

# KIC 009032551

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032551-01	OBS	No	1.944770	132.913519	26.3	7.052	13.4	12.7	2.38	7077	1.45	9699.07
009032551-02	OBS	No	3.889898	133.497027	31.0	5.723	10.1	11.3	2.38	7077	1.52	3848.60
009032551-03	OBS	No	3.887031	134.739732	46.3	23.589	8.5	6.4	2.38	7077	1.65	3852.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032551-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
009032551-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009032551-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

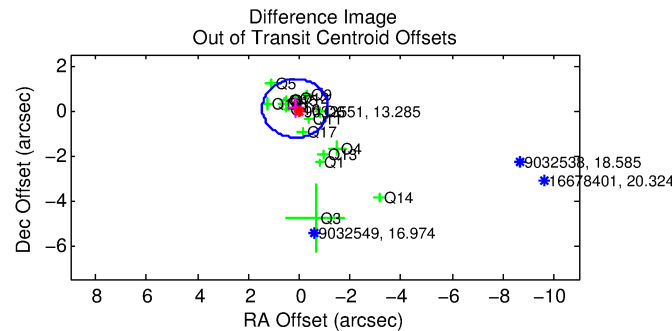
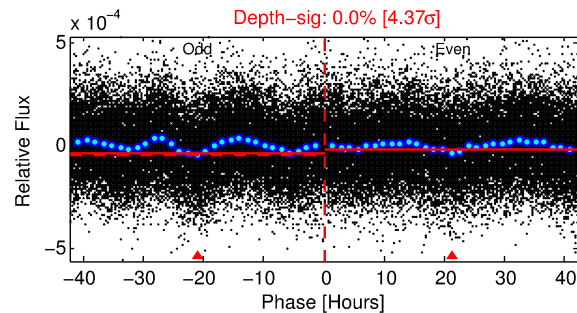
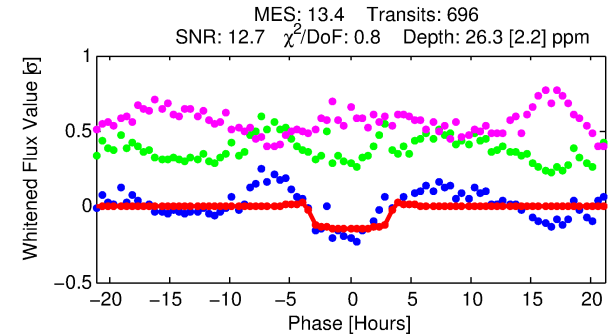
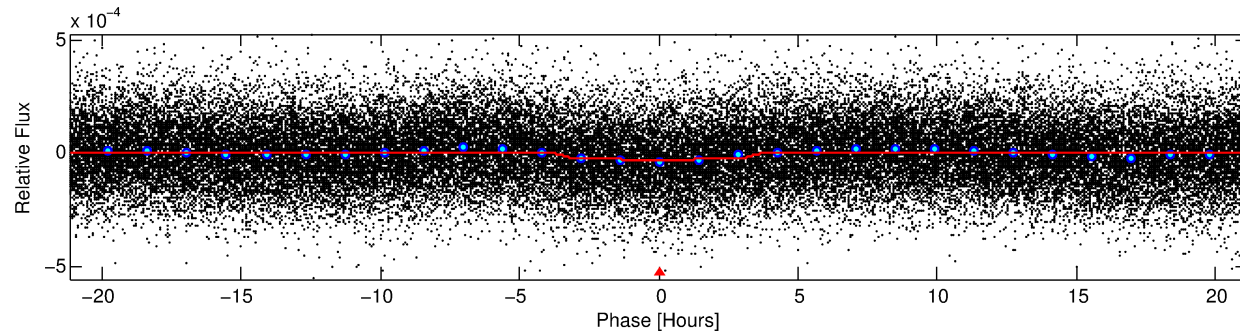
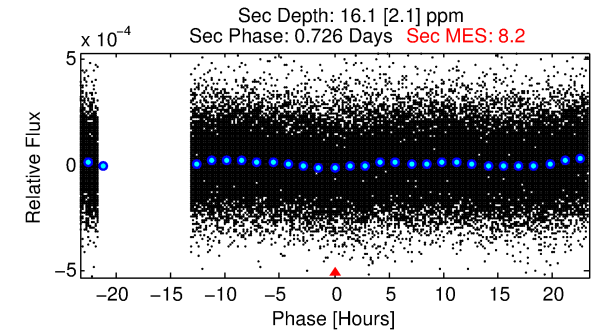
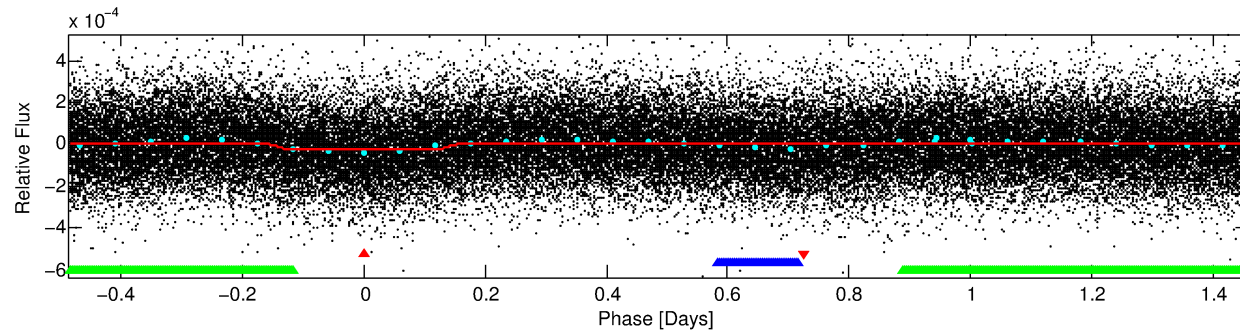
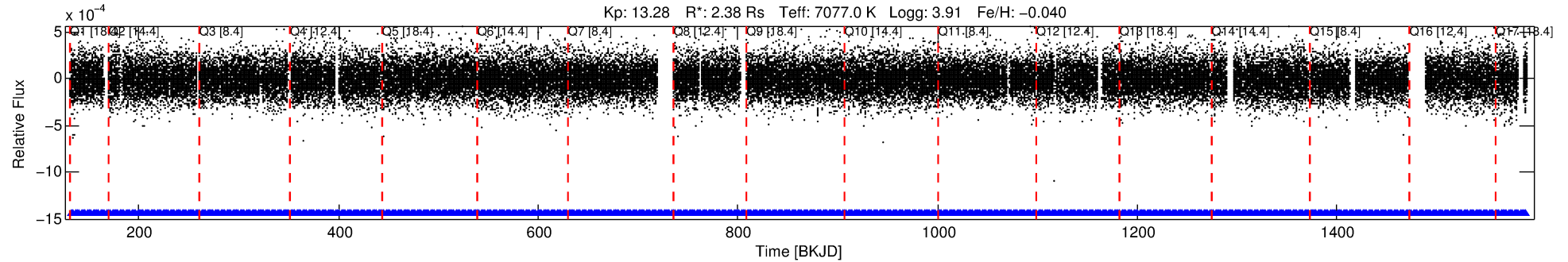
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009032551-01

No Significant Match Found

# DV One-Page Summary

KIC: 9032551 Candidate: 1 of 3 Period: 1.945 d



## DV Fit Results:

Period = 1.94477 [0.00002] d  
Epoch = 132.9135 [0.0047] BKJD  
Rp/R\* = 0.0056 [0.0010]  
a/R\* = 1.26 [0.51]  
b = 0.93 [0.17]  
Seff = 9699.06 [4236.04]  
Teq = 2531 [276] K  
Rp = 1.45 [0.49] Re  
a = 0.0362 [0.0096] AU  
Ag = 5.53 [3.06] [1.48σ]  
Teffp = 5999 [605] K [5.21σ]

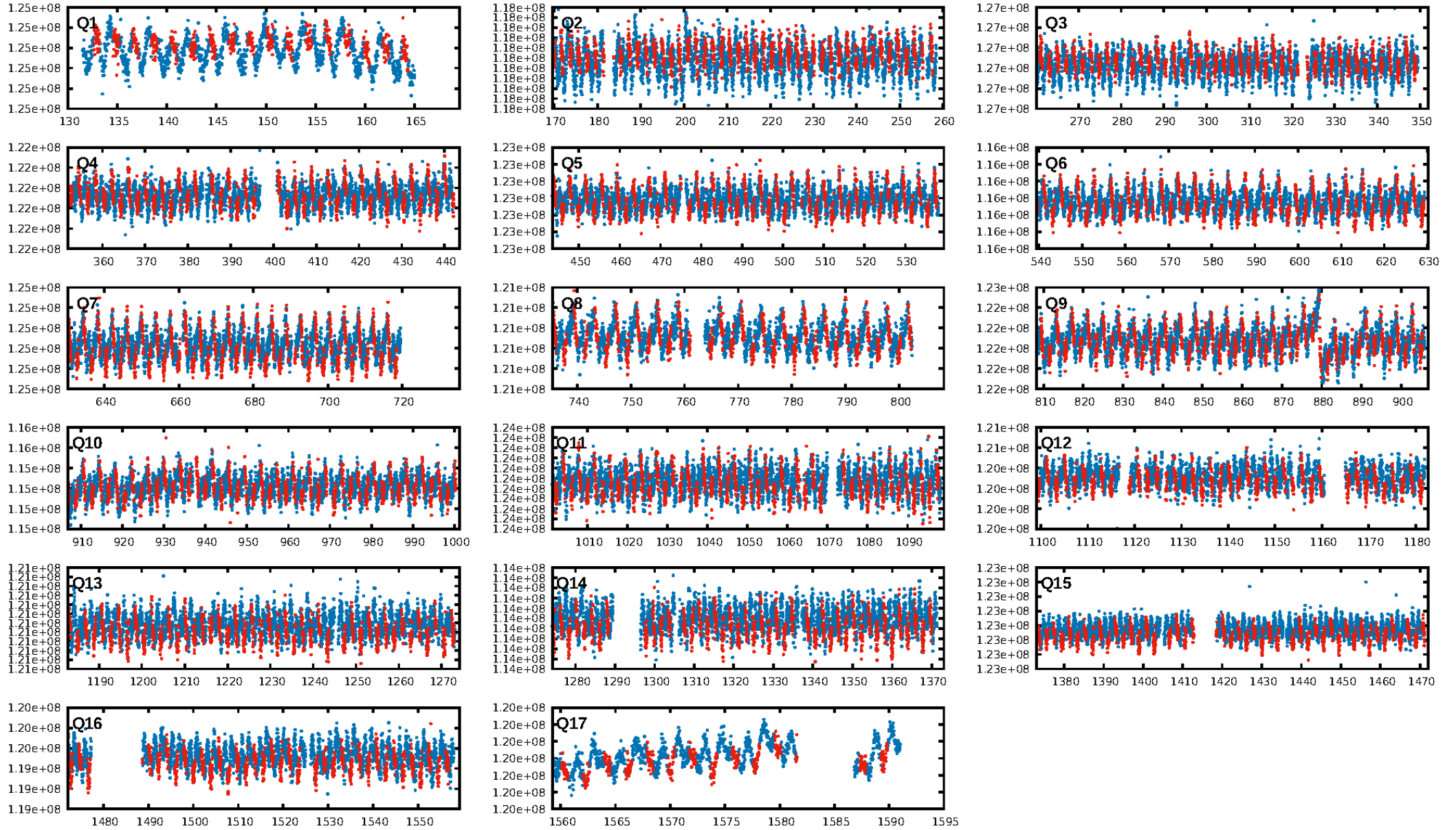
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 94.2% [1.89σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.38e-38  
RollingBand-fgt: 1.00 [666/666]  
GhostDiagnostic-chr: 3.584  
Centroid-sig: 3.5%  
Centroid-so: 1.141 arcsec [1.58σ]  
OotOffset-rm: 0.180 arcsec [0.42σ]  
KicOffset-rm: 0.237 arcsec [0.57σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.75 [12/16]  
DiffImageOverlap-fno: 0.12 [2/17]

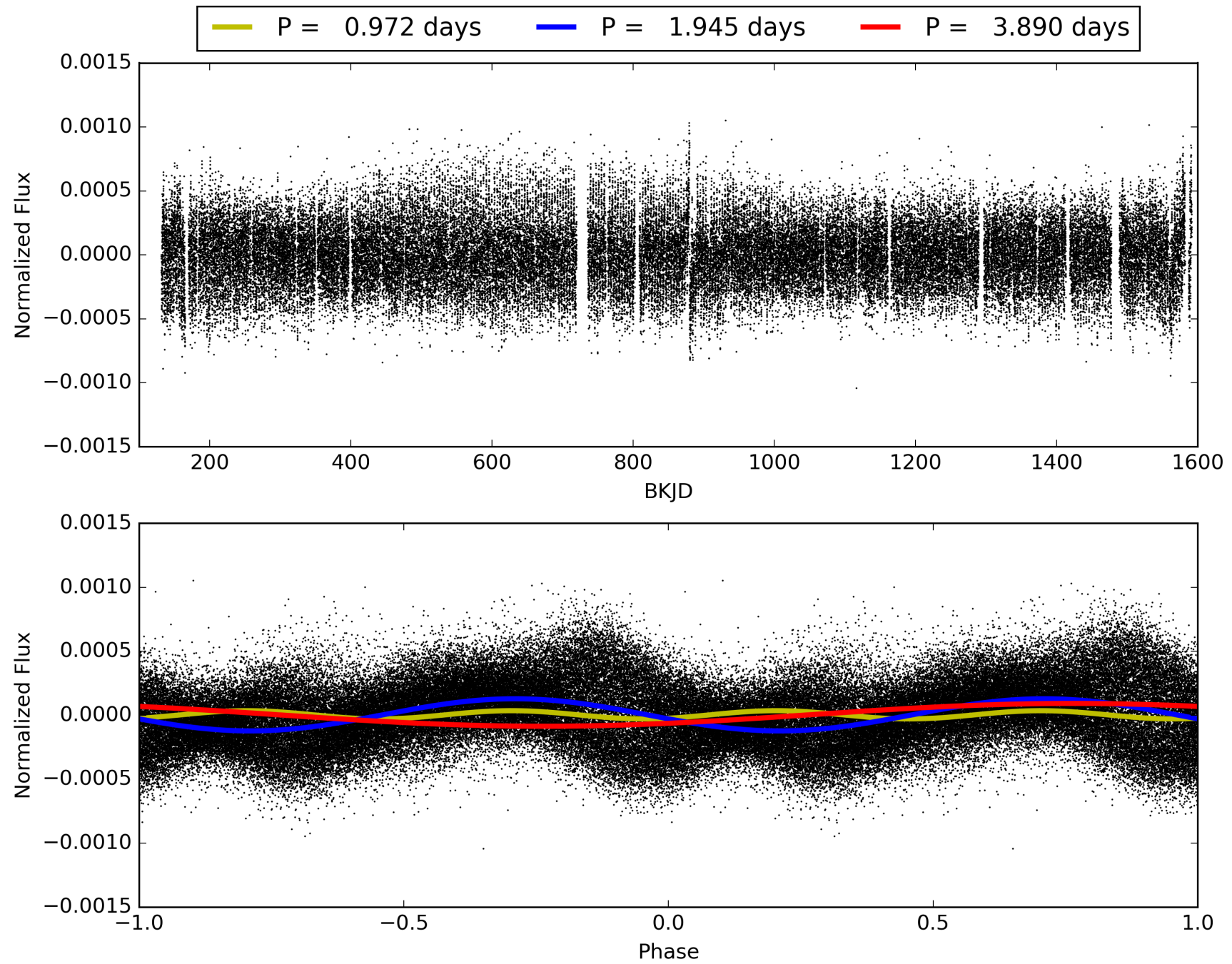
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:44:19 Z

