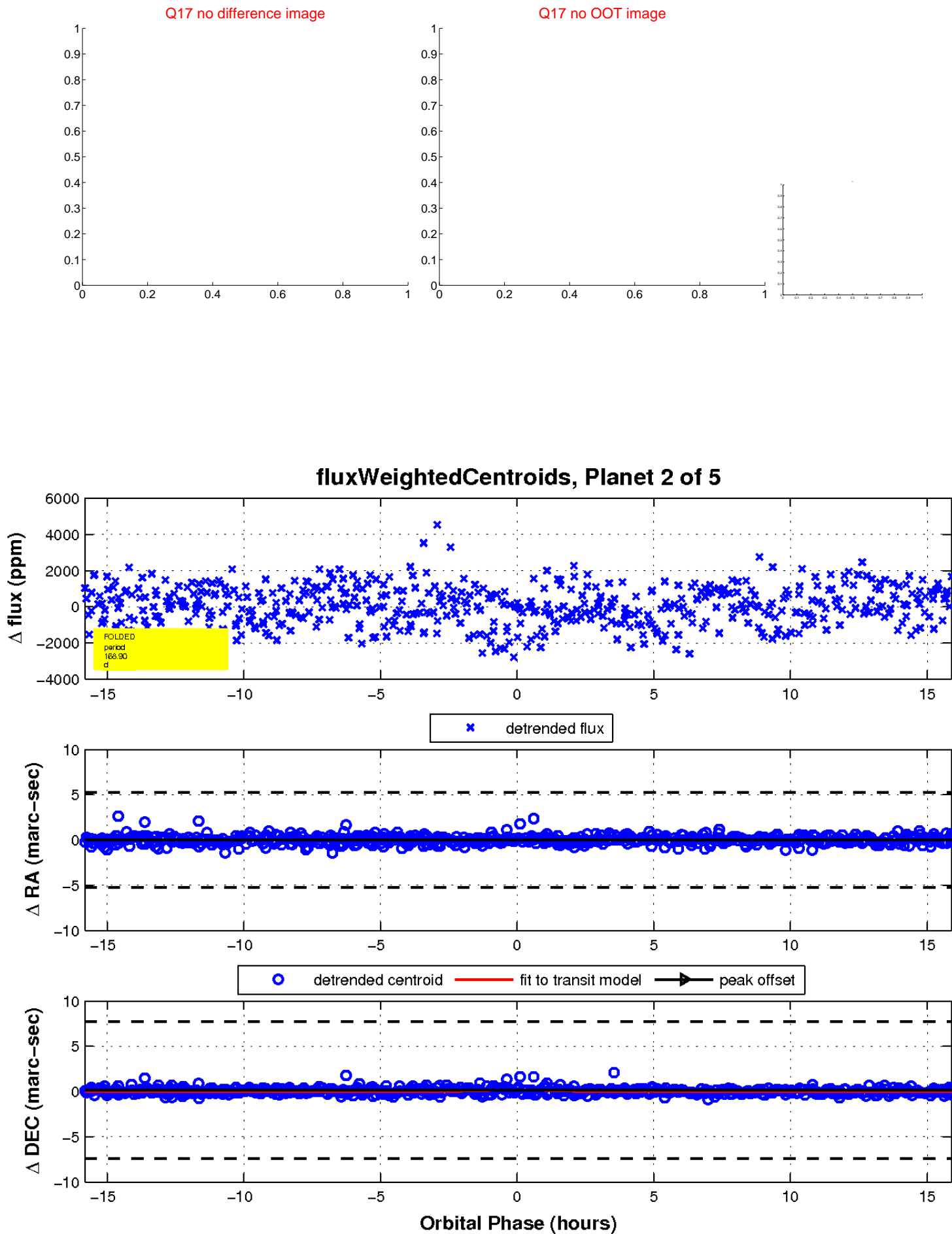
Q16 no difference image



Q16 no OOT image

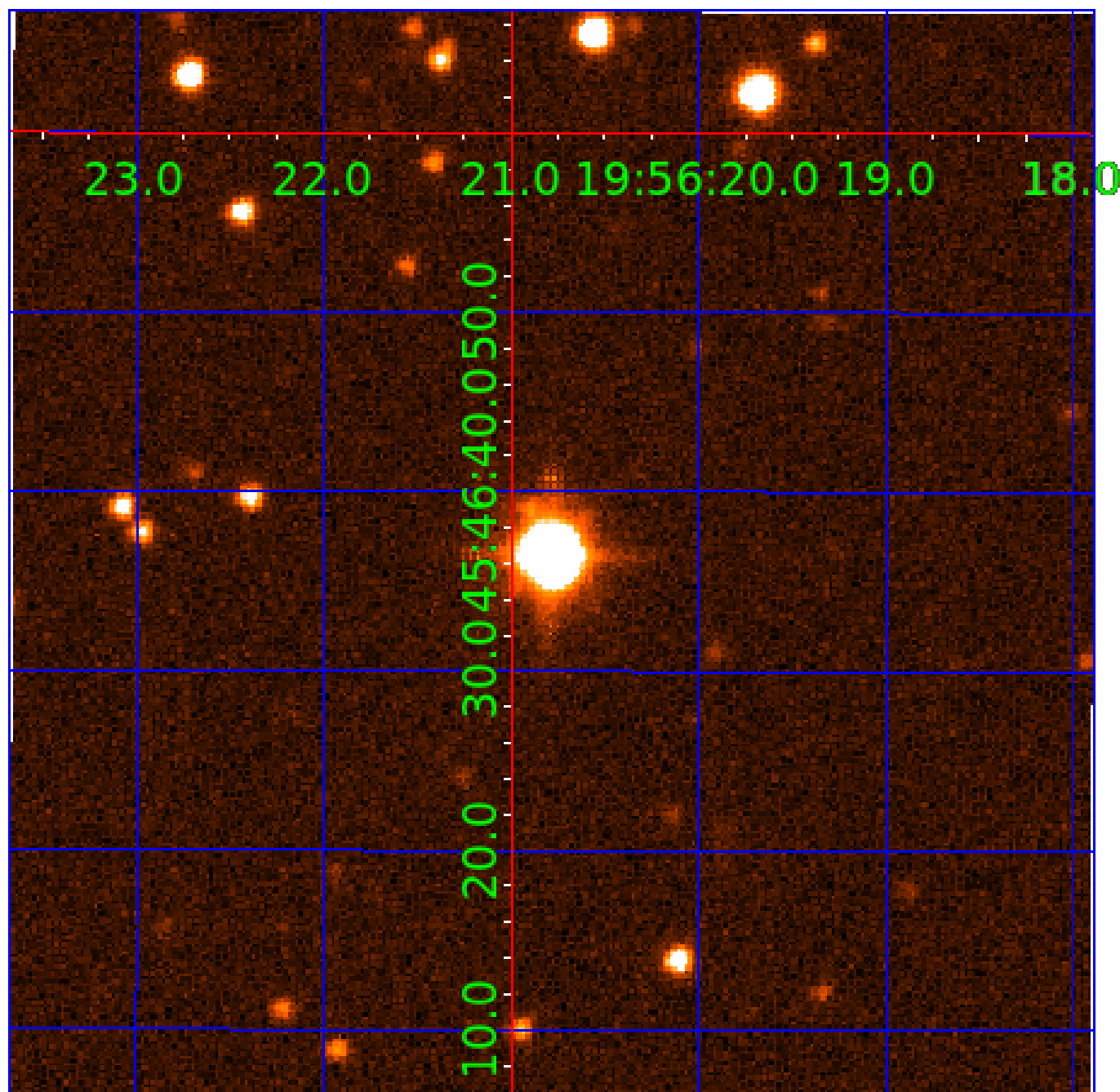


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009302543

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009302543-01	OBS	4272.01	1.214671	131.809402	126.4	7.228	13.9	11.9	3.28	6732	3.79	28167.95
009302543-02	OBS	No	168.896136	146.980295	2154.2	5.303	9.8	10.5	3.28	6732	27.91	39.10
009302543-03	OBS	No	51.178056	153.390023	651.1	1.470	9.5	3.0	3.28	6732	9.24	192.13
009302543-04	OBS	No	32.062512	139.838089	1364.6	2.483	10.0	10.1	3.28	6732	13.16	358.40
009302543-05	OBS	No	51.175646	153.599226	1675.6	2.147	9.8	9.5	3.28	6732	14.30	192.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009302543-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—CENT_SATURATED
009302543-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

## Ephemeris Match Information For 009302543-03

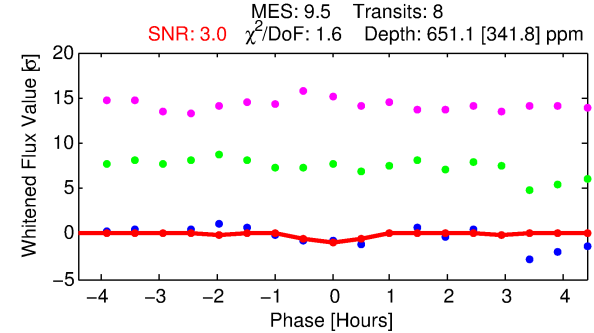
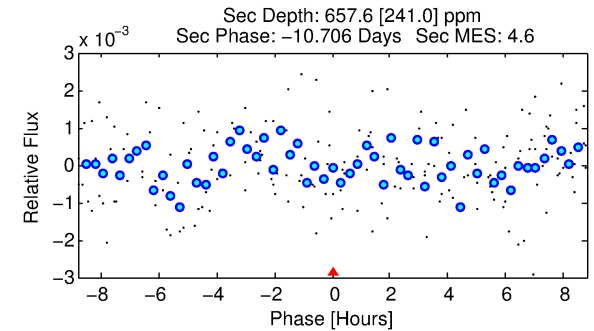
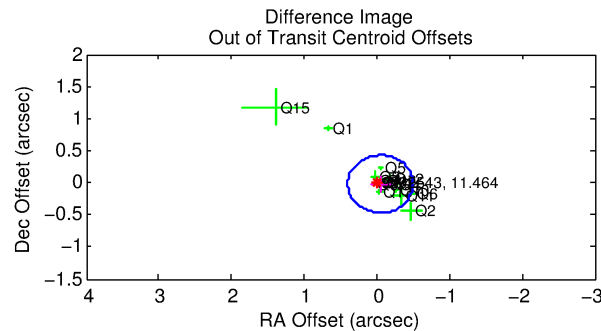
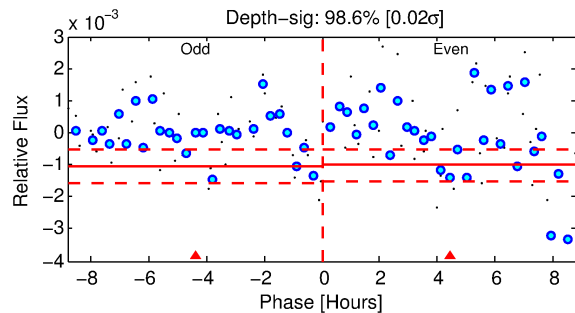
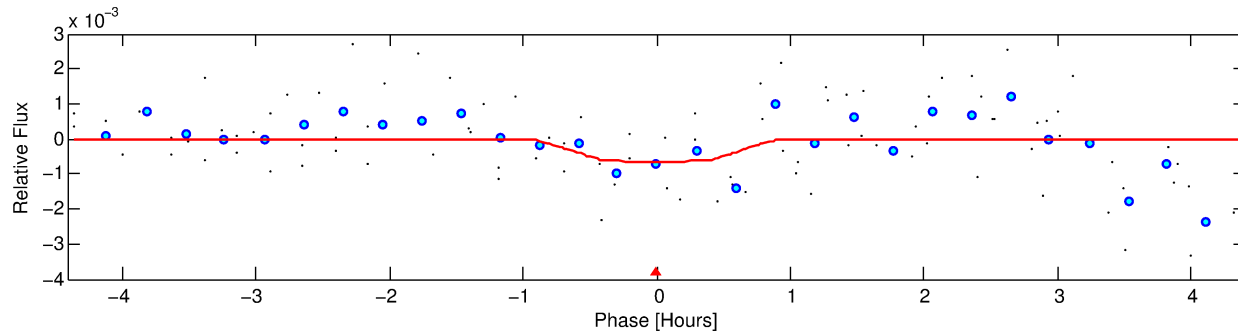
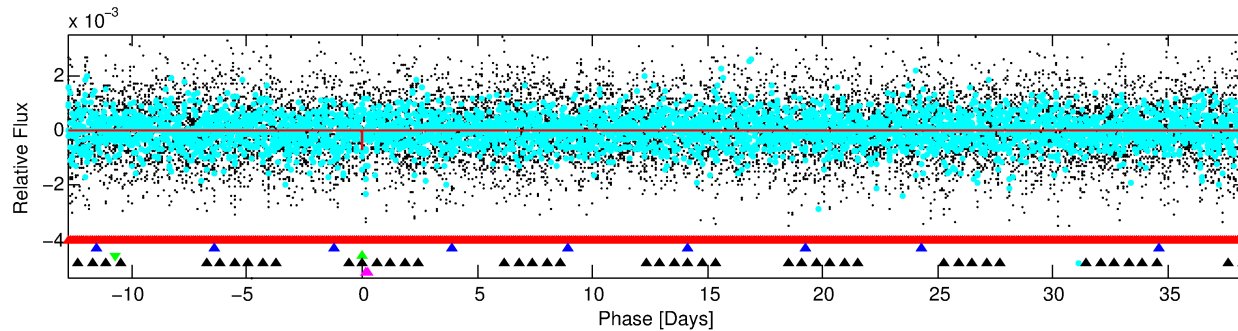
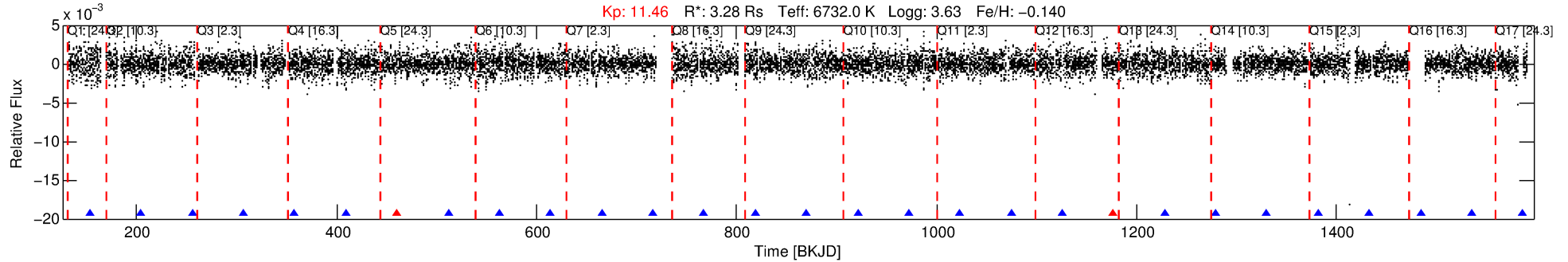
No Significant Match Found

# DV One-Page Summary

KIC: 9302543 Candidate: 3 of 5 Period: 51.178 d

KOI: K04272 Corr: No Ephemeris Match

Kp: 11.46 R\*: 3.28 Rs Teff: 6732.0 K Logg: 3.63 Fe/H: -0.140



## DV Fit Results:

Period = 51.17806 [0.00115] d  
Epoch = 153.3900 [0.0166] BKJD  
Rp/R\* = 0.0259 [0.0630]  
a/R\* = 172.36 [2358.83]  
b = 0.80 [6.37]  
Seff = 192.13 [184.54]  
Teq = 949 [228] K  
Rp = 9.24 [23.13] Re  
a = 0.3206 [0.1860] AU  
Ag = 435.38 [2167.17] [0.20σ]  
Teffp = 6705 [8193] K [0.70σ]

## DV Diagnostic Results:

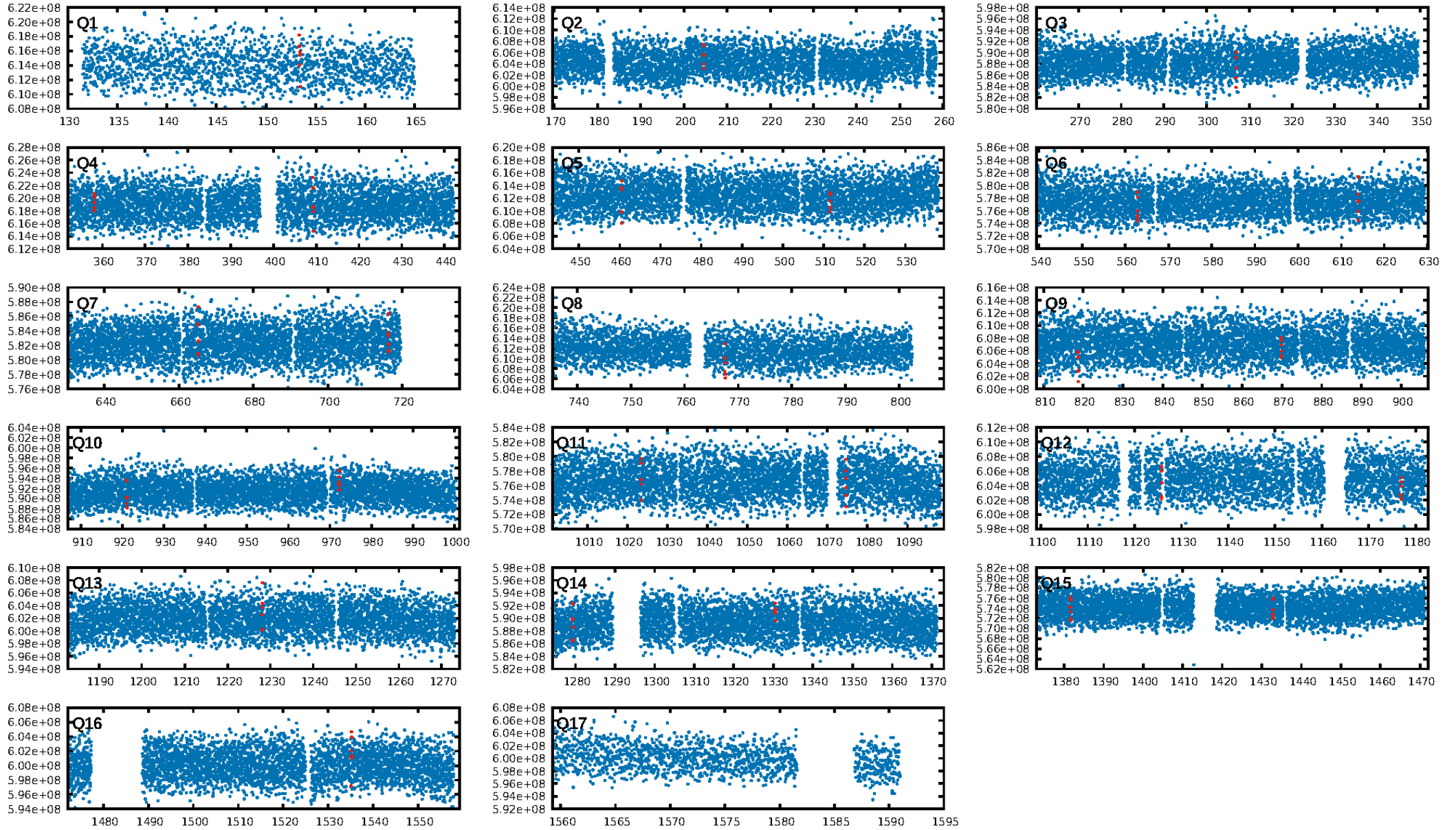
ShortPeriod-sig: 1.8% [0.02σ]  
LongPeriod-sig: 100.0% [513.37σ]  
ModelChiSquare2-sig: 4.1%  
ModelChiSquareGof-sig: 95.1%  
Bootstrap-pfa: 8.72e-10  
RollingBand-fgt: 0.75 [6/8]  
GhostDiagnostic-chr: 0.2818  
Centroid-sig: 94.5%  
Centroid-so: 0.174 arcsec [0.86σ]  
OotOffset-rm: 0.050 arcsec [0.33σ]  
KicOffset-rm: 0.174 arcsec [1.12σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.44 [7/16]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:35 Z

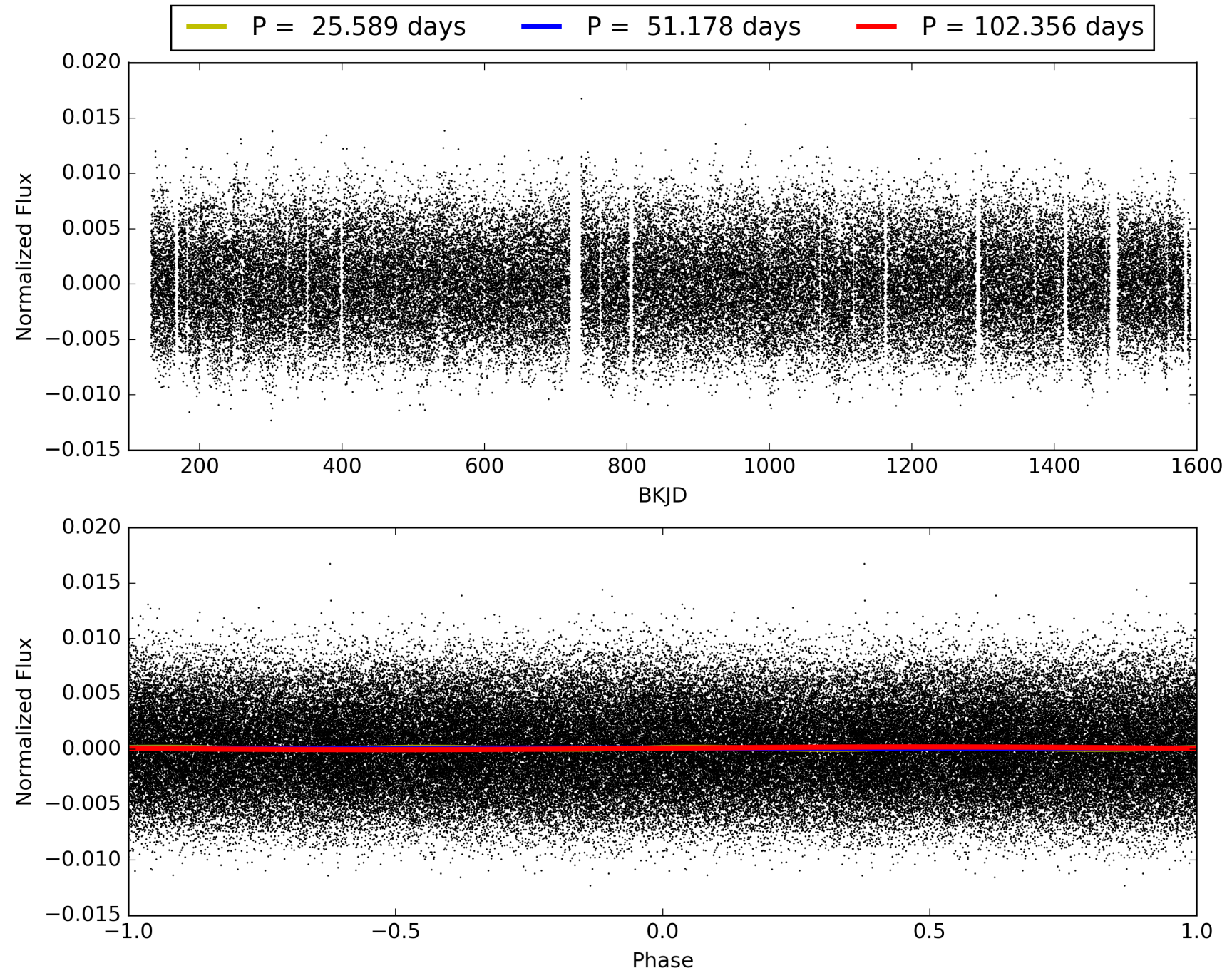
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009302543-03, PDC Light Curves