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

# TCE 009032551-01, PDC Light Curves

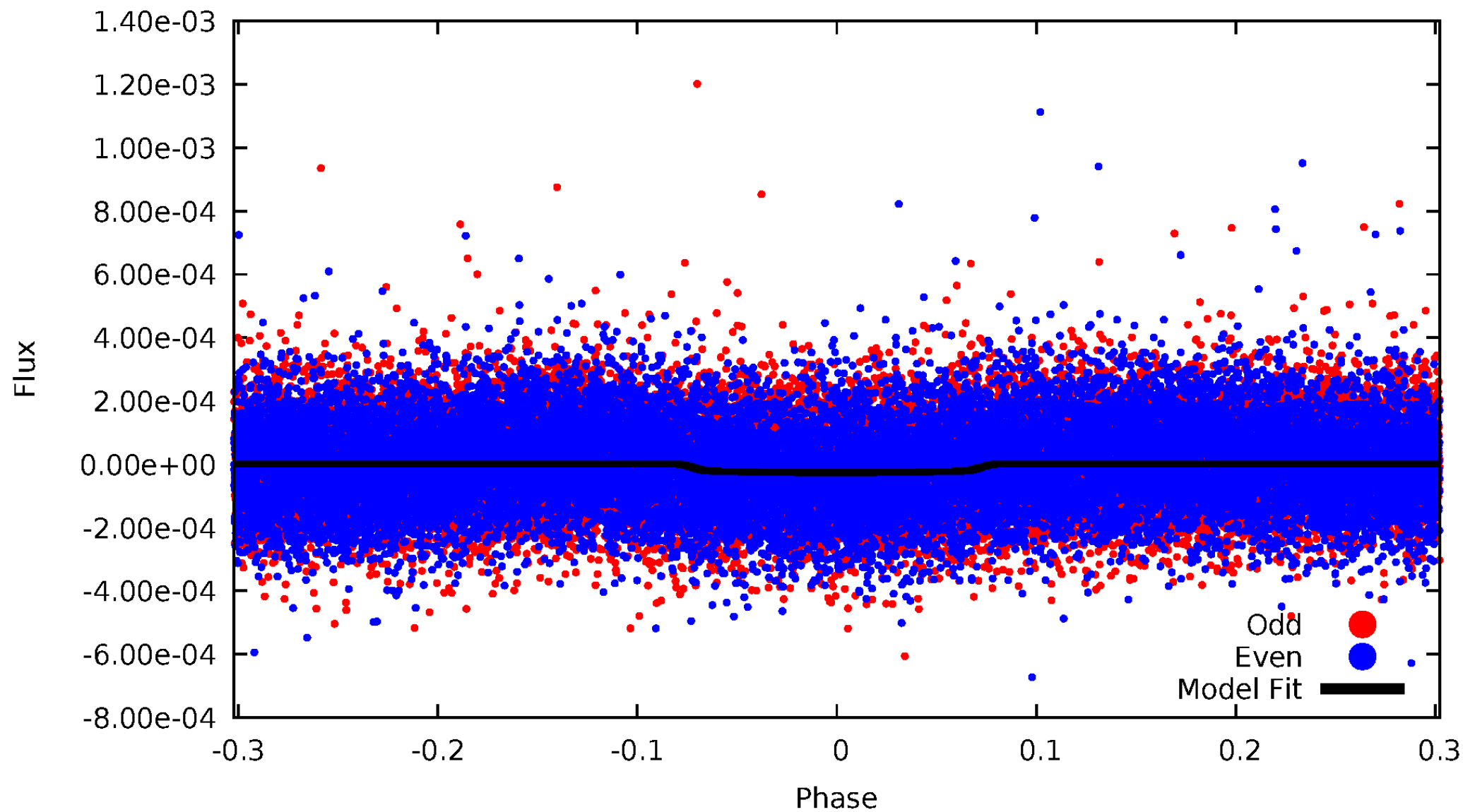


TCE 009032551-01



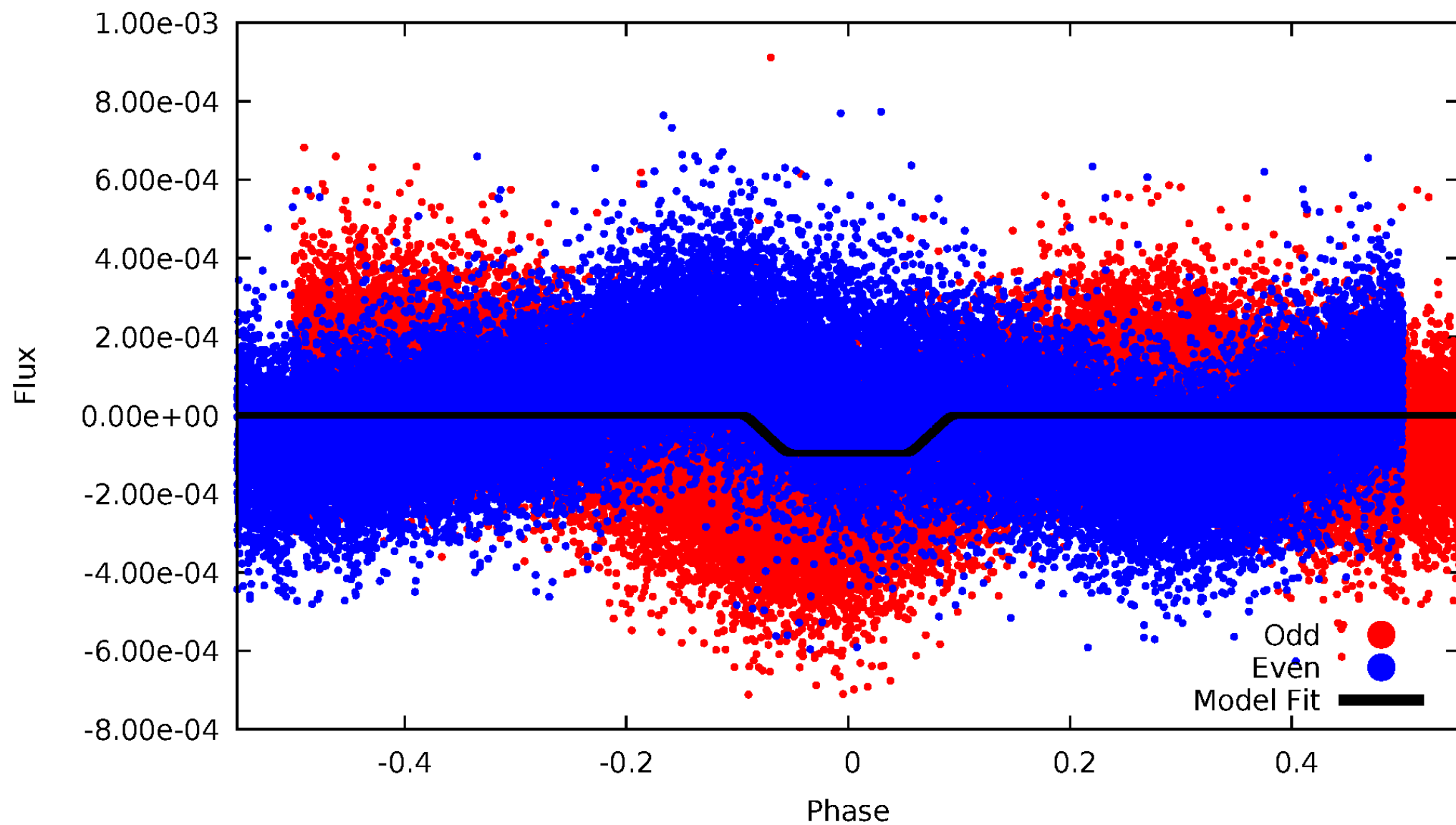
# DV Odd/Even

TCE 009032551-01



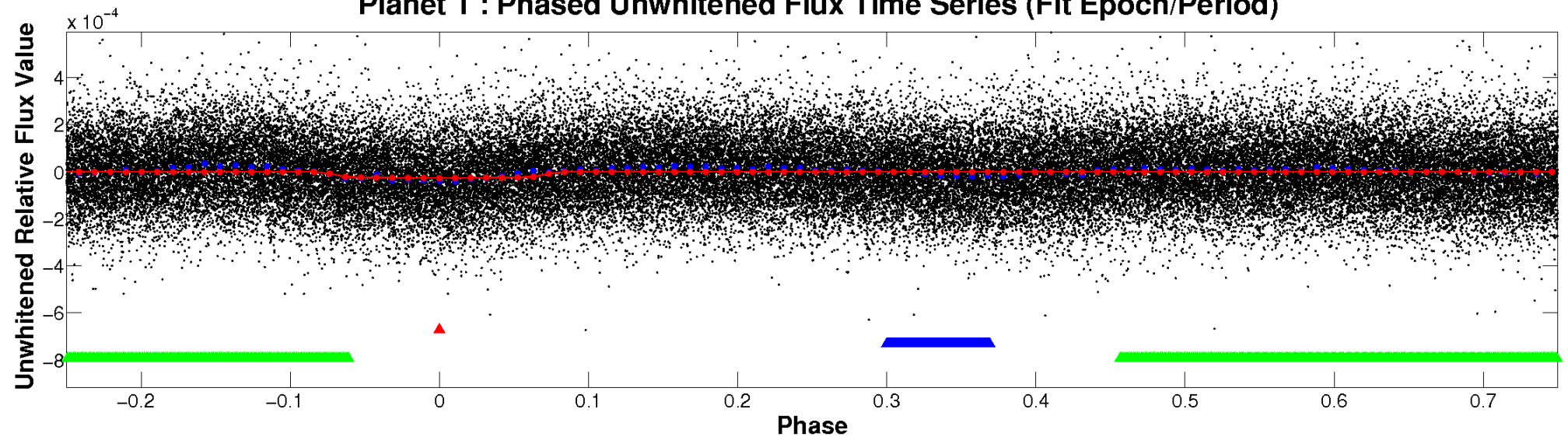
# ALT Odd/Even

TCE 009032551-01

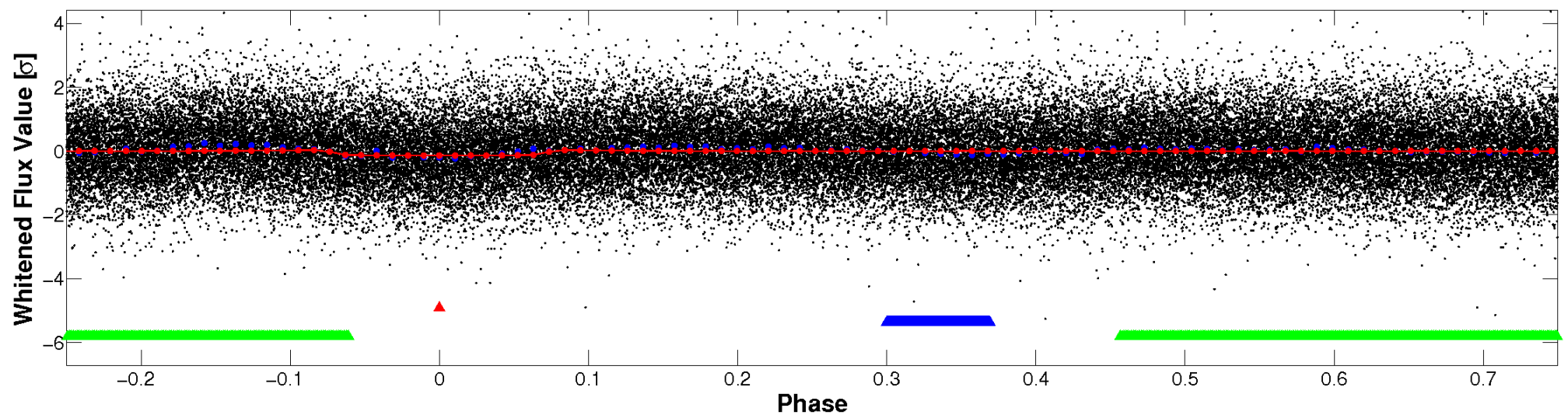


# Non-Whitened Vs. Whitened Light Curve

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

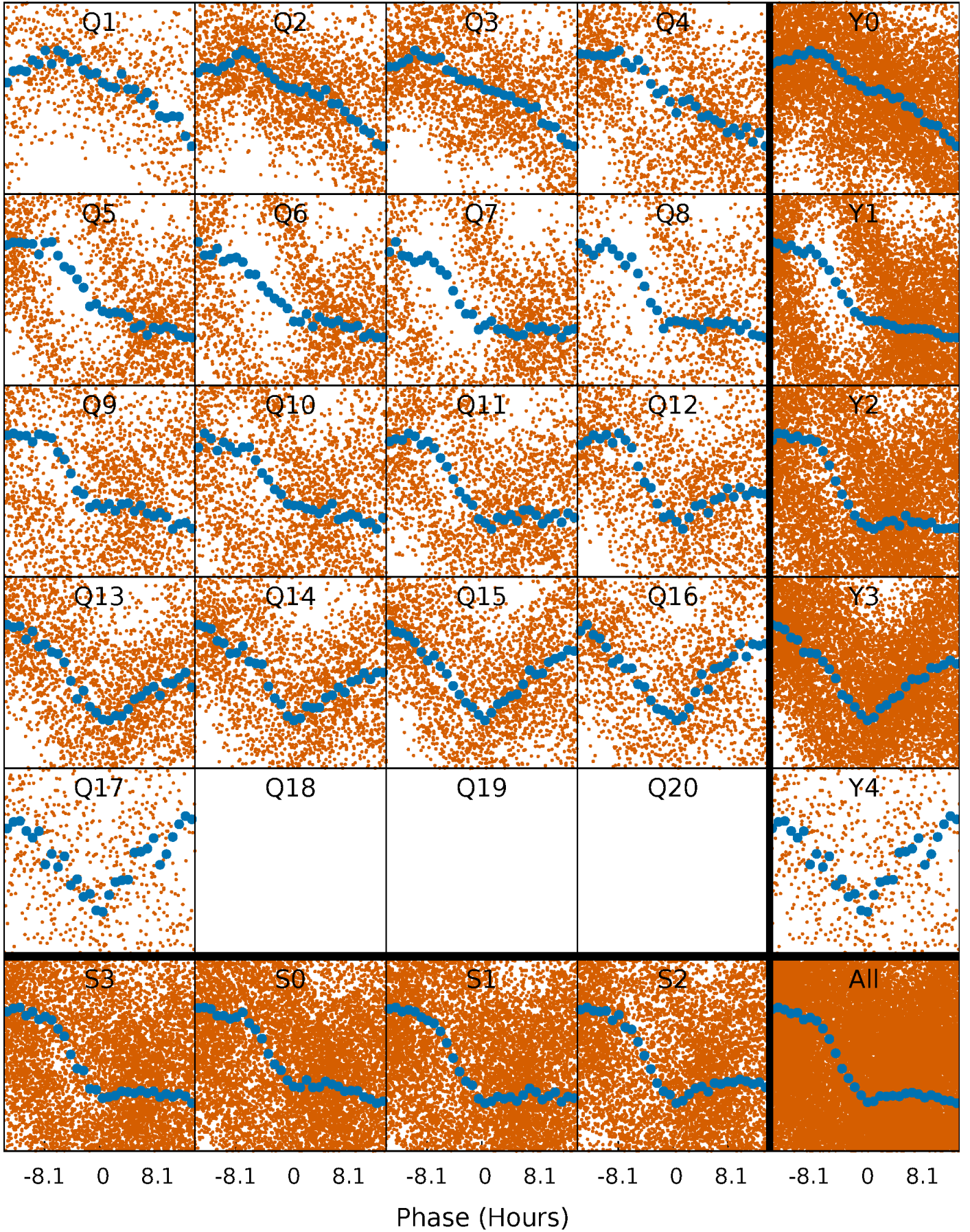


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



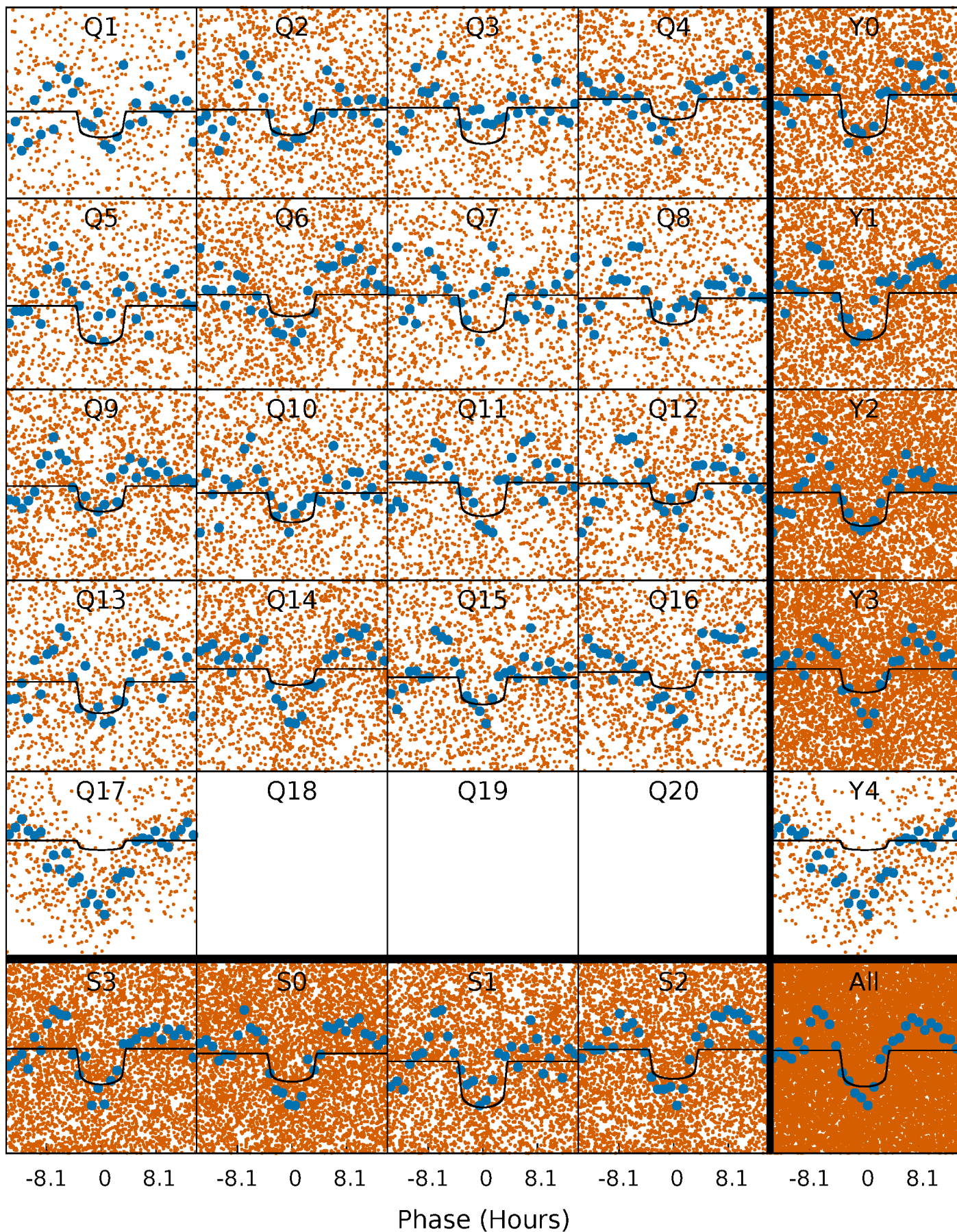
# PDC Quarter-Phased Transit Curves

TCE 009032551-01   P= 1.944770 Days    $T_0=132.913519$  (BKJD)



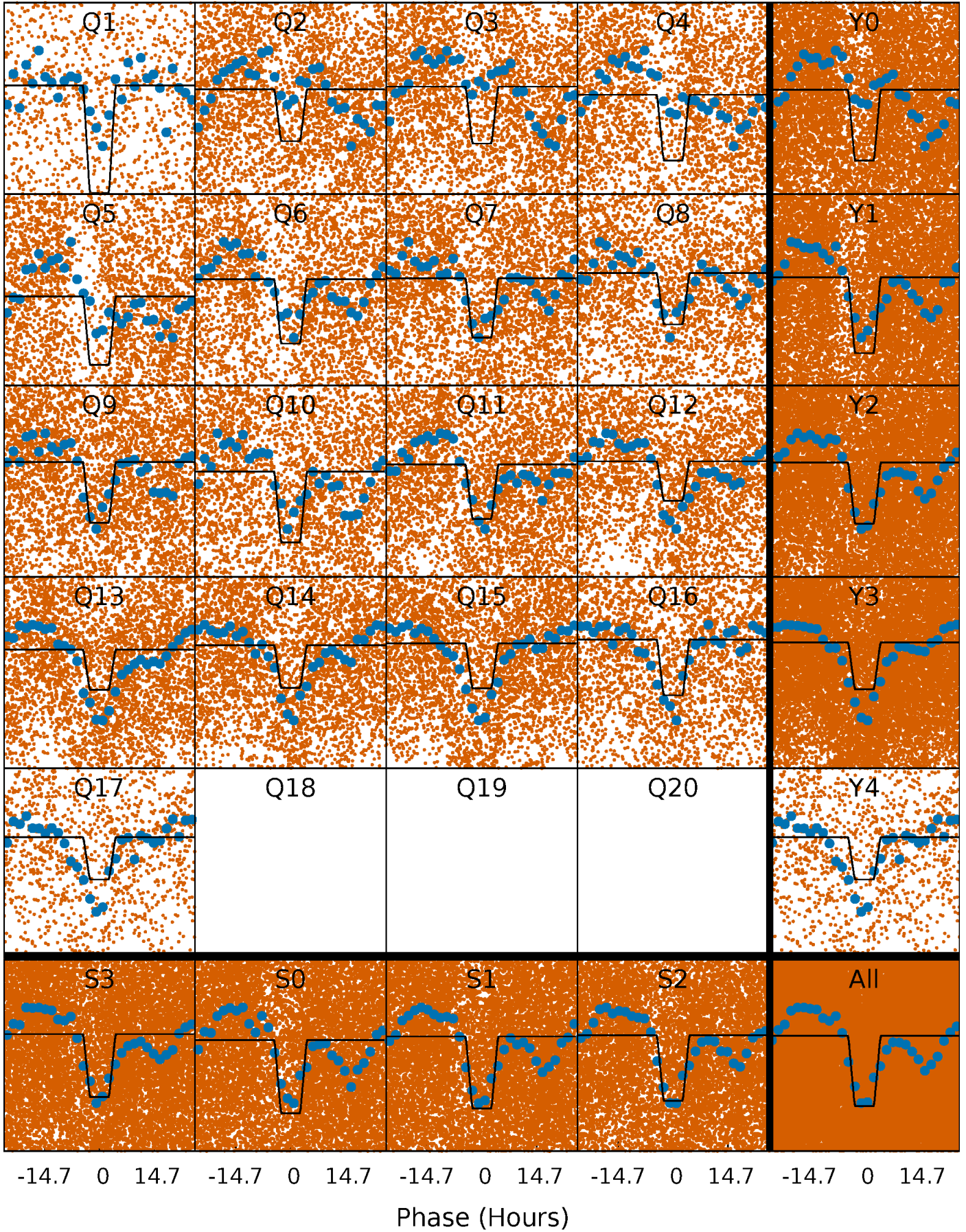
# DV Quarter-Phased Transit Curves

TCE 009032551-01 P= 1.944770 Days  $T_0=132.913519$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

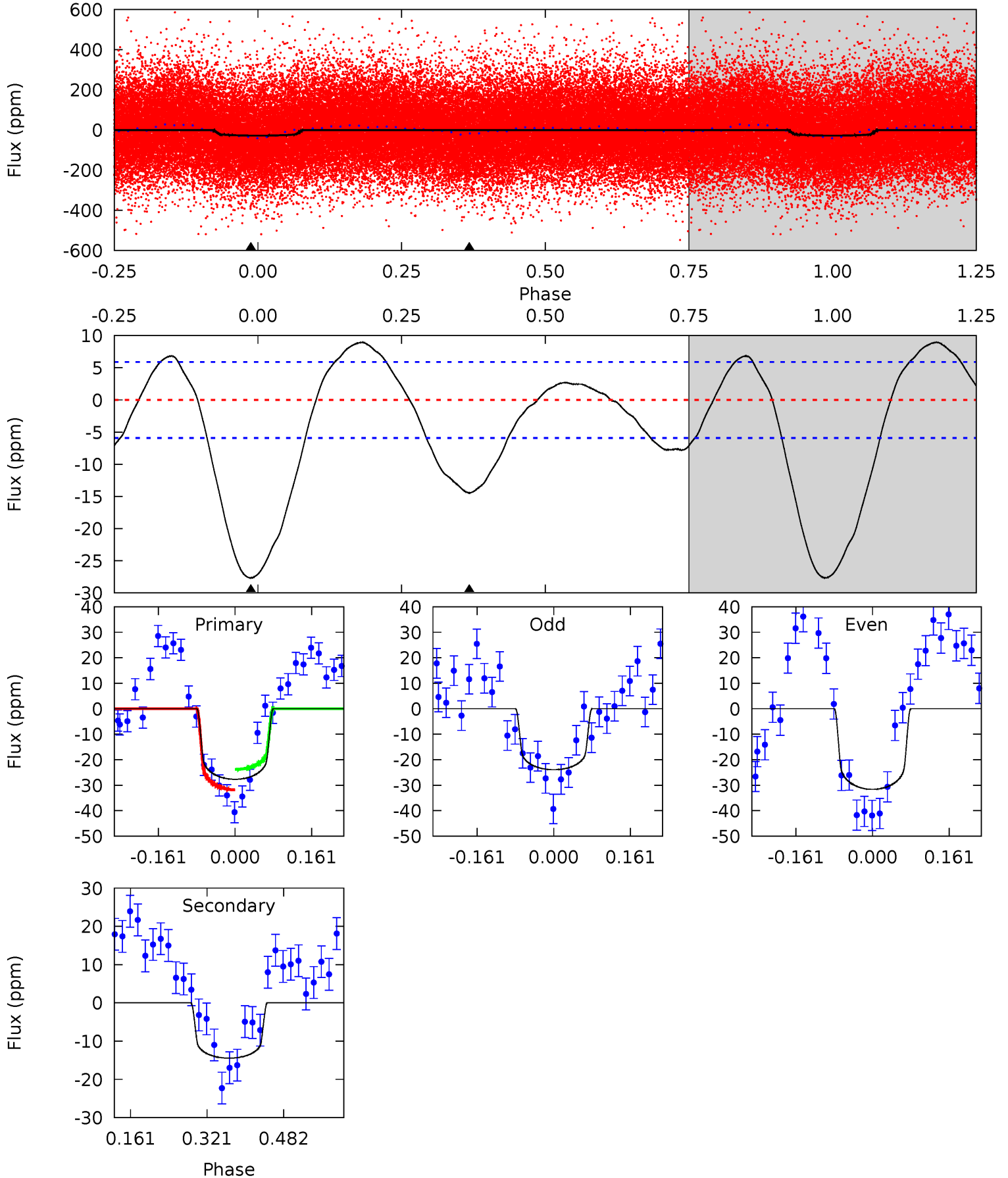
TCE 009032551-01 P= 1.944811 Days  $T_0=132.905957$  (BKJD)



# DV Model-Shift Uniqueness Test

009032551-01, P = 1.944770 Days, E = 130.968749 Days

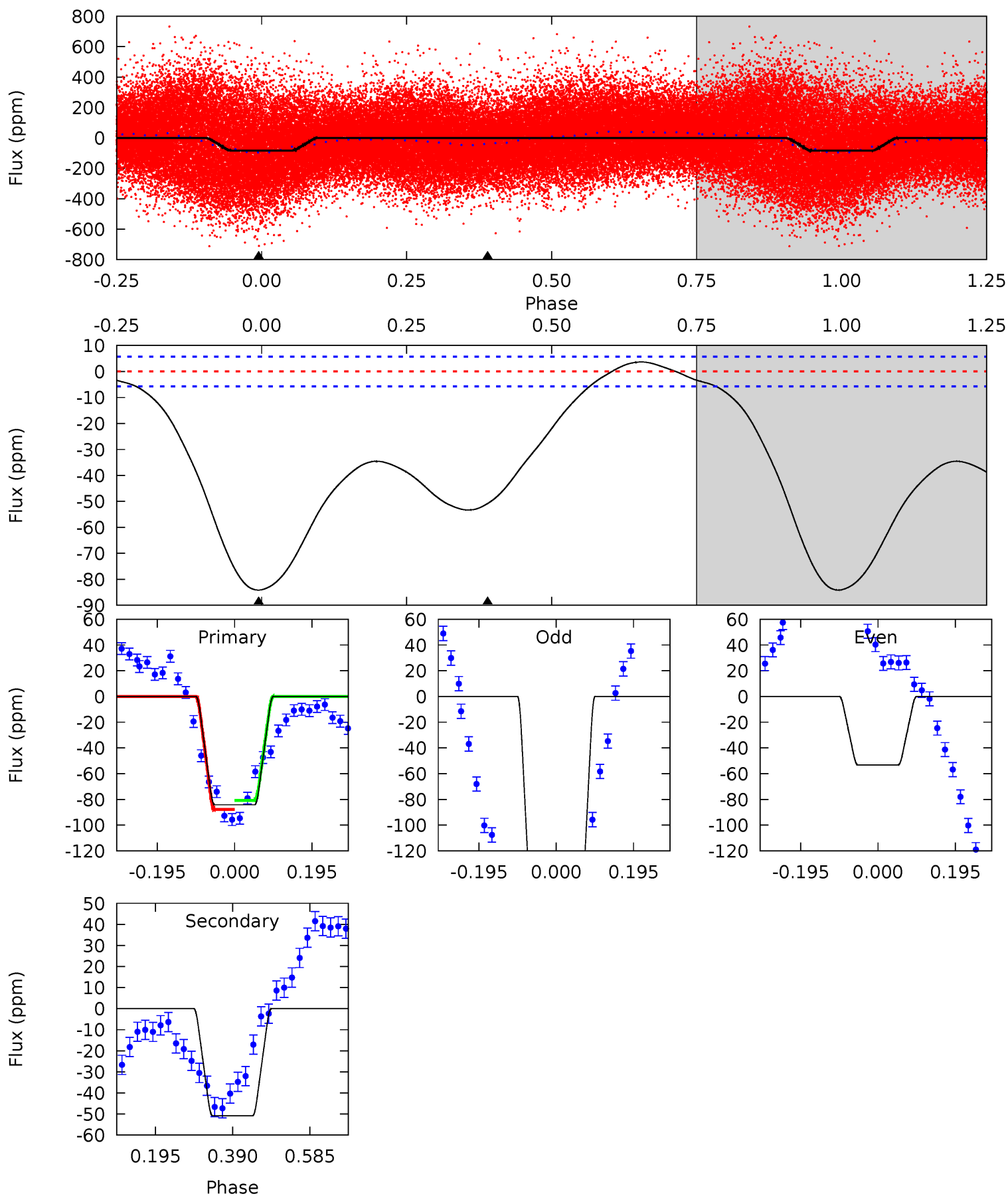
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.0	10.9	0	0	4.46	1.40	4.01	21.0	21.0	10.9	10.9	2.92	1.10	0.24	3.05



# Alt Model-Shift Uniqueness Test

009032551-01, P = 1.944811 Days, E = 130.961146 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
65.0	39.3	0	0	4.42	1.30	4.63	65.0	65.0	39.3	39.3	66.0	0.88	0.04	2.56



### Stellar Parameters For KIC 009032551

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7077^{+197}_{-271}$	$3.909^{+0.234}_{-0.126}$	$-0.040^{+0.250}_{-0.300}$	$2.379^{+0.466}_{-0.698}$	$1.674^{+0.162}_{-0.324}$	$0.175^{+0.241}_{-0.064}$
	+3%/-4%	+6%/-3%	+625%/-750%	+20%/-29%	+10%/-19%	+138%/-37%
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 009032551-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-14 \pm 1$	$1.38^{+0.36}_{-0.30}$	$3477^{+243}_{-273}$	$5686^{+705}_{-467}$	$5.309^{+3.342}_{-1.840}$
Alt.	$-51 \pm 1$	$2.49^{+0.43}_{-0.44}$	$3498^{+237}_{-278}$	$5917^{+378}_{-335}$	$5.880^{+2.610}_{-1.522}$

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

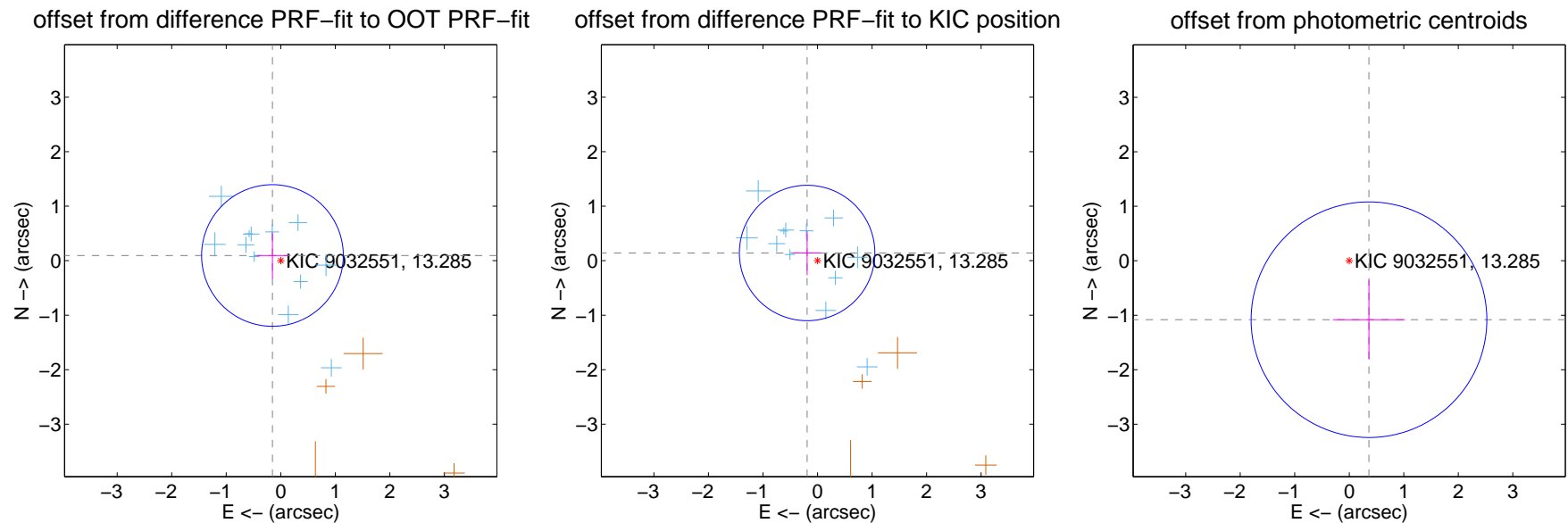
## DV Centroid Data

Supplemental centroid analysis for 009032551-01. Kepler magnitude: 13.29. Transit SNR 12.67

There are 12 quarters with good PRF difference image offsets

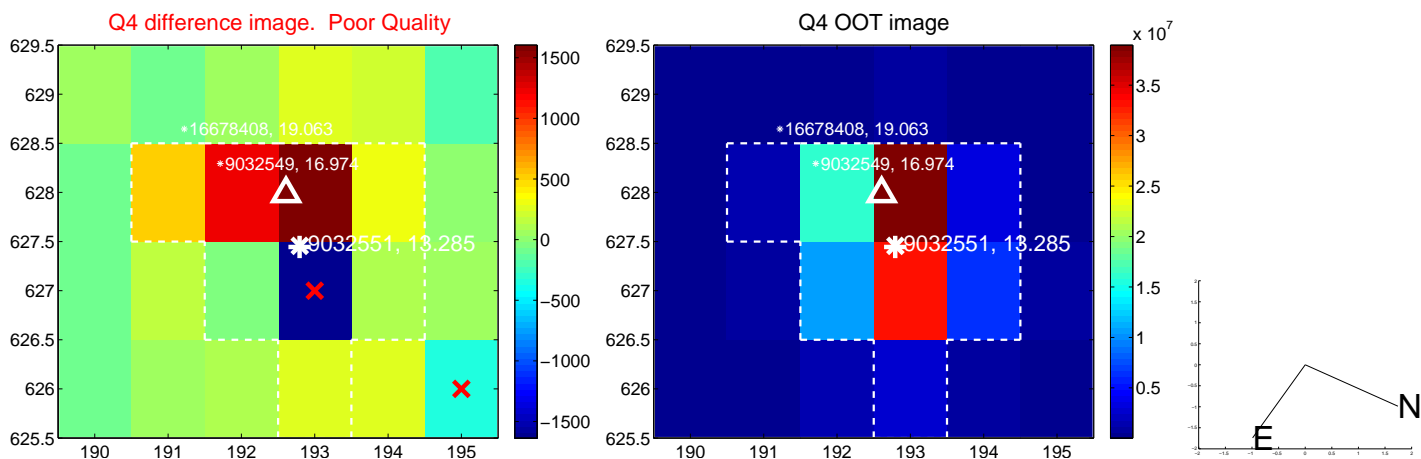
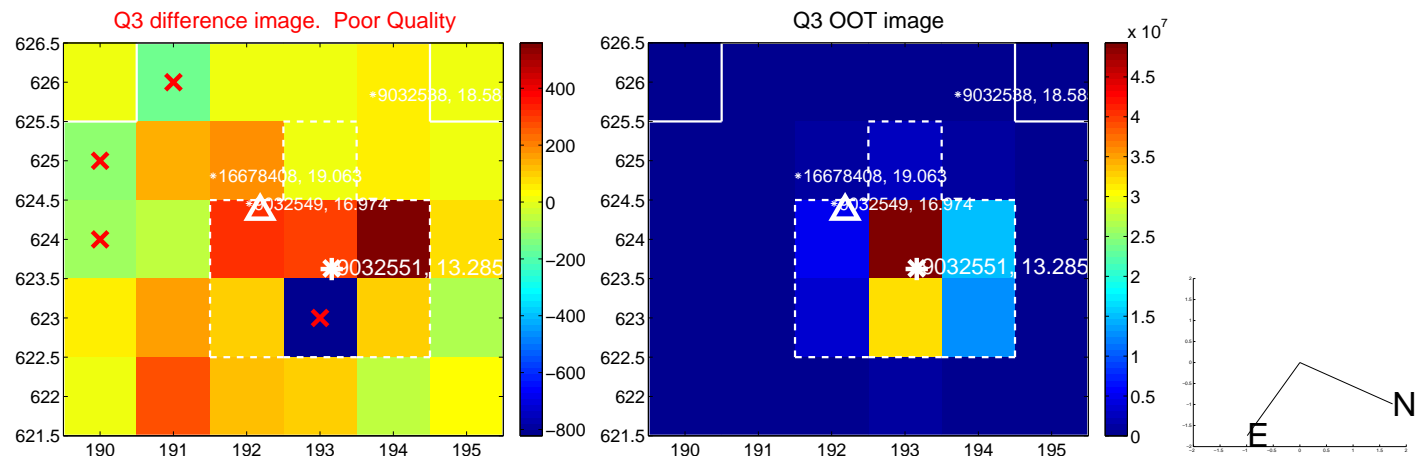
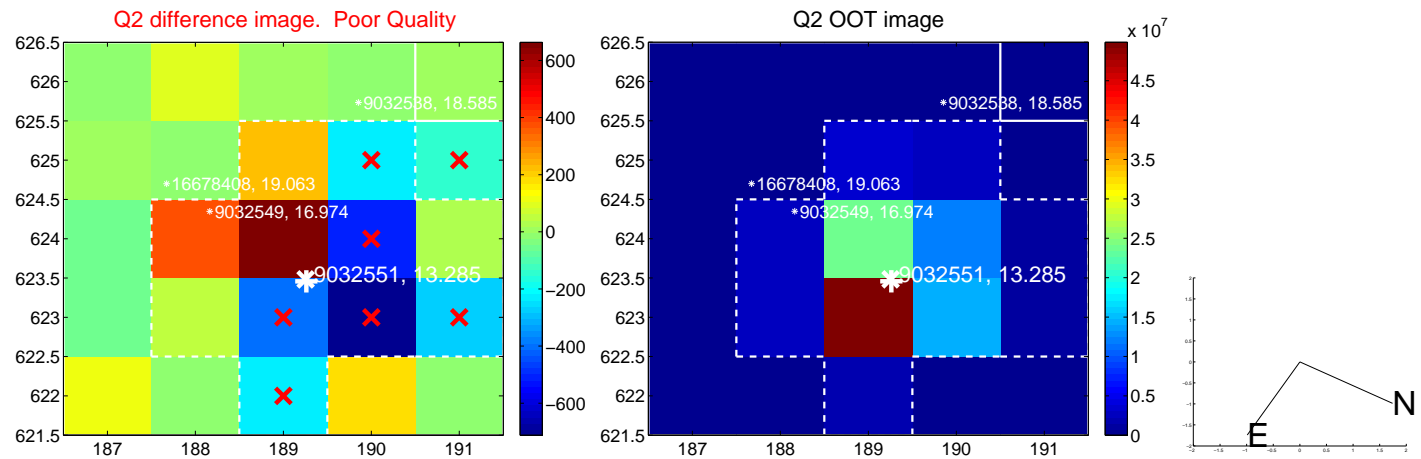
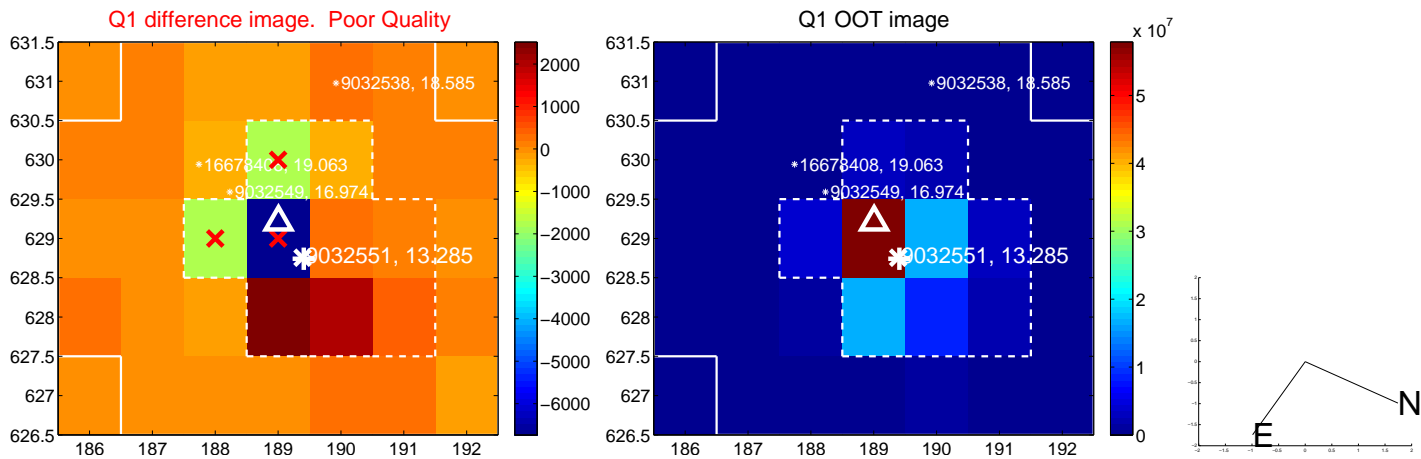
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.180 \pm 0.433$	0.42	$0.153 \pm 0.286$	$0.096 \pm 0.422$
PRF-fit source offset from KIC position	$0.237 \pm 0.414$	0.57	$0.191 \pm 0.260$	$0.141 \pm 0.409$
photometric centroid source offset	$1.14 \pm 0.72$	1.58	$-0.36 \pm 0.66$	$-1.08 \pm 0.73$