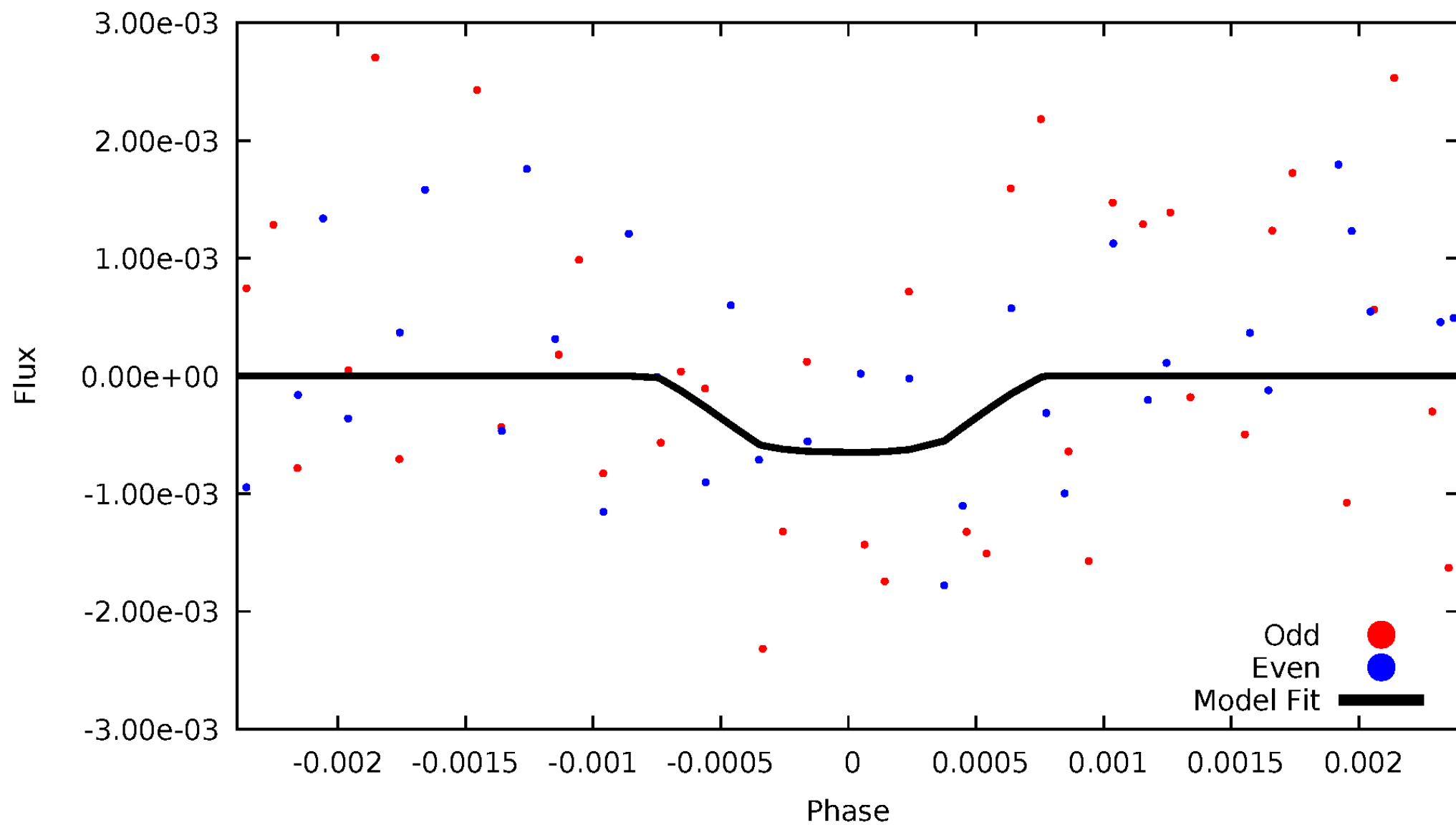


TCE 009302543-03



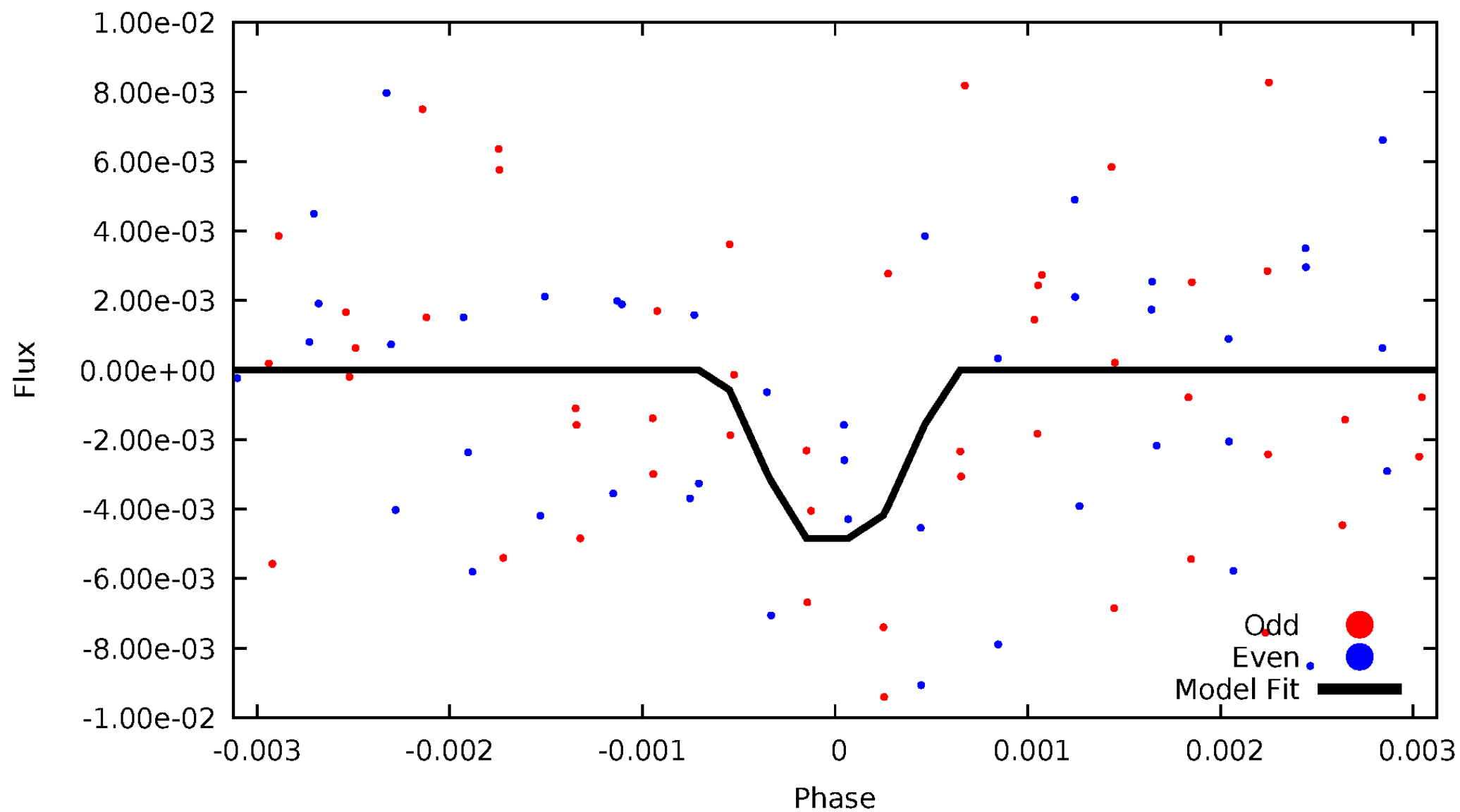
# DV Odd/Even

TCE 009302543-03

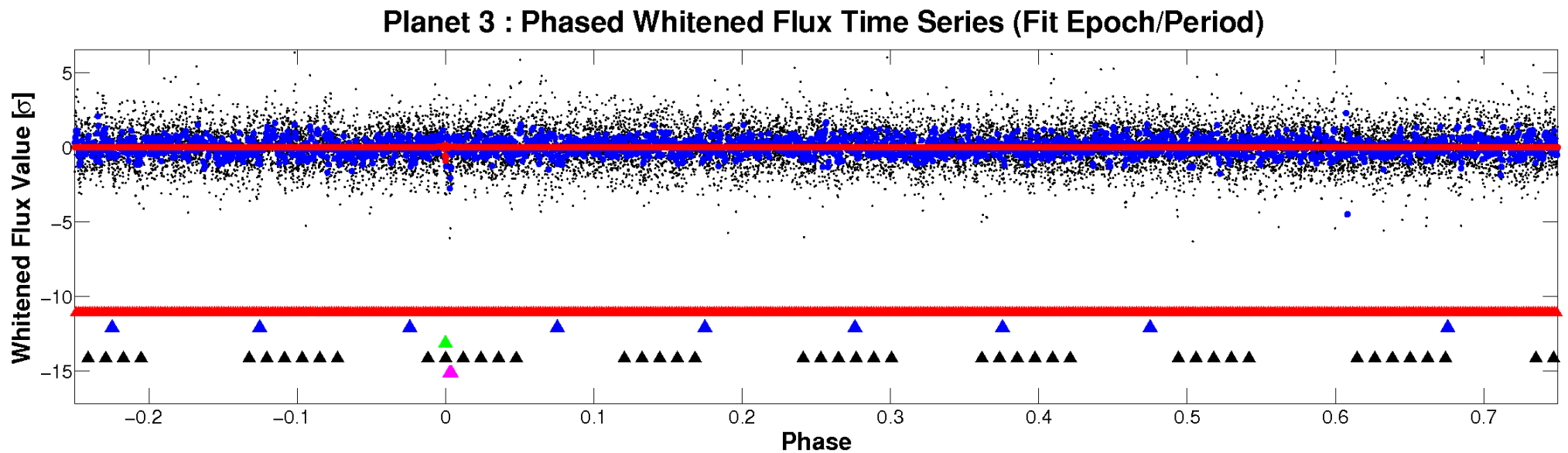
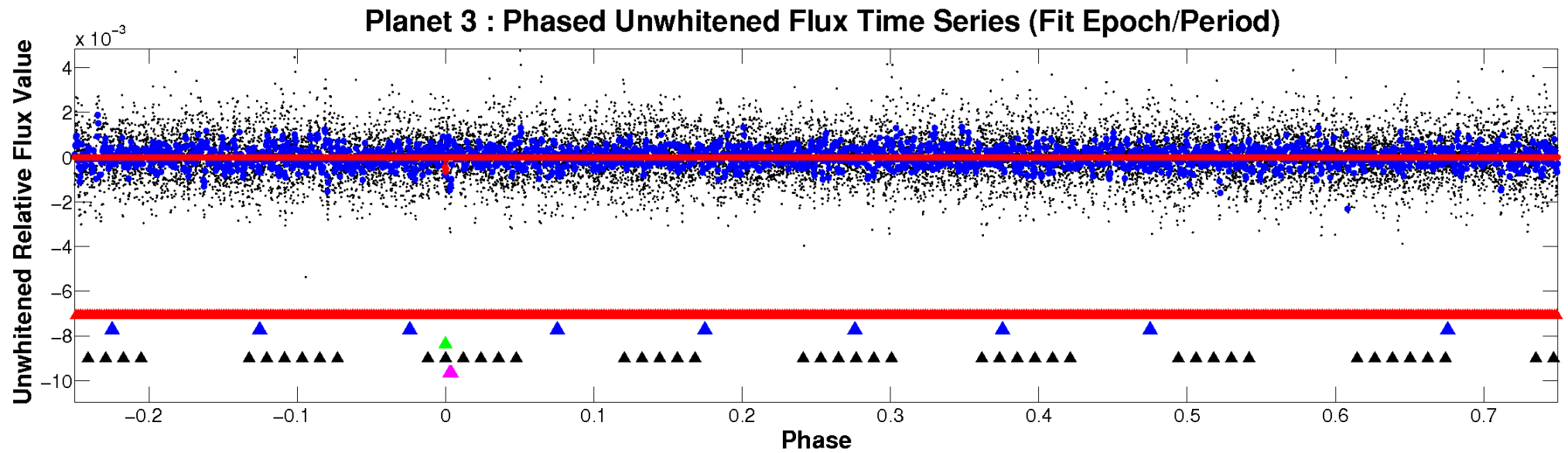


# ALT Odd/Even

TCE 009302543-03



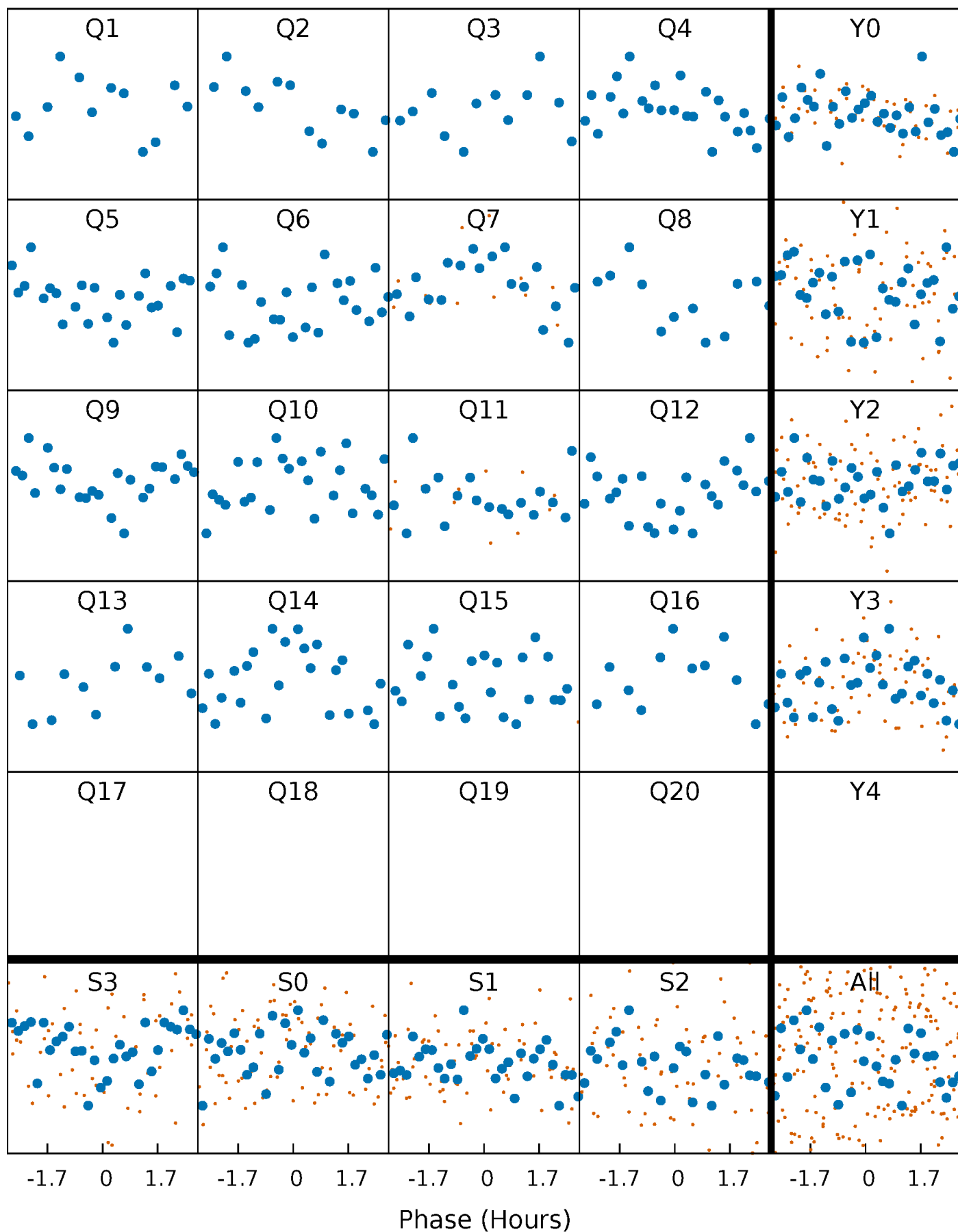
# Non-Whitened Vs. Whitened Light Curve





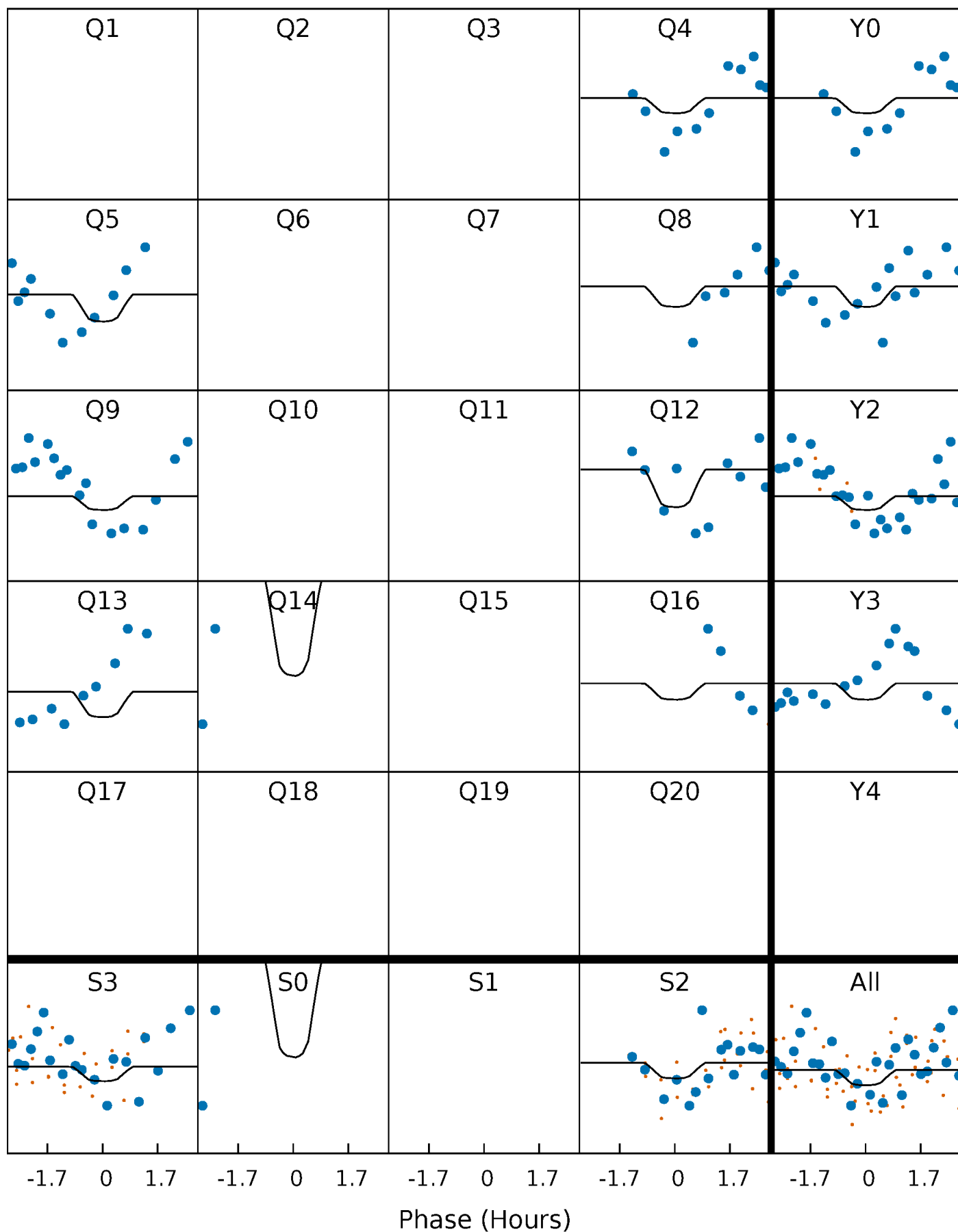
# PDC Quarter-Phased Transit Curves

TCE 009302543-03 P= 51.178056 Days  $T_0=153.390023$  (BKJD)



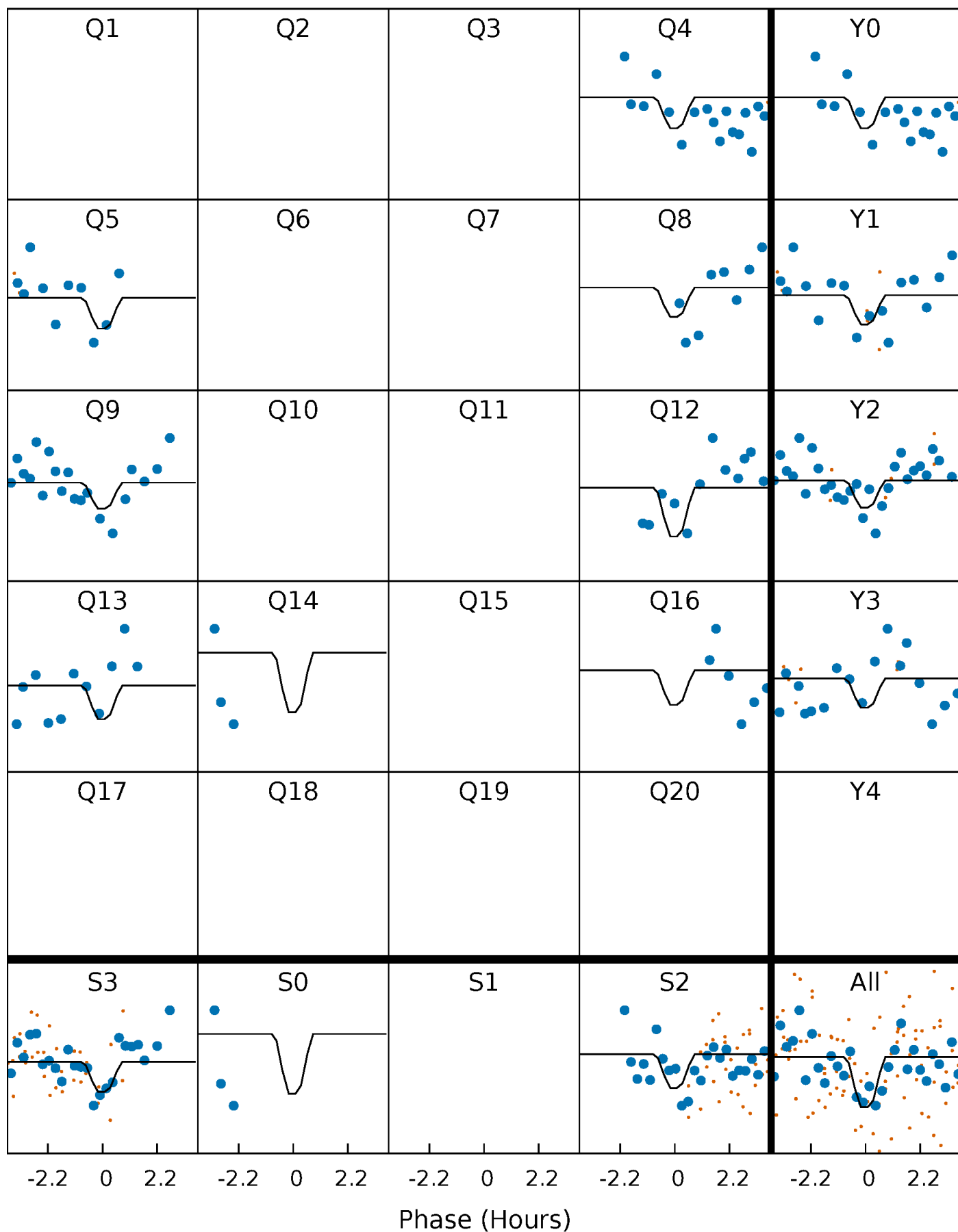
# DV Quarter-Phased Transit Curves

TCE 009302543-03 P= 51.178056 Days  $T_0=153.390023$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

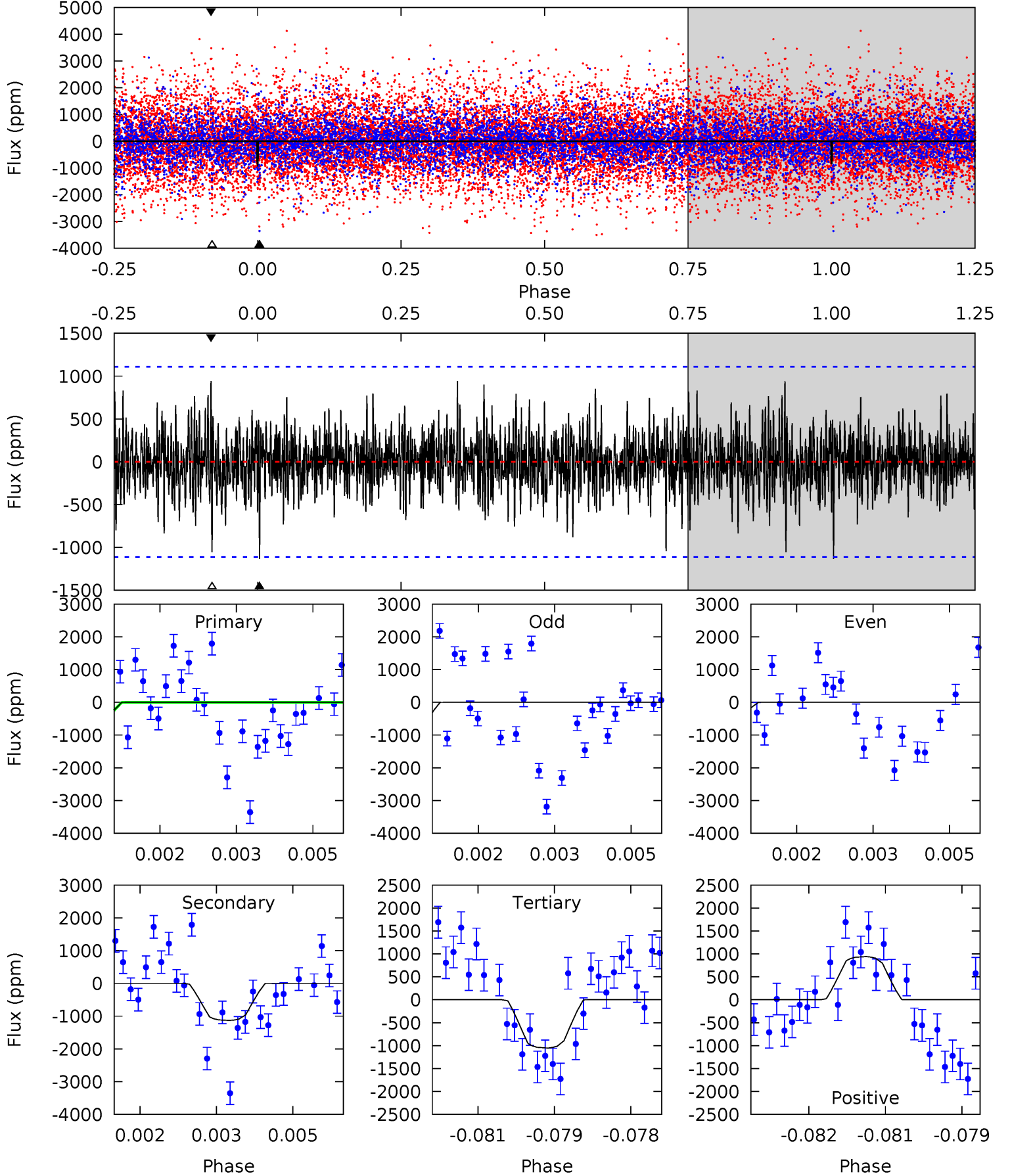
TCE 009302543-03 P= 51.175981 Days  $T_0=153.431682$  (BKJD)



# DV Model-Shift Uniqueness Test

009302543-03, P = 51.178056 Days, E = 102.211967 Days

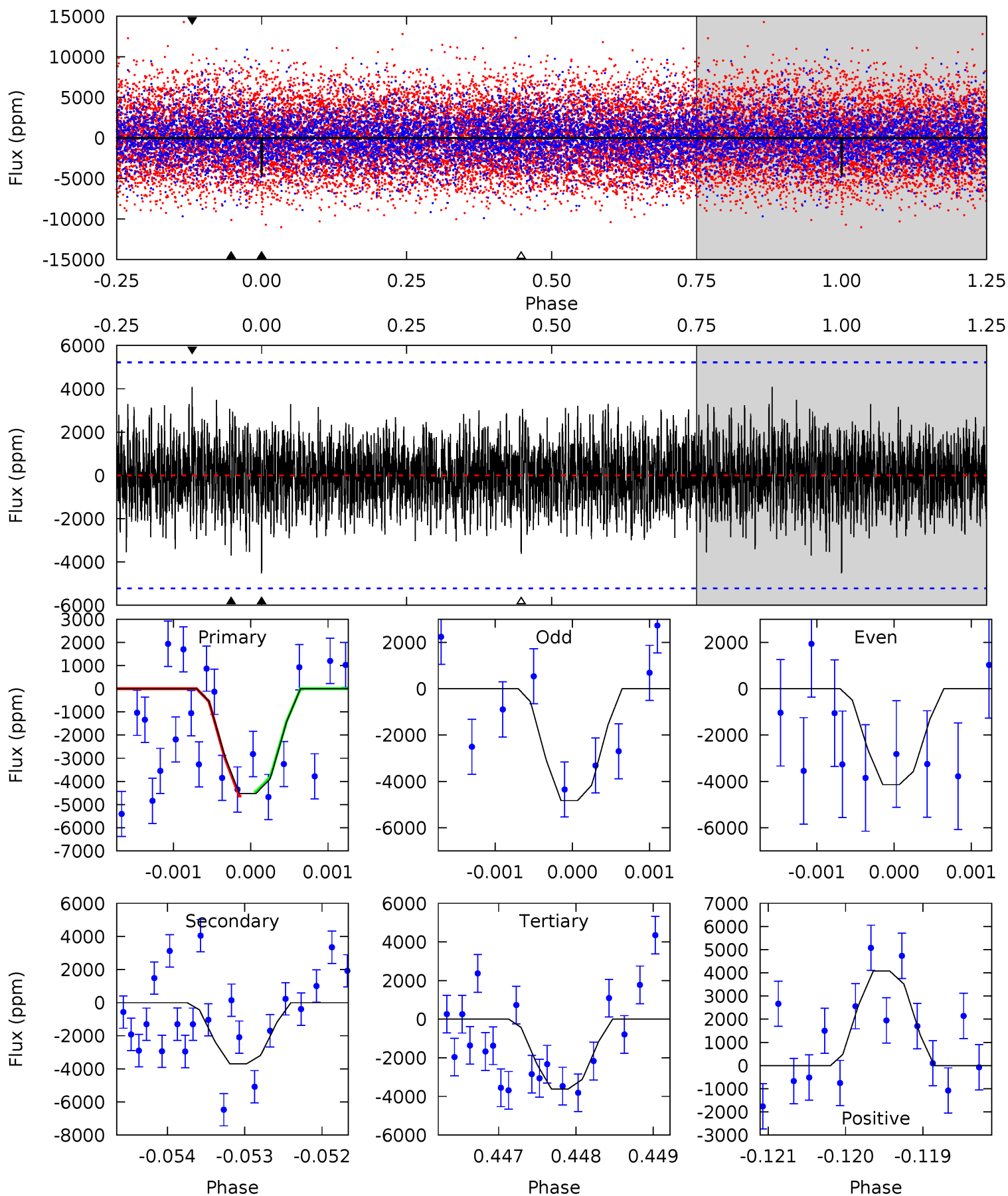
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.12	5.49	5.10	4.56	5.38	3.17	1.34	-0.98	-0.44	0.38	0.92	1.10	0.90	0.45	0.03



# Alt Model-Shift Uniqueness Test

009302543-03, P = 51.175981 Days, E = 102.255701 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
4.72	3.86	3.78	4.26	5.45	3.29	1.19	0.94	0.46	0.08	-0.40	0.36	0.93	0.47	0.10





### Stellar Parameters For KIC 009302543

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6732^{+184}_{-225}$	$3.632^{+0.567}_{-0.063}$	$-0.140^{+0.300}_{-0.300}$	$3.276^{+0.444}_{-1.885}$	$1.676^{+0.197}_{-0.460}$	$0.067^{+0.472}_{-0.014}$
	+3%/-3%	+16%/-2%	+214%/-214%	+14%/-58%	+12%/-27%	+703%/-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 009302543-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1132 \pm 206$	$15.38^{+18.80}_{-10.75}$	$1273^{+83}_{-194}$	$5406^{+5643}_{-1323}$	$265^{+2723}_{-209}$
Alt.	$-3700 \pm 957$	$23.93^{+20.82}_{-14.89}$	$1276^{+83}_{-164}$	$5941^{+4793}_{-1398}$	$363^{+2086}_{-266}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