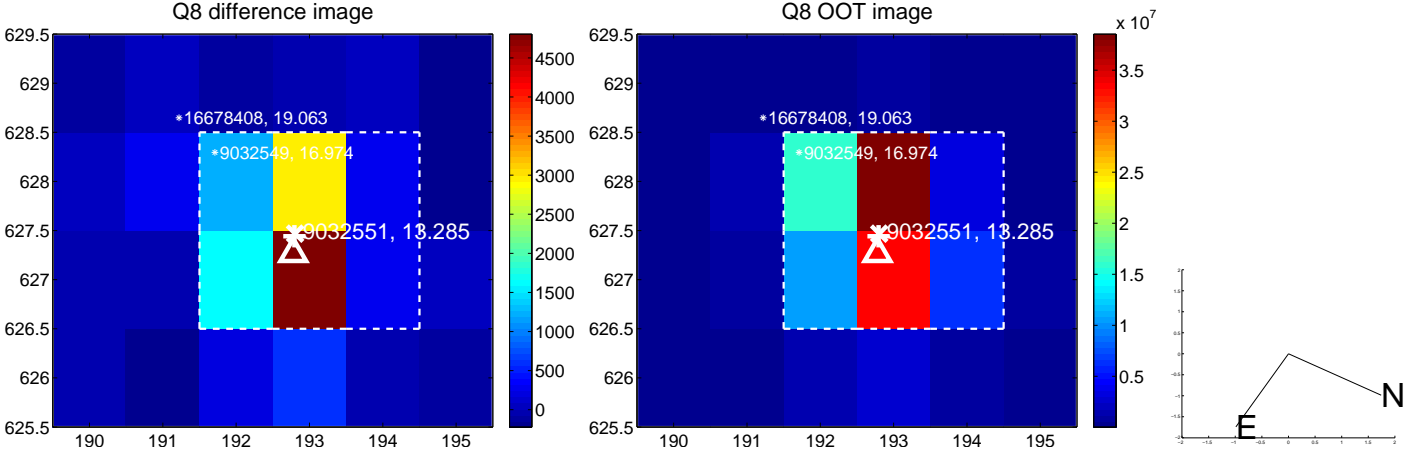
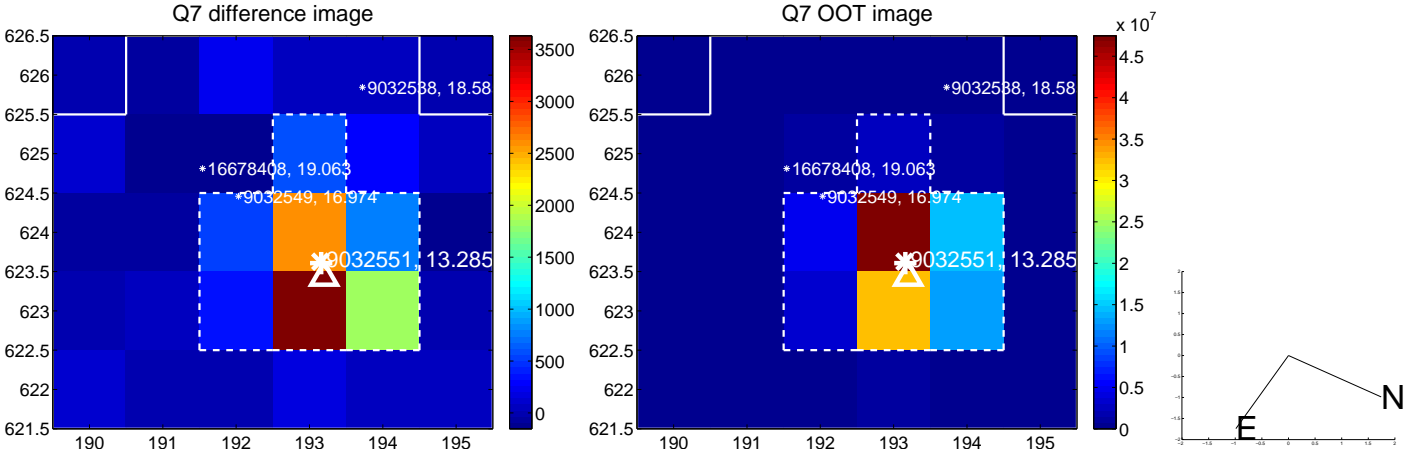
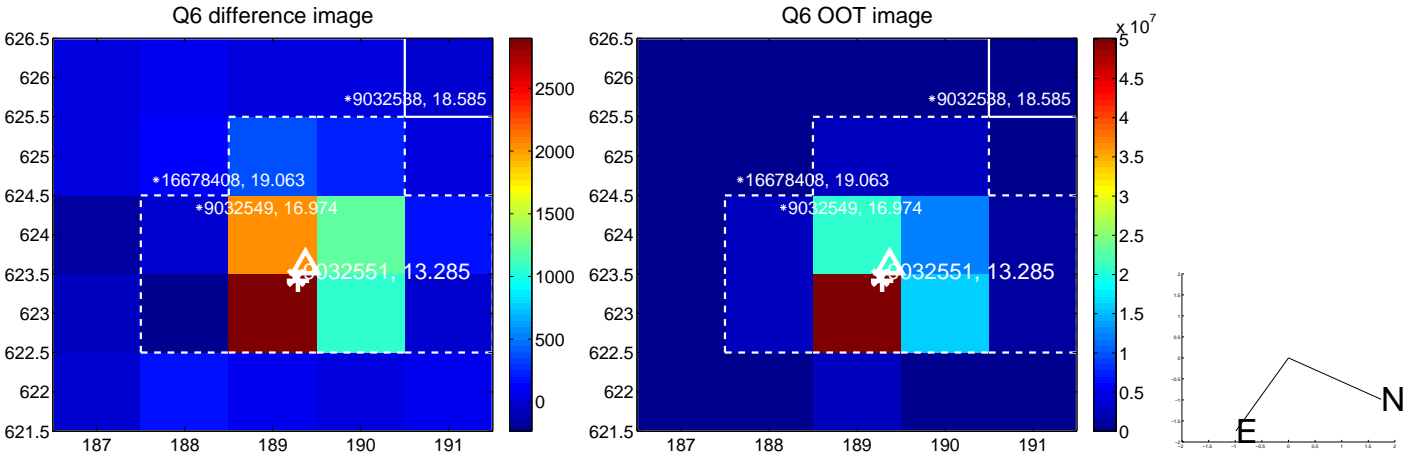
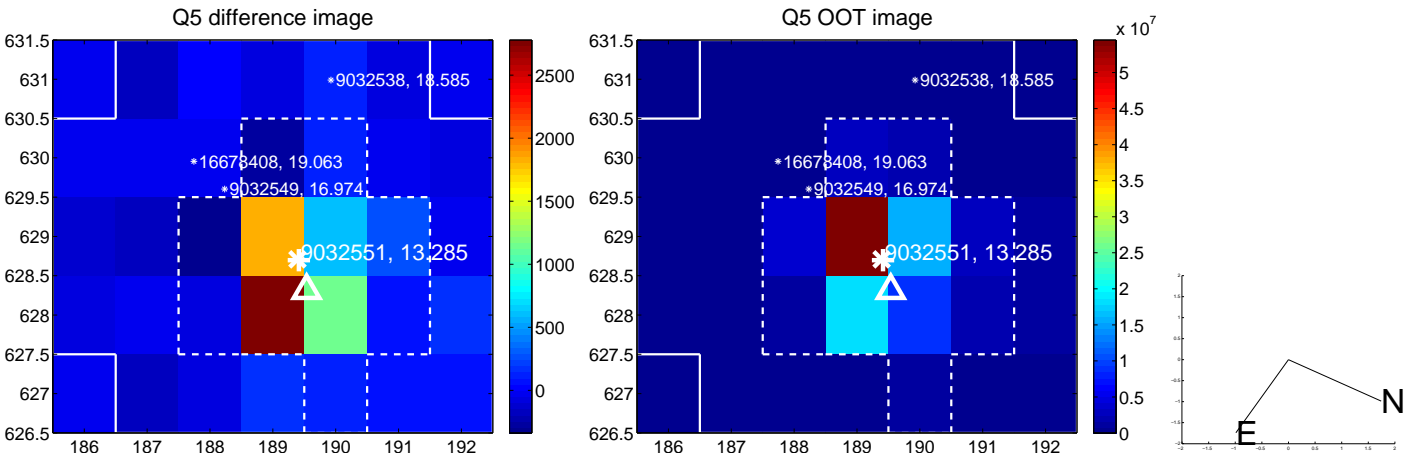


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



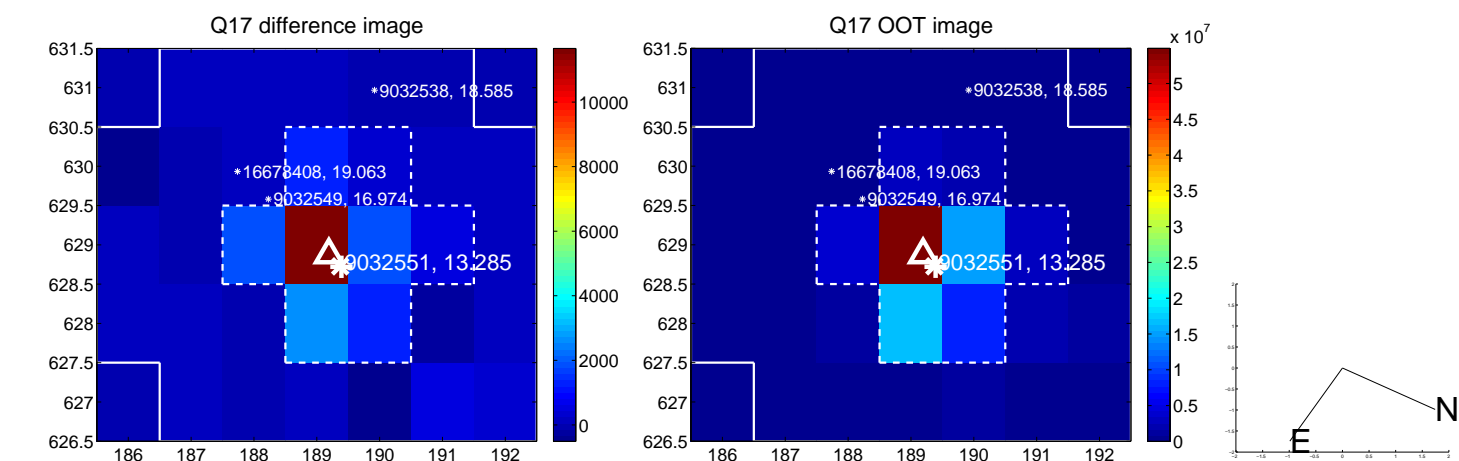
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



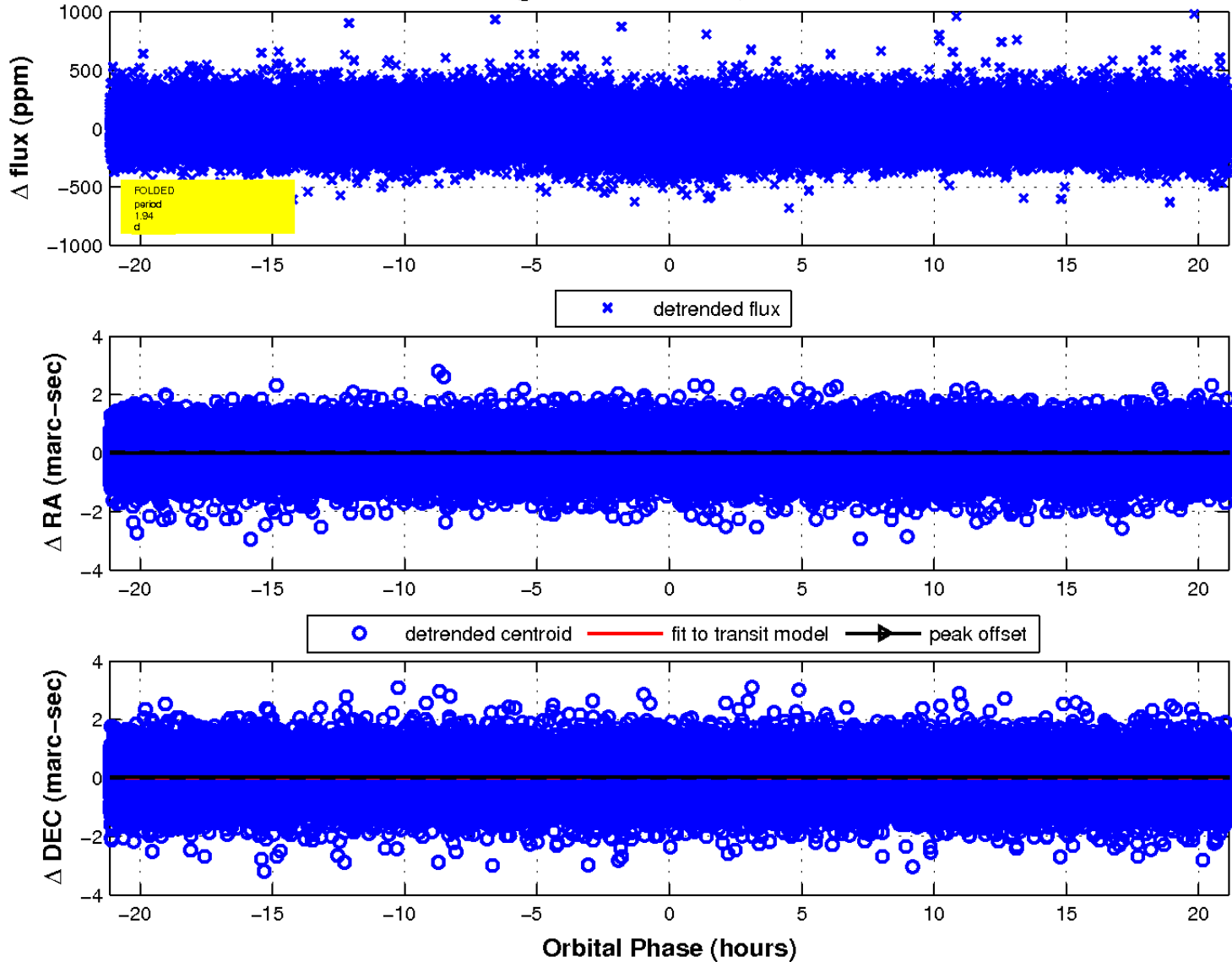




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.

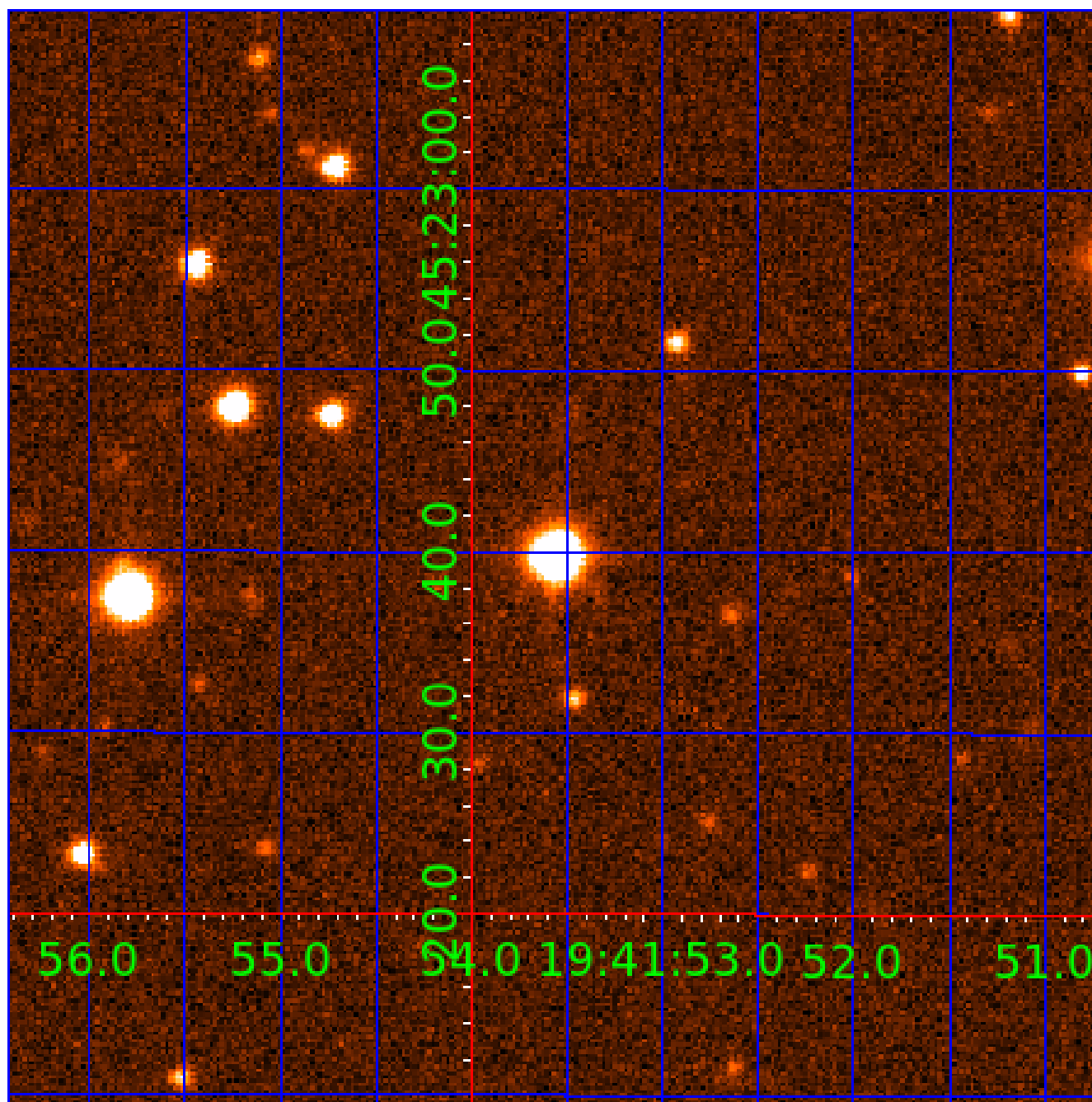


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



# KIC 009032551

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032551-01	OBS	No	1.944770	132.913519	26.3	7.052	13.4	12.7	2.38	7077	1.45	9699.07
009032551-02	OBS	No	3.889898	133.497027	31.0	5.723	10.1	11.3	2.38	7077	1.52	3848.60
009032551-03	OBS	No	3.887031	134.739732	46.3	23.589	8.5	6.4	2.38	7077	1.65	3852.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032551-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
009032551-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009032551-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

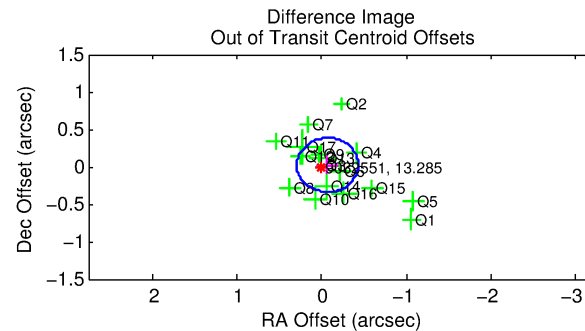
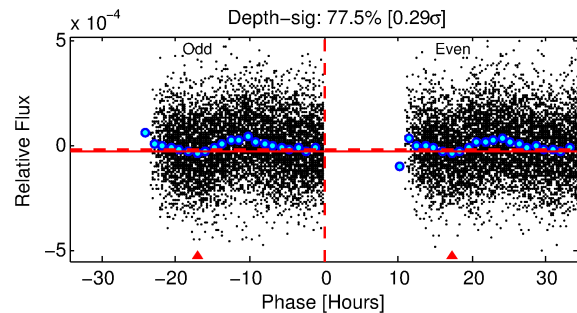
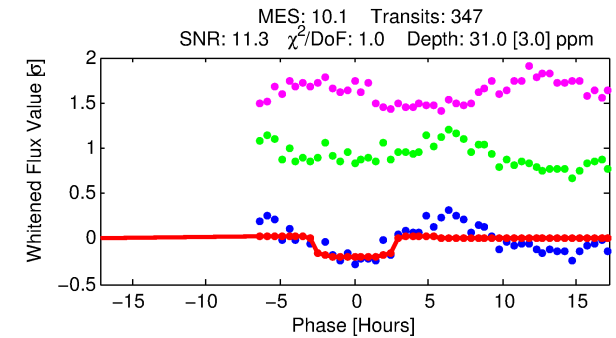
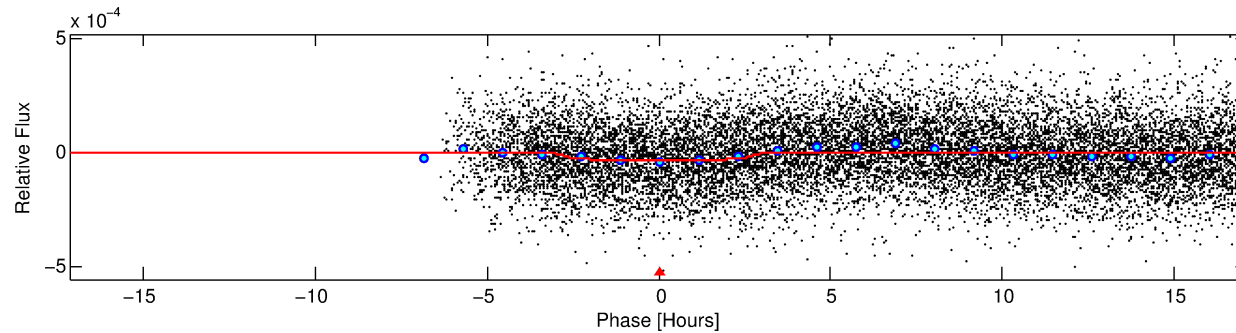
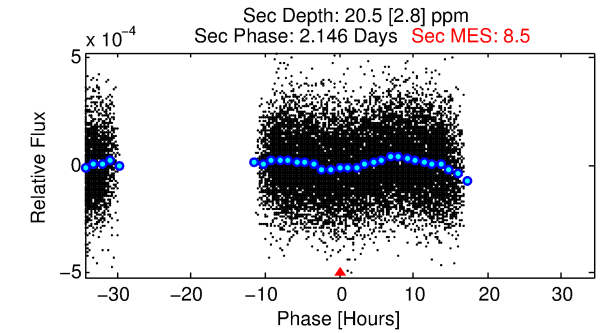
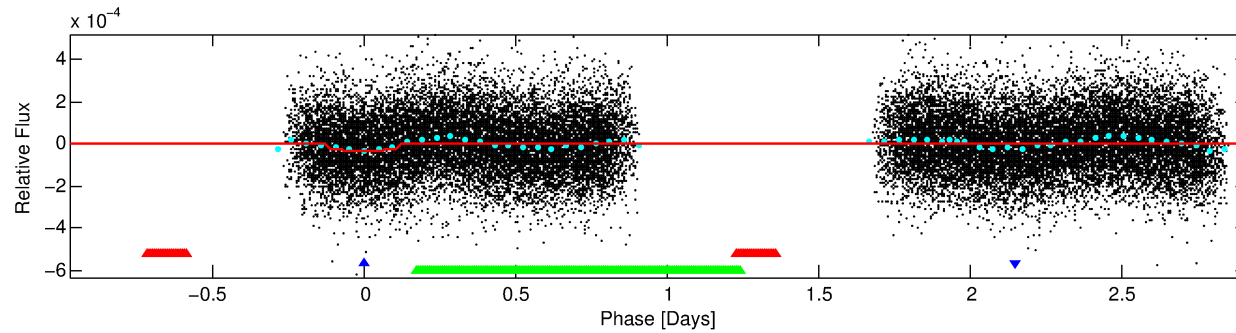
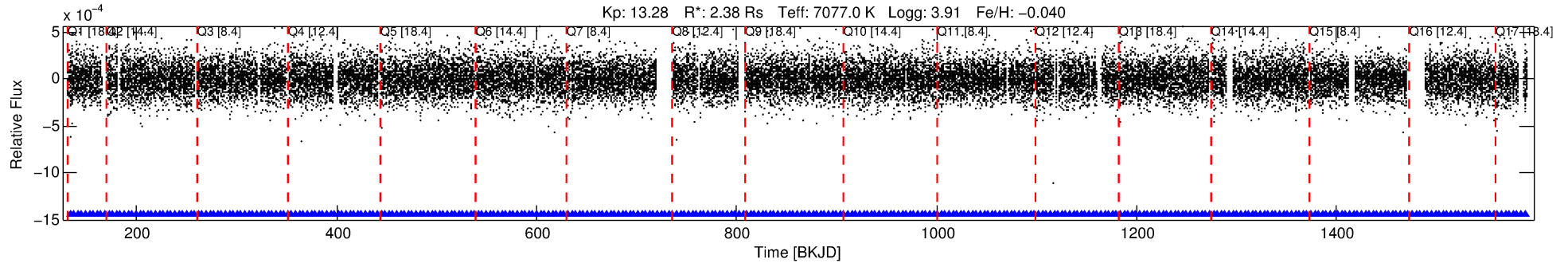
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009032551-02

No Significant Match Found

# DV One-Page Summary

KIC: 9032551 Candidate: 2 of 3 Period: 3.890 d



## DV Fit Results:

Period = 3.88990 [0.00004] d  
Epoch = 133.4970 [0.0061] BKJD  
Rp/R\* = 0.0059 [0.0016]  
a/R\* = 2.62 [3.79]  
b = 0.89 [0.40]  
Seff = 3848.60 [1680.87]  
Teq = 2008 [219] K  
Rp = 1.52 [0.61] Re  
a = 0.0575 [0.0153] AU  
Ag = 16.07 [11.20] [1.35σ]  
Teffp = 6218 [909] K [4.50σ]

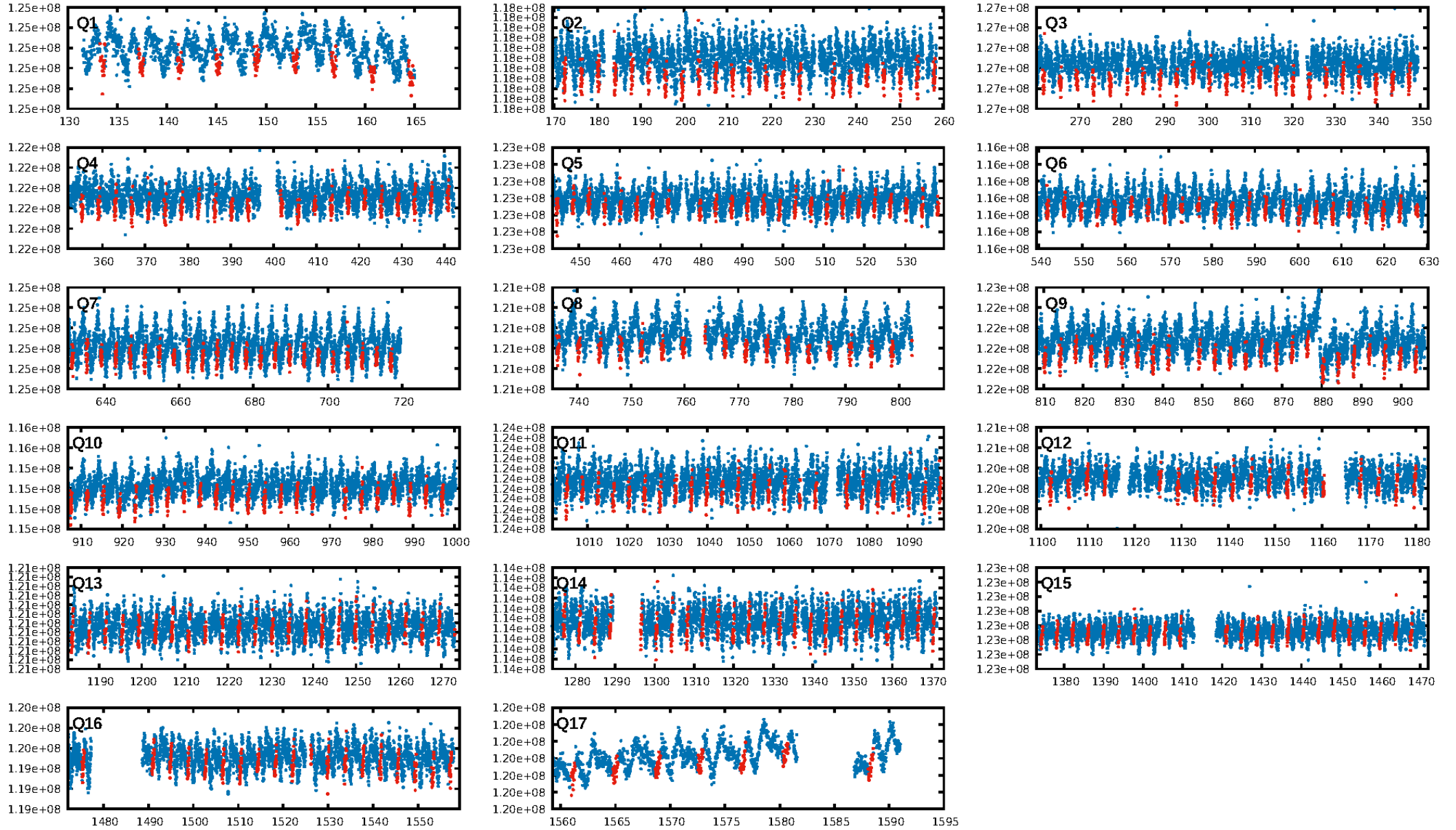
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.39e-22  
RollingBand-fgt: 1.00 [331/331]  
GhostDiagnostic-chr: 0.8519  
Centroid-sig: 3.8%  
Centroid-so: 1.555 arcsec [1.73σ]  
OotOffset-rm: 0.073 arcsec [0.61σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.087 arcsec [0.75σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

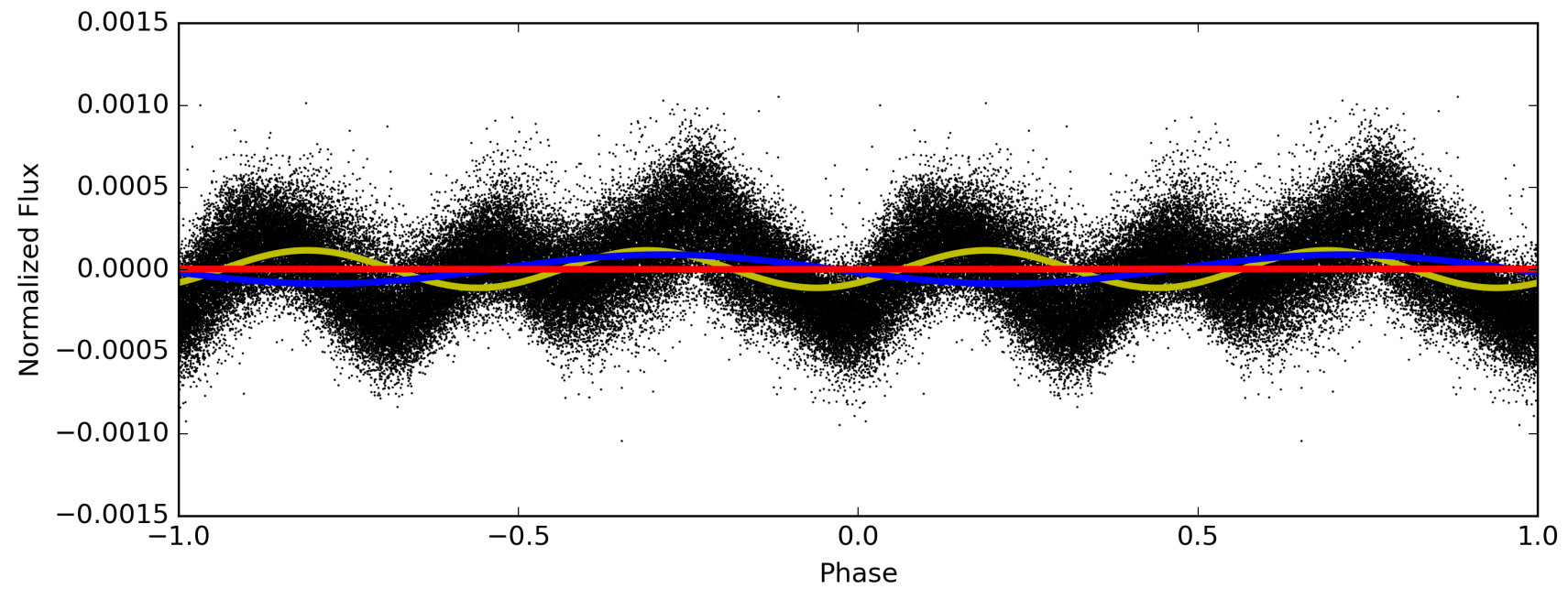
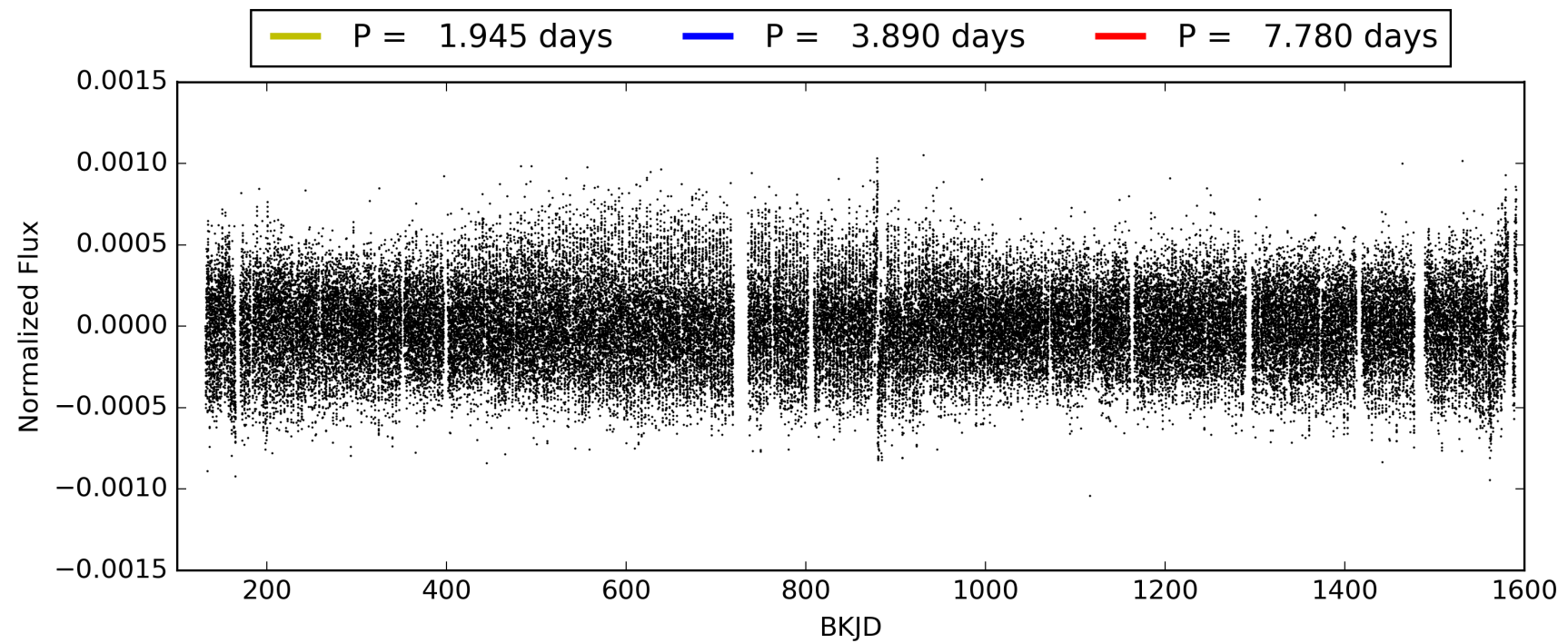
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:44:30 Z

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

# TCE 009032551-02, PDC Light Curves

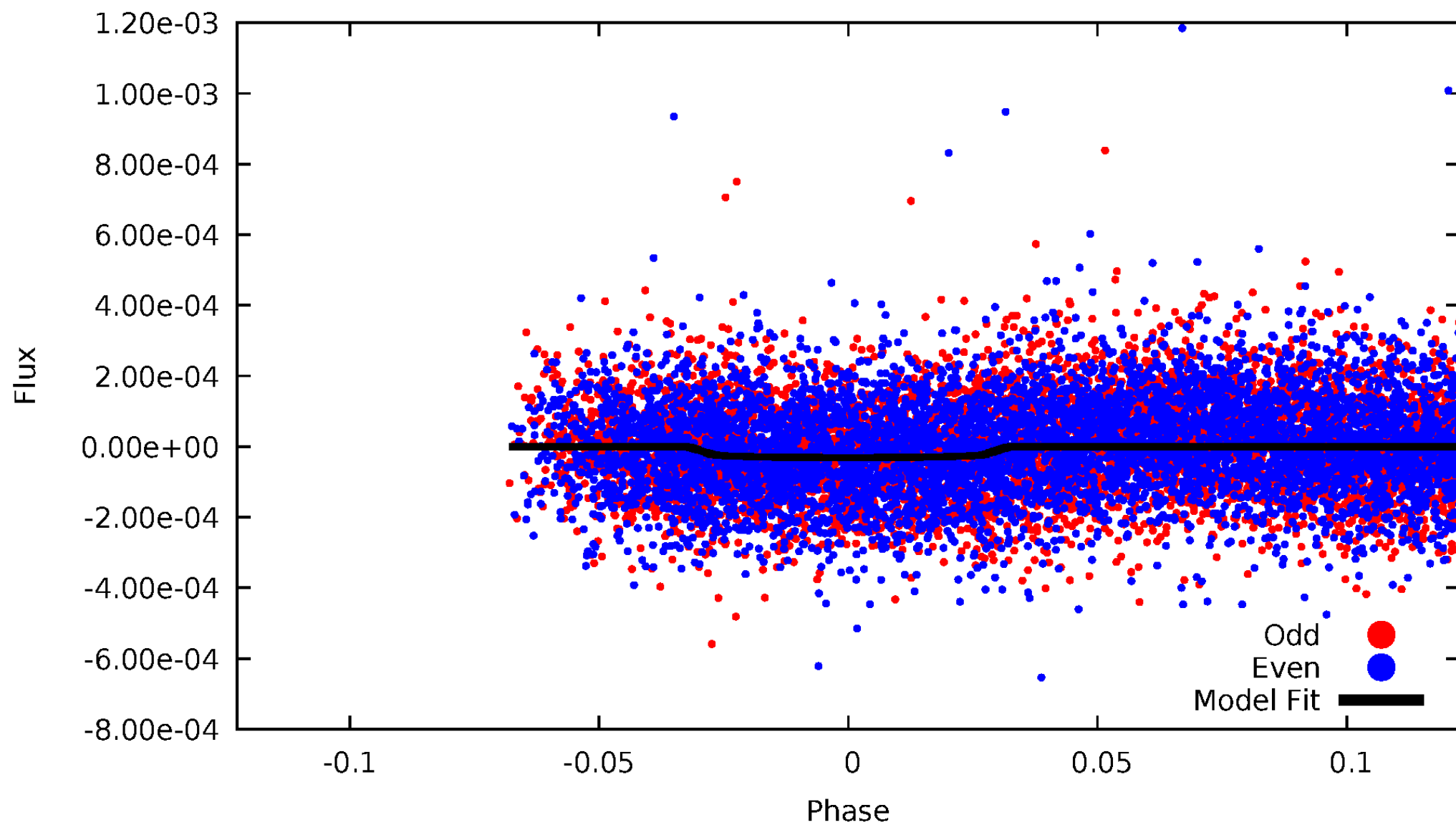


TCE 009032551-02



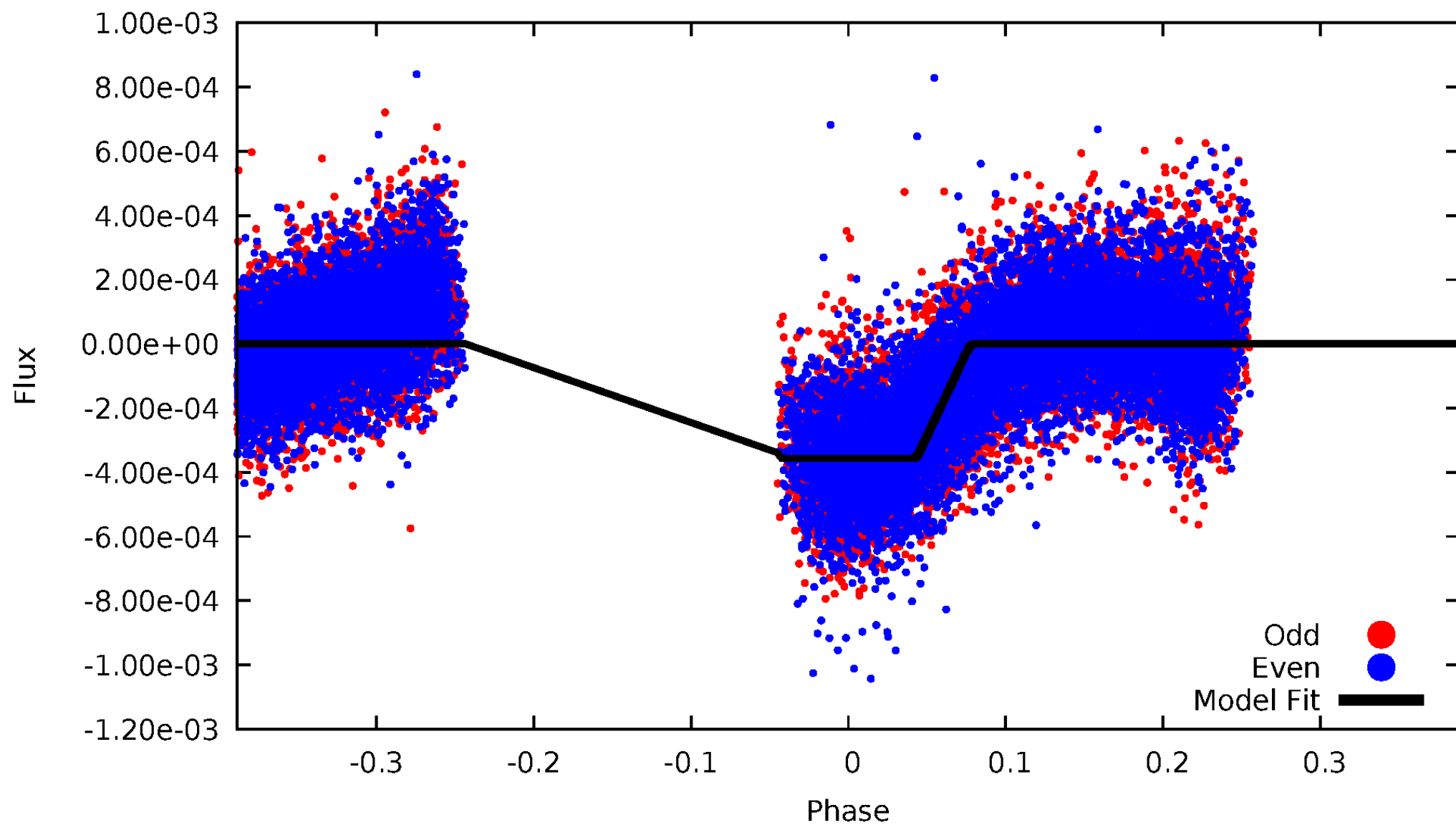
# DV Odd/Even

TCE 009032551-02



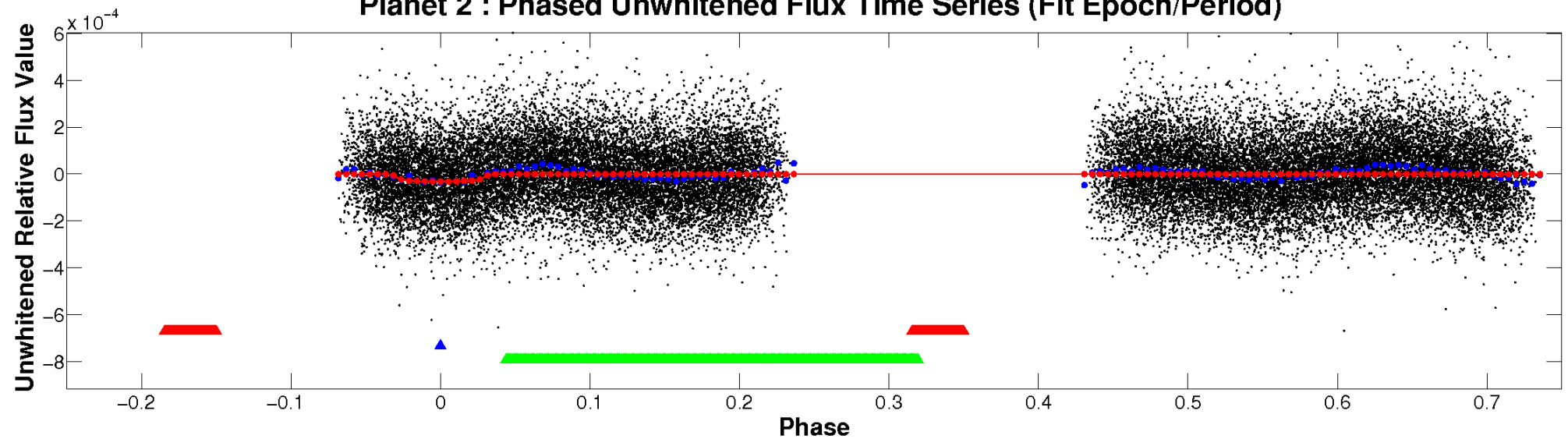
# ALT Odd/Even

TCE 009032551-02

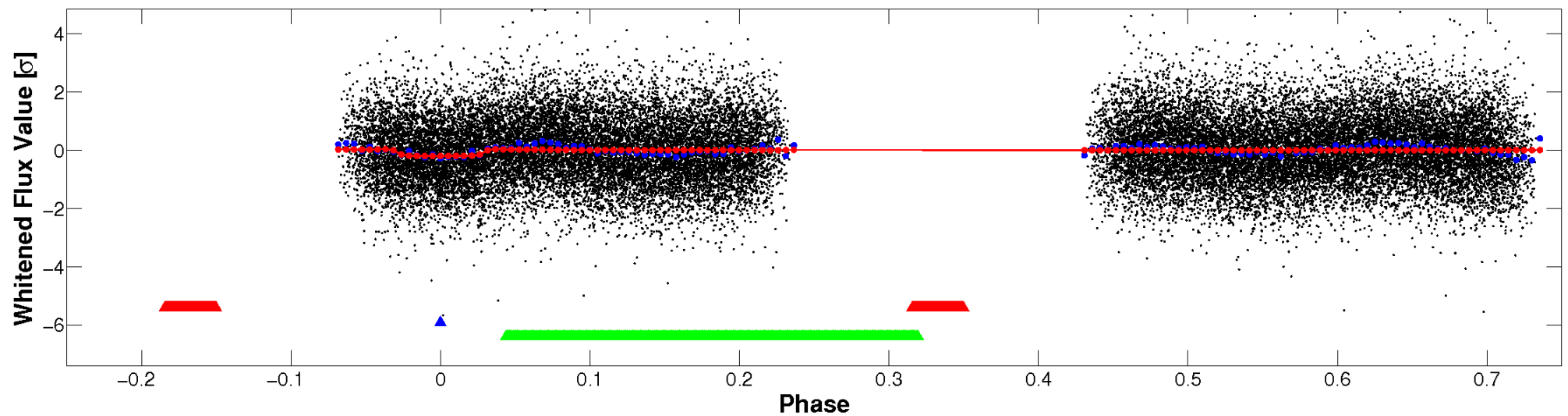


# Non-Whitened Vs. Whitened Light Curve

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

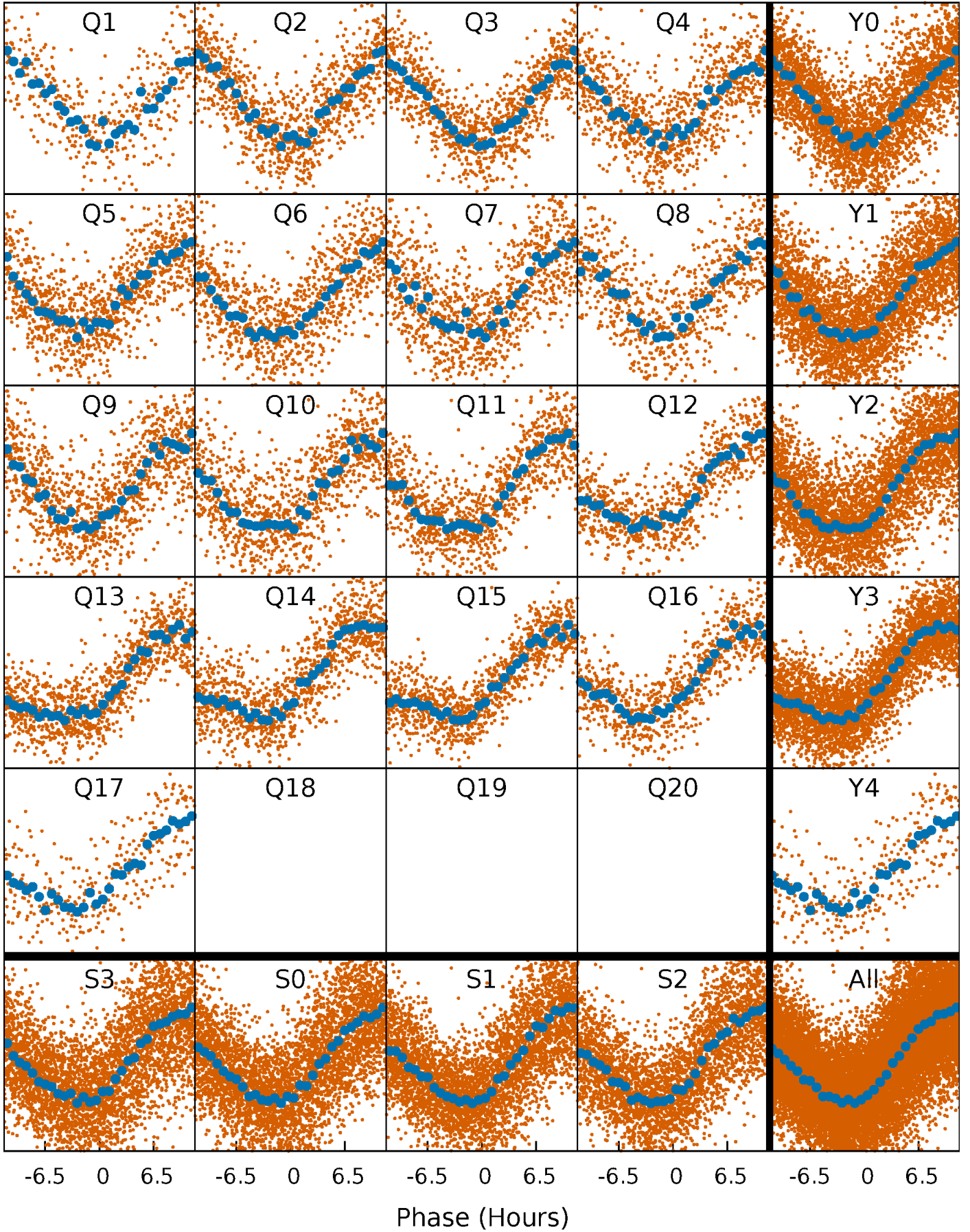


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



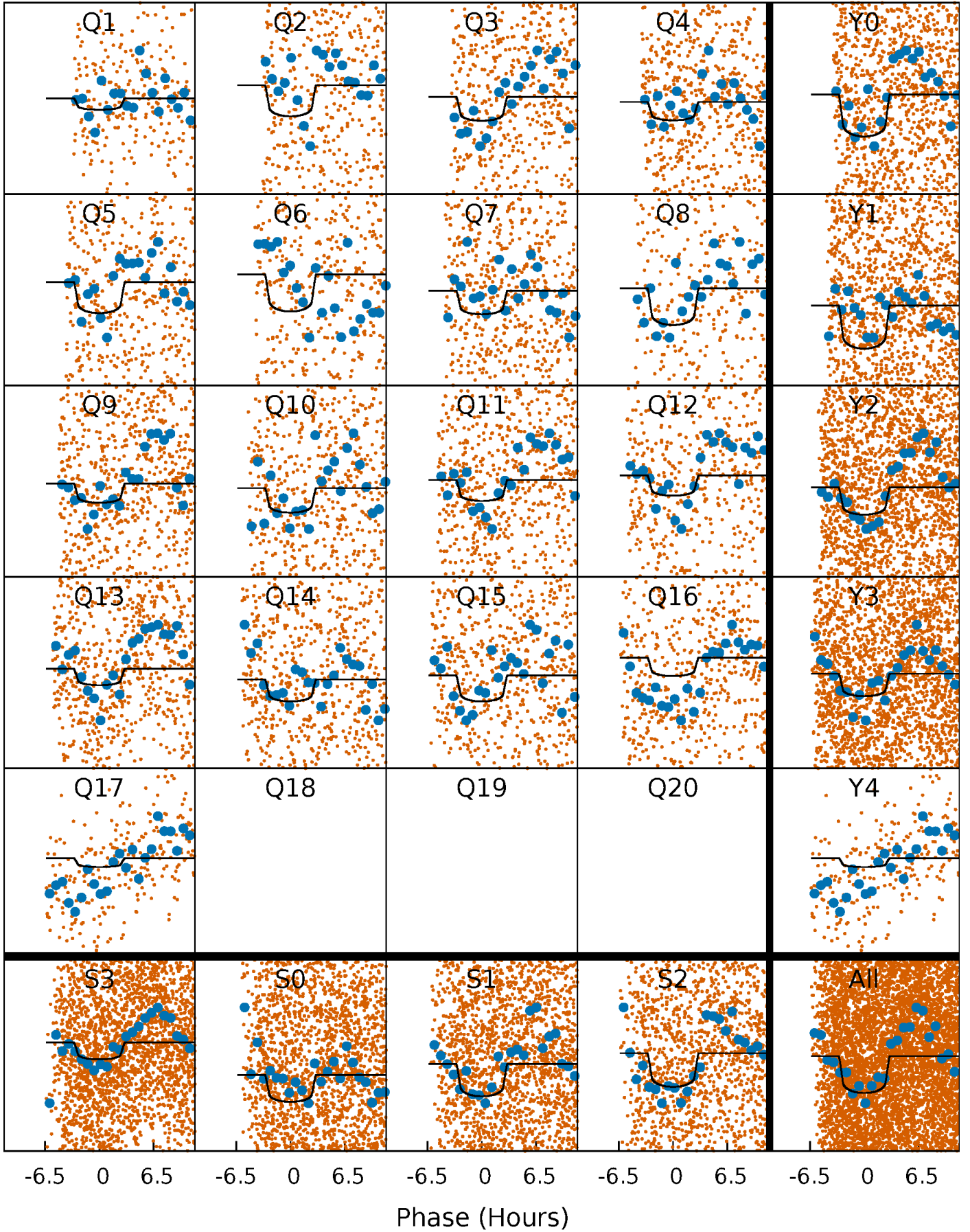
# PDC Quarter-Phased Transit Curves

TCE 009032551-02   P= 3.889898 Days    $T_0=133.497027$  (BKJD)