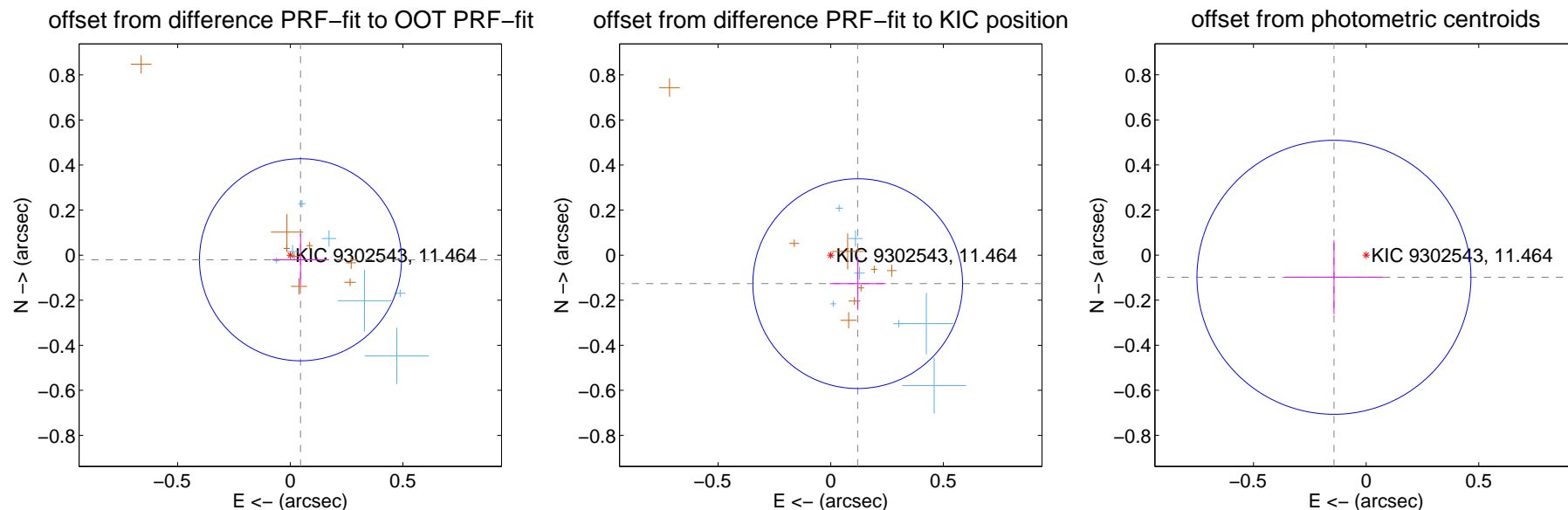
## DV Centroid Data

Supplemental centroid analysis for 009302543-03. **Kepler magnitude: 11.46.** Transit SNR 3.02

There are 7 quarters with good PRF difference image offsets

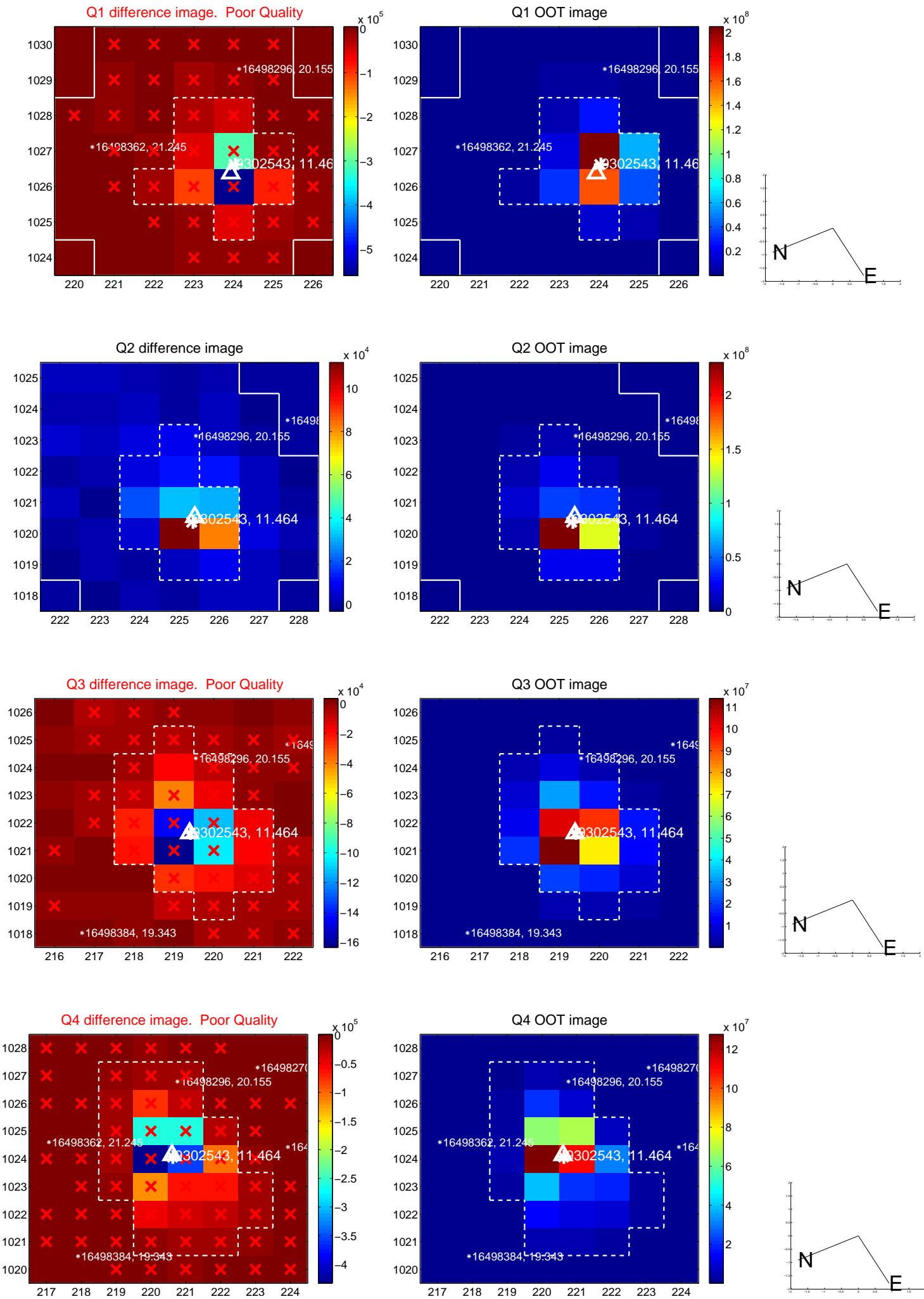
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.050 \pm 0.149$	0.33	$-0.045 \pm 0.126$	$-0.020 \pm 0.115$
PRF-fit source offset from KIC position	$0.174 \pm 0.155$	1.12	$-0.120 \pm 0.124$	$-0.126 \pm 0.118$
photometric centroid source offset	$0.17 \pm 0.20$	0.86	$0.14 \pm 0.22$	$-0.10 \pm 0.16$

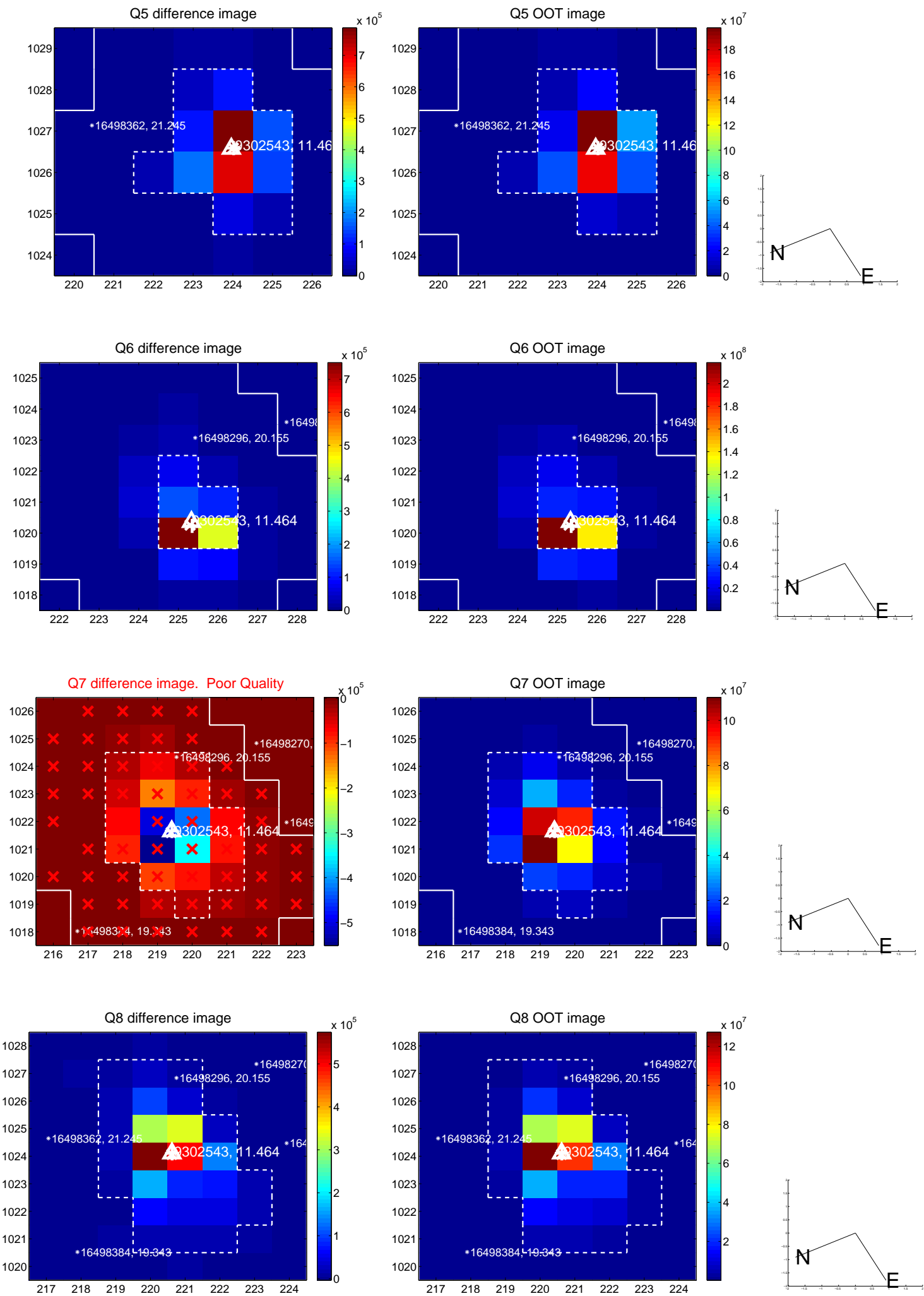


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

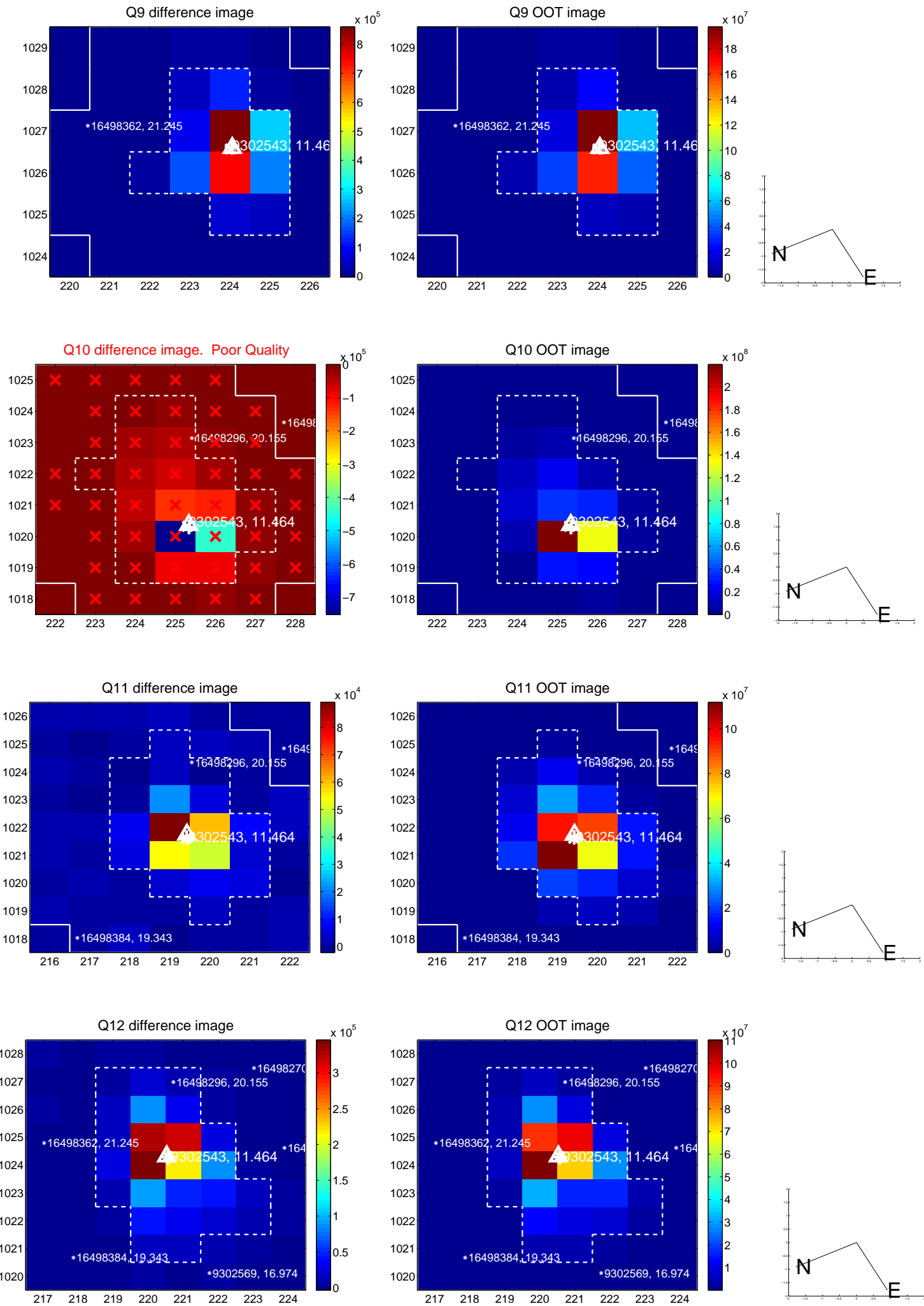
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



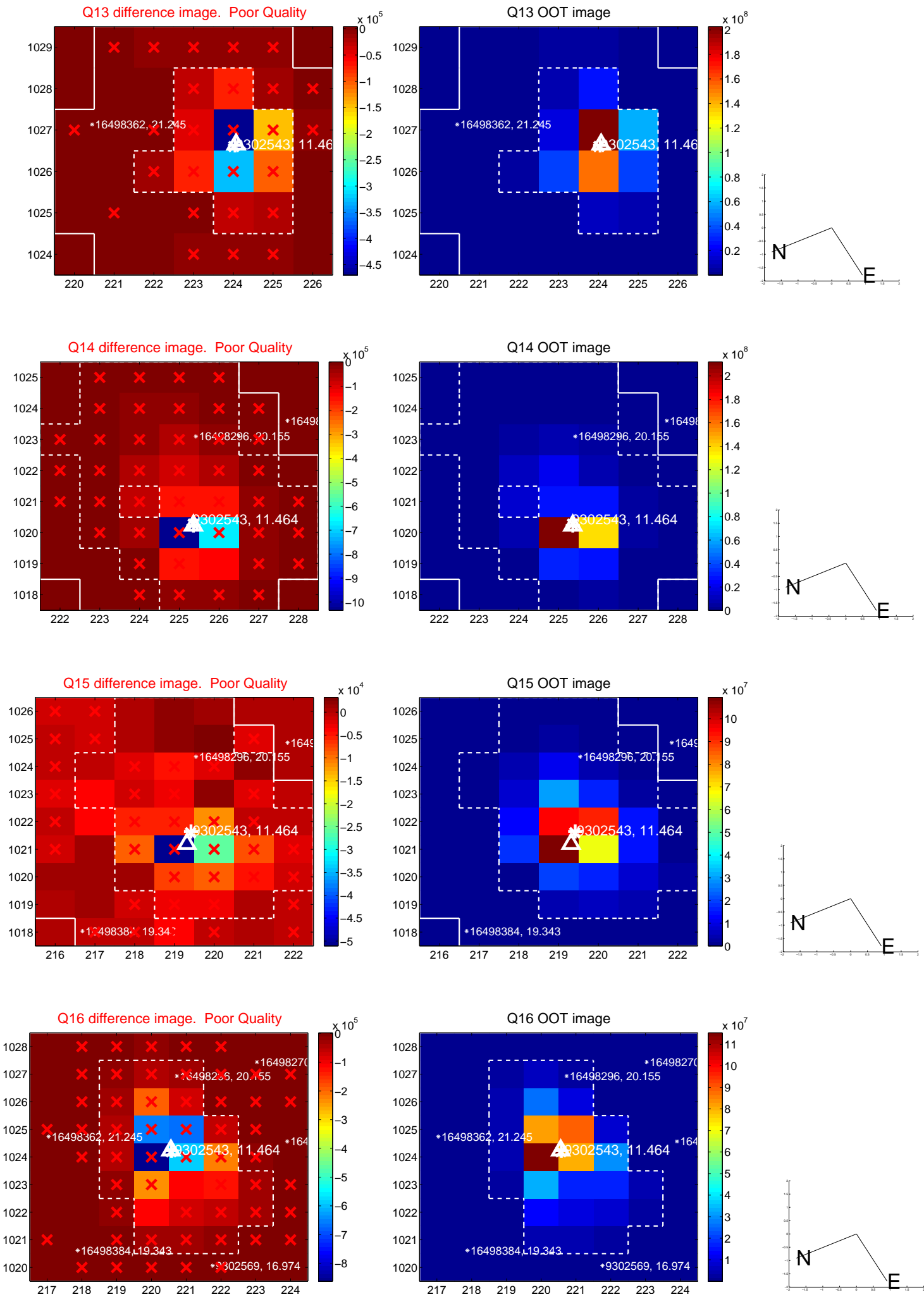
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

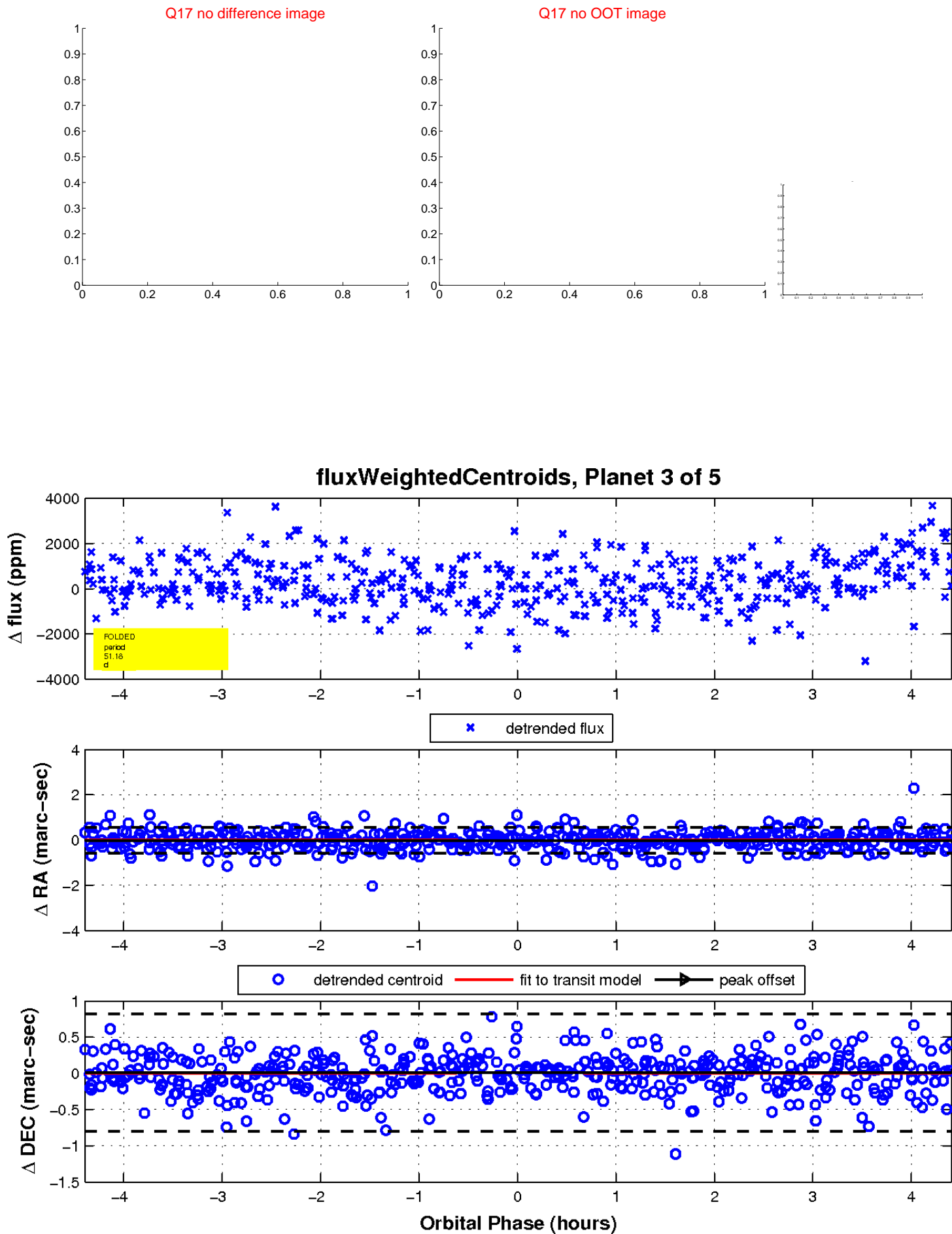


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



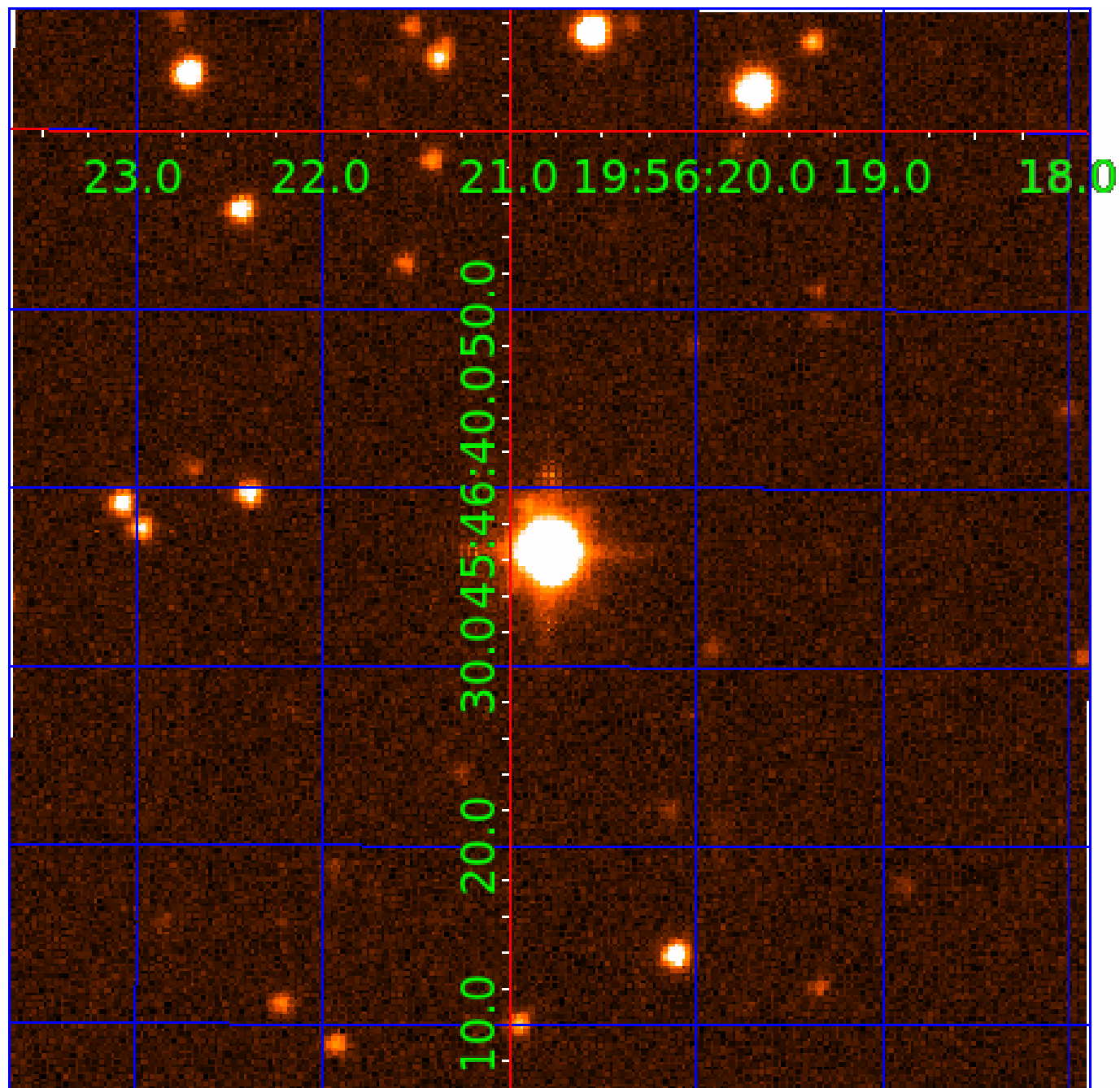


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009302543

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009302543-01	OBS	4272.01	1.214671	131.809402	126.4	7.228	13.9	11.9	3.28	6732	3.79	28167.95
009302543-02	OBS	No	168.896136	146.980295	2154.2	5.303	9.8	10.5	3.28	6732	27.91	39.10
009302543-03	OBS	No	51.178056	153.390023	651.1	1.470	9.5	3.0	3.28	6732	9.24	192.13
009302543-04	OBS	No	32.062512	139.838089	1364.6	2.483	10.0	10.1	3.28	6732	13.16	358.40
009302543-05	OBS	No	51.175646	153.599226	1675.6	2.147	9.8	9.5	3.28	6732	14.30	192.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009302543-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—CENT_SATURATED
009302543-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

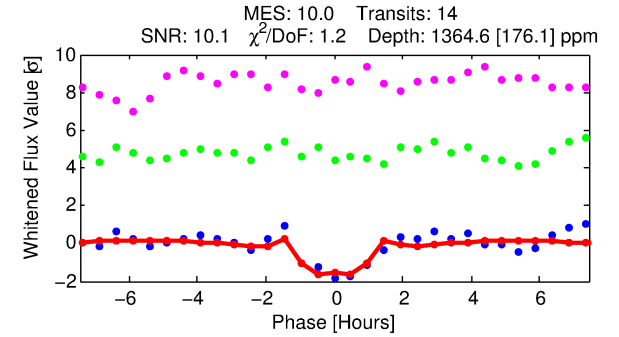
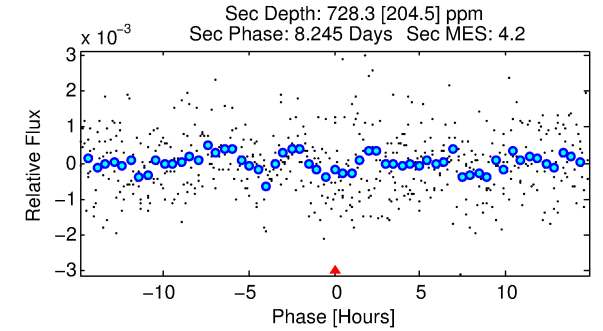
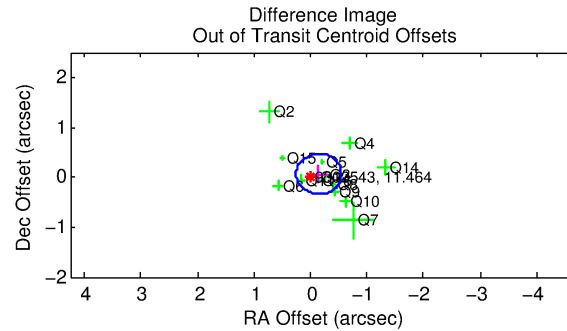
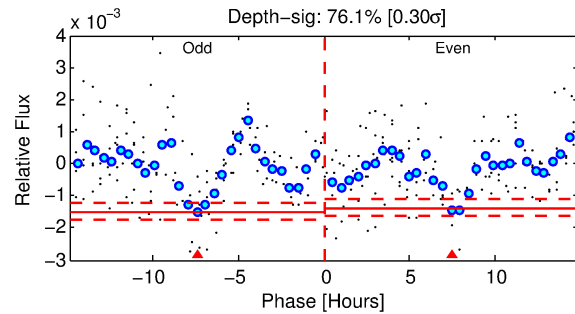
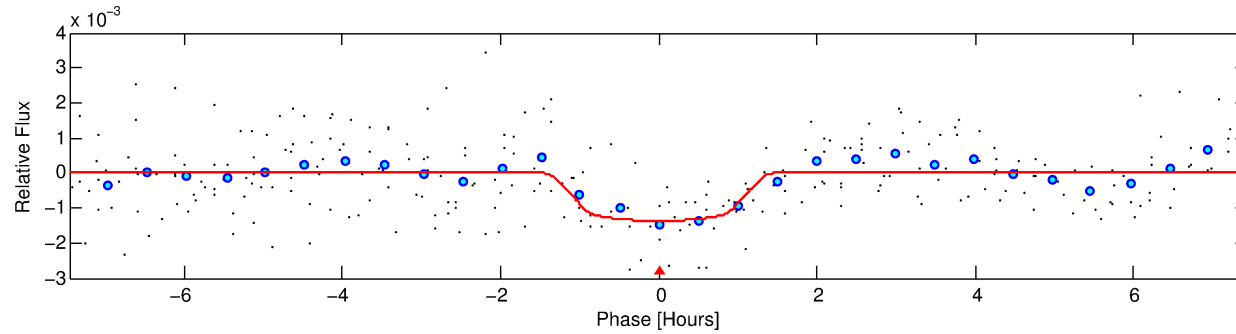
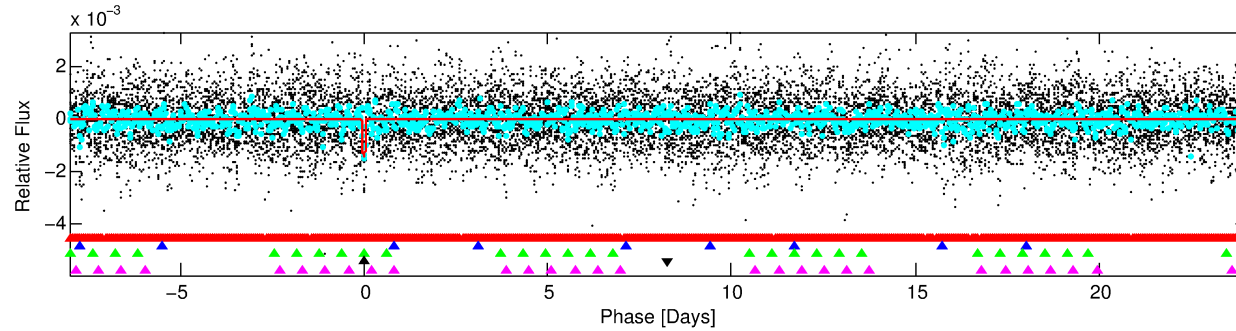
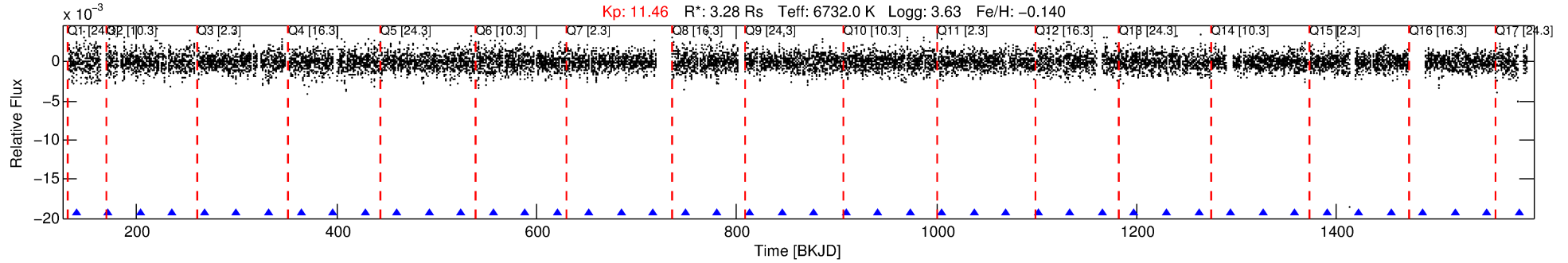
Ephemeris Match Information For 009302543-04

No Significant Match Found

# DV One-Page Summary

KIC: 9302543 Candidate: 4 of 5 Period: 32.063 d

KOI: K04272 Corr: No Ephemeris Match



## DV Fit Results:

Period = 32.06251 [0.00020] d  
Epoch = 139.8381 [0.0055] BKJD  
Rp/R\* = 0.0368 [0.0177]  
a/R\* = 70.51 [187.01]  
b = 0.75 [1.56]  
Seff = 358.40 [344.25]  
Teq = 1109 [266] K  
Rp = 13.16 [9.88]  
a = 0.2347 [0.1362] AU  
Ag = 127.58 [176.50] [0.72 $\sigma$ ]  
Teffp = 5765 [1461] K [3.14 $\sigma$ ]

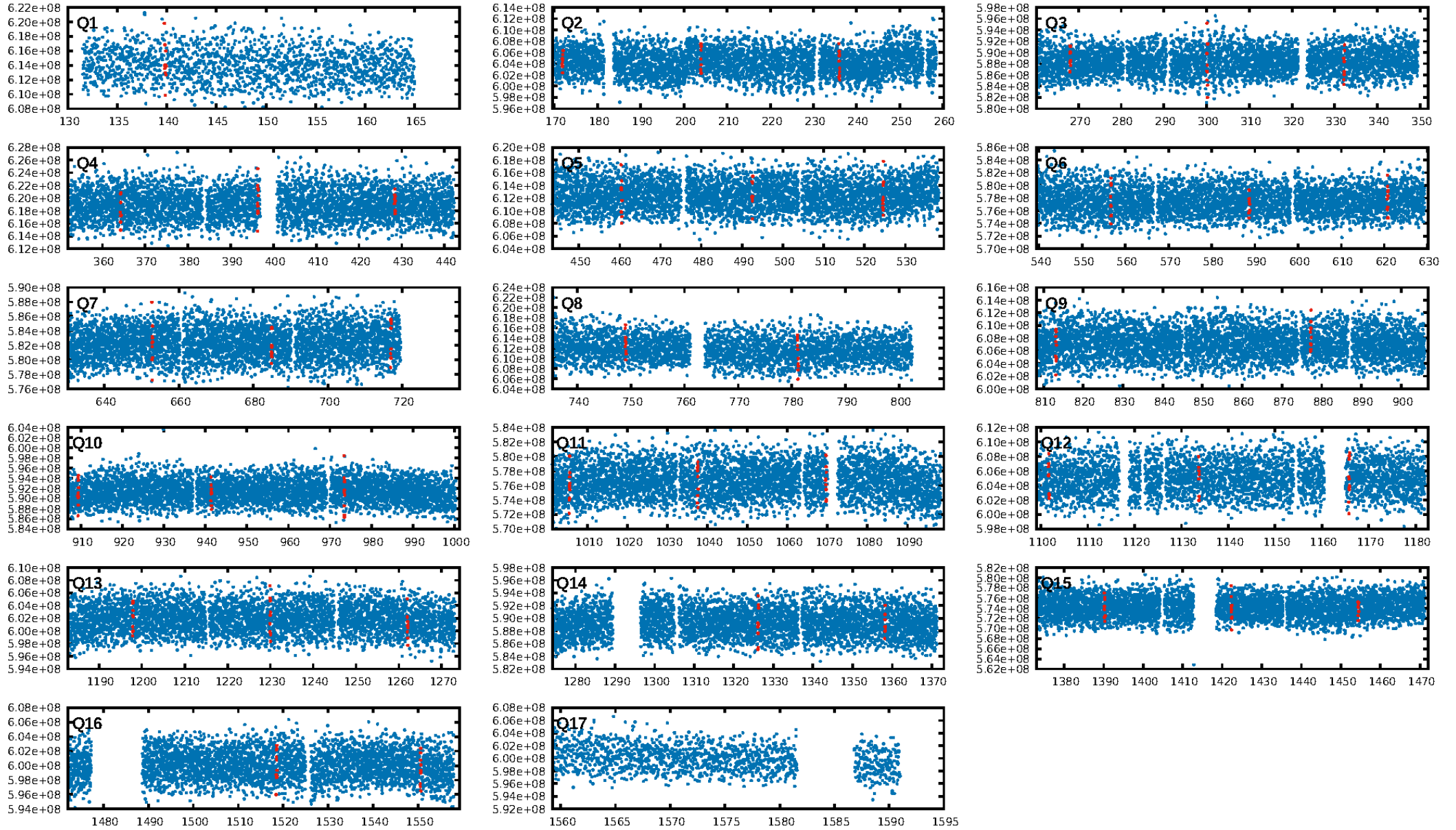
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [96.87 $\sigma$ ]  
LongPeriod-sig: 100.0% [139.75 $\sigma$ ]  
ModelChiSquare2-sig: 2.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.72e-11**  
RollingBand-fgt: 1.00 [13/13]  
GhostDiagnostic-chr: 2.179  
Centroid-sig: 53.0%  
Centroid-so: 0.137 arcsec [2.38 $\sigma$ ]  
OotOffset-rm: 0.159 arcsec [1.19 $\sigma$ ]  
KicOffset-rm: 0.182 arcsec [1.03 $\sigma$ ]  
OotOffset-st: 4/4/3/3 [14]  
KicOffset-st: 4/4/3/3 [14]  
DiffImageQuality-fgm: 0.50 [7/14]  
DiffImageOverlap-fno: 0.62 [10/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:39 Z

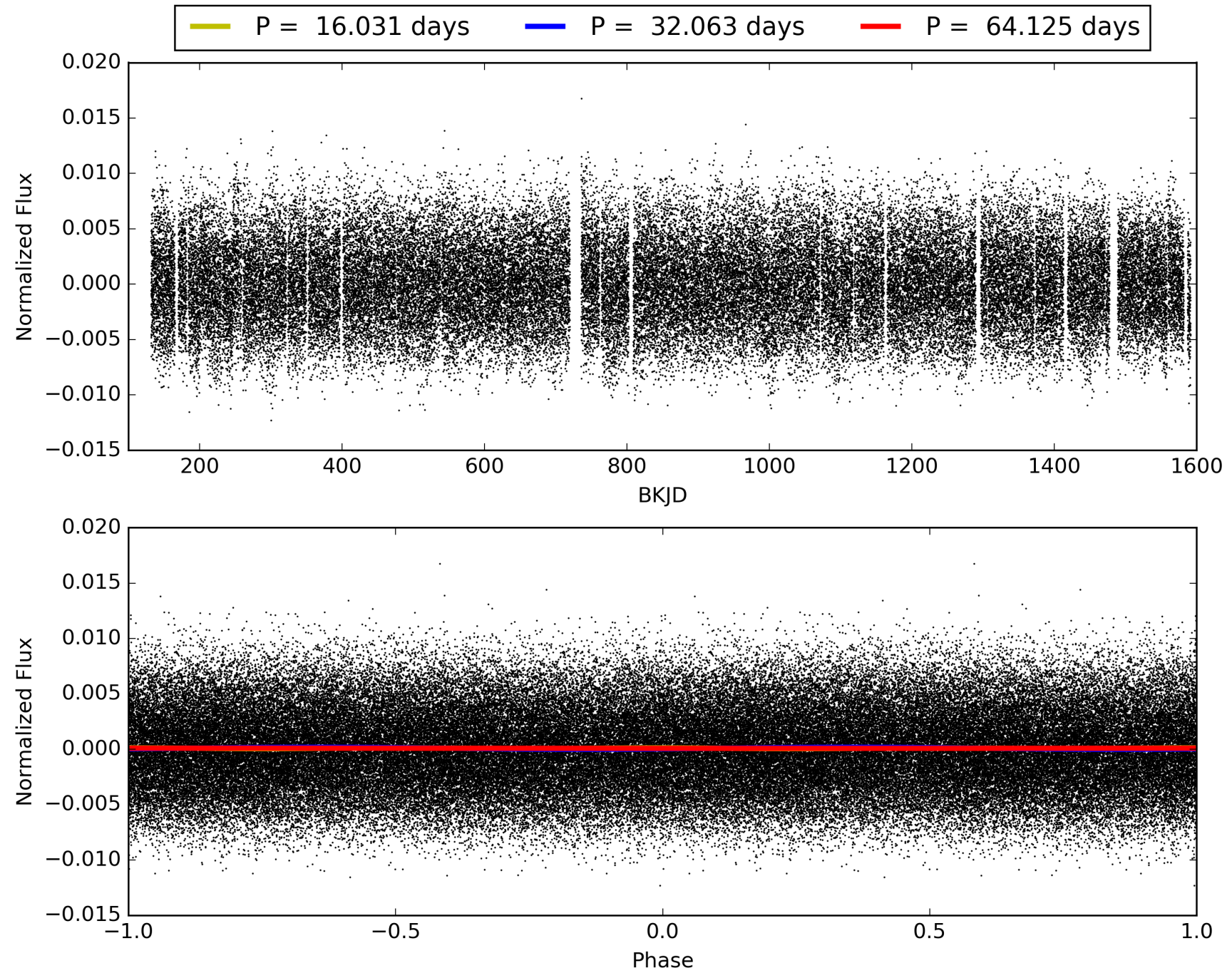
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009302543-04, PDC Light Curves





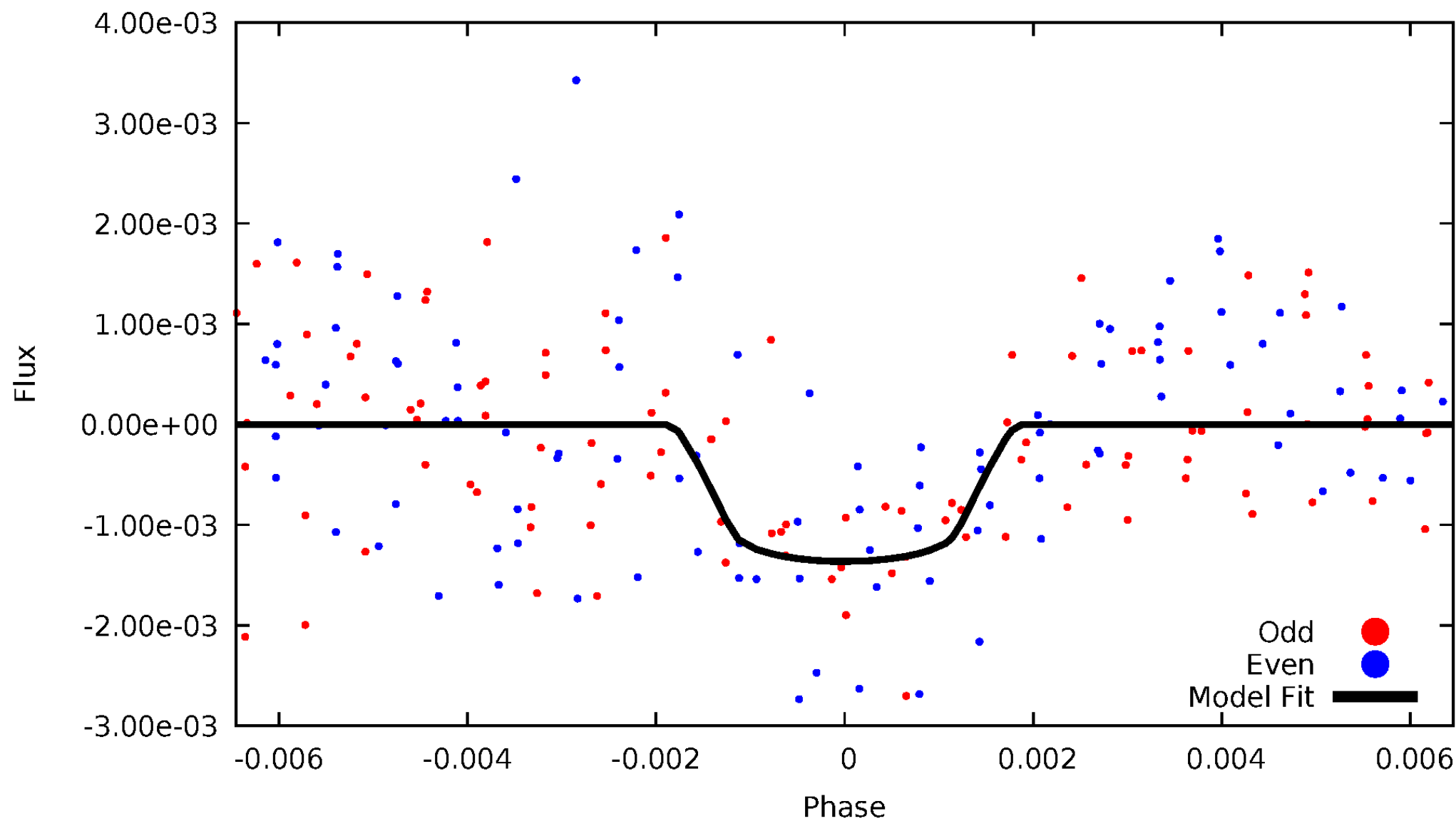
TCE 009302543-04





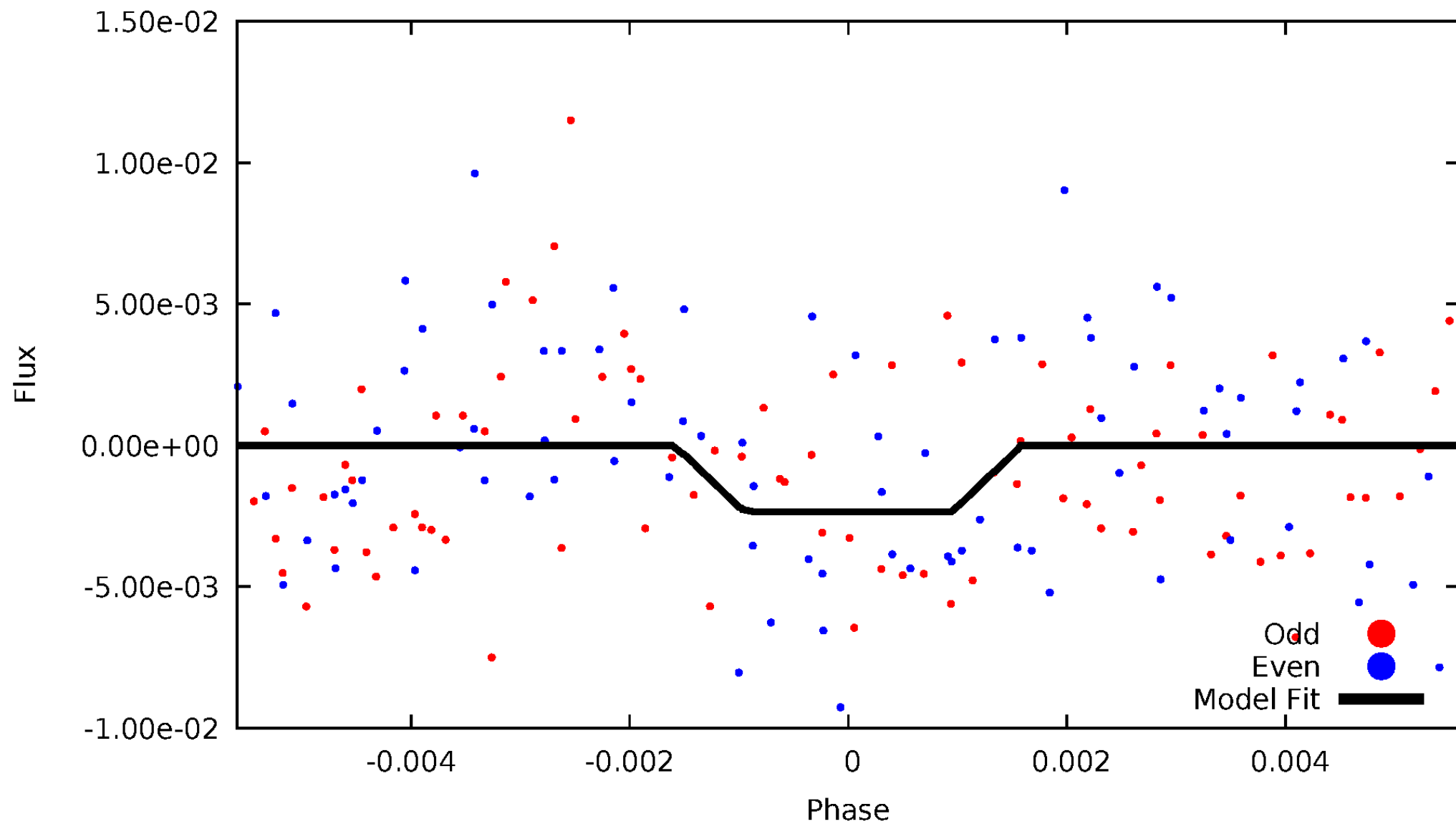
# DV Odd/Even

TCE 009302543-04



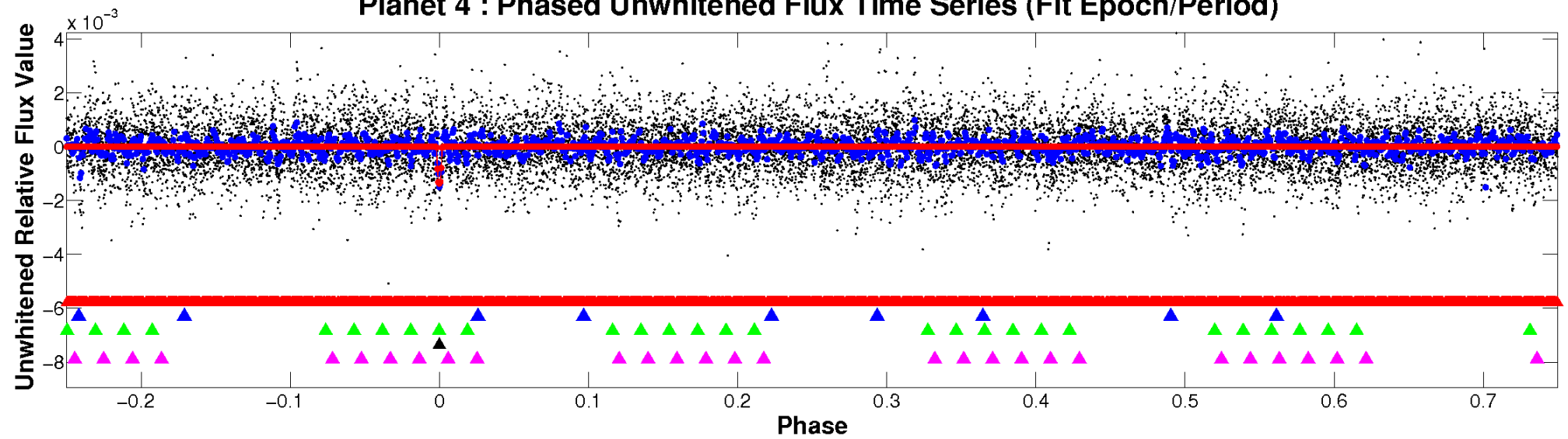
# ALT Odd/Even

TCE 009302543-04

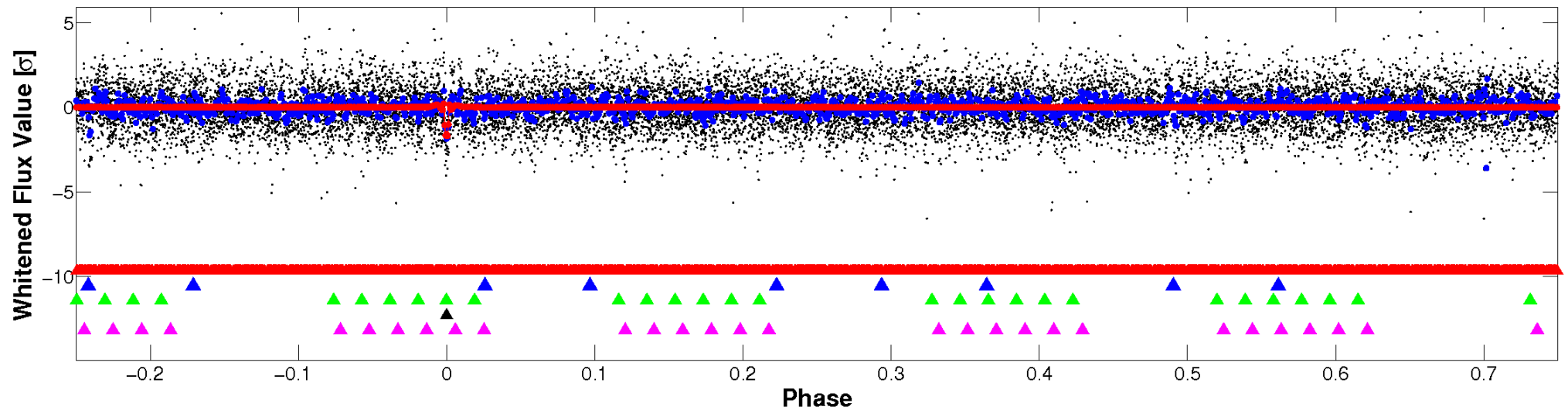


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

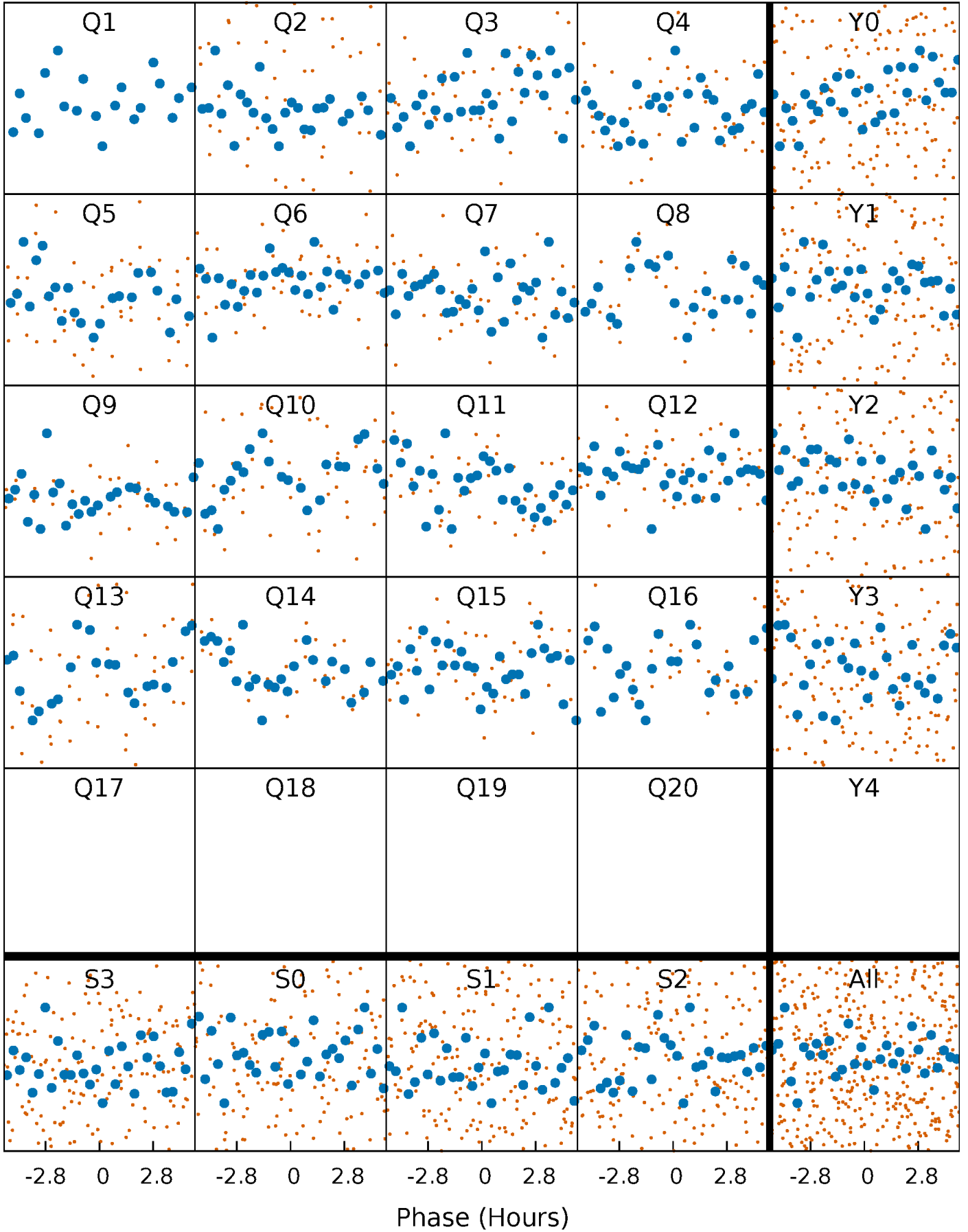


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



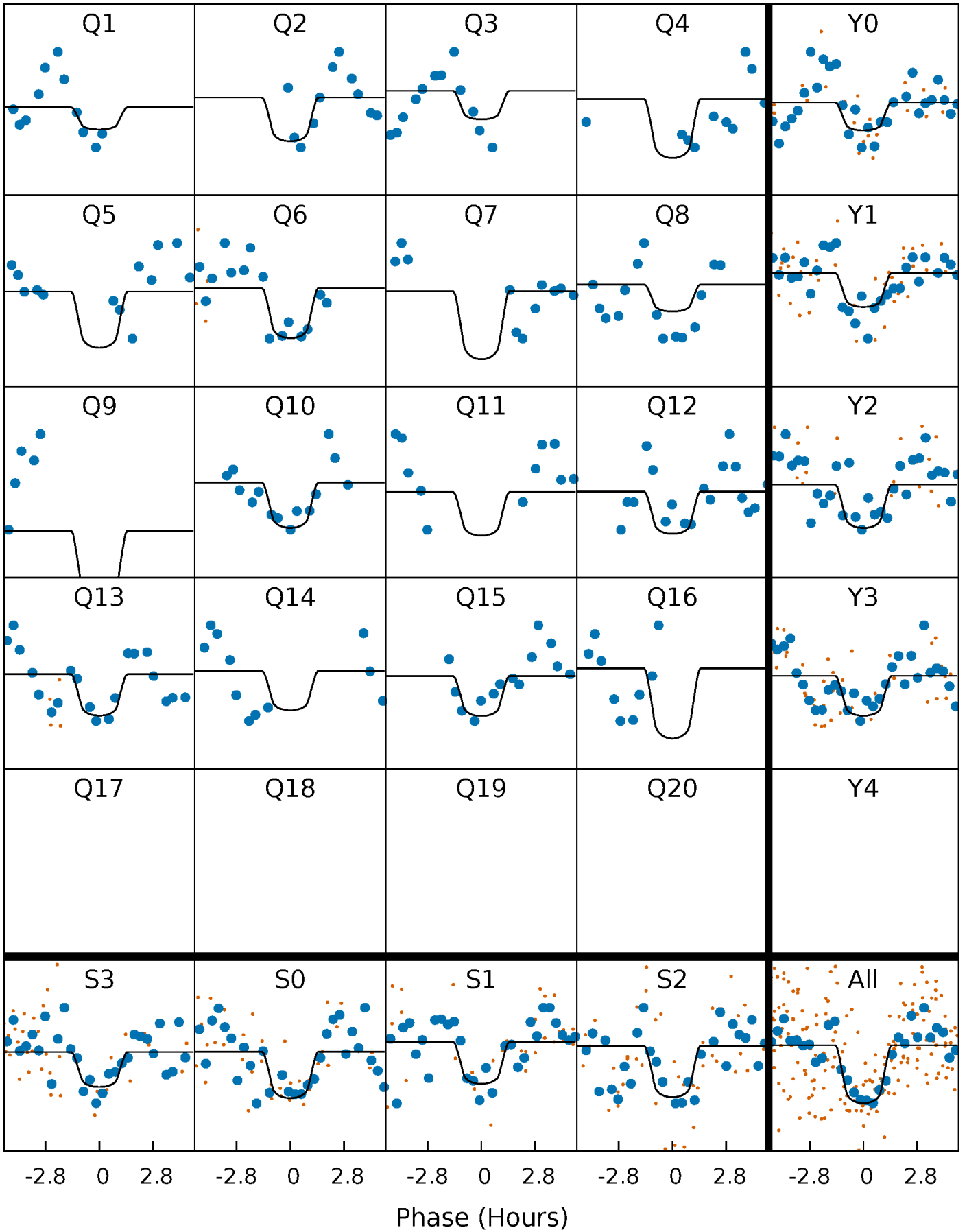
# PDC Quarter-Phased Transit Curves

TCE 009302543-04   P= 32.062512 Days    $T_0=139.838089$  (BKJD)