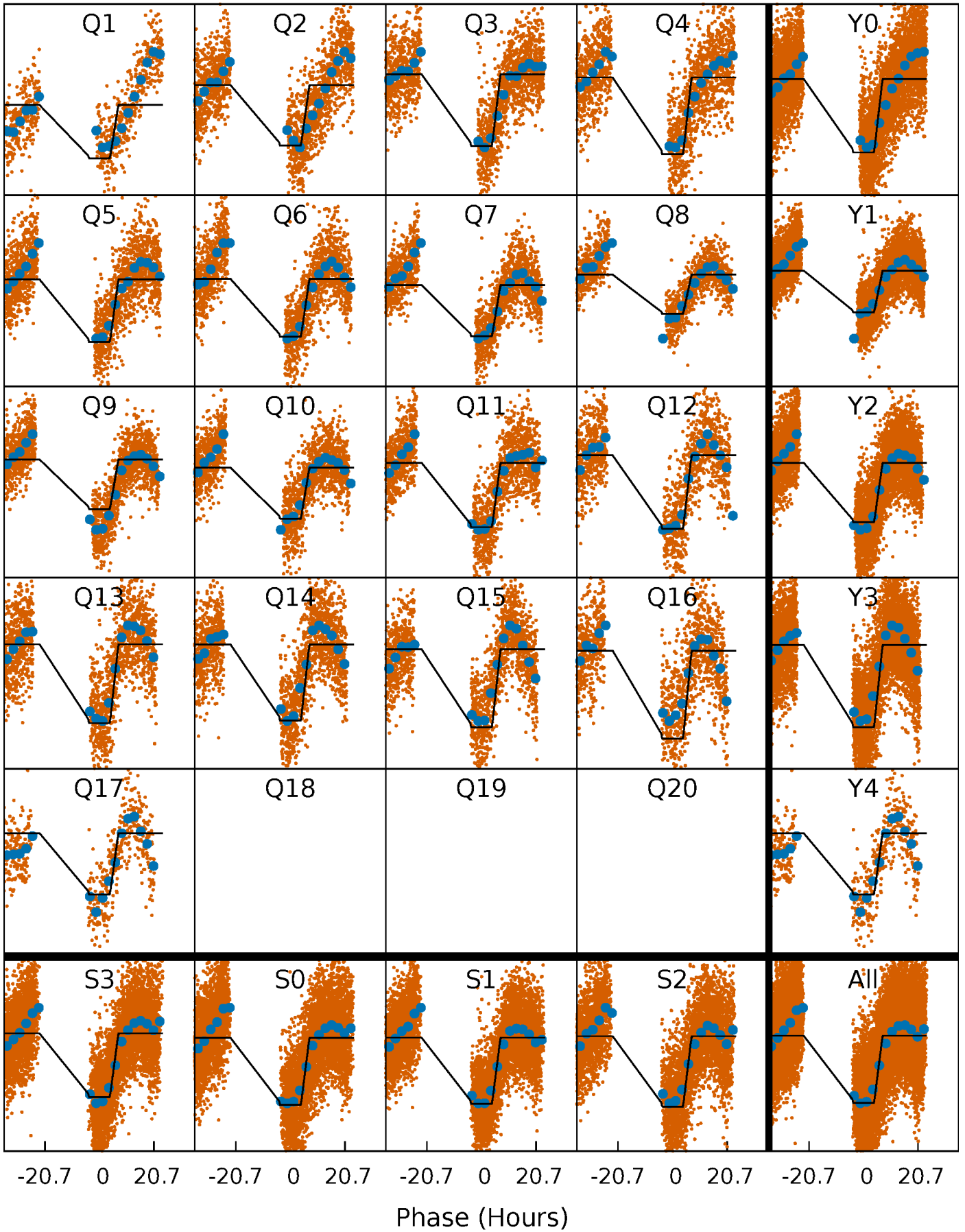
# DV Quarter-Phased Transit Curves

TCE 009032551-02   P= 3.889898 Days    $T_0=133.497027$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

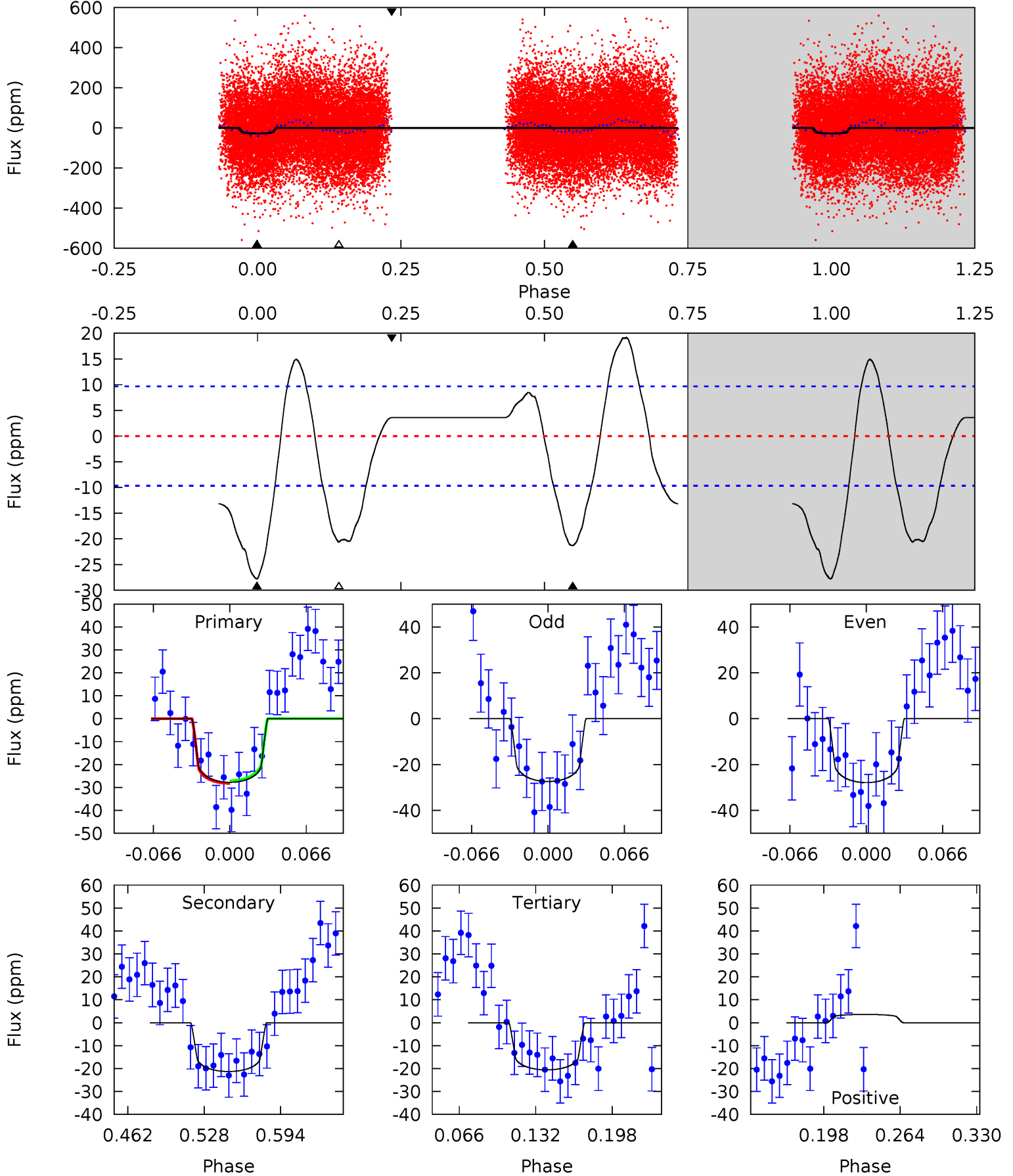
TCE 009032551-02     $P = 3.889905$  Days     $T_0 = 133.404607$  (BKJD)



# DV Model-Shift Uniqueness Test

009032551-02, P = 3.889898 Days, E = 129.607129 Days

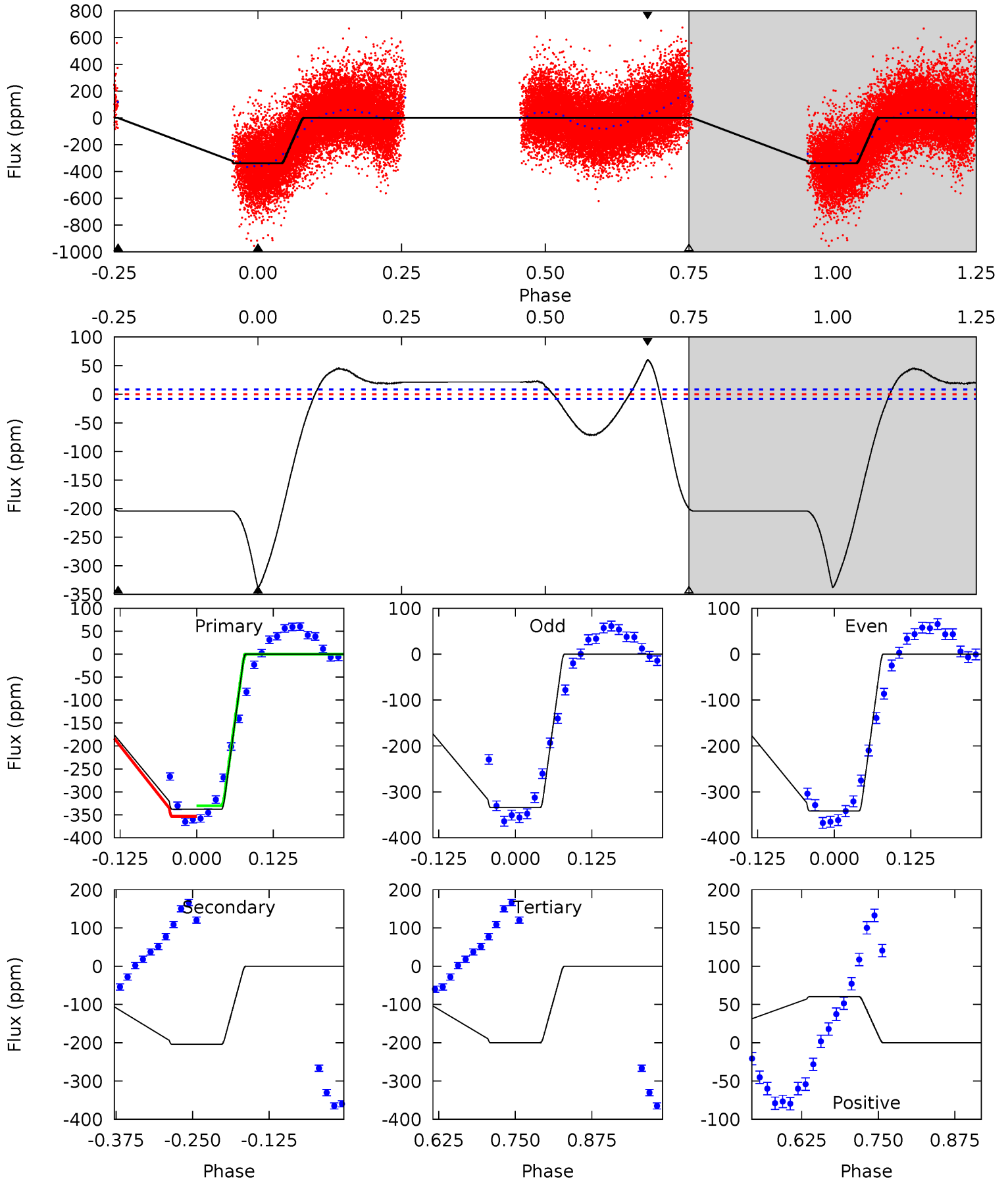
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	10.3	9.92	1.73	4.65	1.84	6.15	3.46	11.7	0.34	8.53	0.12	0.98	0.41	0.27



# Alt Model-Shift Uniqueness Test

009032551-02, P = 3.889905 Days, E = 129.514702 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
184.3	111.3	109.0	32.9	4.52	1.53	27.7	75.3	151.5	2.28	78.5	2.02	1.00	0.15	5.10



### Stellar Parameters For KIC 009032551

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7077^{+197}_{-271}$	$3.909^{+0.234}_{-0.126}$	$-0.040^{+0.250}_{-0.300}$	$2.379^{+0.466}_{-0.698}$	$1.674^{+0.162}_{-0.324}$	$0.175^{+0.241}_{-0.064}$
	+3%/-4%	+6%/-3%	+625%/-750%	+20%/-29%	+10%/-19%	+138%/-37%
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 009032551-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-21 \pm 2$	$1.46^{+0.50}_{-0.46}$	$2777^{+175}_{-214}$	$6222^{+1354}_{-742}$	$18^{+20}_{-8}$
Alt.	$-204 \pm 2$	$4.78^{+0.71}_{-0.81}$	$2779^{+186}_{-207}$	$6080^{+345}_{-280}$	$16^{+6}_{-4}$

$T_{\text{max}}$  = 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

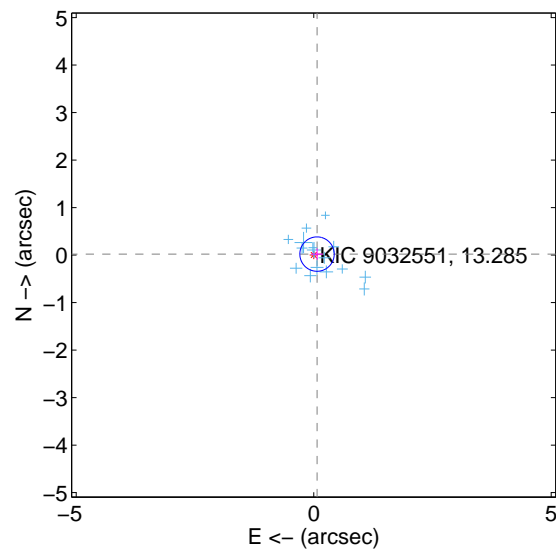
Supplemental centroid analysis for 009032551-02. Kepler magnitude: 13.29. Transit SNR 11.32

There are 17 quarters with good PRF difference image offsets

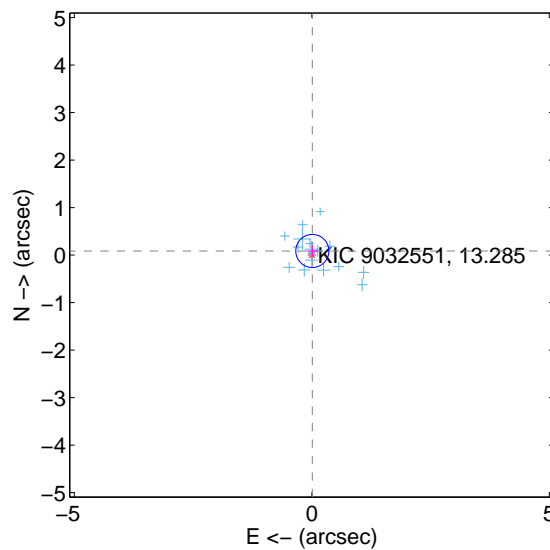
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.073 \pm 0.121$	0.61	$-0.070 \pm 0.121$	$0.021 \pm 0.117$
PRF-fit source offset from KIC position	$0.087 \pm 0.116$	0.75	$-0.011 \pm 0.119$	$0.087 \pm 0.116$
photometric centroid source offset	$1.56 \pm 0.90$	1.73	$-1.35 \pm 0.87$	$0.77 \pm 0.96$

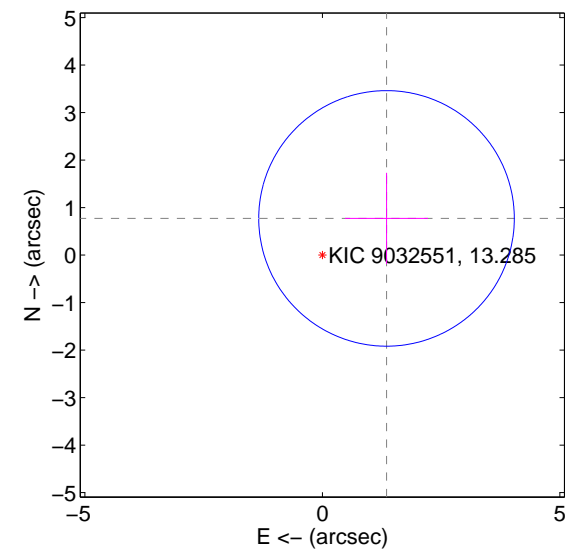
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

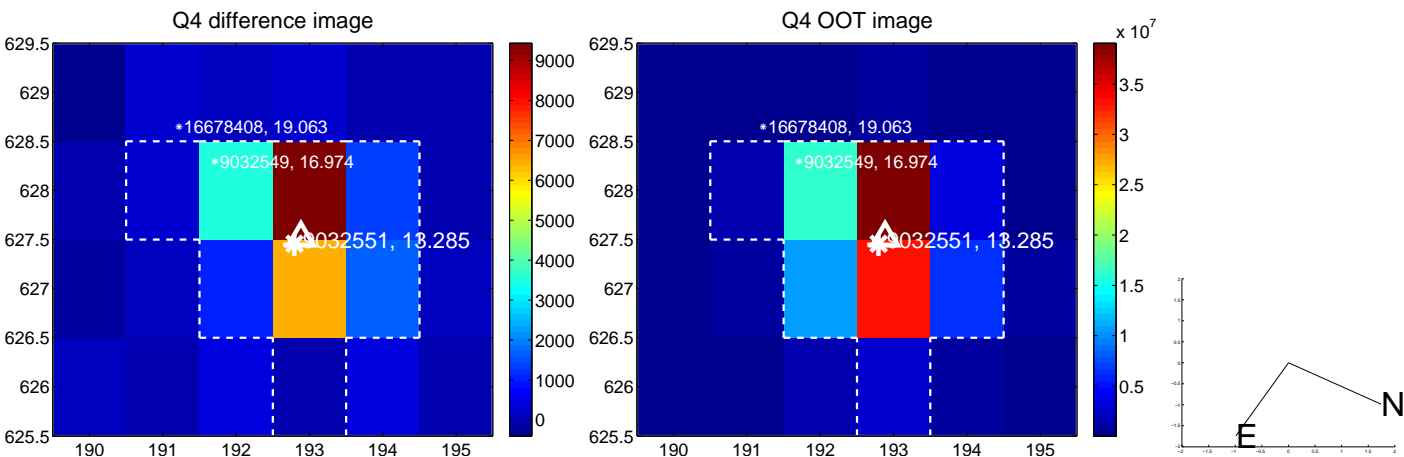
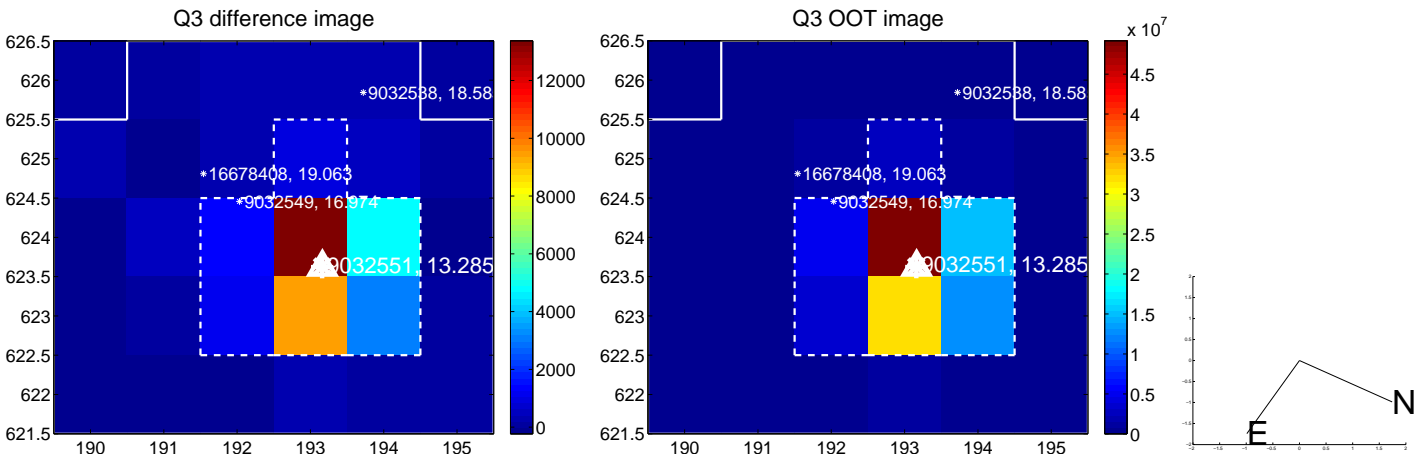
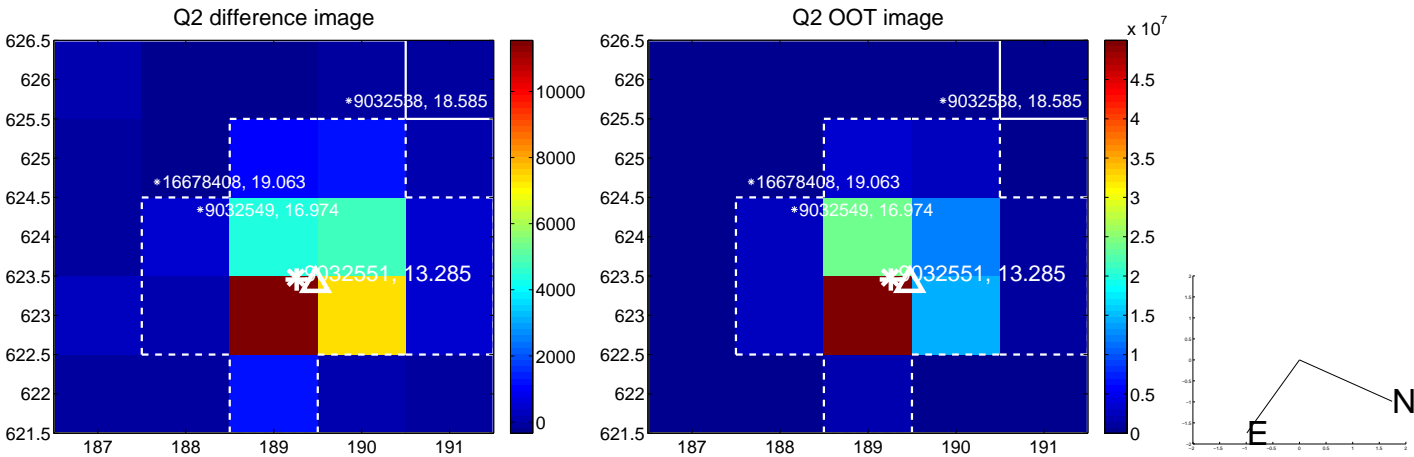
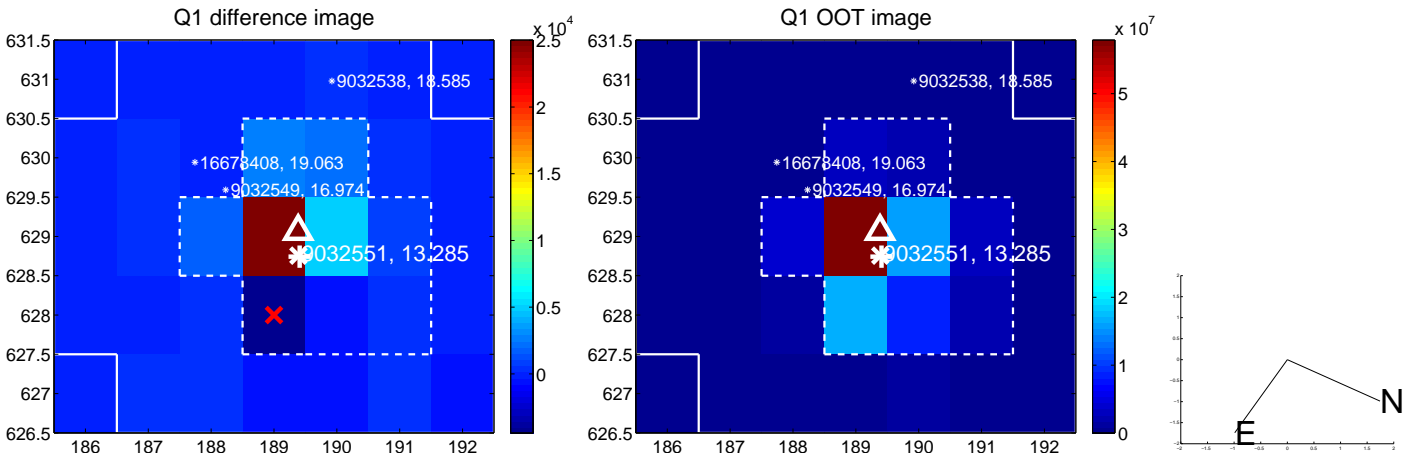


offset from photometric centroids

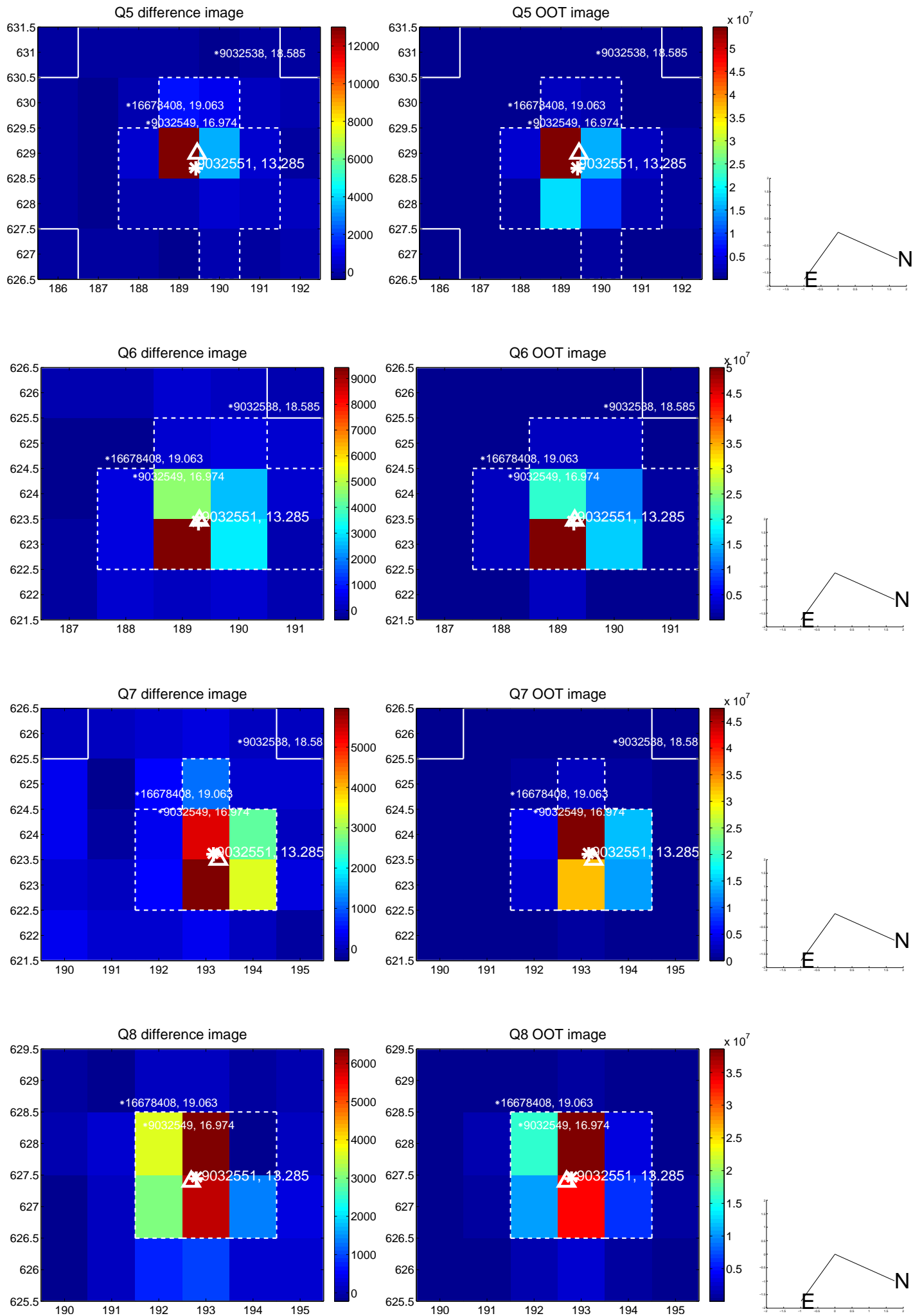


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

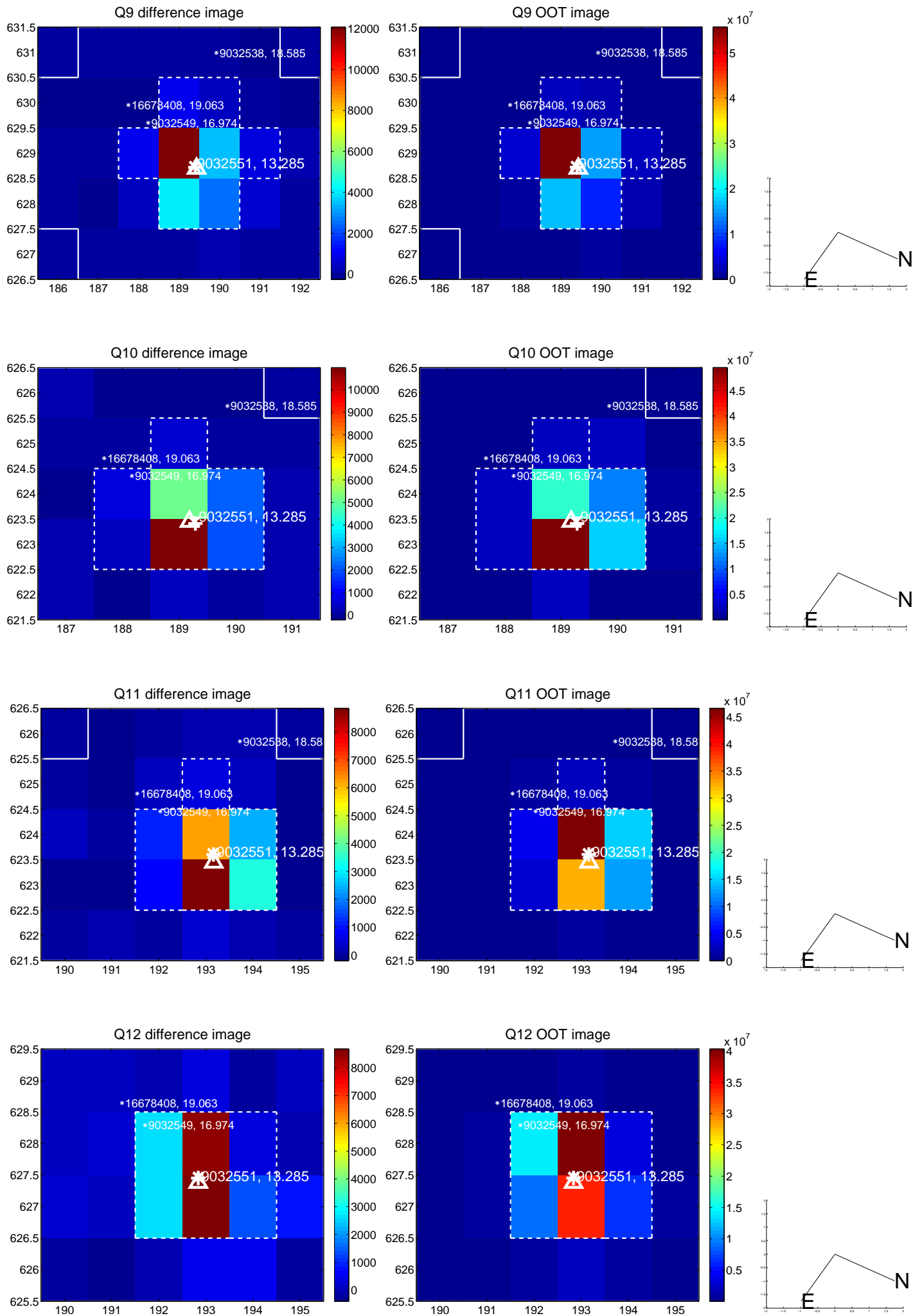
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



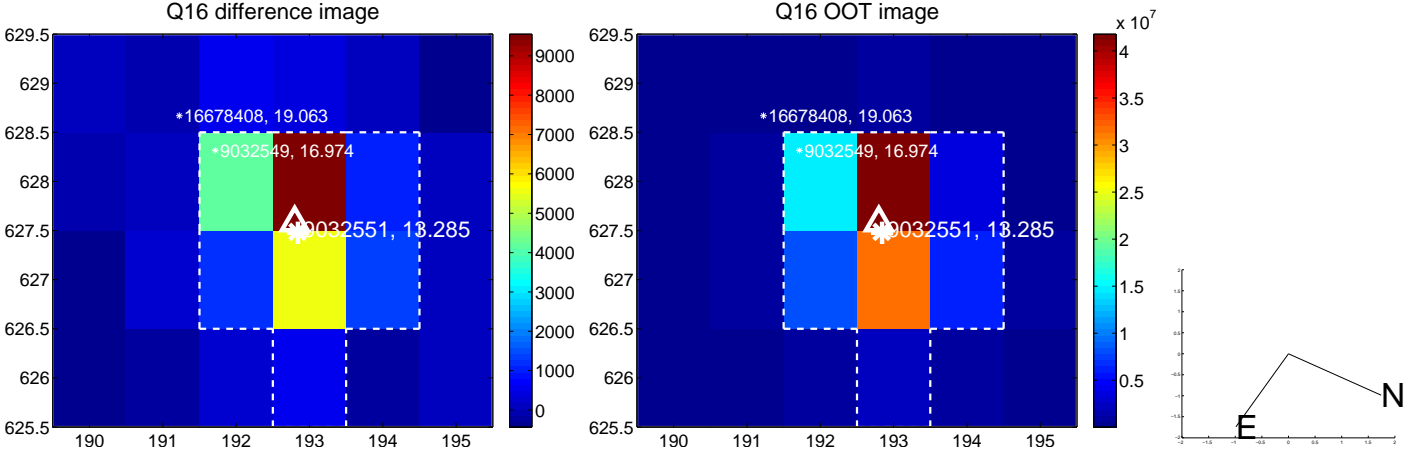
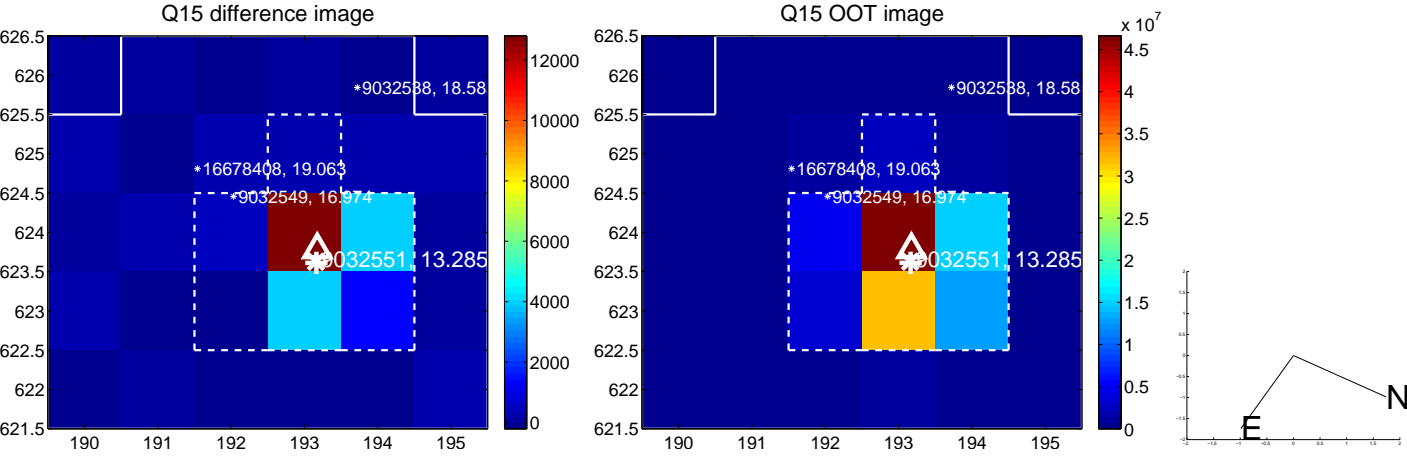
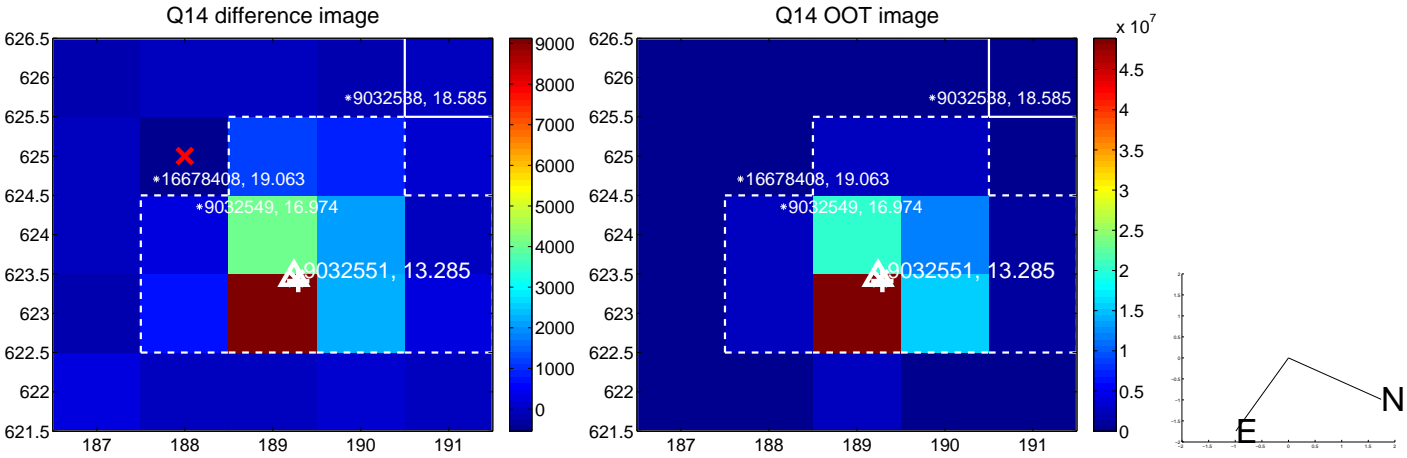
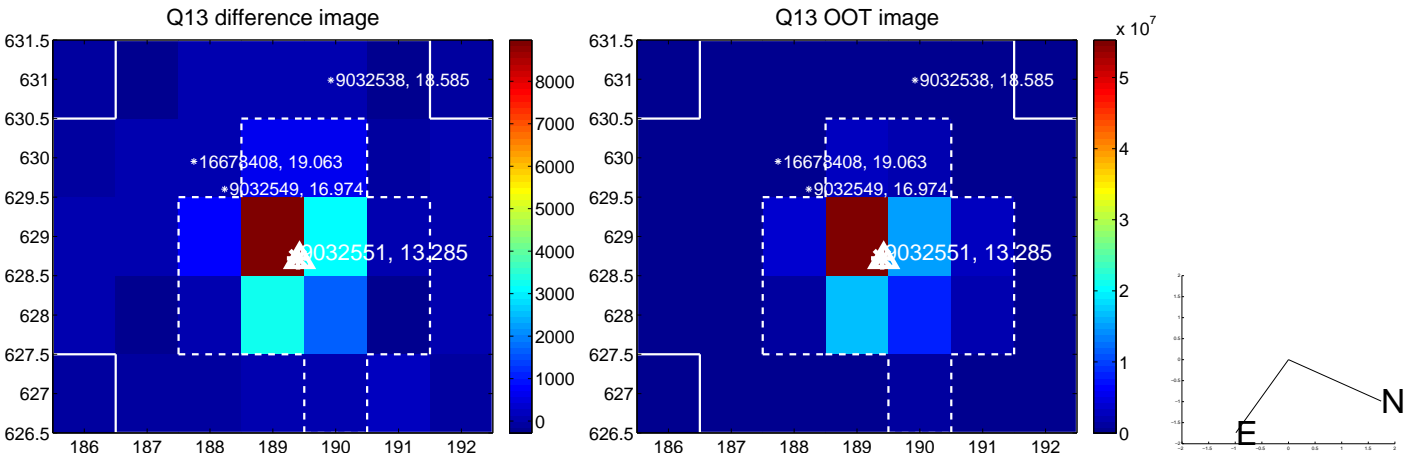
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



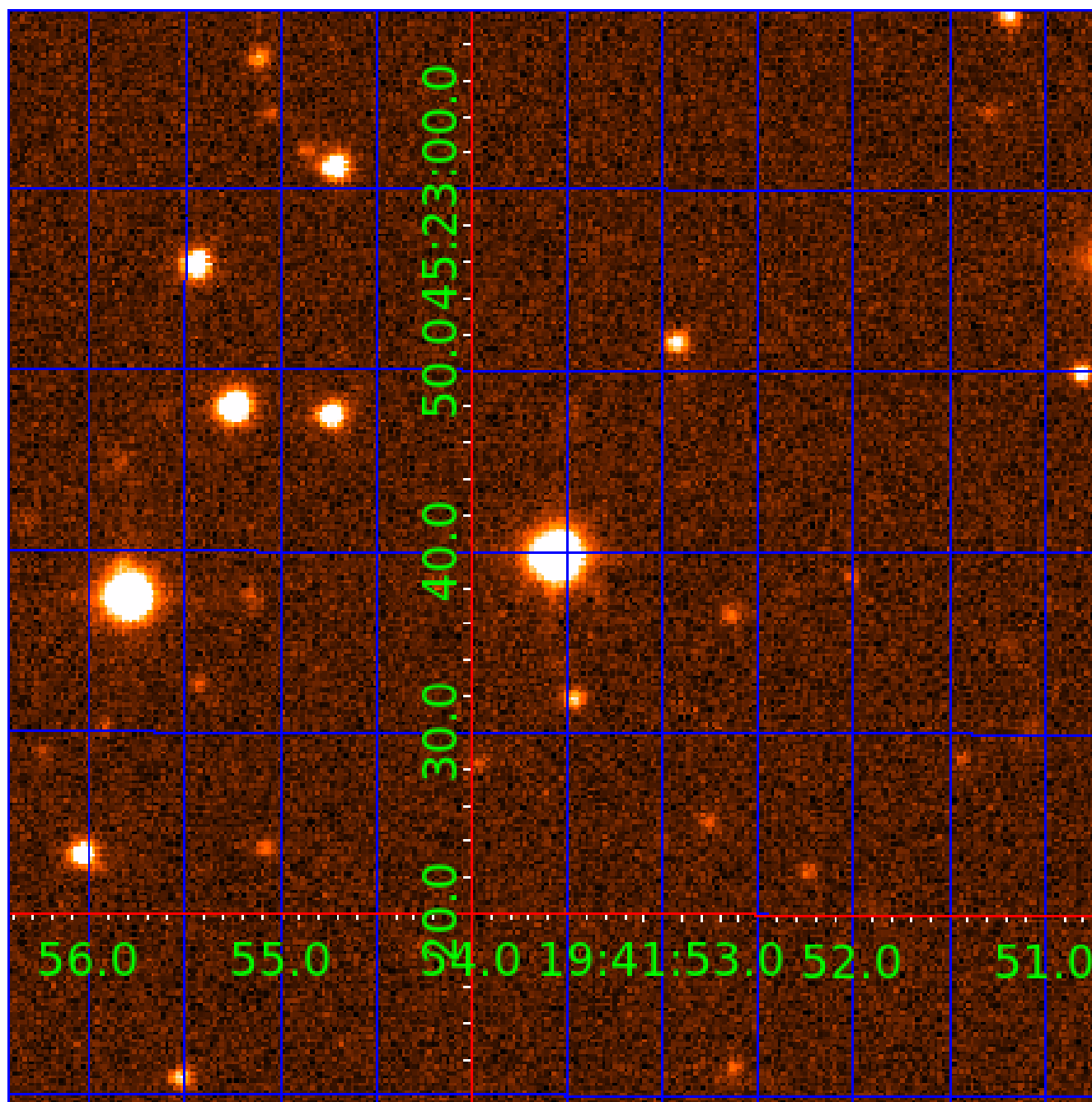
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009032551

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032551-01	OBS	No	1.944770	132.913519	26.3	7.052	13.4	12.7	2.38	7077	1.45	9699.07
009032551-02	OBS	No	3.889898	133.497027	31.0	5.723	10.1	11.3	2.38	7077	1.52	3848.60
009032551-03	OBS	No	3.887031	134.739732	46.3	23.589	8.5	6.4	2.38	7077	1.65	3852.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032551-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
009032551-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
009032551-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT

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

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

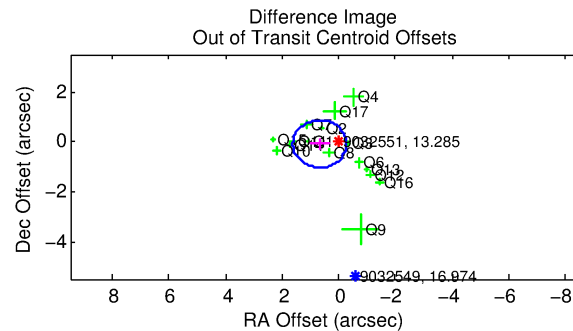
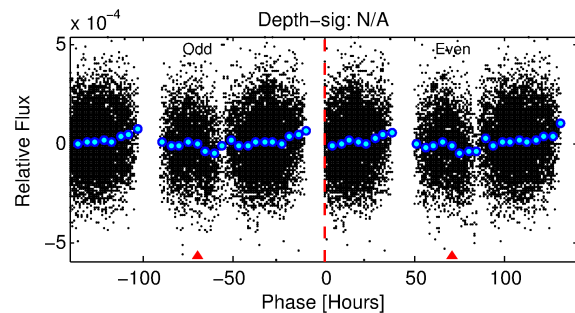
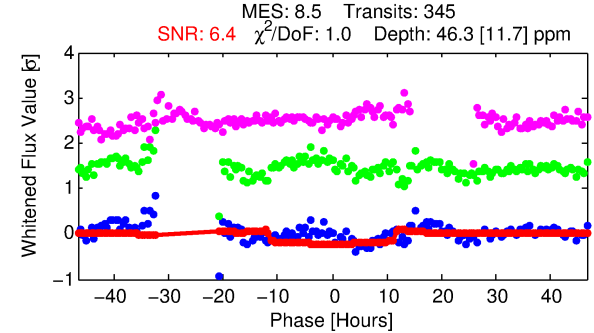
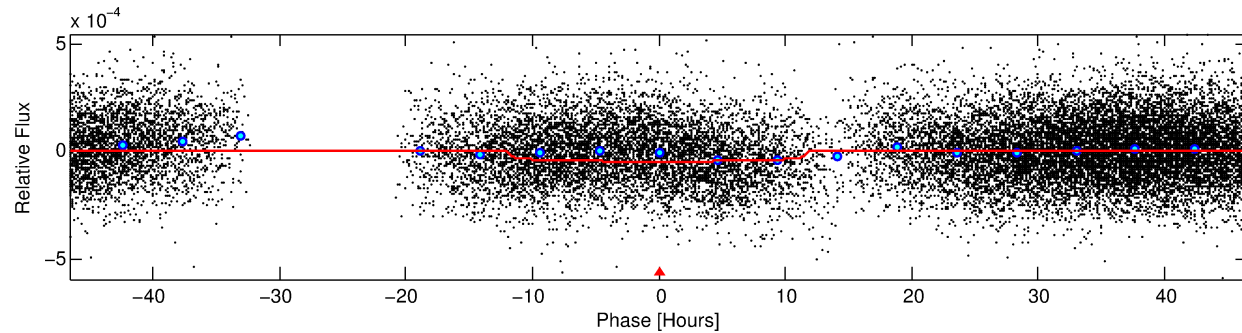
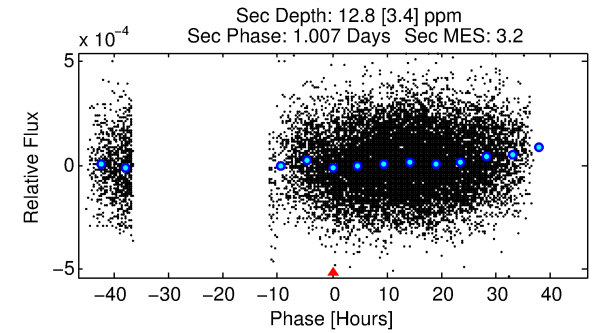
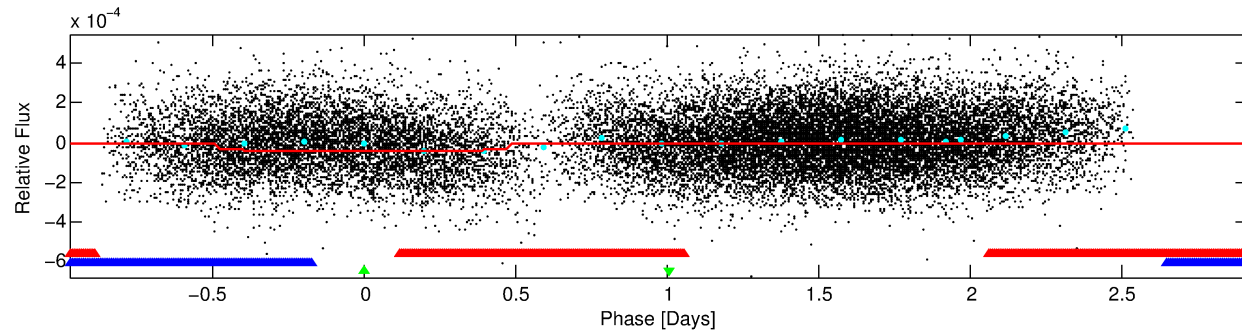
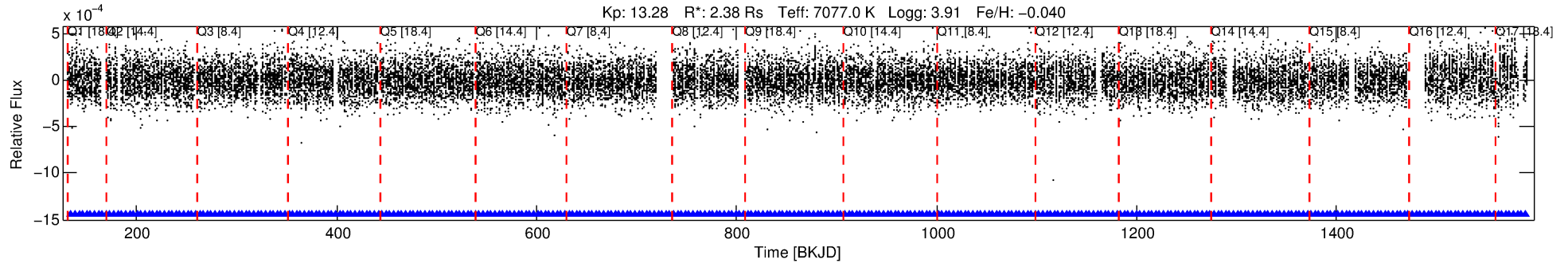
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009032551-03

No Significant Match Found

# DV One-Page Summary

KIC: 9032551 Candidate: 3 of 3 Period: 3.887 d



## DV Fit Results:

Period = 3.88703 [0.00009] d  
Epoch = 134.7397 [0.0952] BKJD  
Rp/R\* = 0.0063 [0.0094]  
a/R\* = 1.38 [5.90]  
b = 0.29 [27.89]  
Seff = 3852.39 [1682.52]  
Teq = 2009 [219] K  
Rp = 1.65 [2.48] Re  
a = 0.0575 [0.0153] AU  
Ag = 8.53 [25.57] [0.29σ]  
Teffp = 5308 [3946] K [0.83σ]

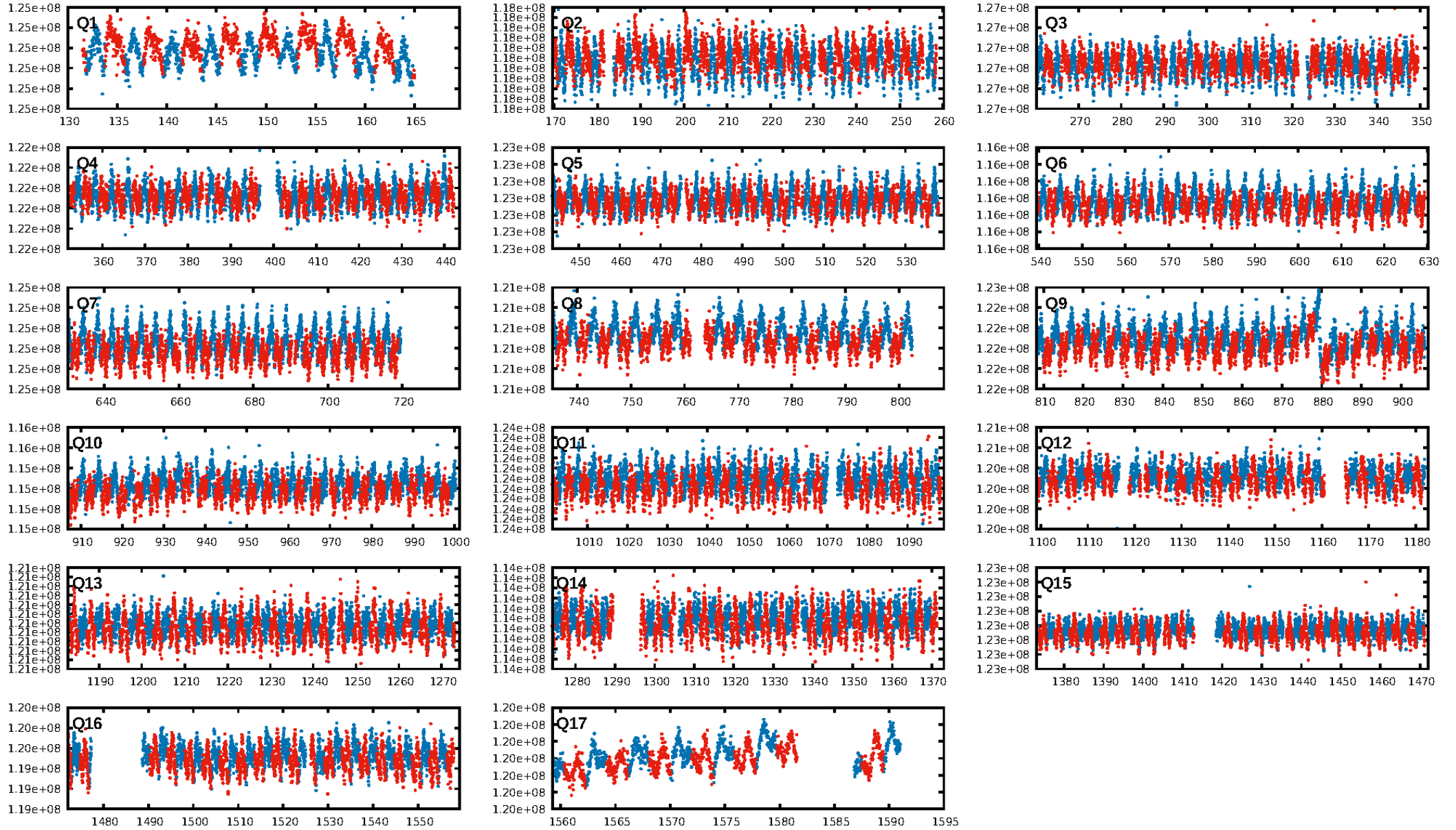
## DV Diagnostic Results:

ShortPeriod-sig: 94.2% [1.89σ]  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: 99.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 5.02e-17  
RollingBand-fgt: 1.00 [330/330]  
GhostDiagnostic-chr: 9.243  
Centroid-sig: 0.9%  
Centroid-so: 0.660 arcsec [1.91σ]  
OotOffset-rm: 0.687 arcsec [2.17σ]  
KicOffset-rm: 0.729 arcsec [2.26σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.19 [3/16]  
DiffImageOverlap-fno: 0.00 [0/17]