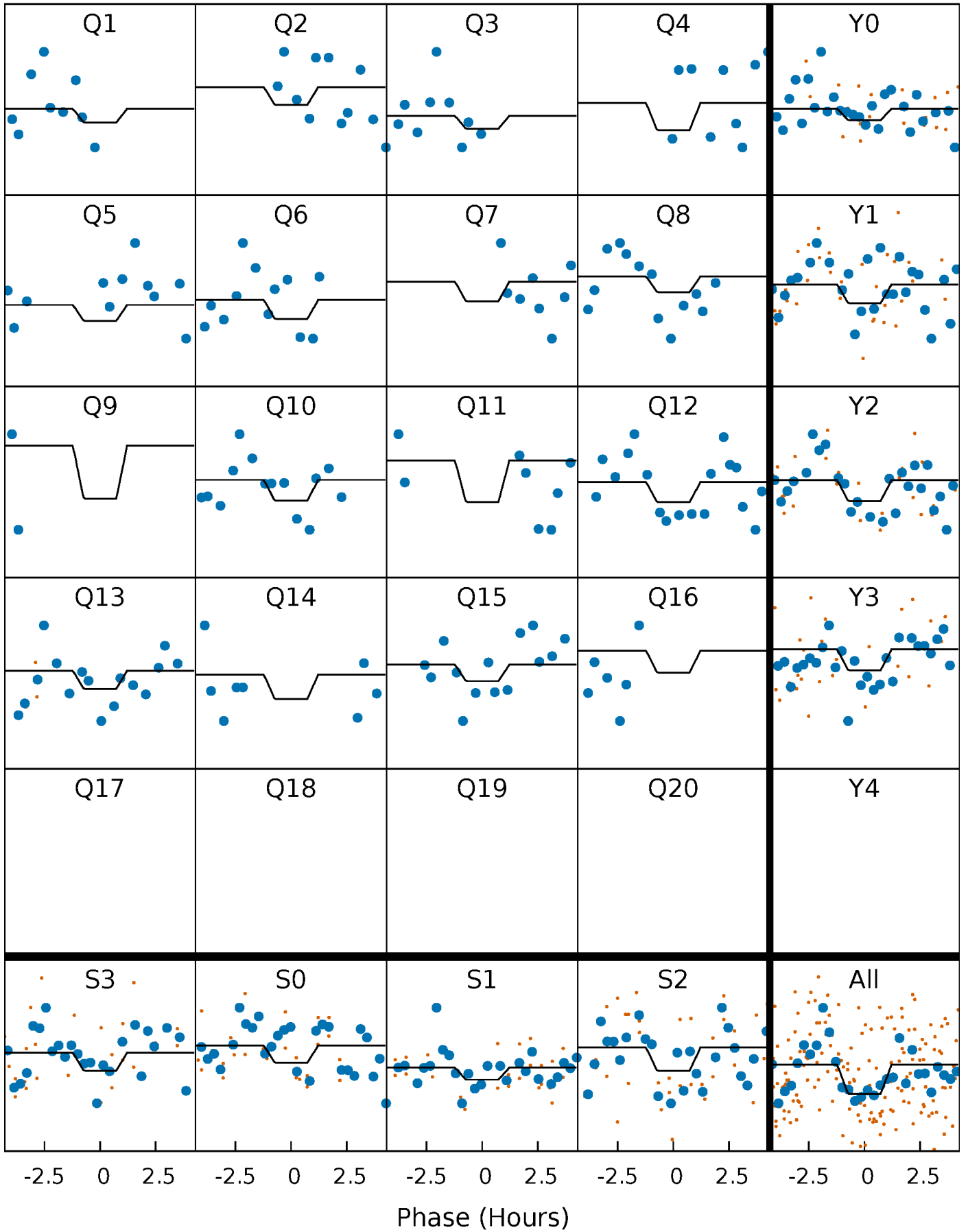
# DV Quarter-Phased Transit Curves

TCE 009302543-04   P= 32.062512 Days    $T_0=139.838089$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

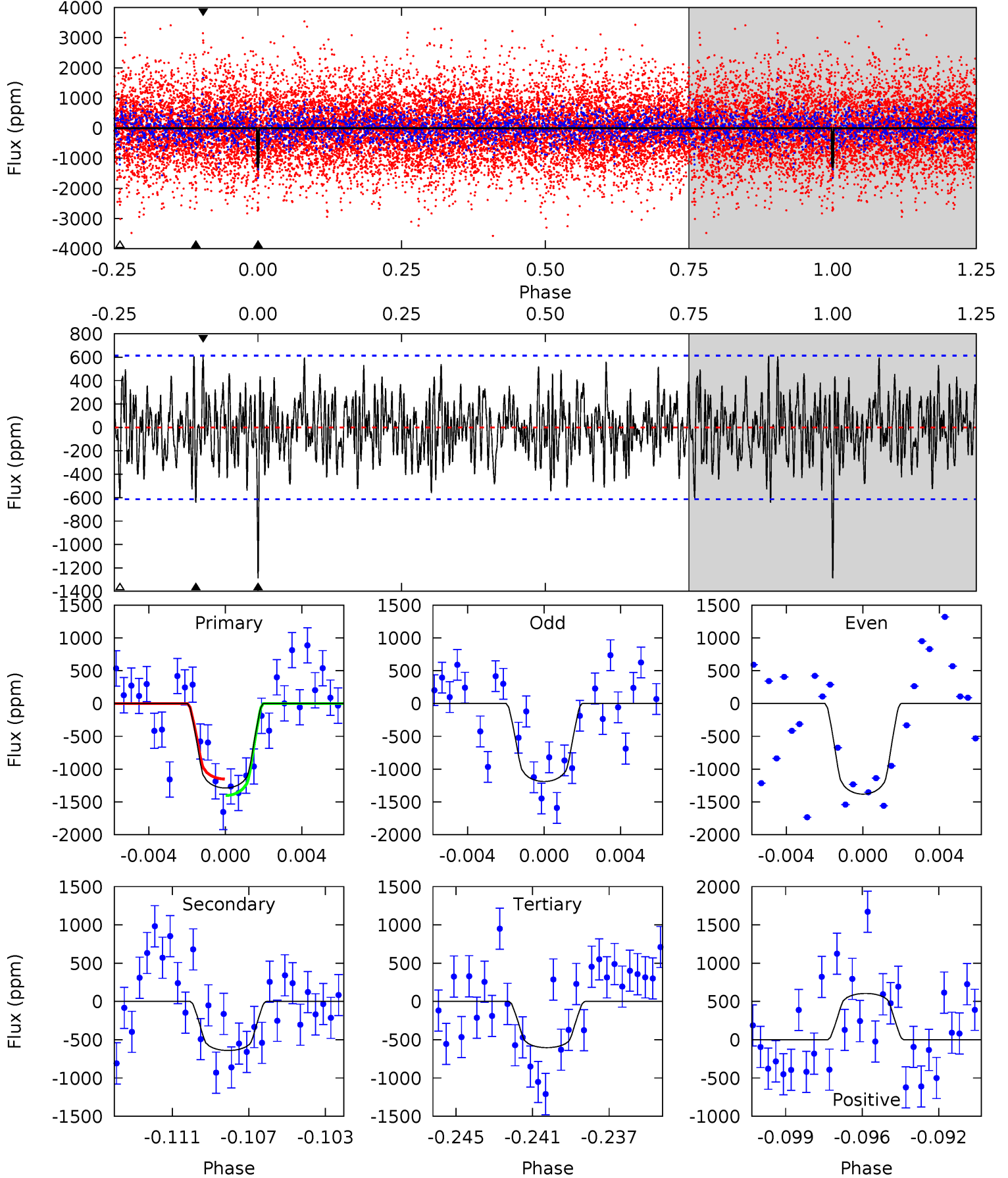
TCE 009302543-04   P= 32.062986 Days    $T_0=139.856292$  (BKJD)



# DV Model-Shift Uniqueness Test

009302543-04, P = 32.062512 Days, E = 107.775577 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
10.9	5.44	5.12	5.13	5.21	2.89	1.75	5.81	5.80	0.32	0.31	0.82	0.97	0.32	1.06

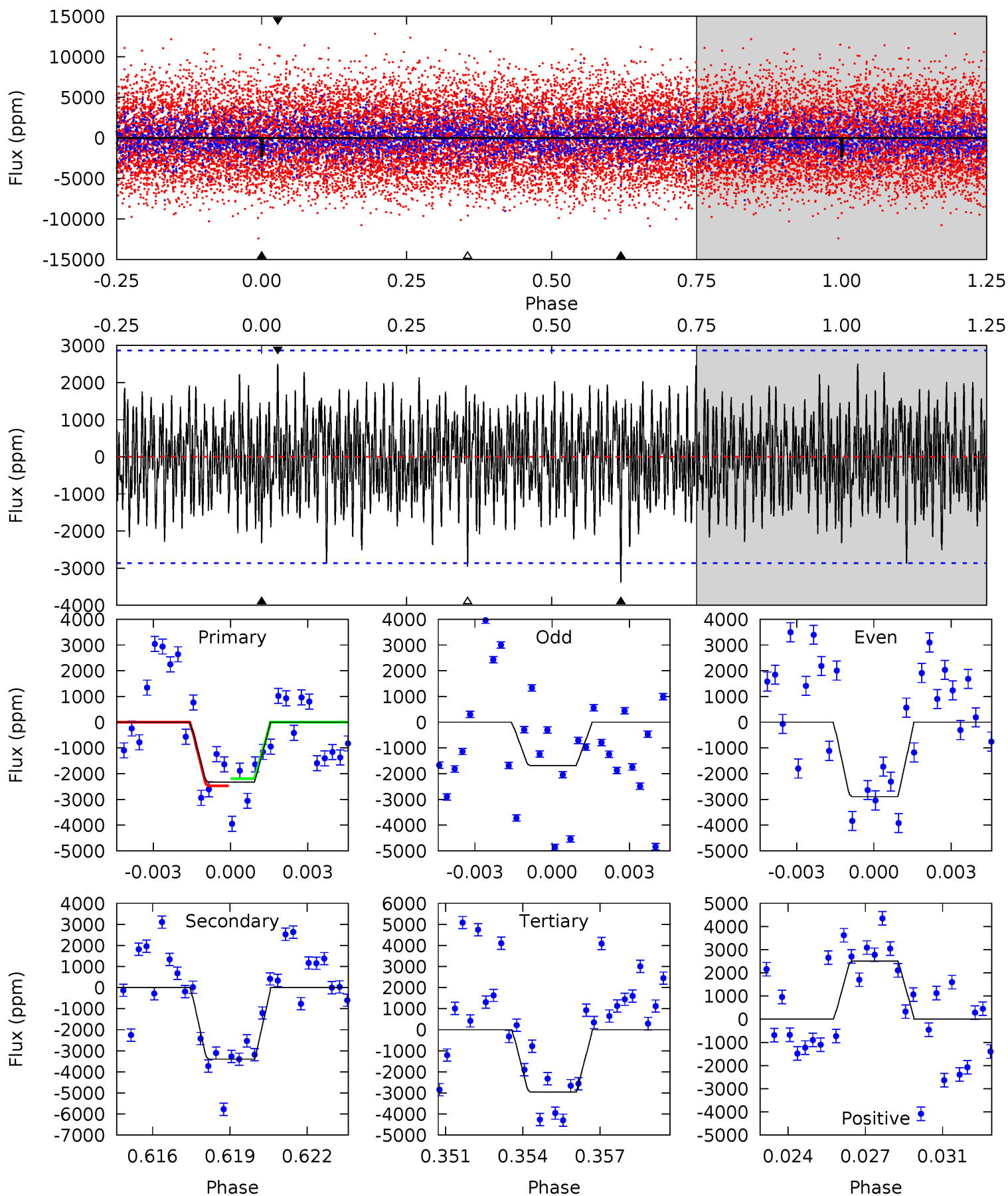




# Alt Model-Shift Uniqueness Test

009302543-04, P = 32.062986 Days, E = 107.793306 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
4.27	6.22	5.42	4.58	5.25	2.96	1.71	-1.15	-0.32	0.80	1.64	1.11	0.60	0.42	0.26



### Stellar Parameters For KIC 009302543

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6732^{+184}_{-225}$	$3.632^{+0.567}_{-0.063}$	$-0.140^{+0.300}_{-0.300}$	$3.276^{+0.444}_{-1.885}$	$1.676^{+0.197}_{-0.460}$	$0.067^{+0.472}_{-0.014}$
	+3%/-3%	+16%/-2%	+214%/-214%	+14%/-58%	+12%/-27%	+703%/-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 009302543-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-641 \pm 118$	$11.73^{+6.22}_{-5.90}$	$1490^{+103}_{-205}$	$5526^{+1923}_{-841}$	$136^{+413}_{-76}$
Alt.	$-3395 \pm 546$	$14.77^{+7.08}_{-6.23}$	$1488^{+103}_{-200}$	$7514^{+2566}_{-1211}$	$467^{+915}_{-244}$

$T_{max}$  = 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  $A_{obs} \gg 1.0$

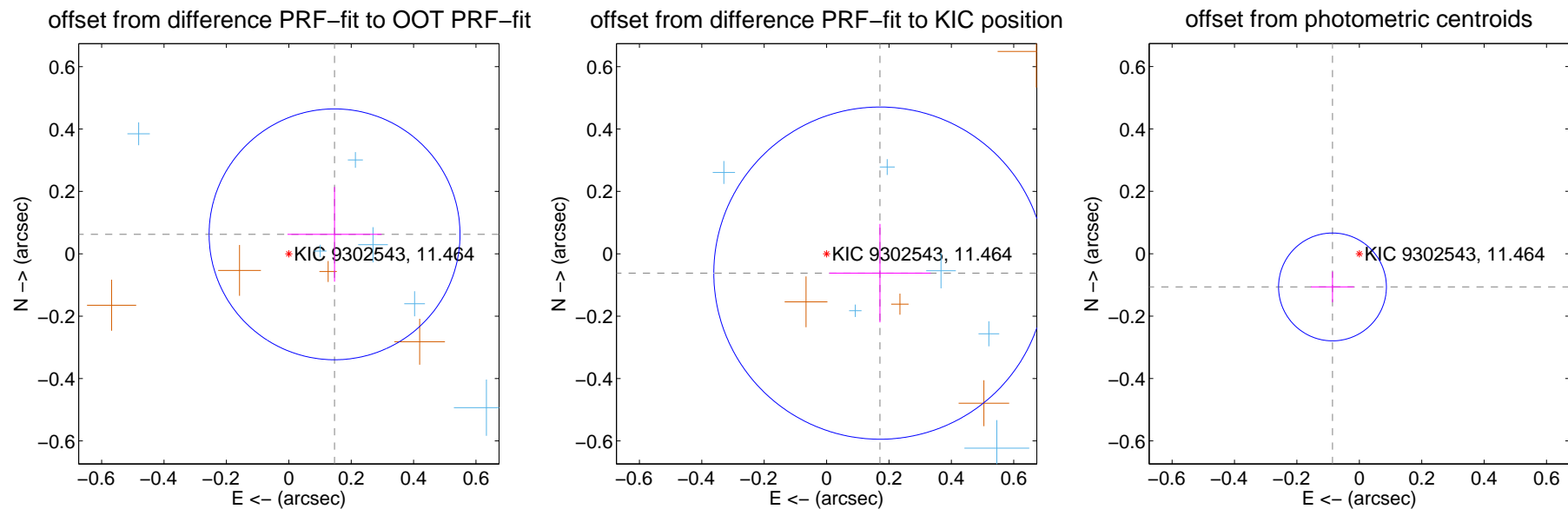
## DV Centroid Data

Supplemental centroid analysis for 009302543-04. **Kepler magnitude: 11.46.** Transit SNR 10.05

There are 7 quarters with good PRF difference image offsets

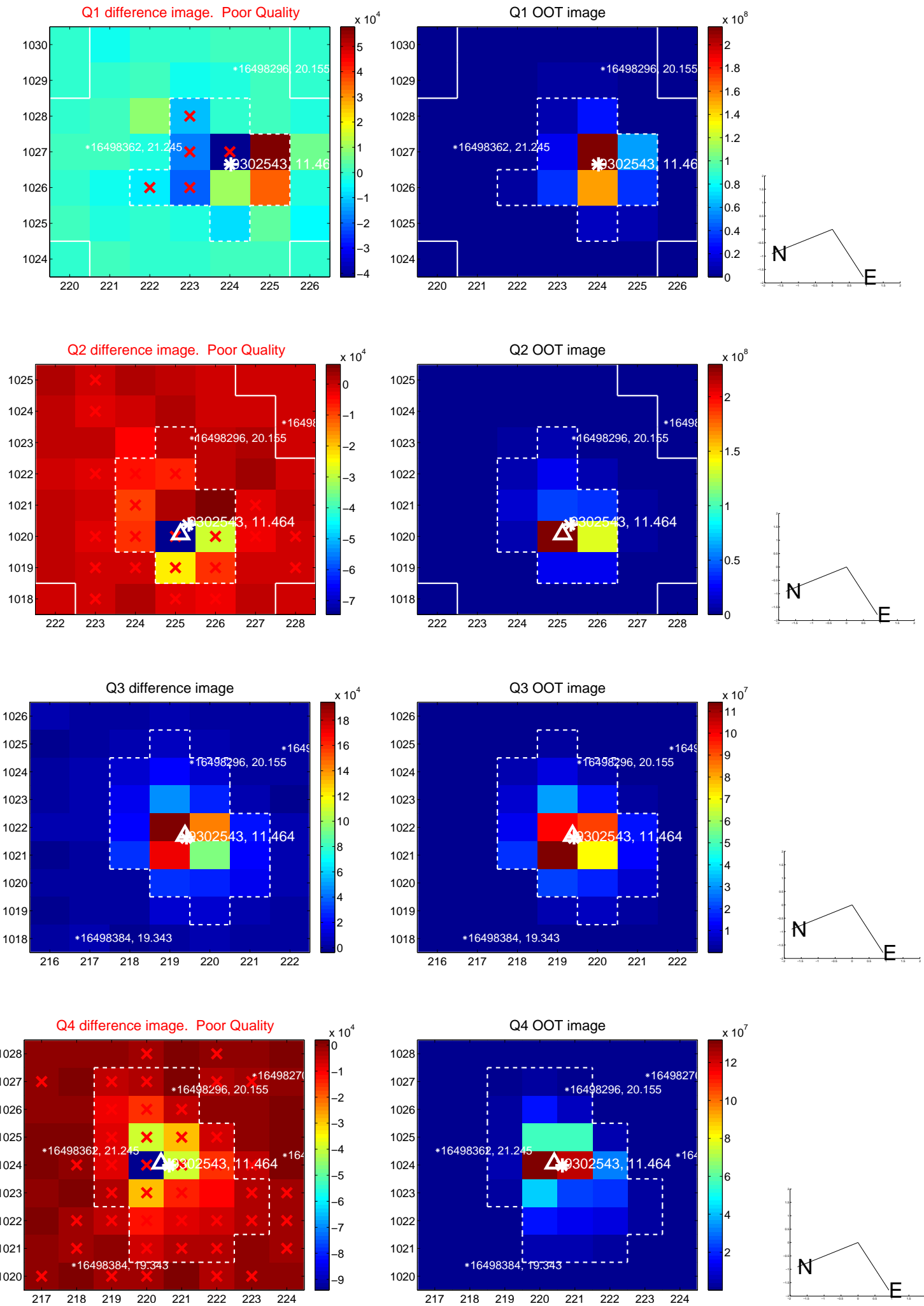
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.159 \pm 0.134$	1.19	$-0.147 \pm 0.151$	$0.062 \pm 0.152$
PRF-fit source offset from KIC position	$0.182 \pm 0.178$	1.03	$-0.171 \pm 0.162$	$-0.062 \pm 0.158$
photometric centroid source offset	$0.14 \pm 0.06$	2.38	$0.09 \pm 0.07$	$-0.11 \pm 0.05$

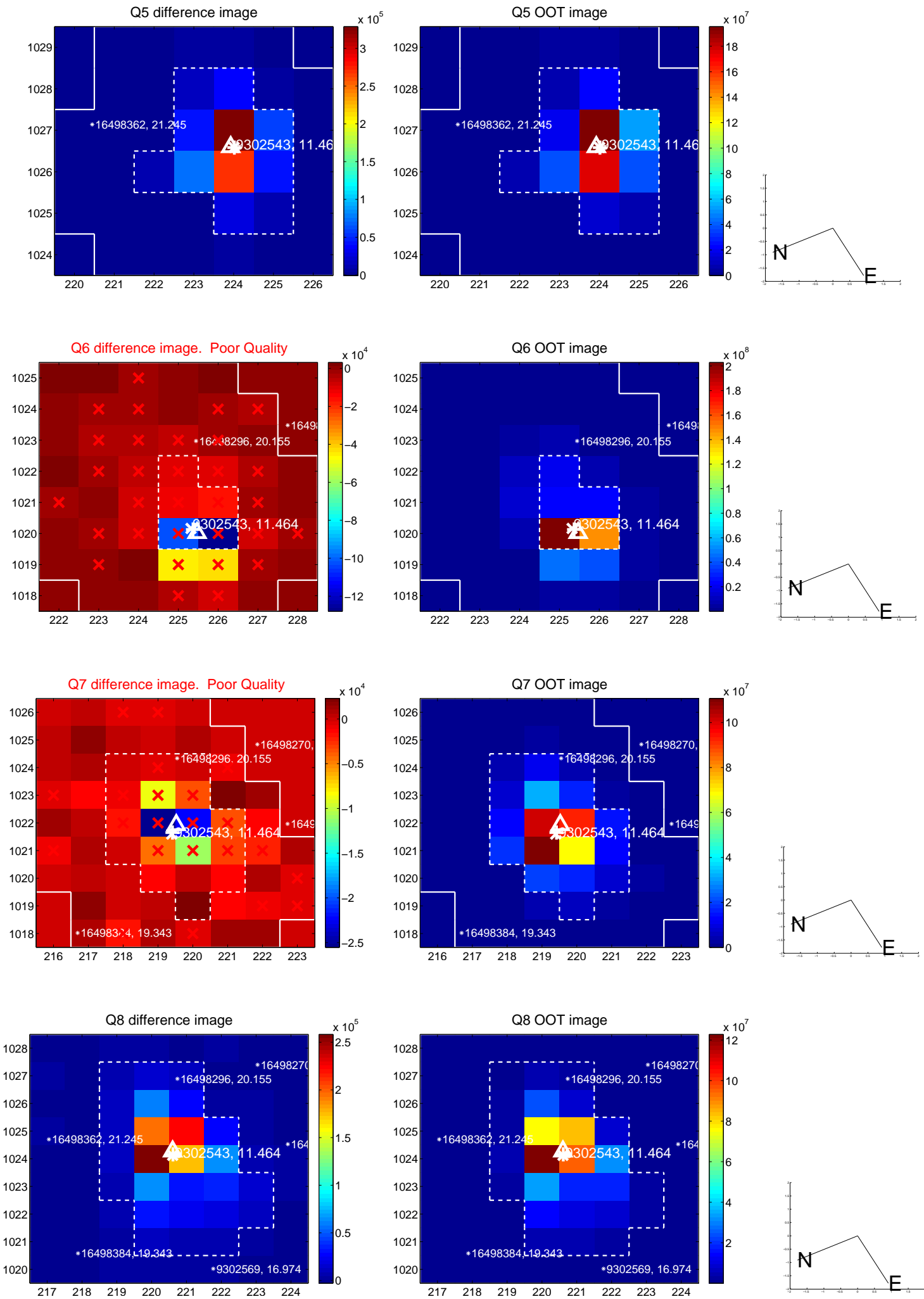


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

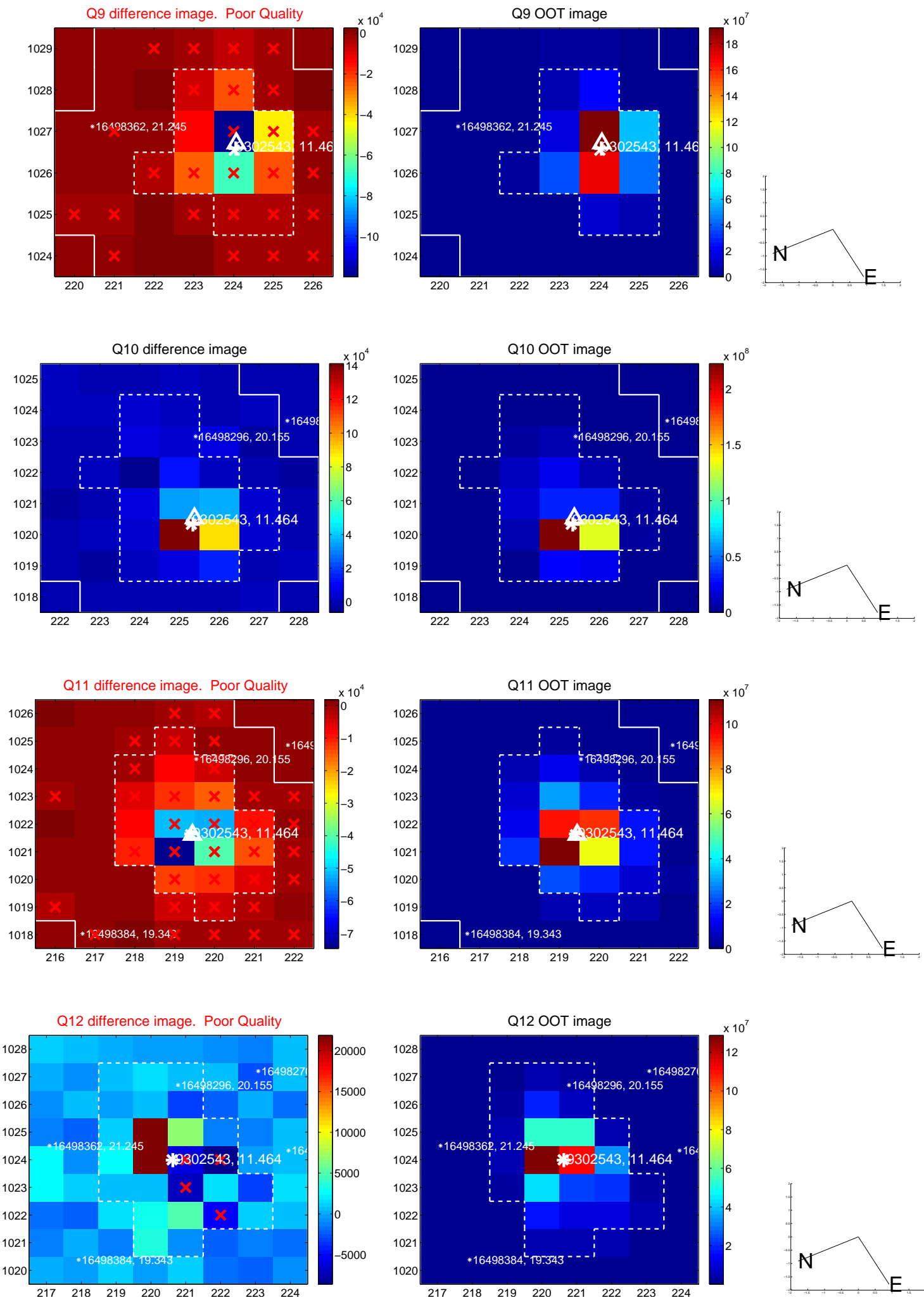
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



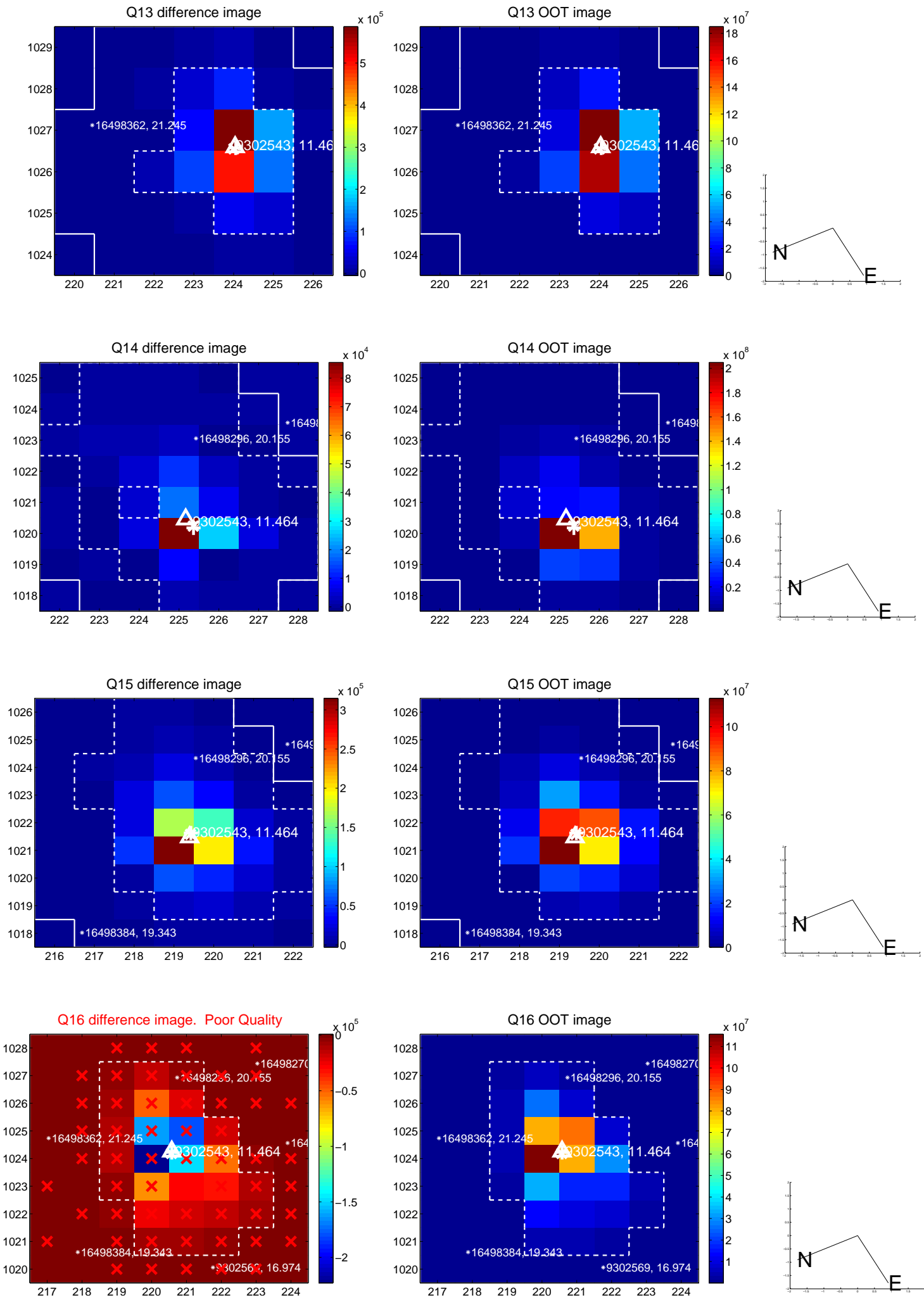
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

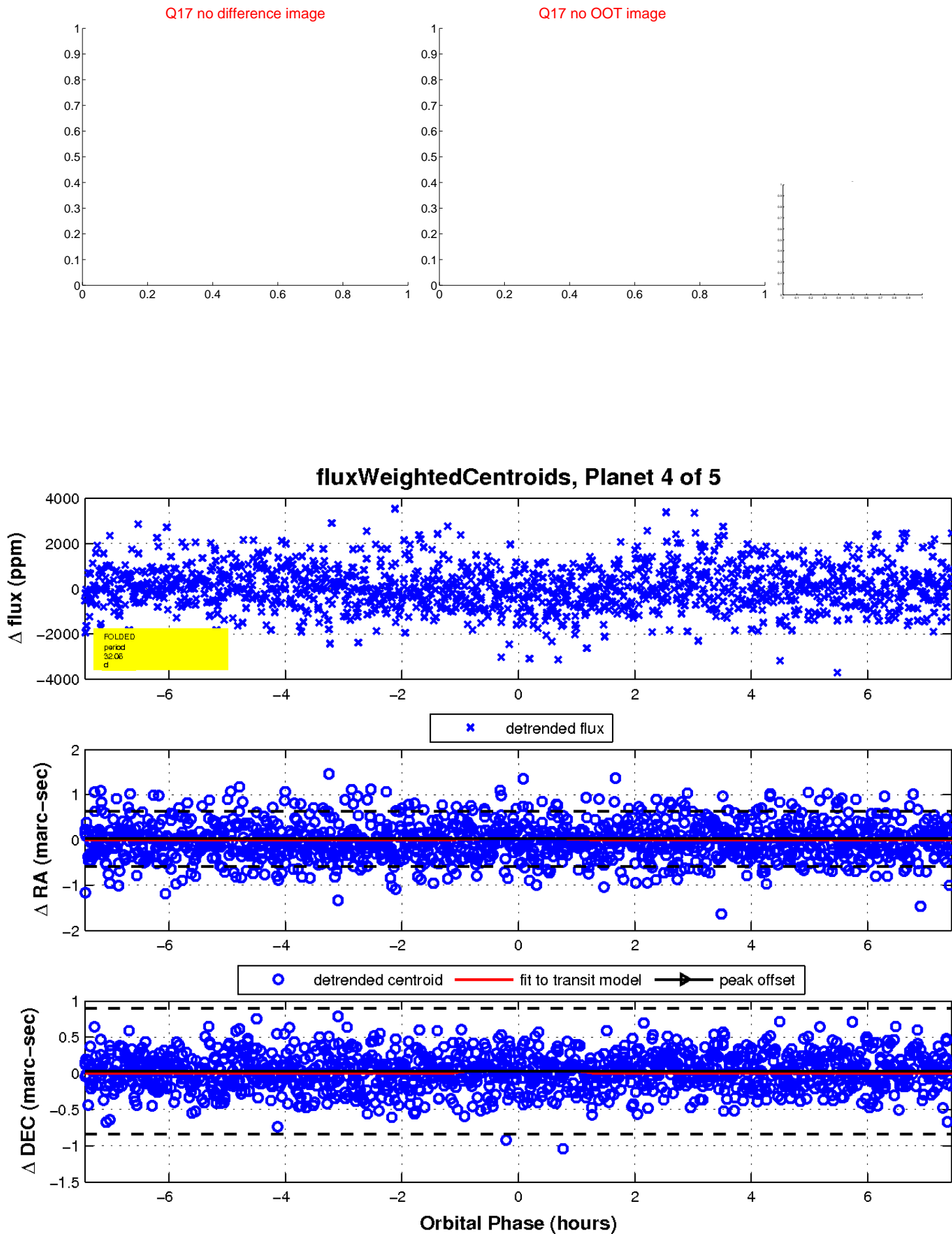


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



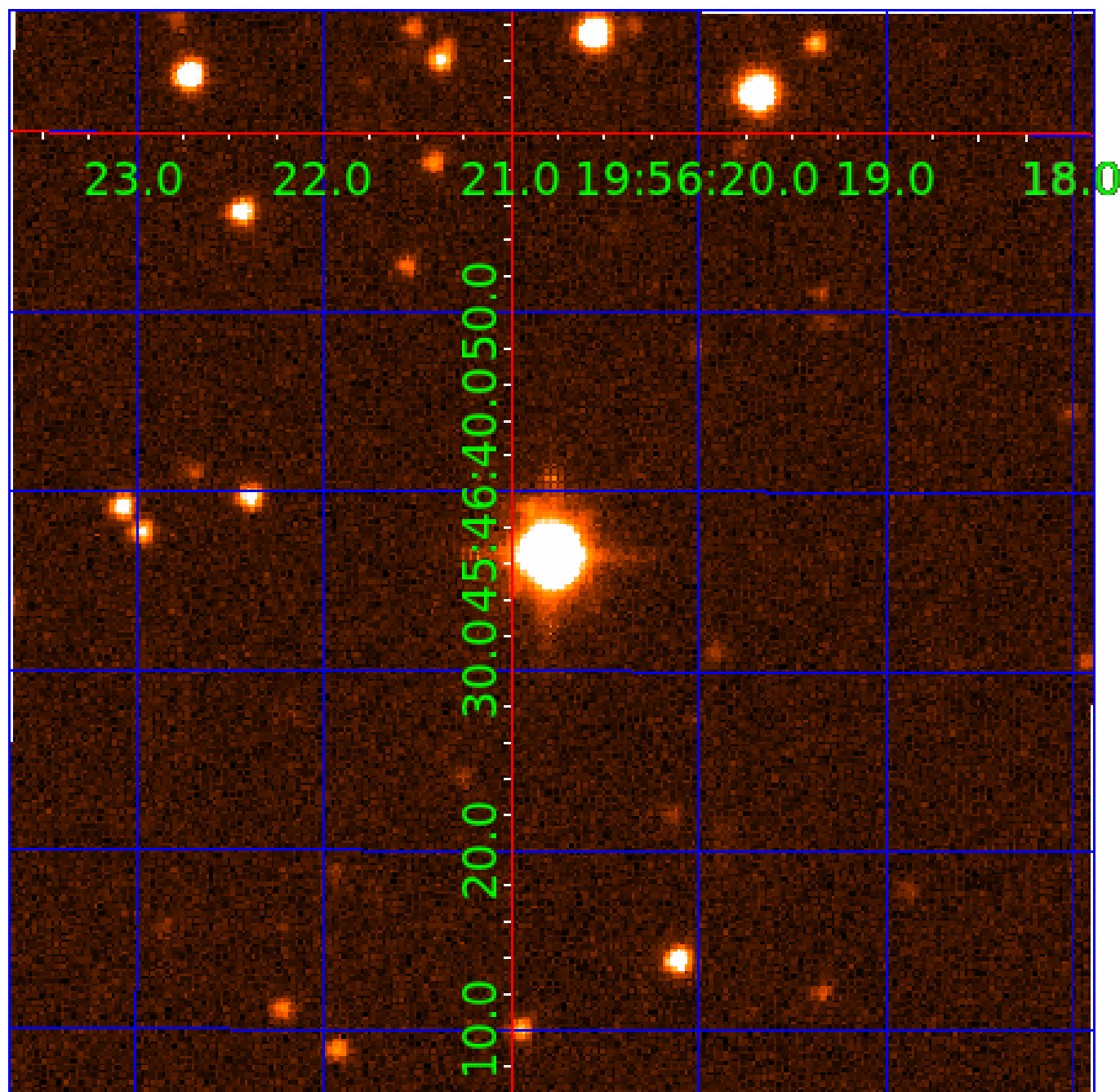


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009302543

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009302543-01	OBS	4272.01	1.214671	131.809402	126.4	7.228	13.9	11.9	3.28	6732	3.79	28167.95
009302543-02	OBS	No	168.896136	146.980295	2154.2	5.303	9.8	10.5	3.28	6732	27.91	39.10
009302543-03	OBS	No	51.178056	153.390023	651.1	1.470	9.5	3.0	3.28	6732	9.24	192.13
009302543-04	OBS	No	32.062512	139.838089	1364.6	2.483	10.0	10.1	3.28	6732	13.16	358.40
009302543-05	OBS	No	51.175646	153.599226	1675.6	2.147	9.8	9.5	3.28	6732	14.30	192.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009302543-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—CENT_SATURATED
009302543-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009302543-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

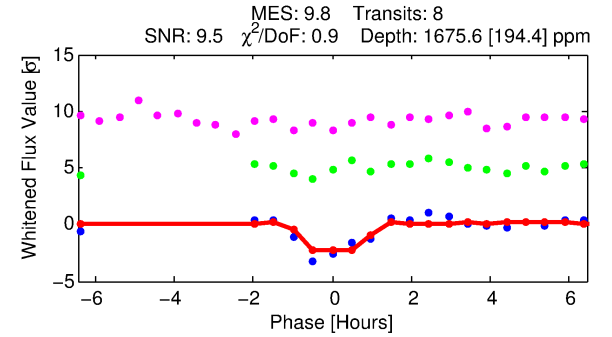
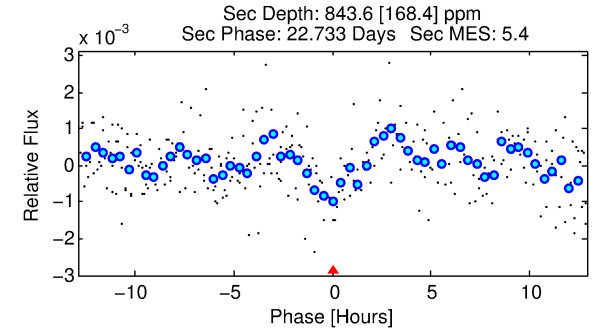
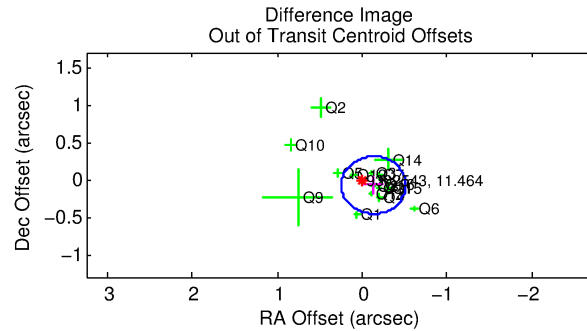
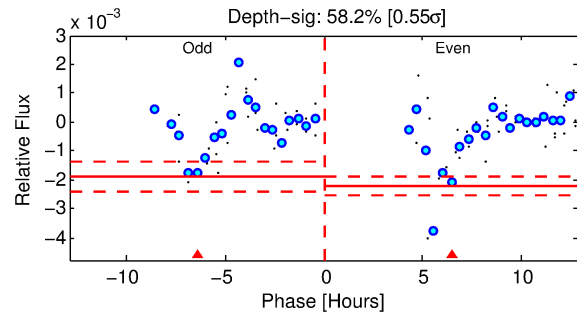
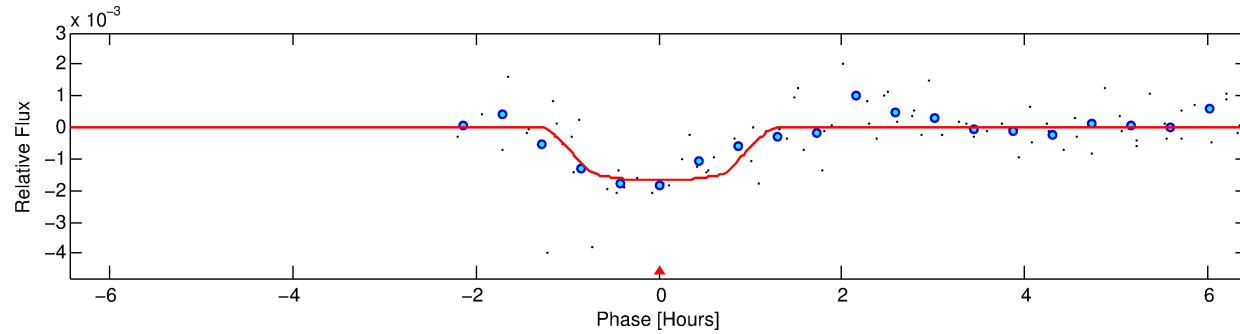
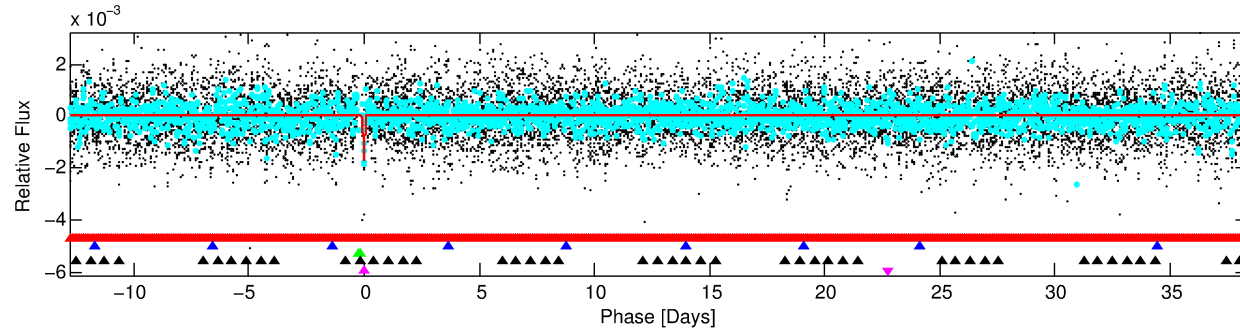
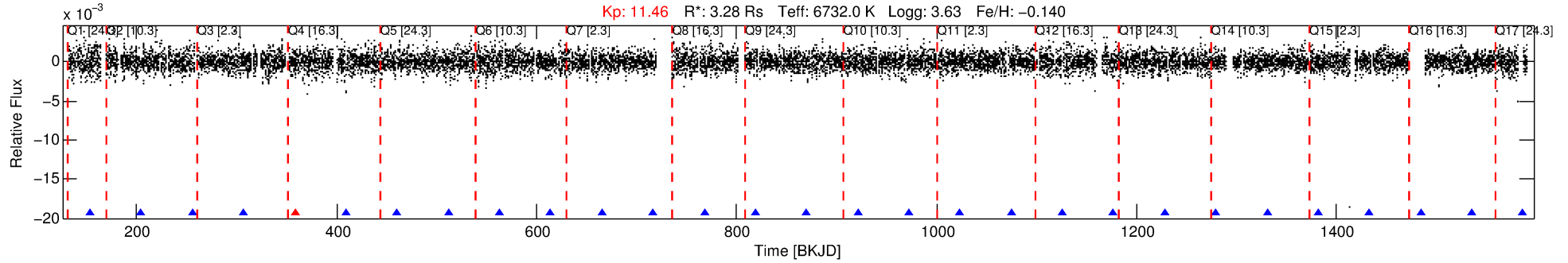
## Ephemeris Match Information For 009302543-05

No Significant Match Found

# DV One-Page Summary

KIC: 9302543 Candidate: 5 of 5 Period: 51.176 d

KOI: K04272 Corr: No Ephemeris Match



## DV Fit Results:

Period = 51.17565 [0.00037] d  
Epoch = 153.5992 [0.0057] BKJD  
 $R_p/R^* = 0.0400$  [0.0408]  
 $a/R^* = 144.15$  [820.67]  
 $b = 0.67$  [4.65]  
 $S_{\text{eff}} = 192.14$  [184.55]  
 $T_{\text{eq}} = 949$  [228] K  
 $R_p = 14.30$  [16.74]  $R_{\text{e}}$   
 $a = 0.3206$  [0.1860] AU  
 $A_g = 233.20$  [526.52] [0.44 $\sigma$ ]  
 $T_{\text{eff}} = 5736$  [2943] K [1.62 $\sigma$ ]

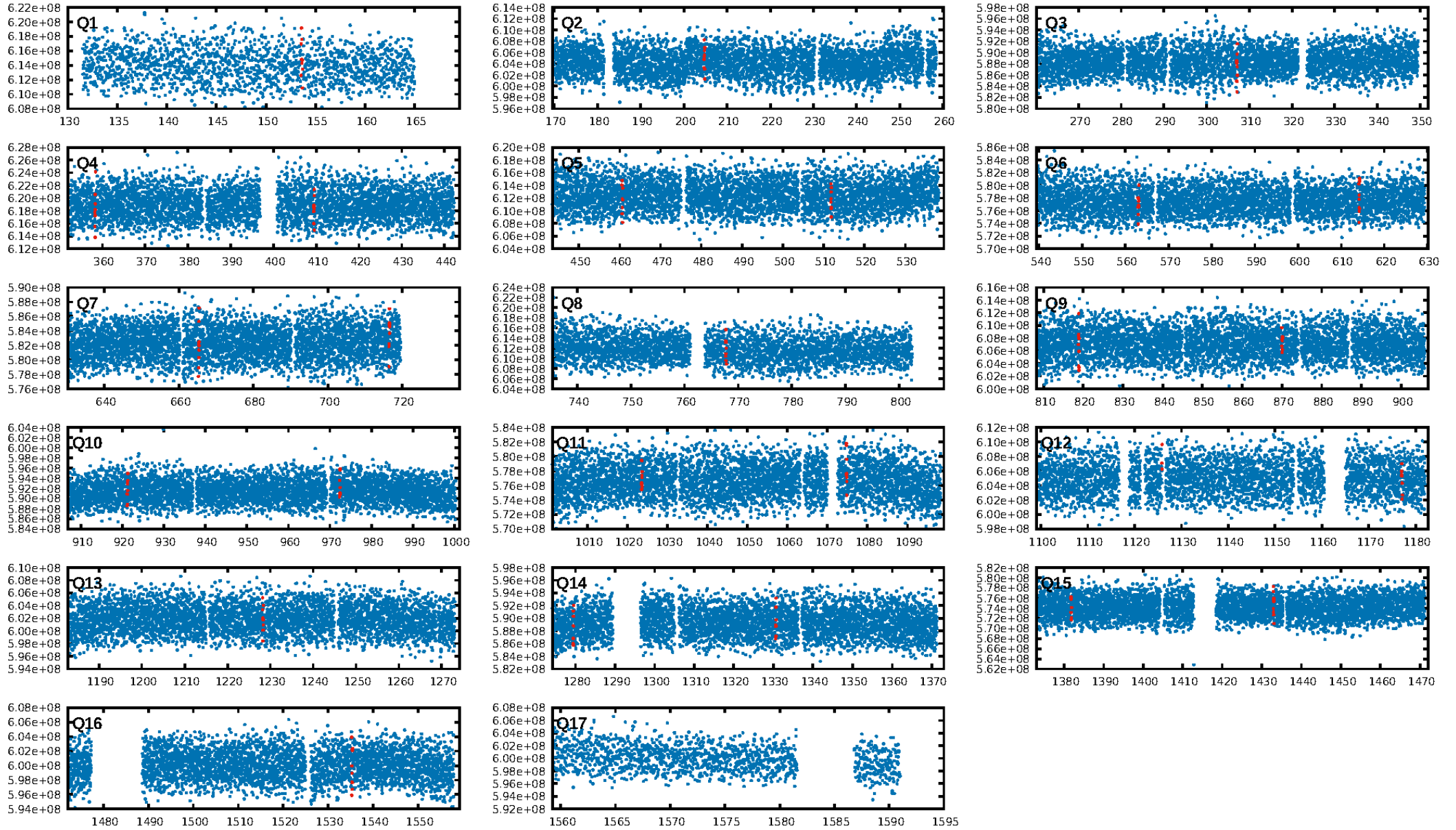
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [139.75 $\sigma$ ]  
LongPeriod-sig: 1.8% [0.02 $\sigma$ ]  
ModelChiSquare2-sig: 60.0%  
ModelChiSquareGoF-sig: 99.9%  
**Bootstrap-pfa: 2.80e-10**  
RollingBand-fgt: 0.88 [7/8]  
GhostDiagnostic-chr: 1.663  
Centroid-sig: 5.7%  
Centroid-so: 0.184 arcsec [2.97 $\sigma$ ]  
OotOffset-rm: 0.156 arcsec [1.22 $\sigma$ ]  
KicOffset-rm: 0.270 arcsec [2.04 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.44 [7/16]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:43 Z

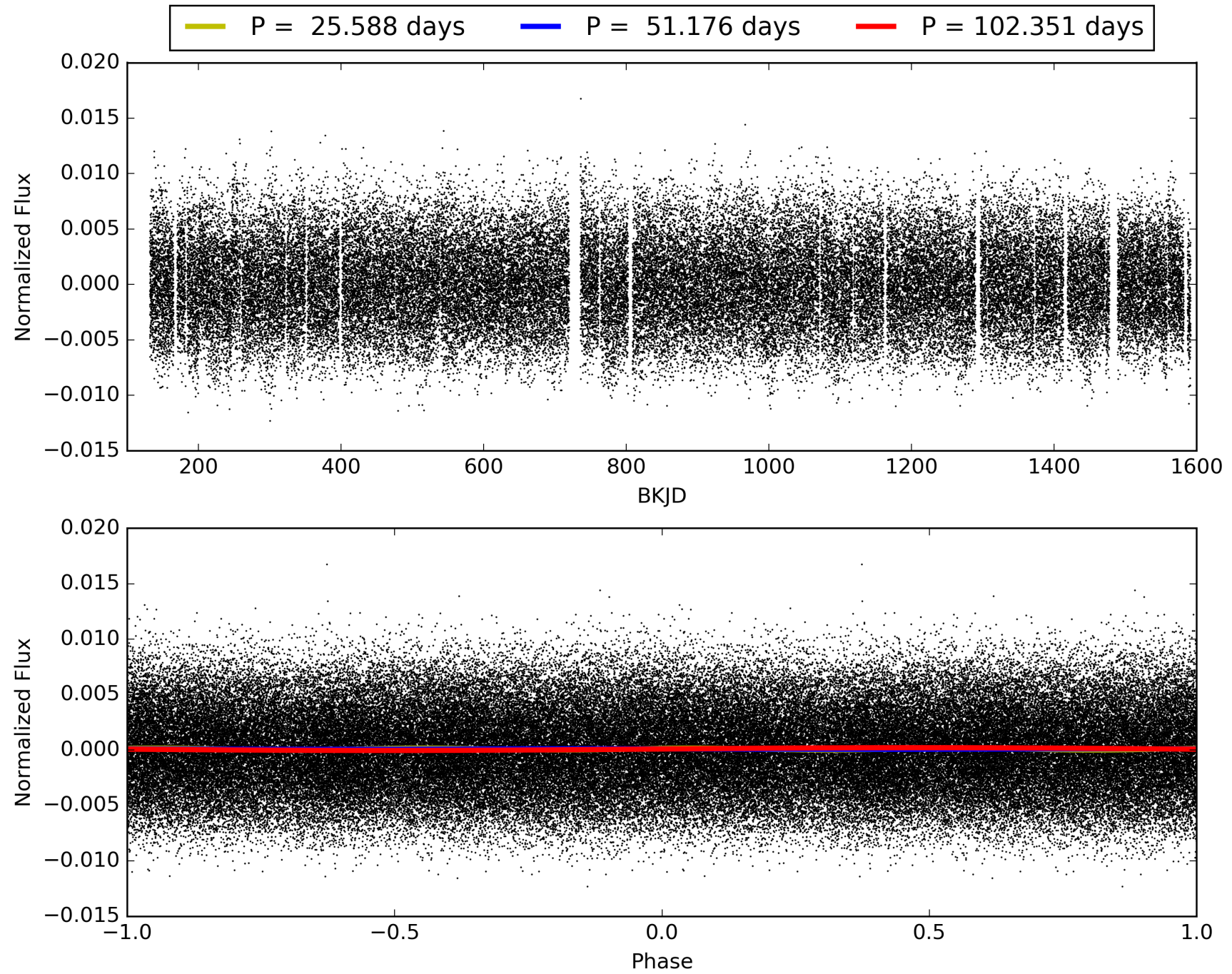
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009302543-05, PDC Light Curves