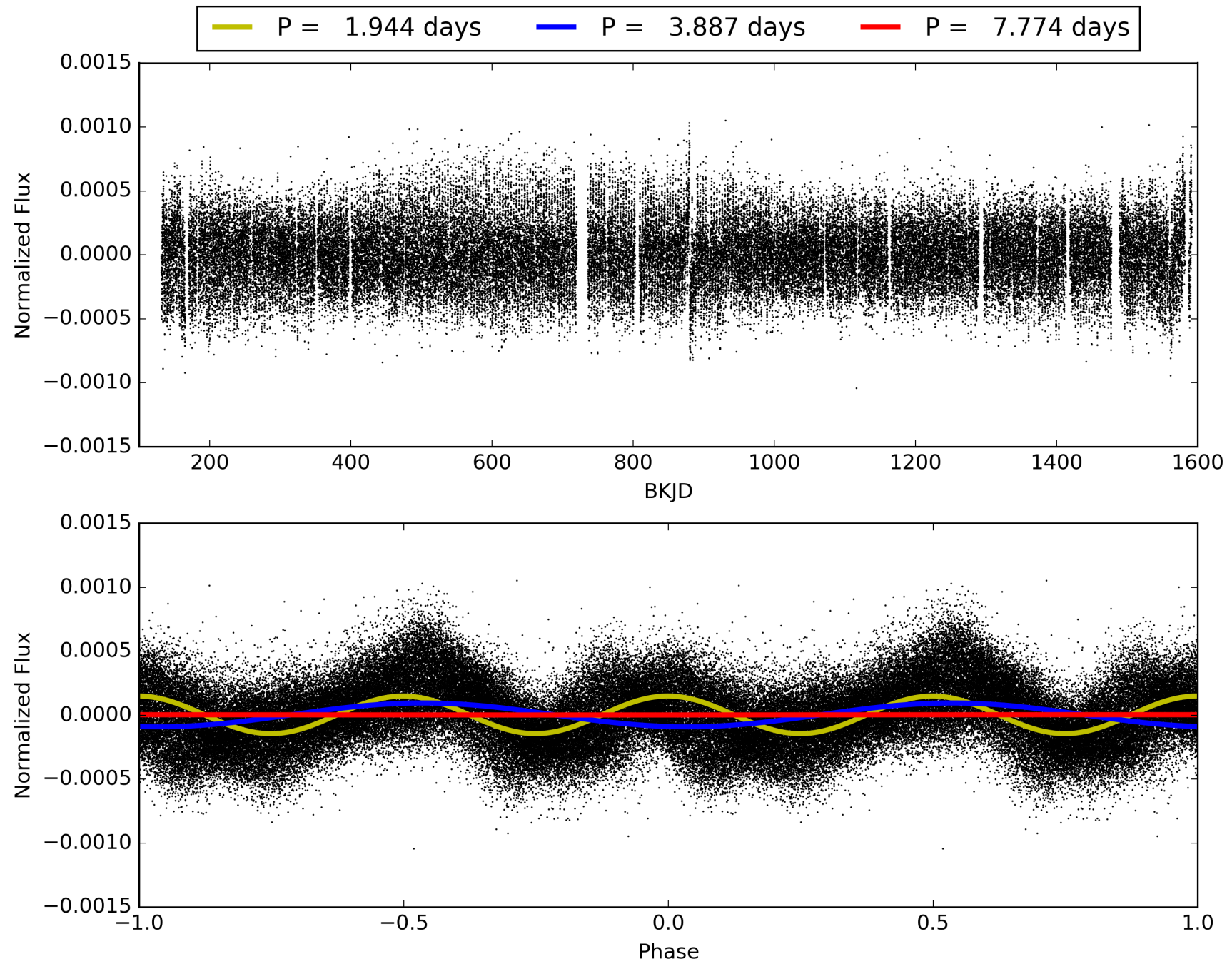
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:44:40 Z

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

# TCE 009032551-03, PDC Light Curves

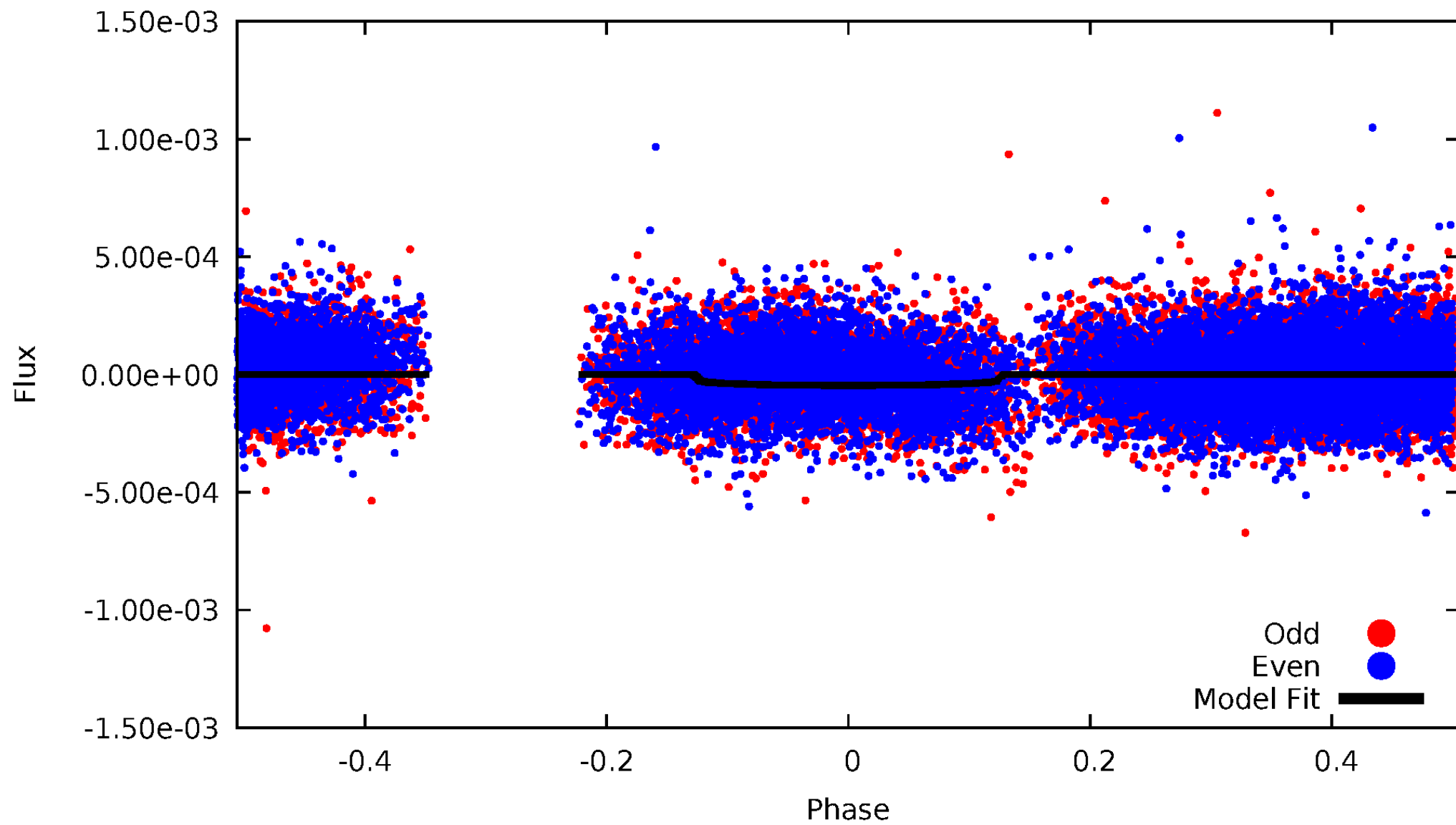


TCE 009032551-03



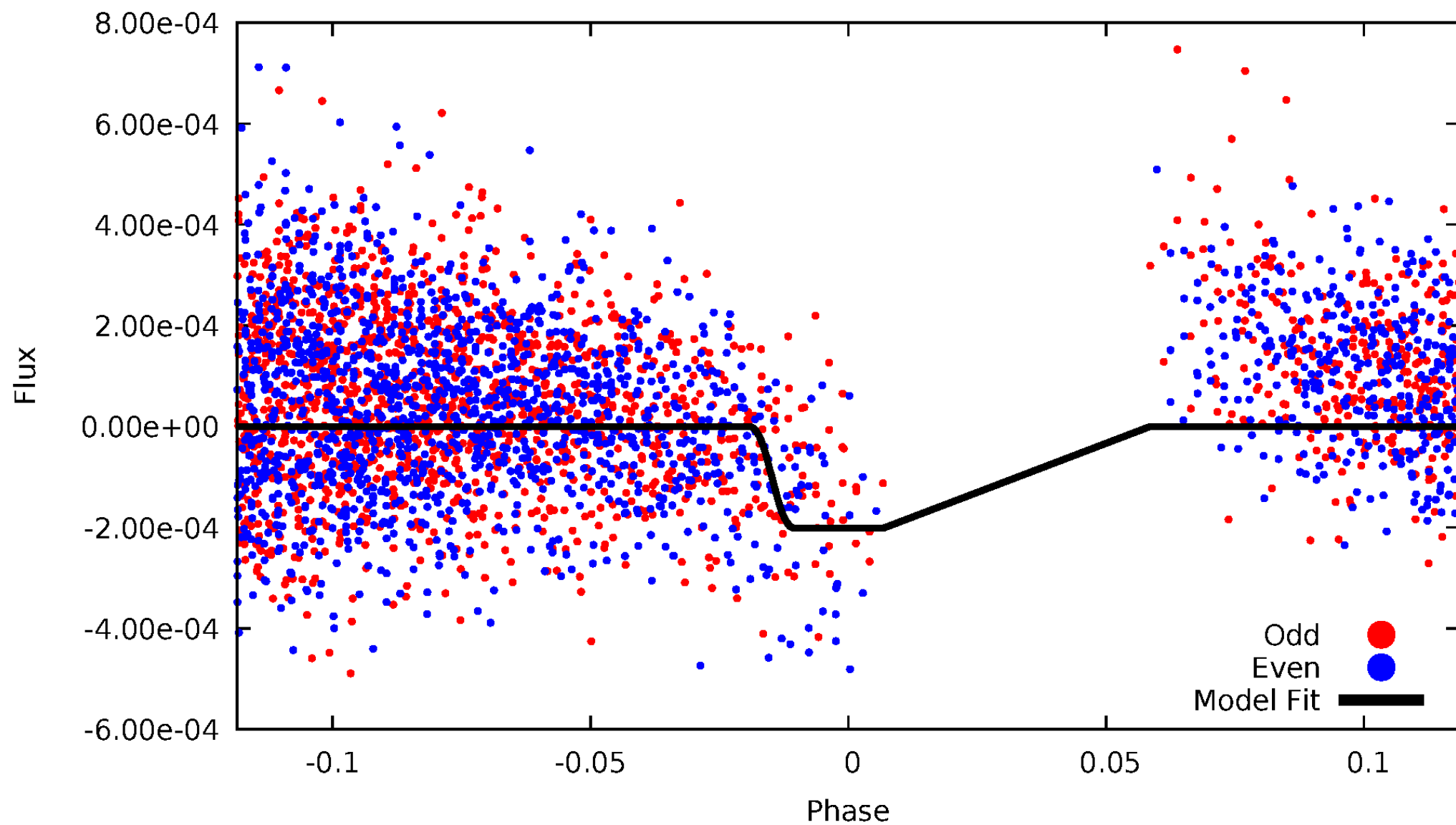
DV Odd/Even

TCE 009032551-03

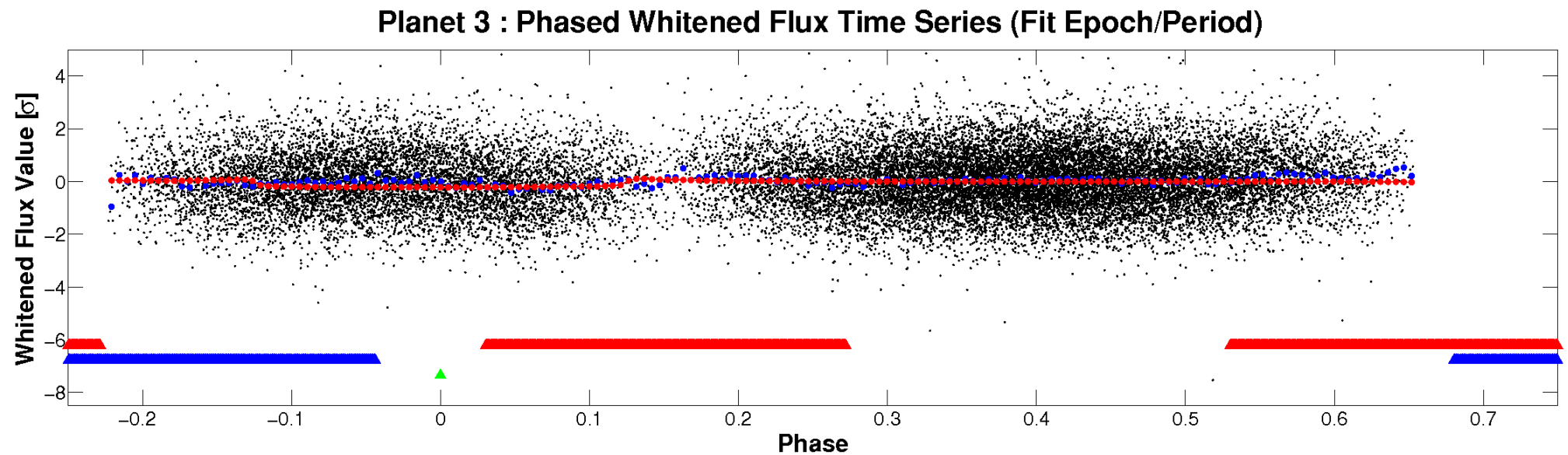
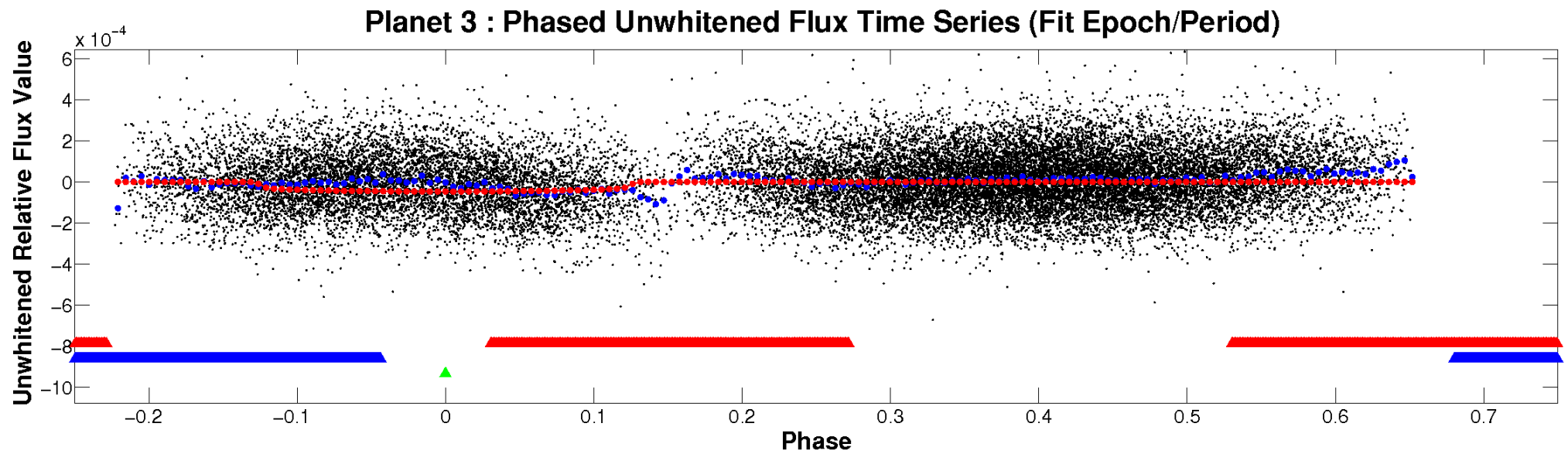


# ALT Odd/Even

TCE 009032551-03

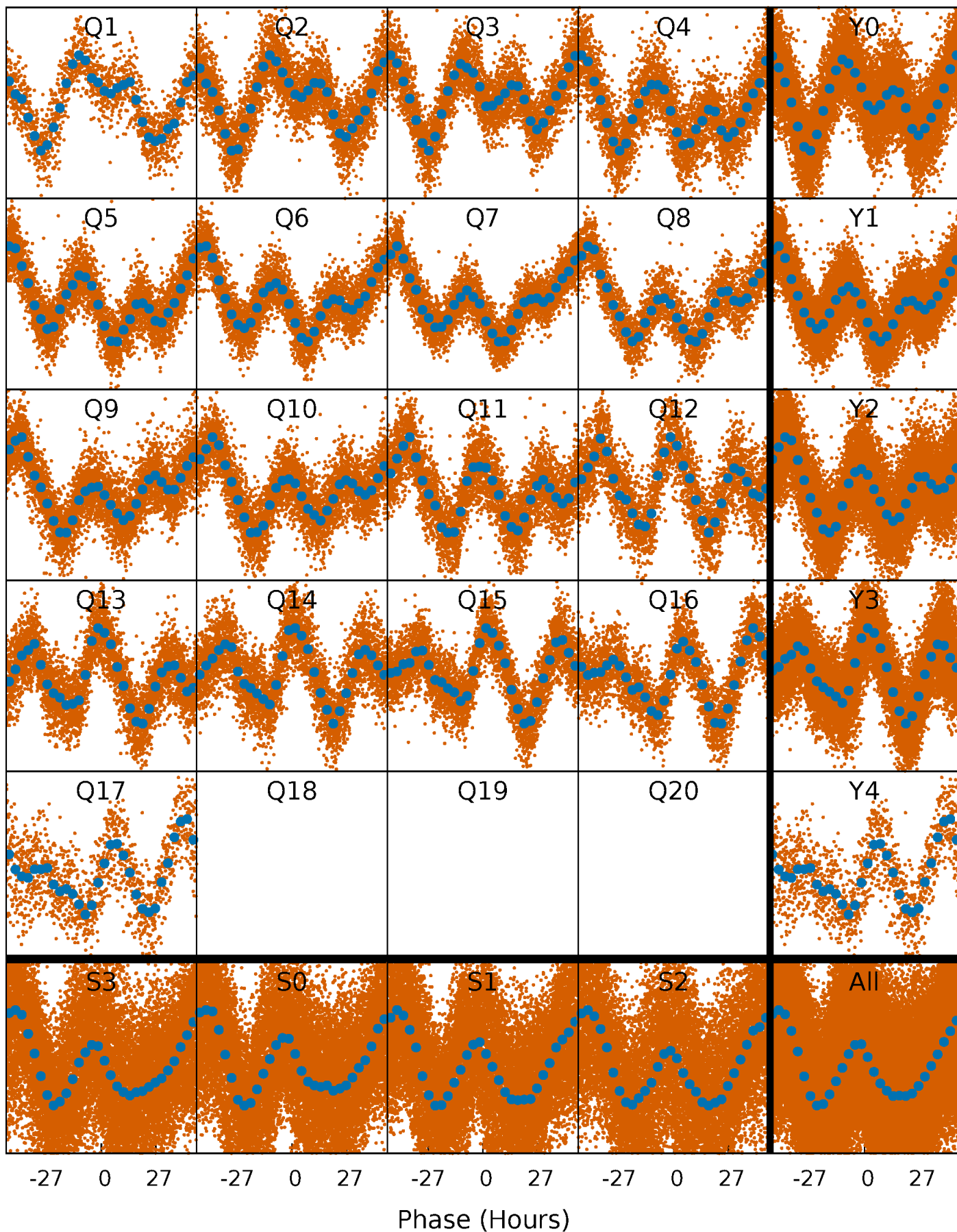


# Non-Whitened Vs. Whitened Light Curve



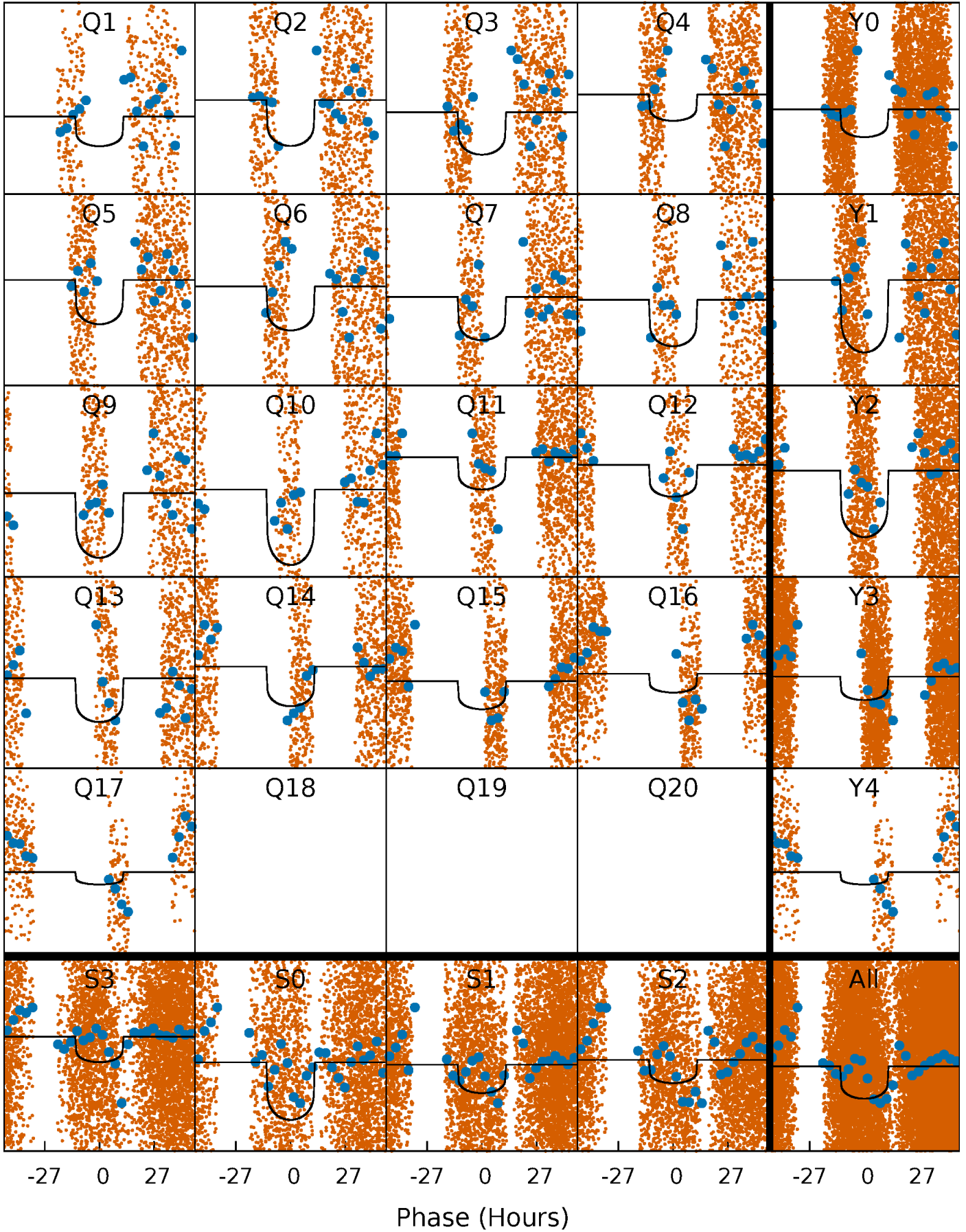
# PDC Quarter-Phased Transit Curves

TCE 009032551-03     $P = 3.887031$  Days     $T_0 = 134.739732$  (BKJD)



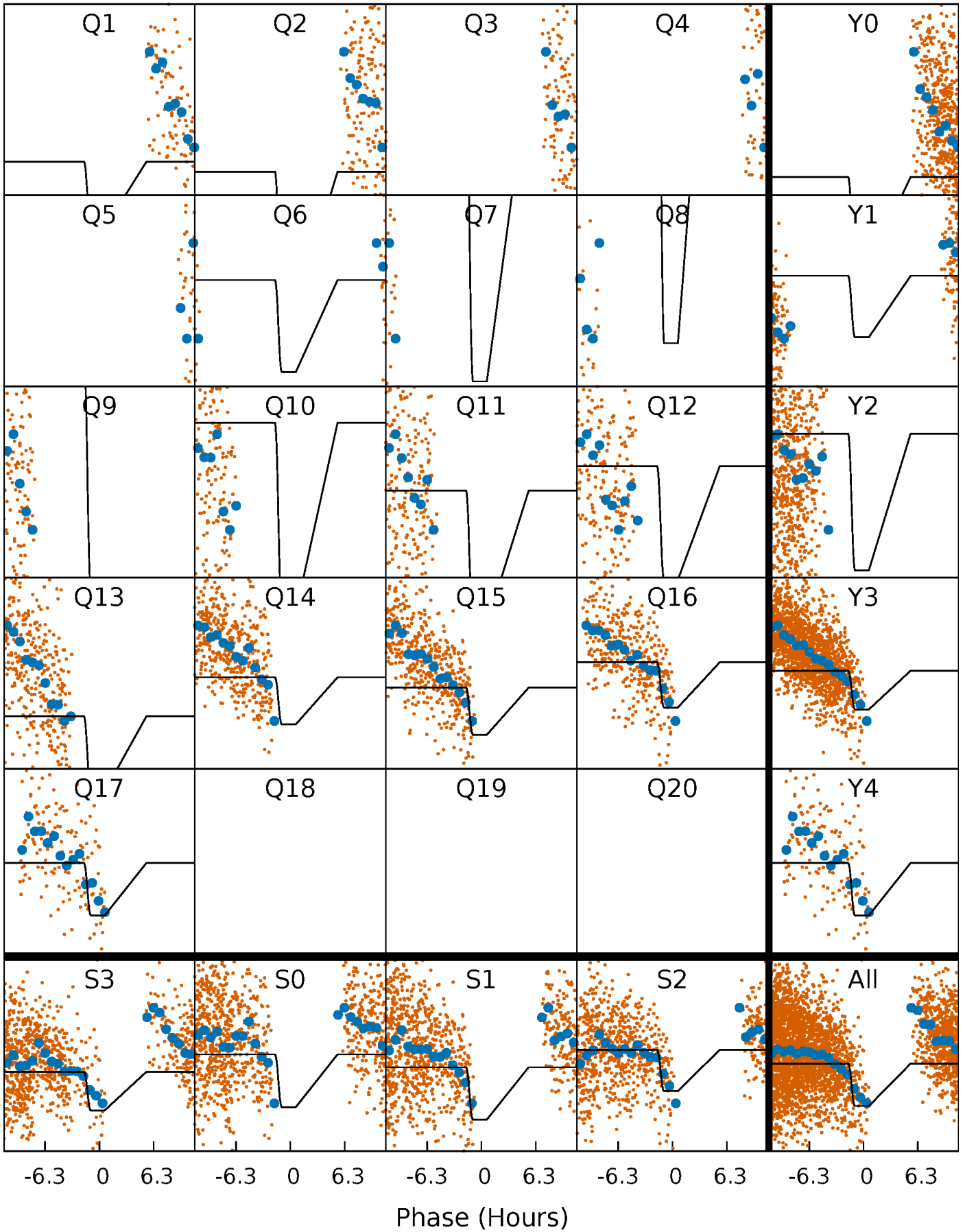
# DV Quarter-Phased Transit Curves

TCE 009032551-03 P= 3.887031 Days  $T_0=134.739732$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

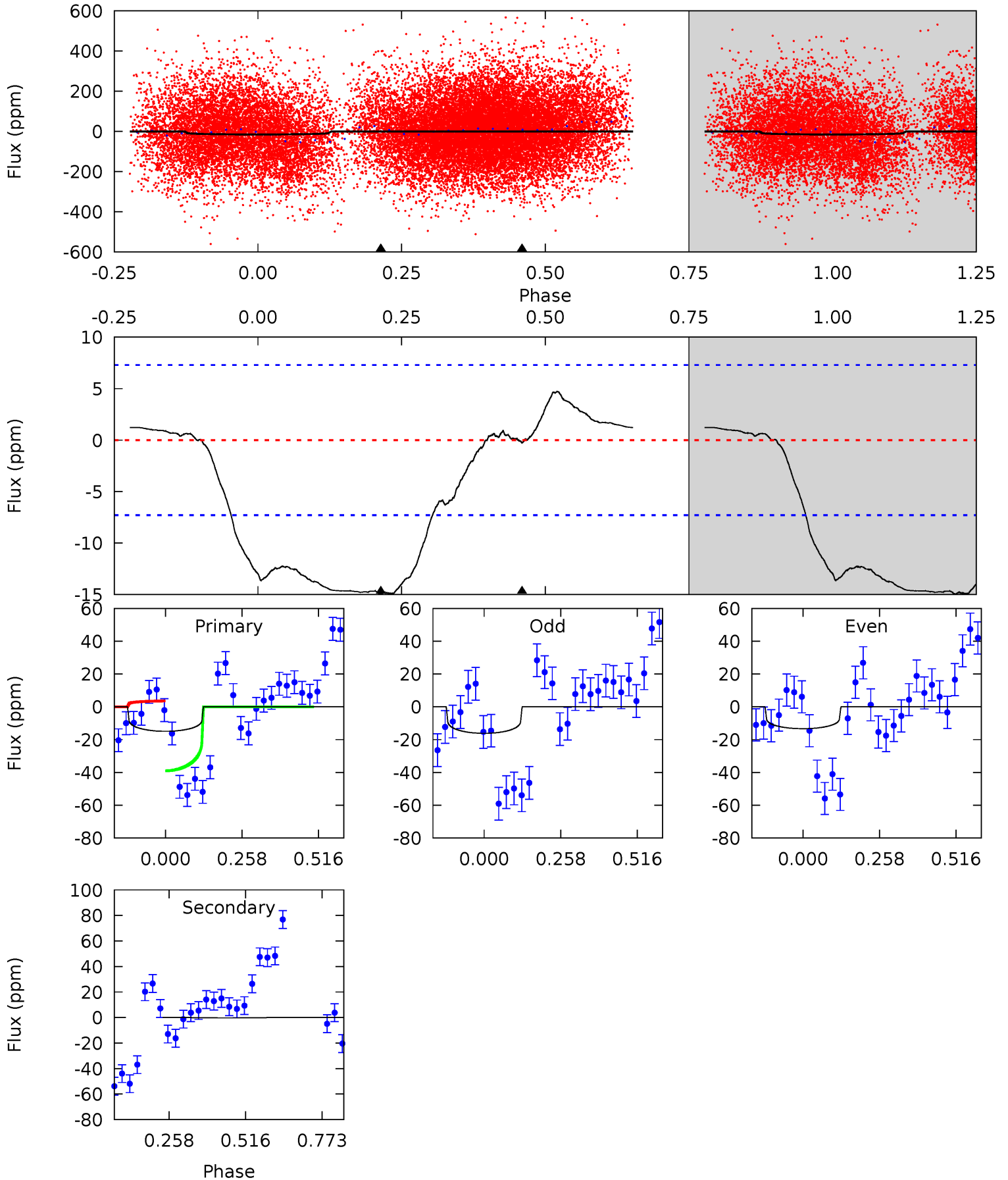
TCE 009032551-03 P= 3.887645 Days  $T_0=135.085156$  (BKJD)