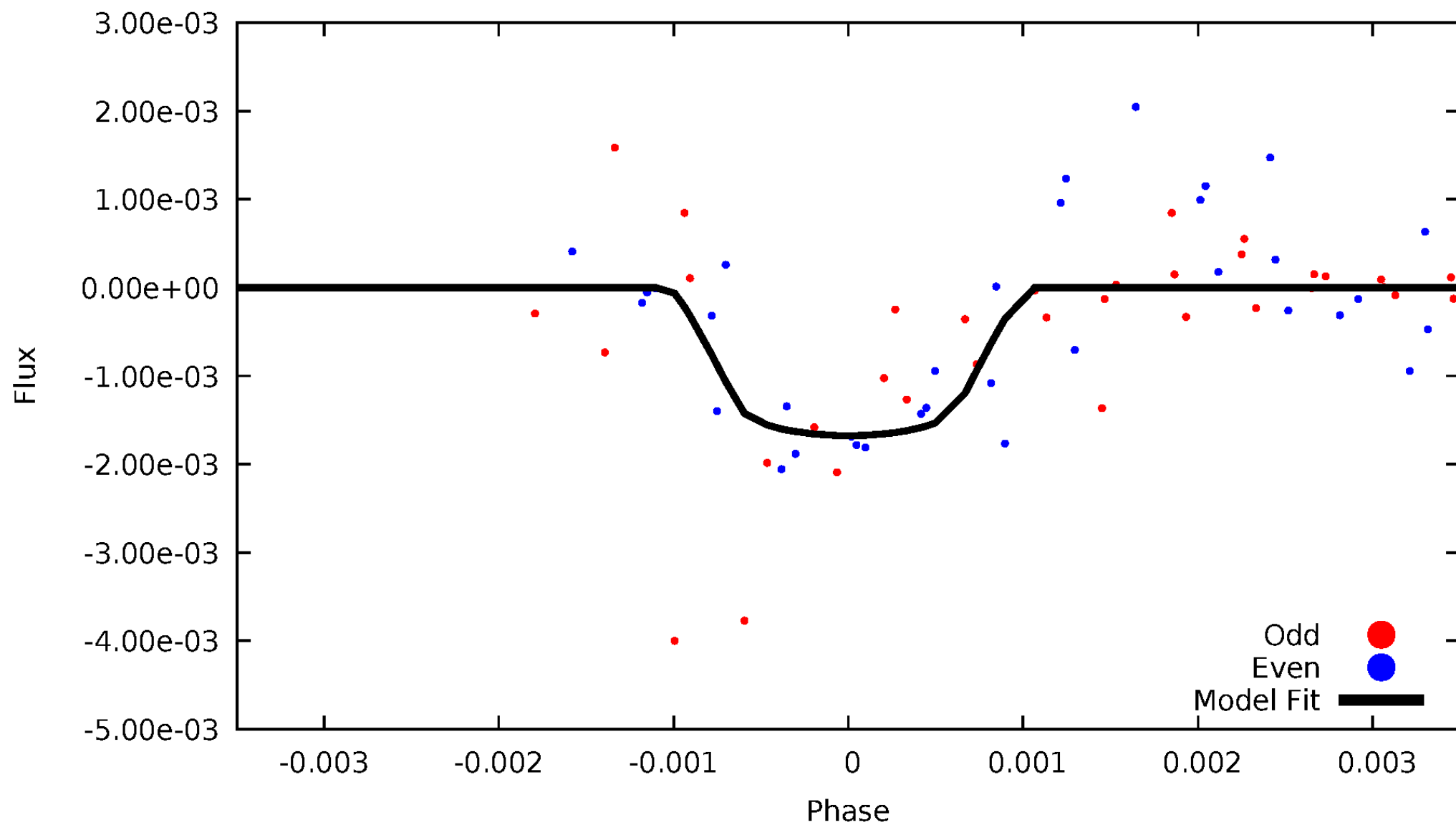


TCE 009302543-05



# DV Odd/Even

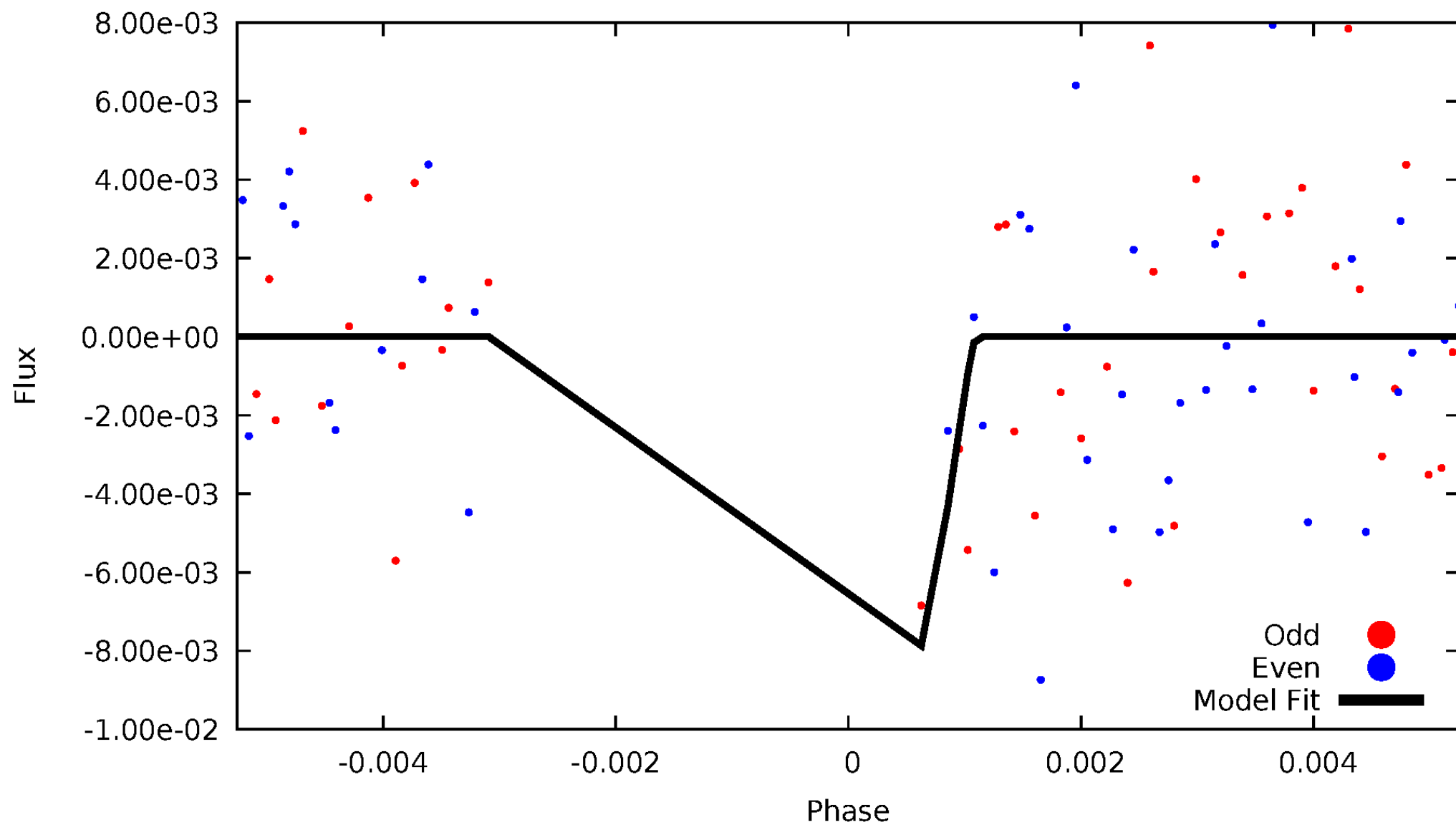
TCE 009302543-05



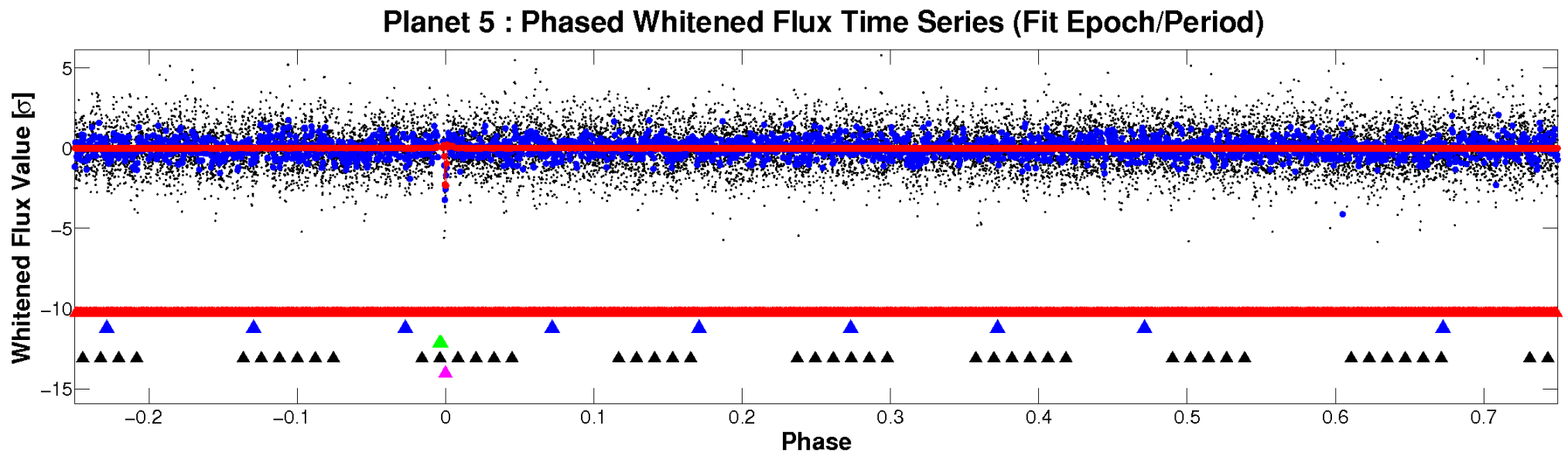
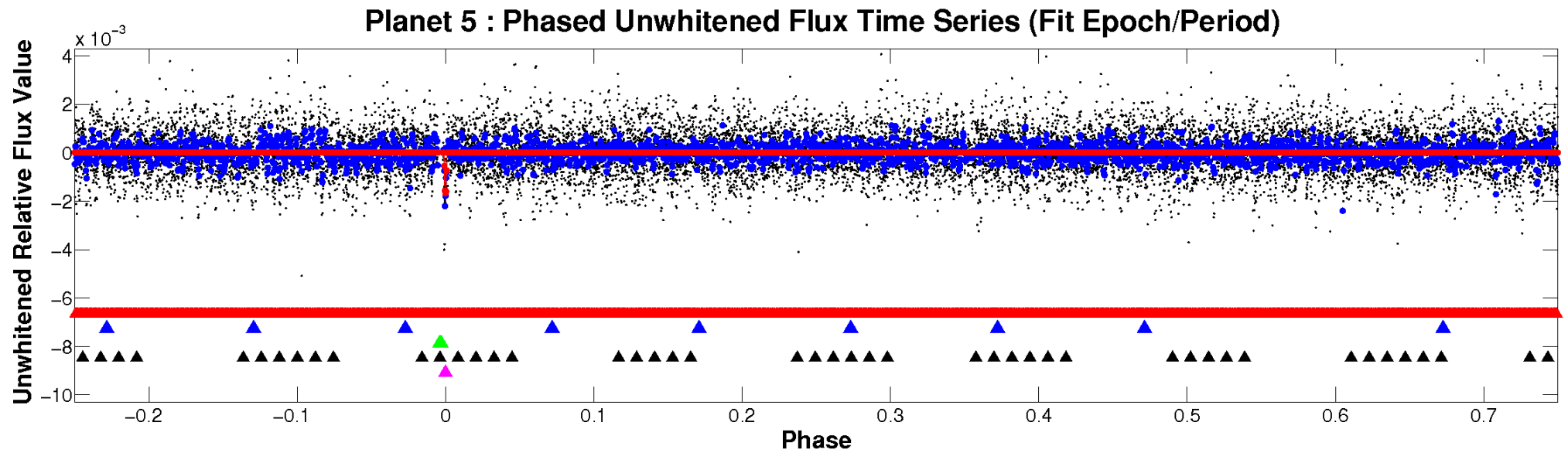


# ALT Odd/Even

TCE 009302543-05

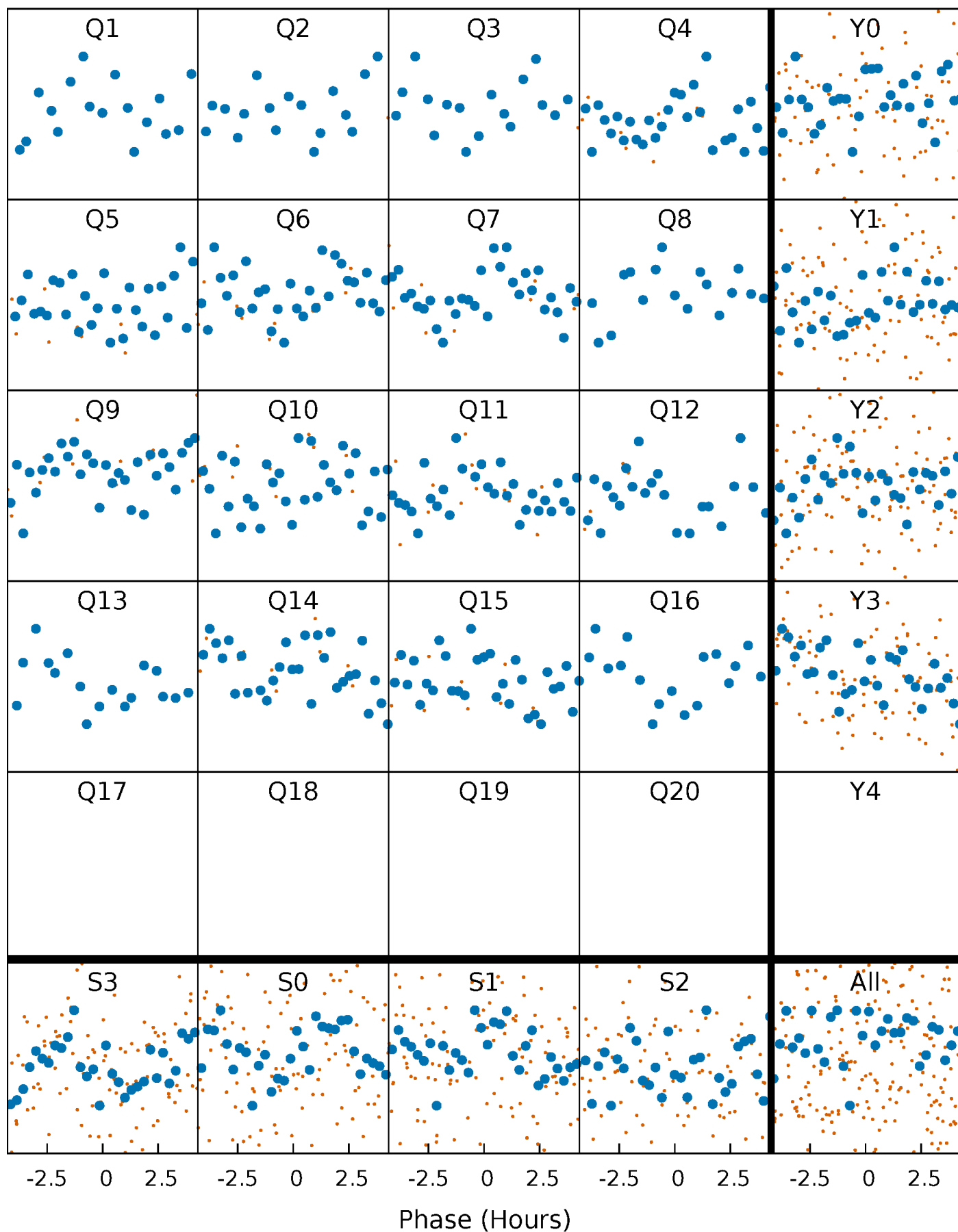


# Non-Whitened Vs. Whitened Light Curve



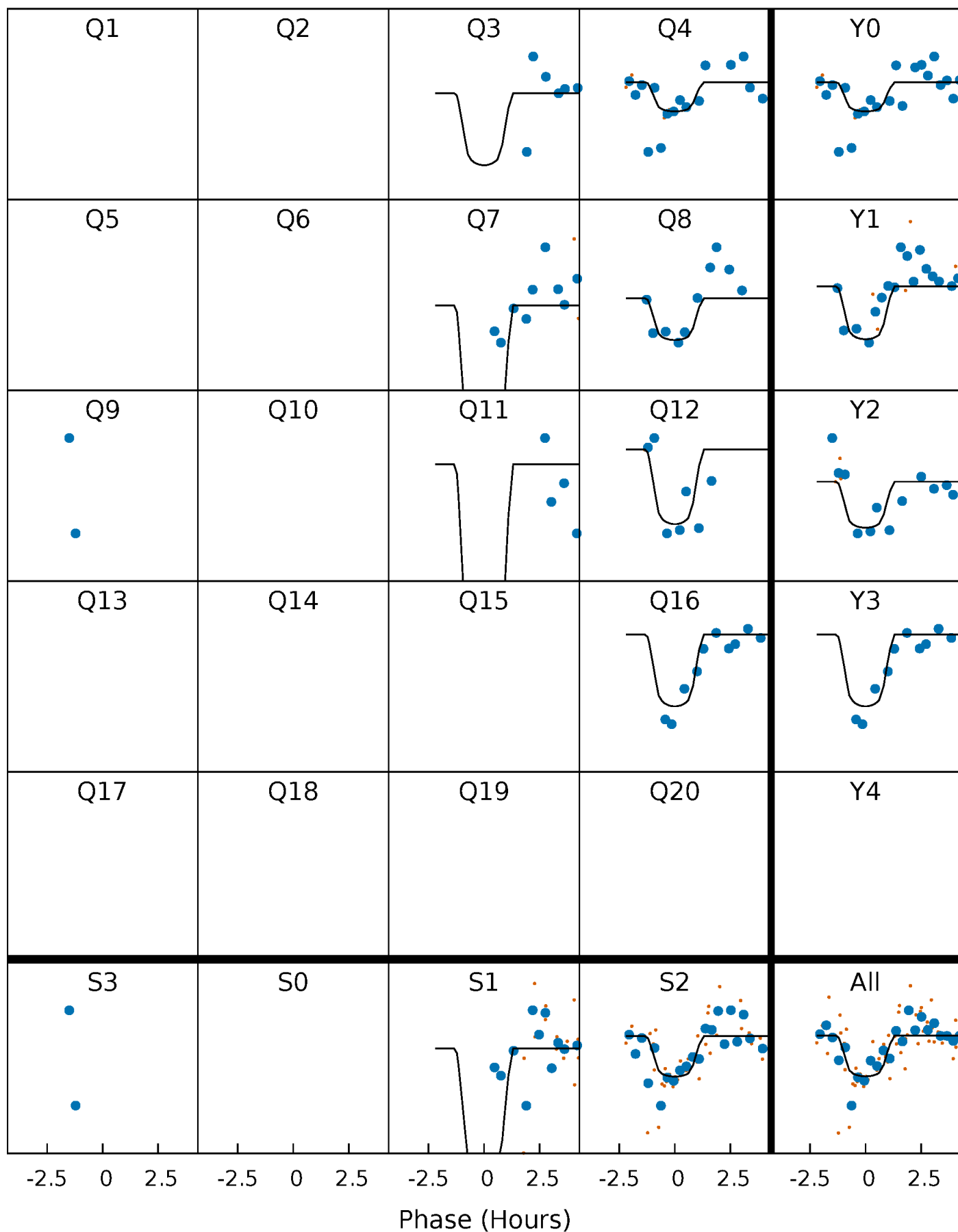
# PDC Quarter-Phased Transit Curves

TCE 009302543-05     $P = 51.175646$  Days     $T_0 = 153.599226$  (BKJD)



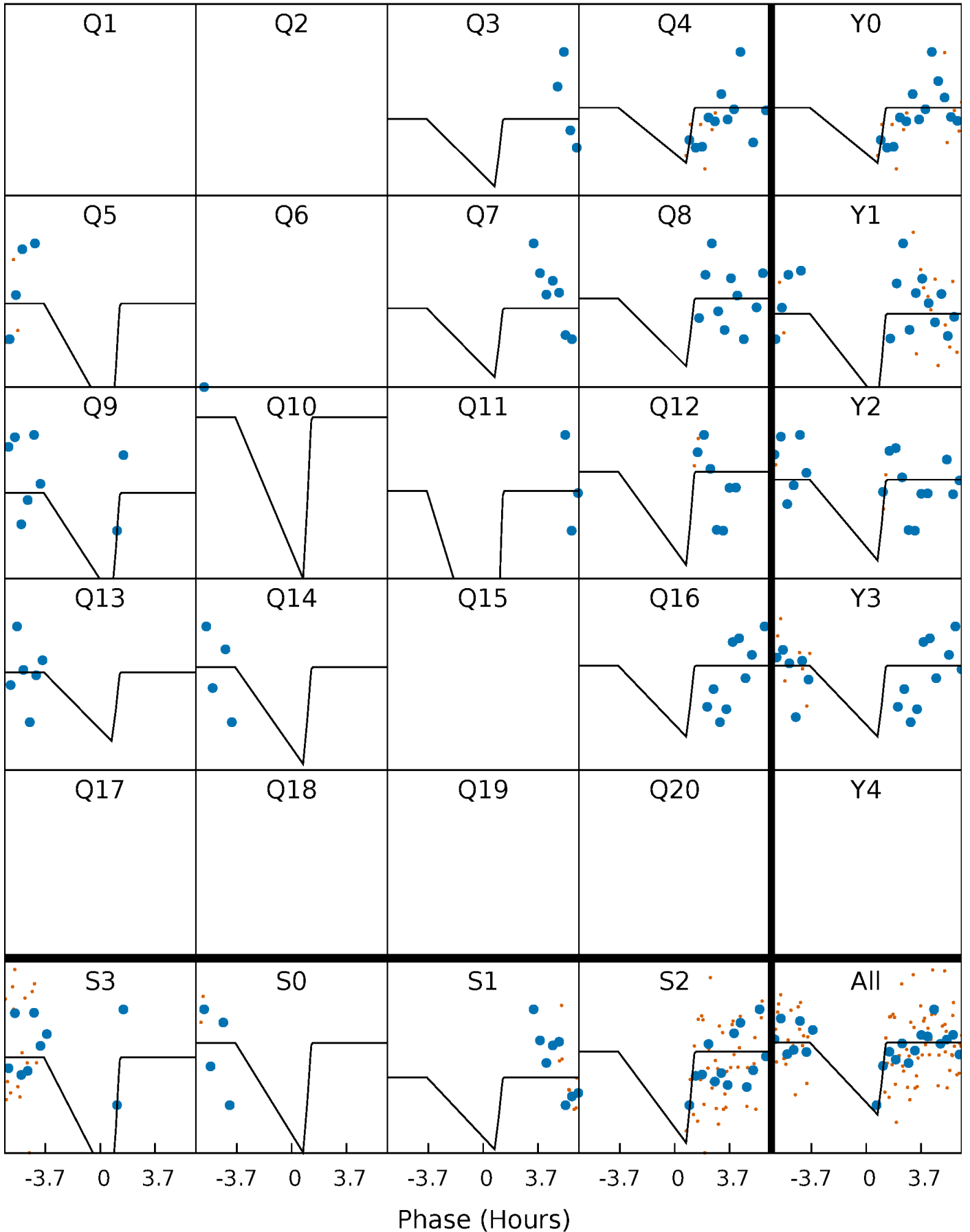
# DV Quarter-Phased Transit Curves

TCE 009302543-05     $P = 51.175646$  Days     $T_0 = 153.599226$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

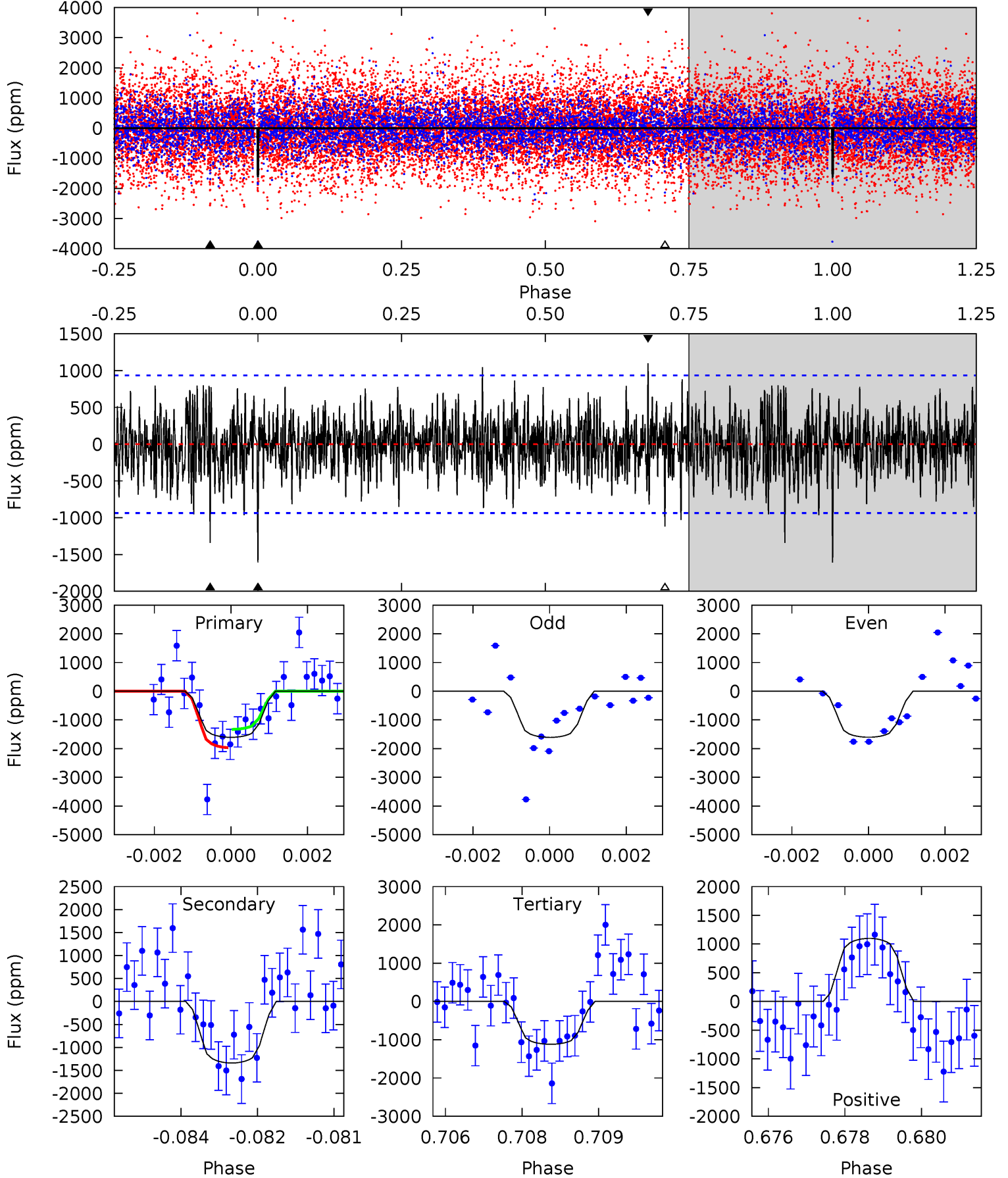
TCE 009302543-05     $P = 51.176466$  Days     $T_0 = 153.471284$  (BKJD)



# DV Model-Shift Uniqueness Test

009302543-05, P = 51.175646 Days, E = 102.423580 Days

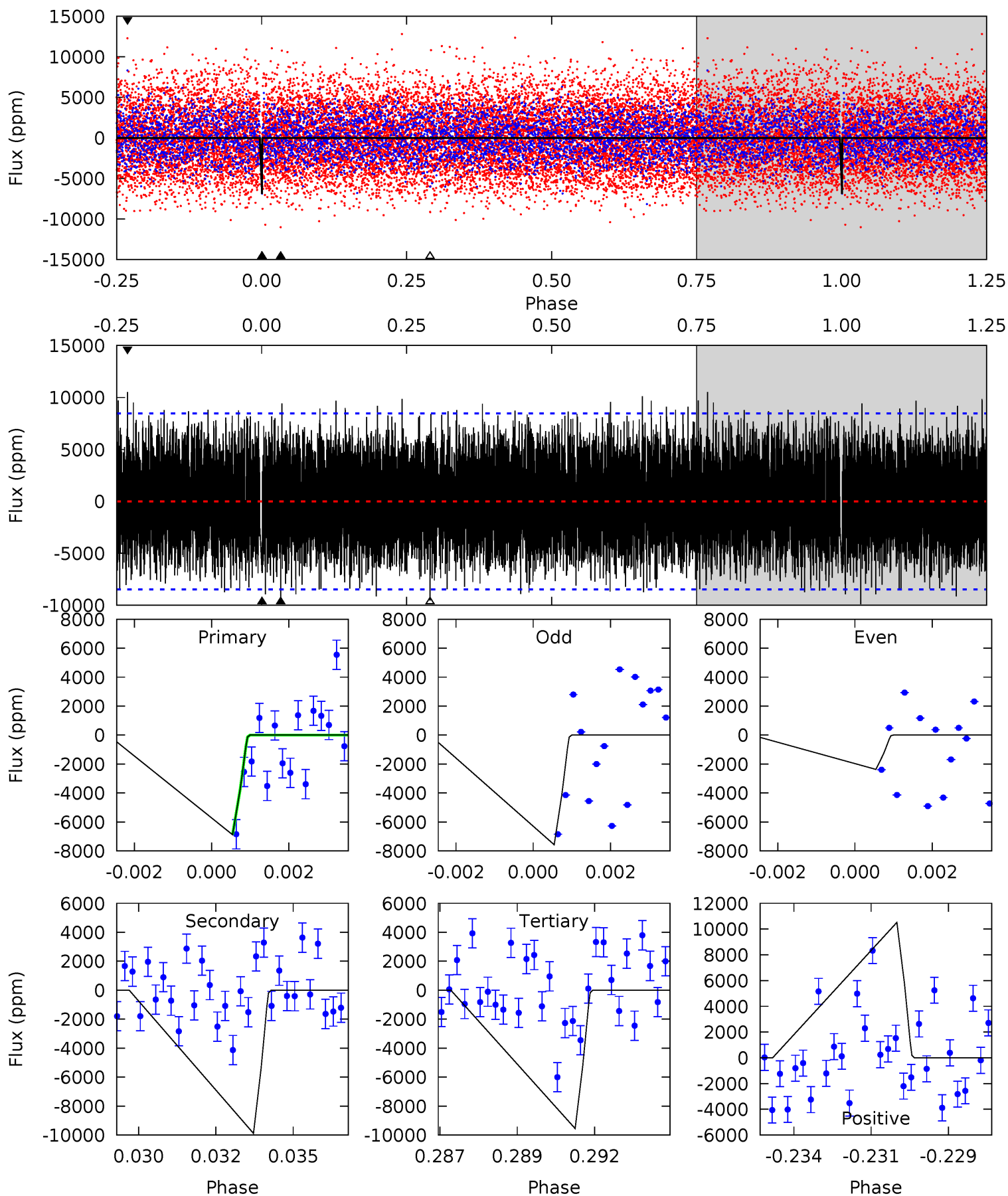
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.18	7.66	6.39	6.27	5.34	3.12	1.74	2.79	2.91	1.27	1.38	0.02	0.91	0.41	1.82



# Alt Model-Shift Uniqueness Test

009302543-05, P = 51.176466 Days, E = 102.294818 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
4.31	6.19	5.98	6.58	5.30	3.05	2.05	-1.67	-2.27	0.21	-0.40	1.60	1.00	0.52	0





### Stellar Parameters For KIC 009302543

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6732^{+184}_{-225}$	$3.632^{+0.567}_{-0.063}$	$-0.140^{+0.300}_{-0.300}$	$3.276^{+0.444}_{-1.885}$	$1.676^{+0.197}_{-0.460}$	$0.067^{+0.472}_{-0.014}$
	+3%/-3%	+16%/-2%	+214%/-214%	+14%/-58%	+12%/-27%	+703%/-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 009302543-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1341 \pm 175$	$15.05^{+13.23}_{-9.88}$	$1272^{+82}_{-185}$	$5763^{+4396}_{-1249}$	$349^{+2406}_{-257}$
Alt.	$-9883 \pm 1597$	$28.15^{+14.91}_{-13.66}$	$1279^{+85}_{-181}$	$7049^{+3476}_{-1315}$	$728^{+1917}_{-440}$

$T_{\text{max}}$  = 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  $A_{\text{obs}} \gg 1.0$

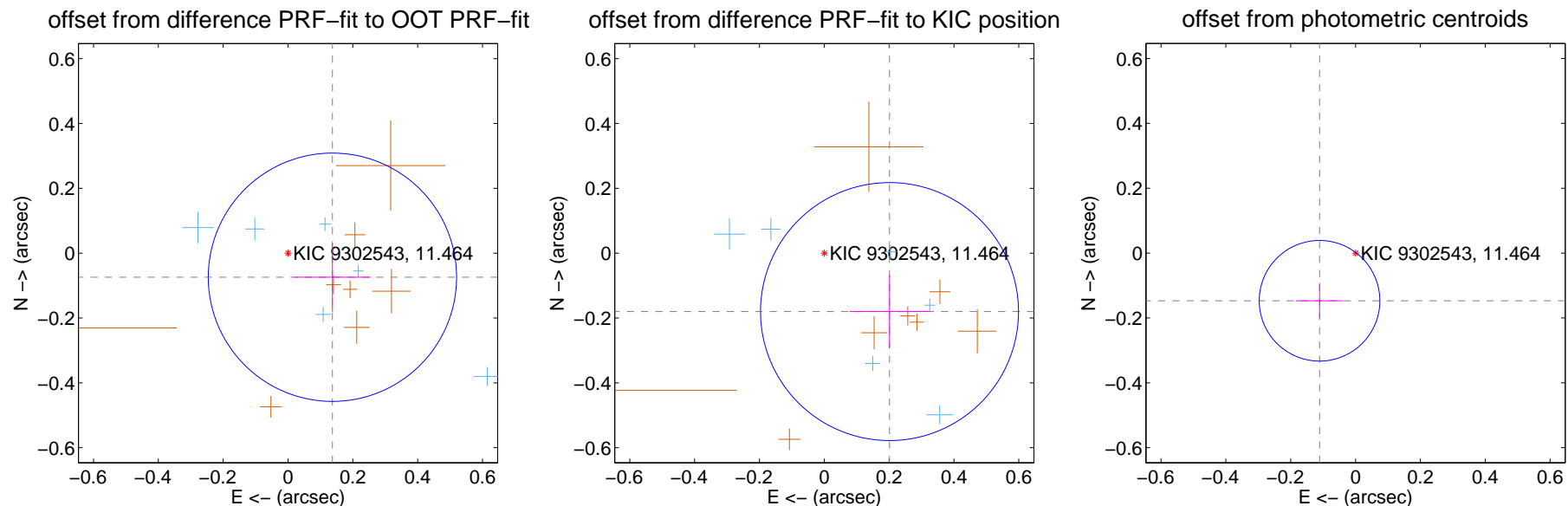
## DV Centroid Data

Supplemental centroid analysis for 009302543-05. **Kepler magnitude: 11.46.** Transit SNR 9.50

There are 7 quarters with good PRF difference image offsets

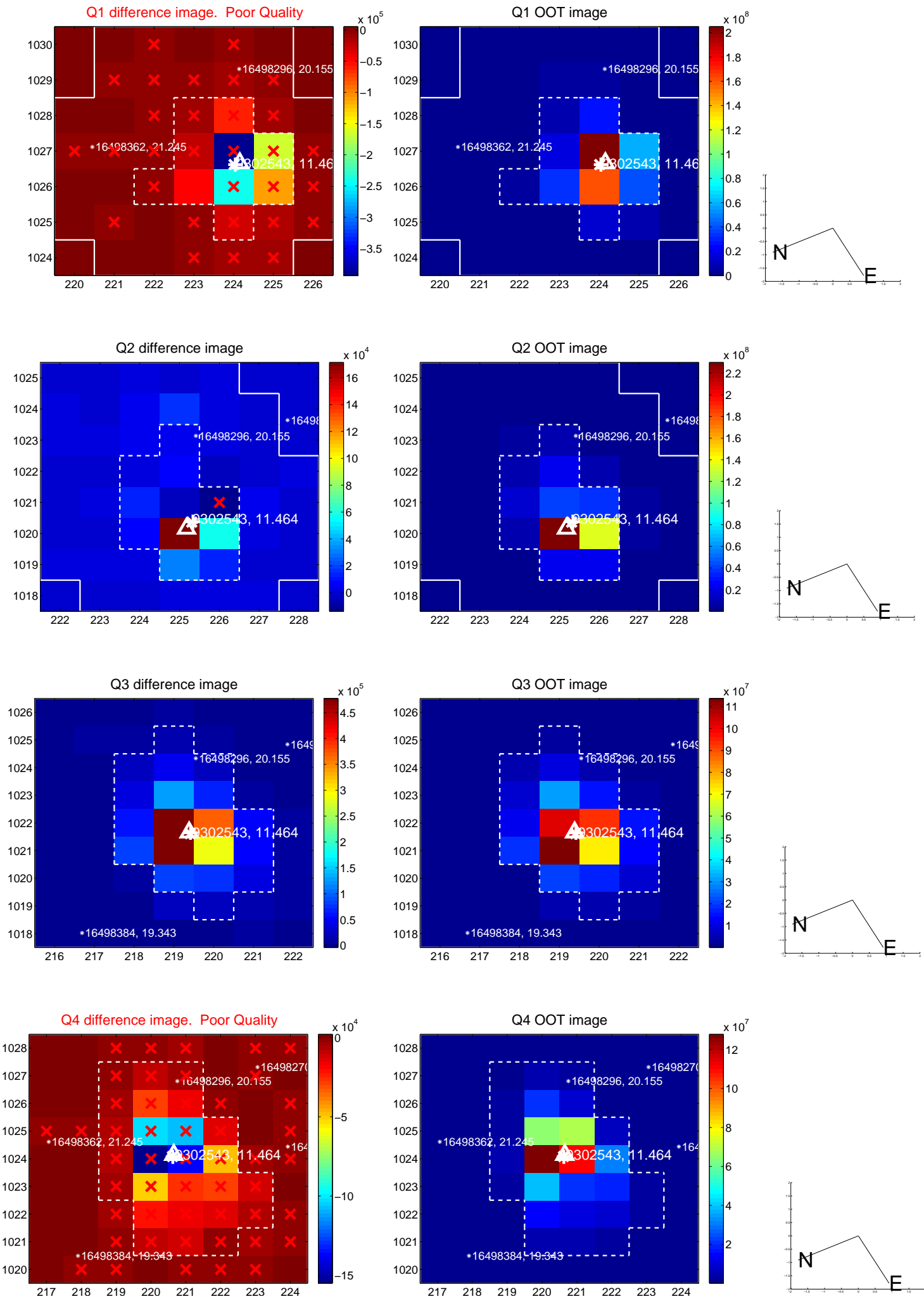
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.156 \pm 0.128$	1.22	$-0.137 \pm 0.118$	$-0.074 \pm 0.106$
PRF-fit source offset from KIC position	$0.270 \pm 0.133$	2.04	$-0.201 \pm 0.124$	$-0.180 \pm 0.112$
photometric centroid source offset	$0.18 \pm 0.06$	2.97	$0.11 \pm 0.07$	$-0.15 \pm 0.05$

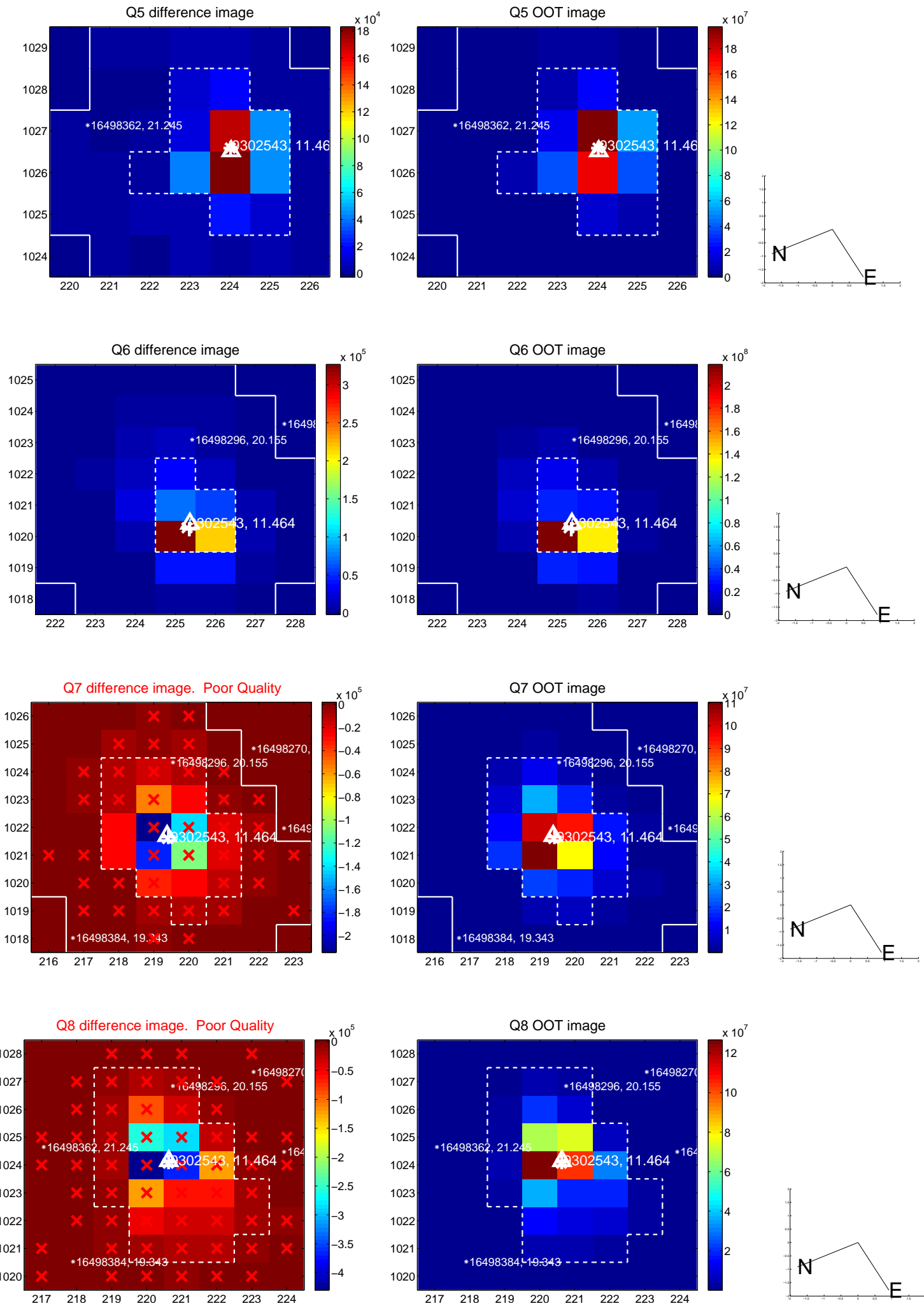


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

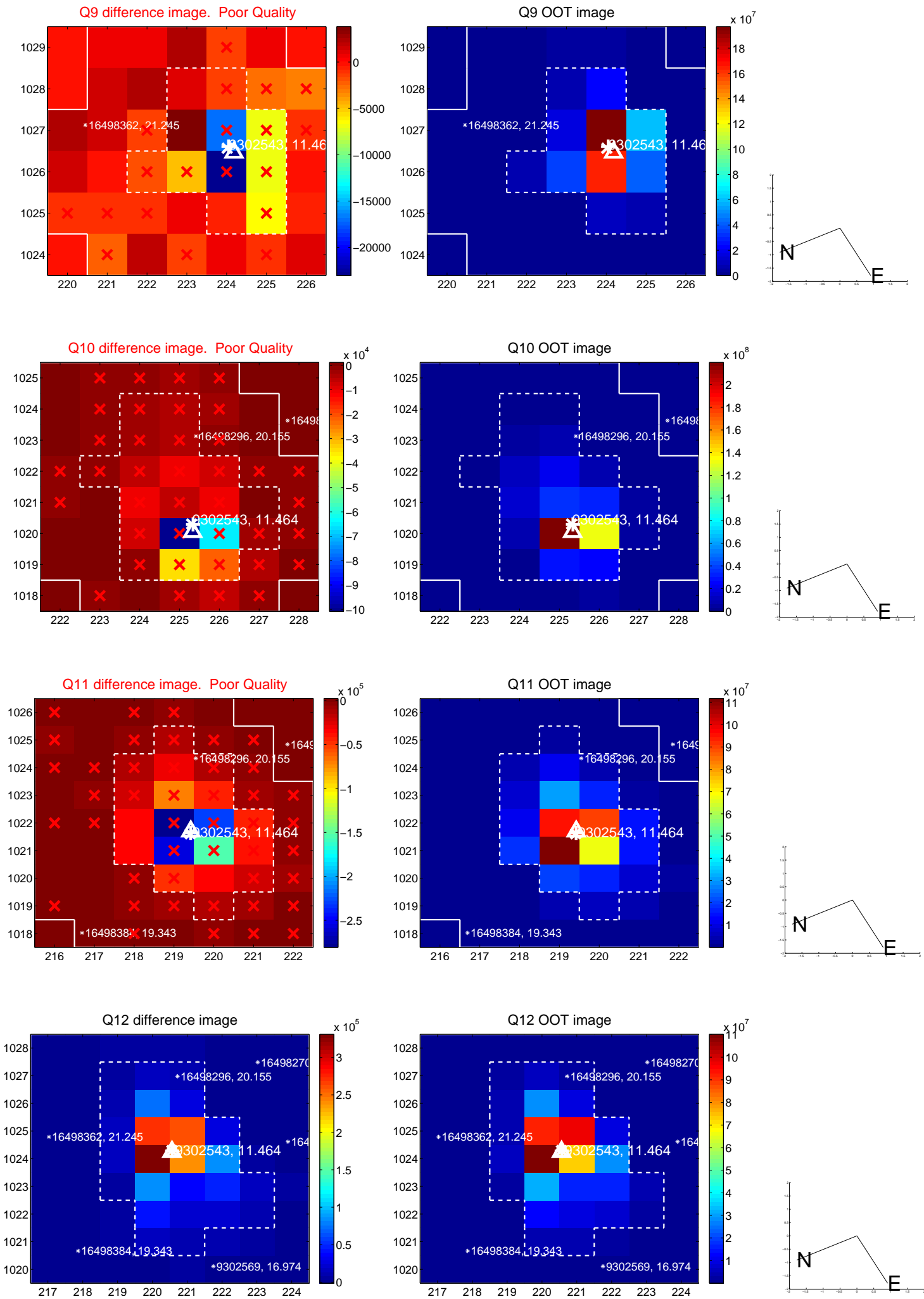
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



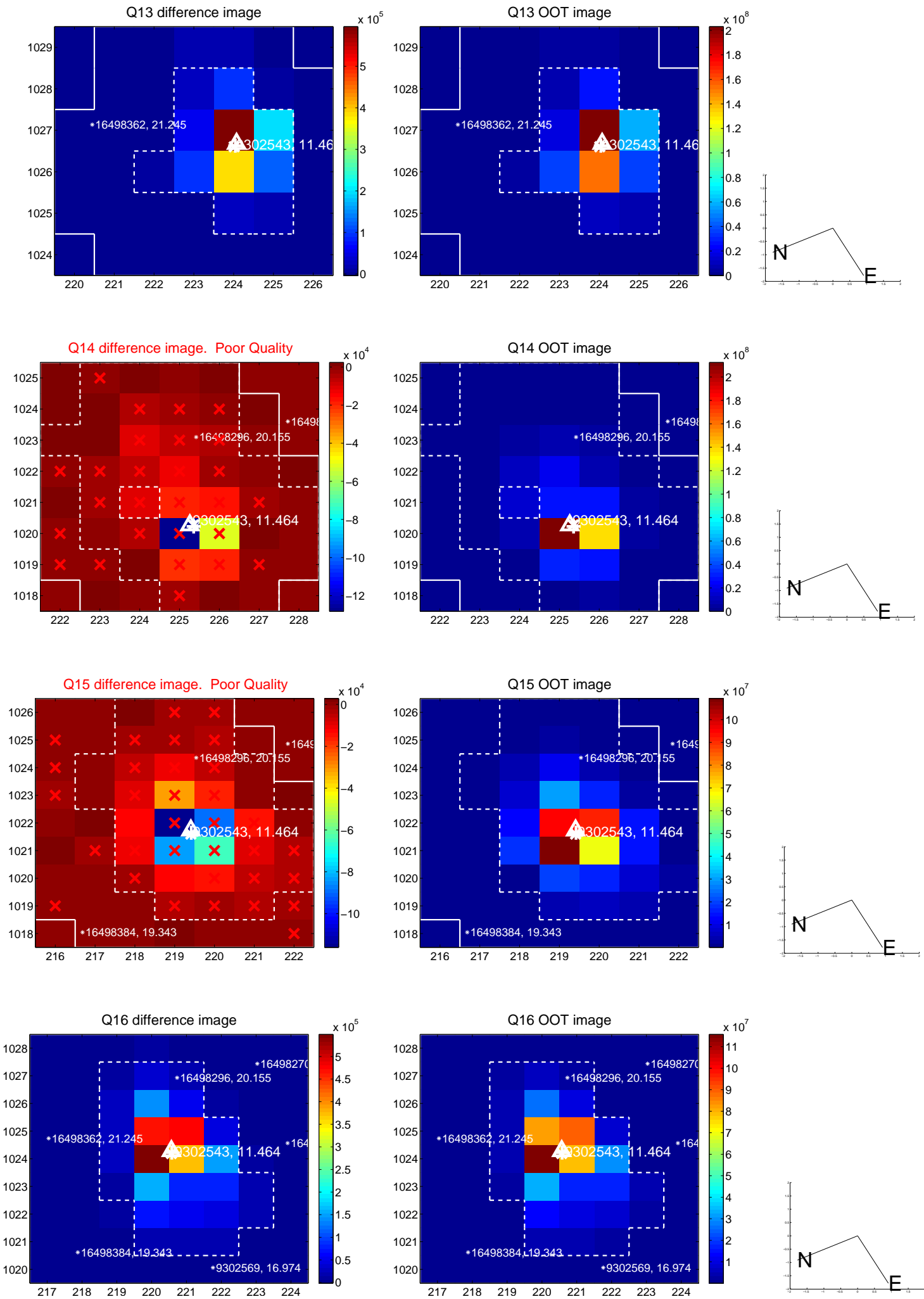
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



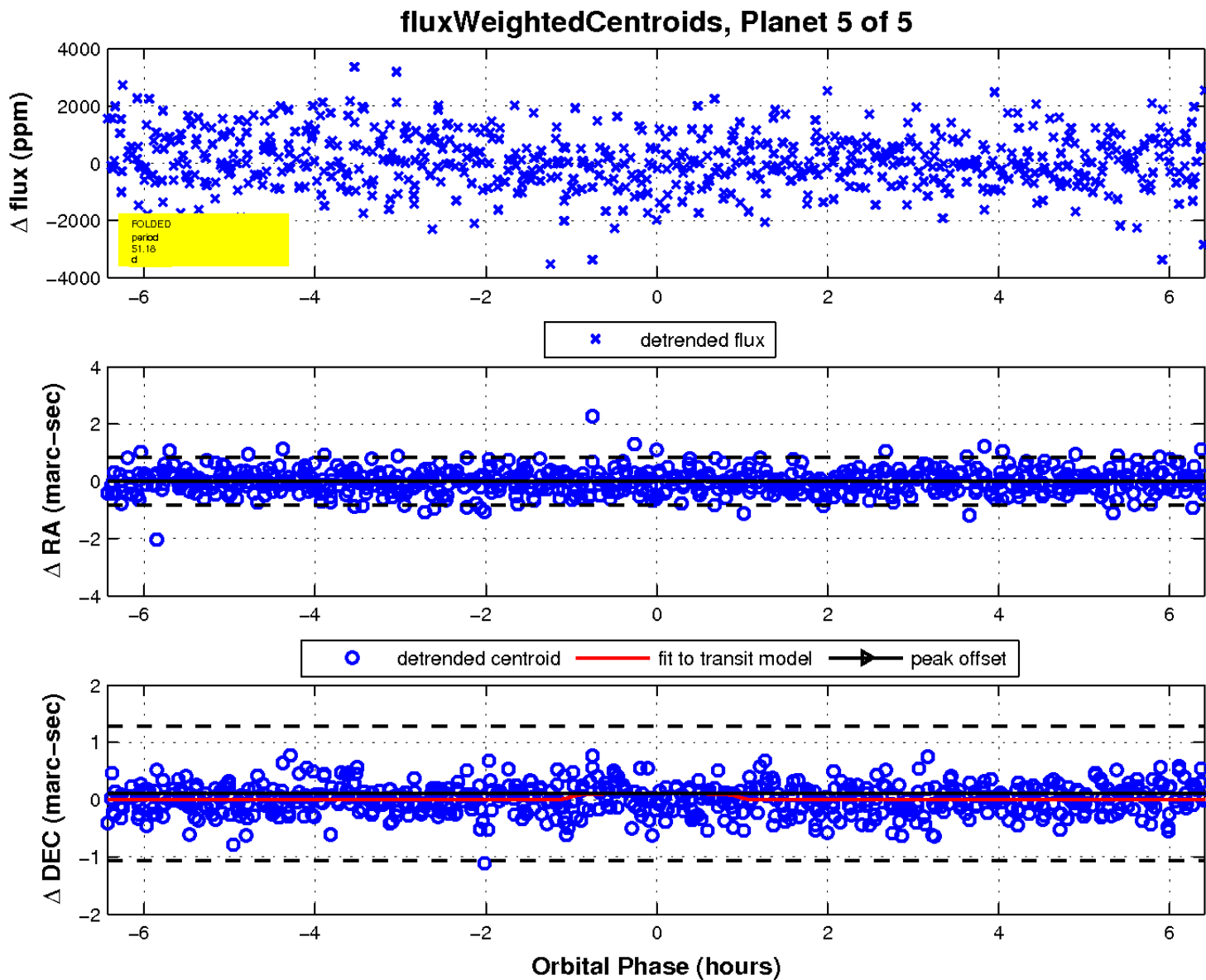
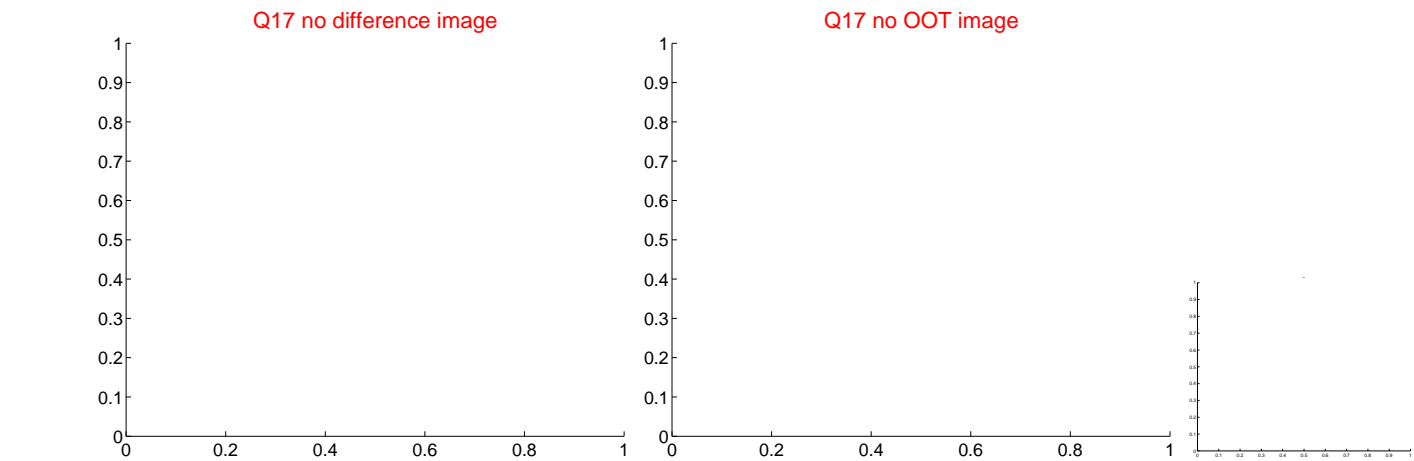
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