# DV Model-Shift Uniqueness Test

009032551-03, P = 3.887031 Days, E = 130.852701 Days

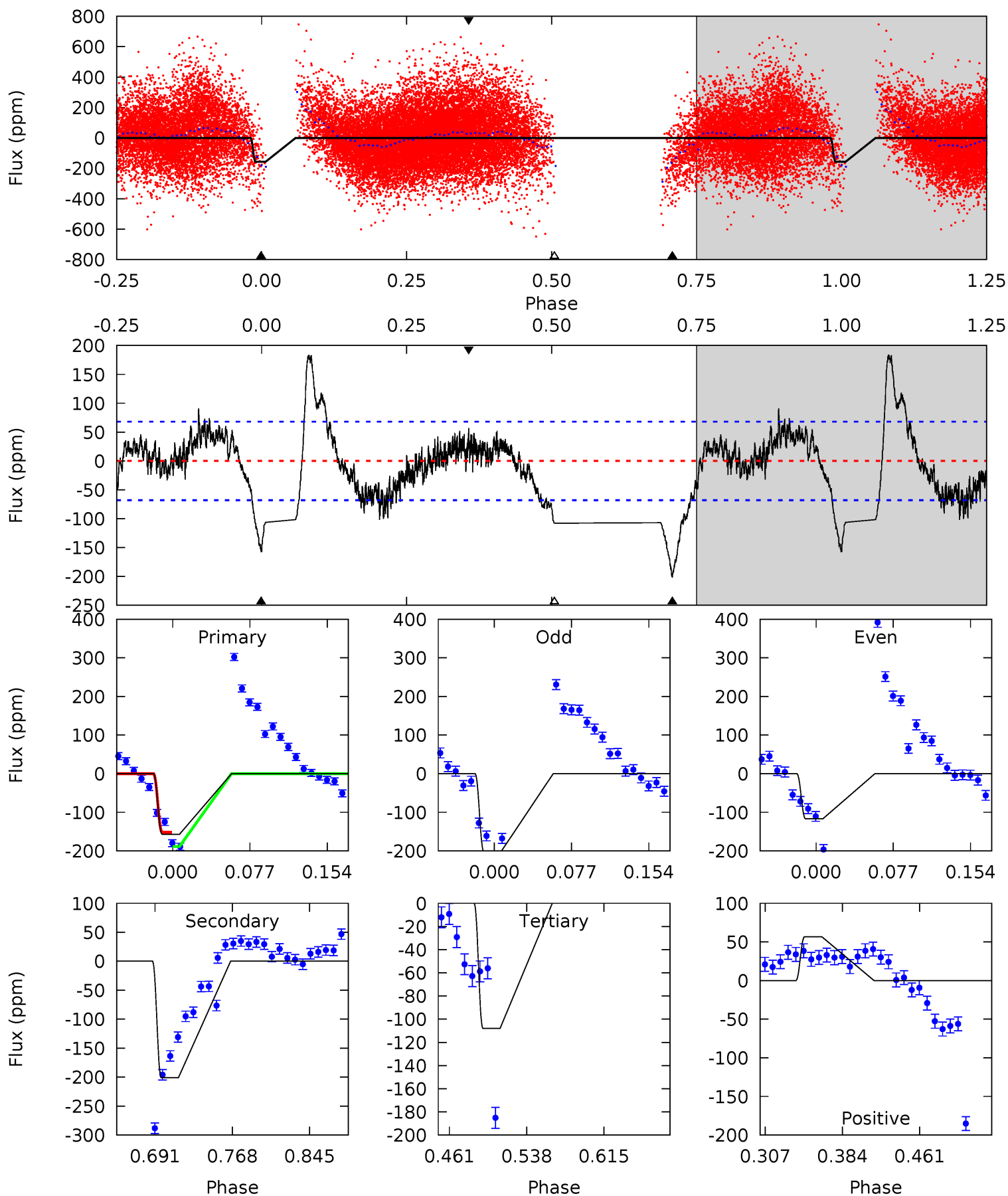
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.94	0.17	0	0	4.36	1.13	1.55	8.94	8.94	0.17	0.17	0.85	1.43	0.24	10.5



# Alt Model-Shift Uniqueness Test

009032551-03, P = 3.887645 Days, E = 131.197511 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
10.7	13.6	7.33	3.85	4.62	1.77	2.40	3.34	6.82	6.32	9.79	2.85	1.07	0.48	0.76



### Stellar Parameters For KIC 009032551

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7077^{+197}_{-271}$	$3.909^{+0.234}_{-0.126}$	$-0.040^{+0.250}_{-0.300}$	$2.379^{+0.466}_{-0.698}$	$1.674^{+0.162}_{-0.324}$	$0.175^{+0.241}_{-0.064}$
	+3%/-4%	+6%/-3%	+625%/-750%	+20%/-29%	+10%/-19%	+138%/-37%
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 009032551-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-0 \pm 2$	$2.36^{+2.00}_{-1.64}$	$2772^{+180}_{-213}$	$-2845^{+6464}_{-635}$	$0.057^{+1.494}_{-0.689}$
Alt.	$-201 \pm 15$	$3.78^{+2.47}_{-1.99}$	$2766^{+192}_{-218}$	$6752^{+4122}_{-1462}$	$25^{+86}_{-16}$

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

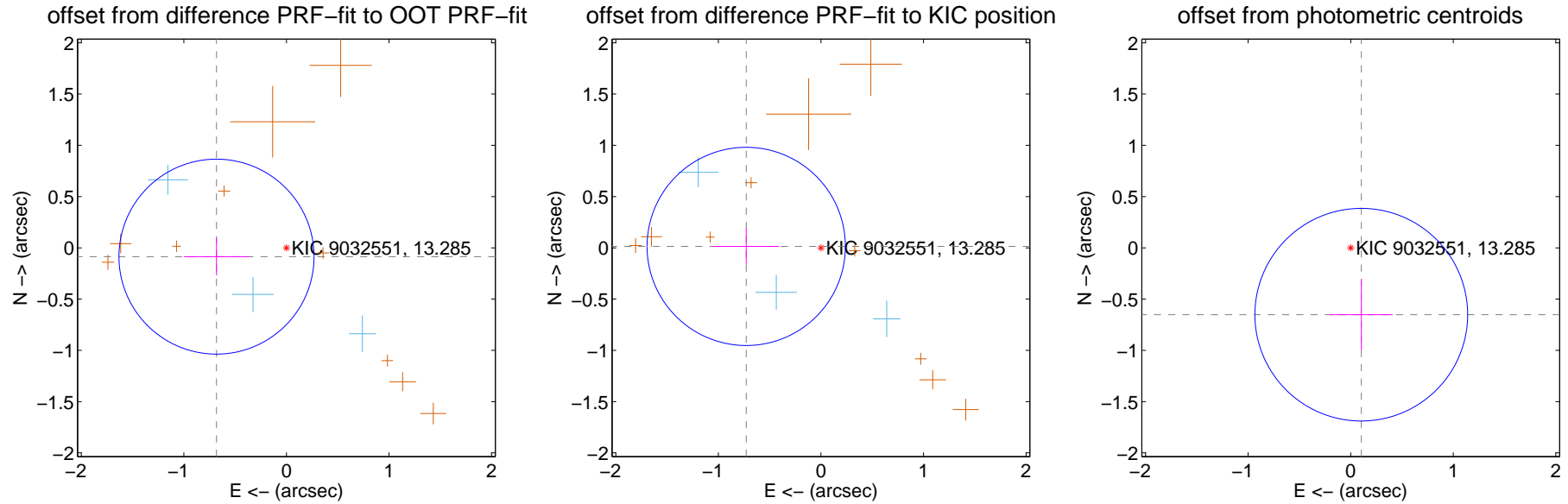
## DV Centroid Data

Supplemental centroid analysis for 009032551-03. Kepler magnitude: 13.29. Transit SNR 6.44

There are 3 quarters with good PRF difference image offsets

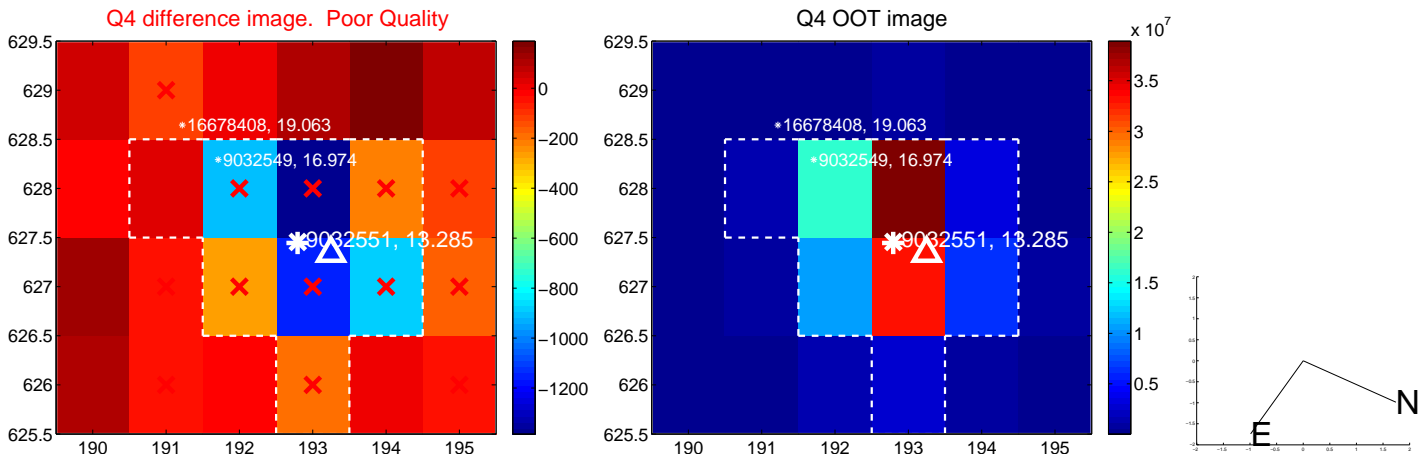
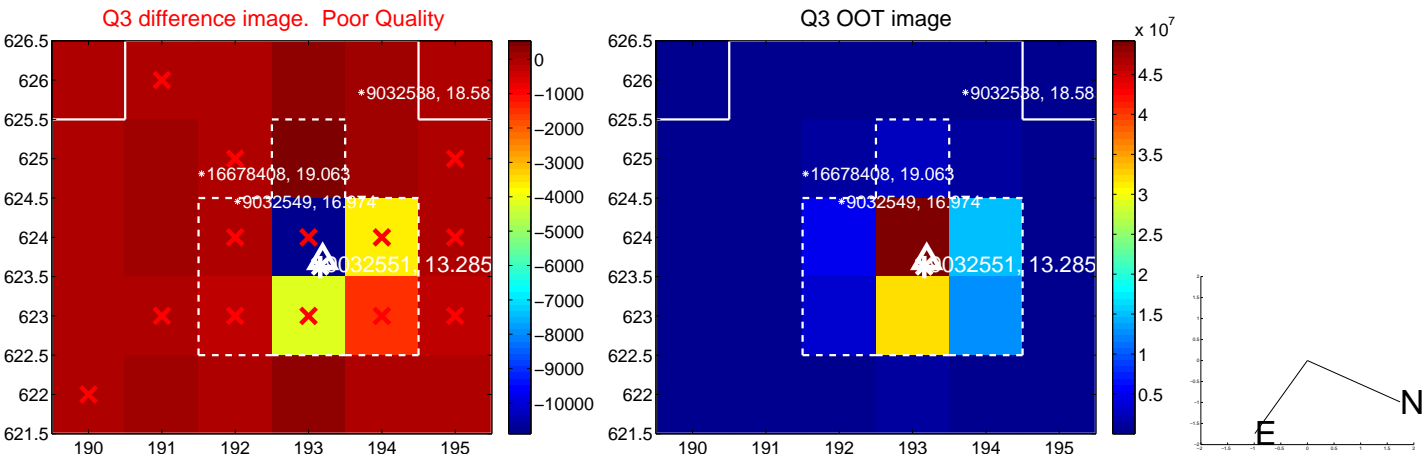
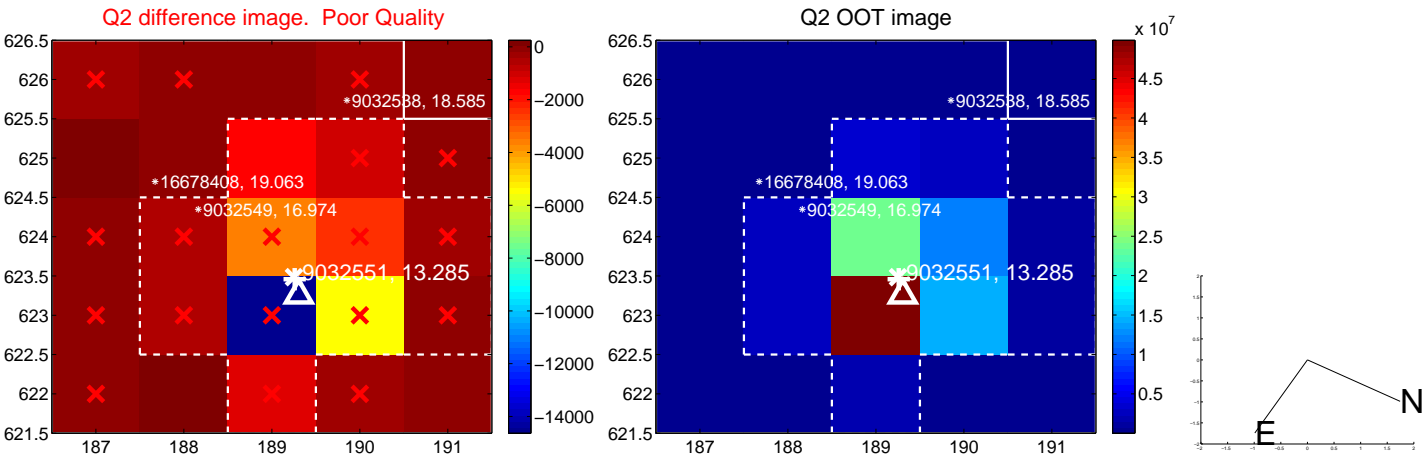
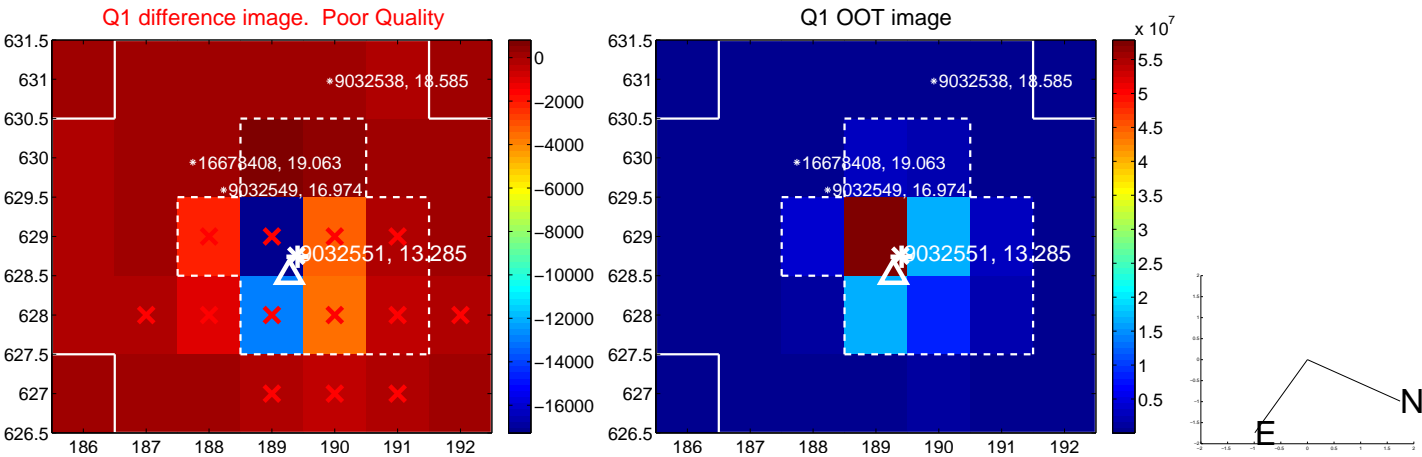
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.687 \pm 0.317$	2.17	$0.682 \pm 0.319$	$-0.086 \pm 0.182$
PRF-fit source offset from KIC position	$0.729 \pm 0.322$	2.26	$0.729 \pm 0.322$	$0.014 \pm 0.178$
photometric centroid source offset	$0.66 \pm 0.35$	1.91	$-0.10 \pm 0.31$	$-0.65 \pm 0.35$

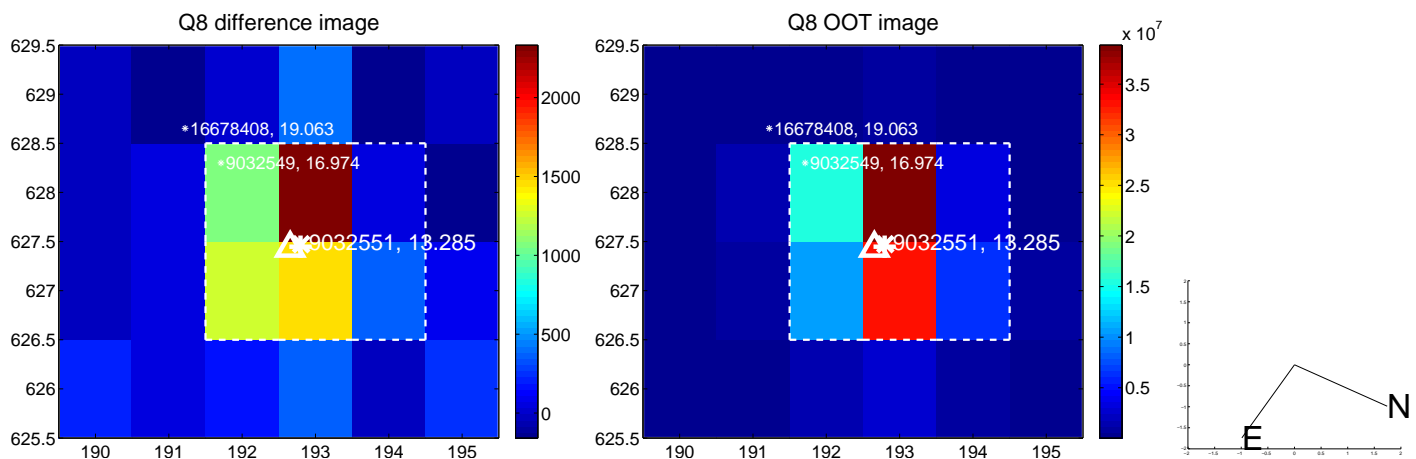
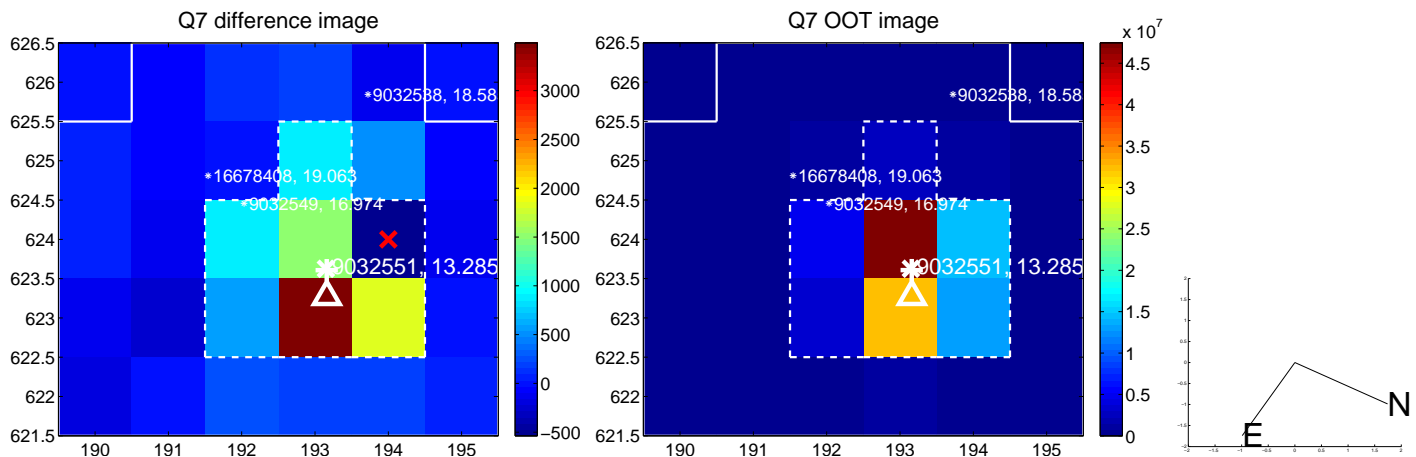
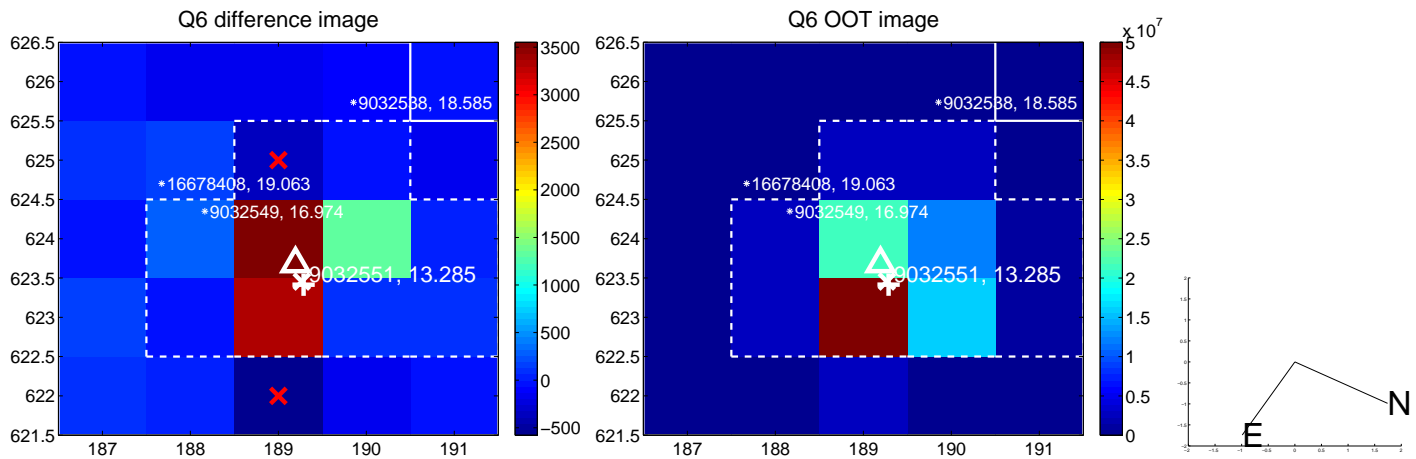
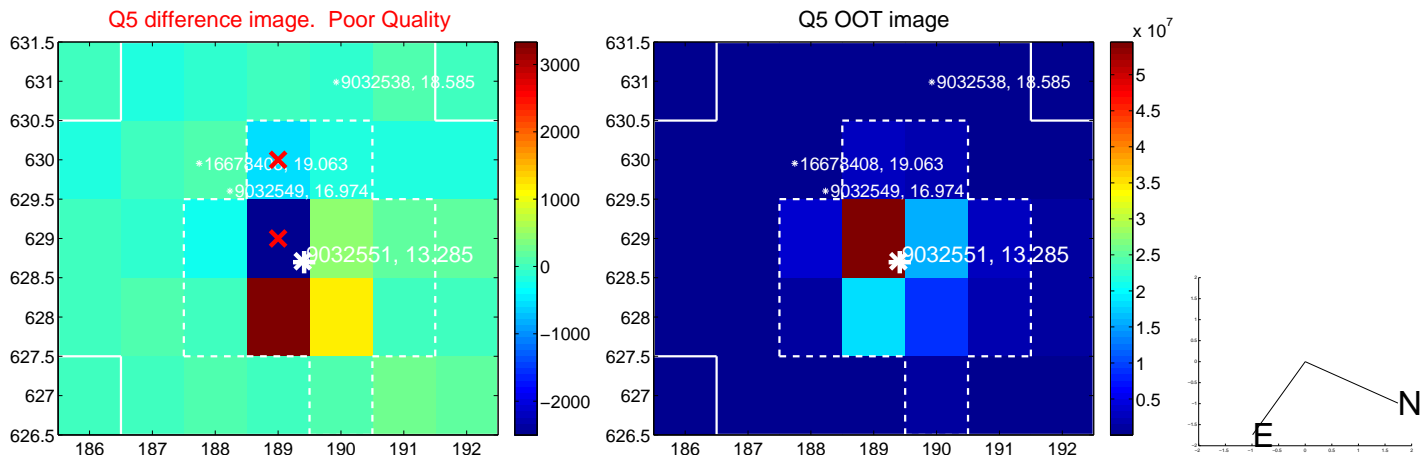


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

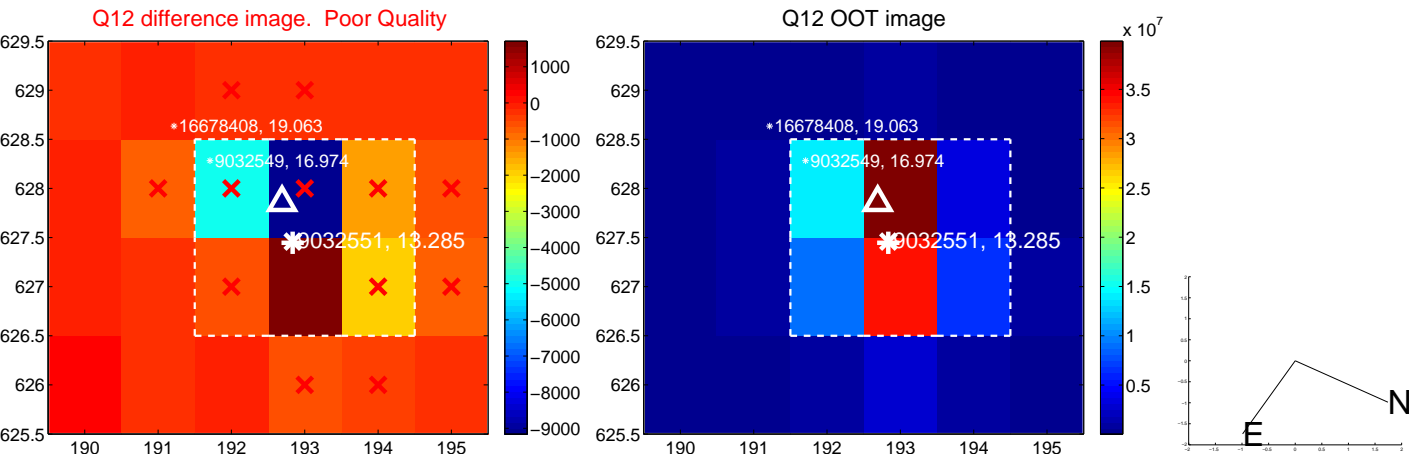
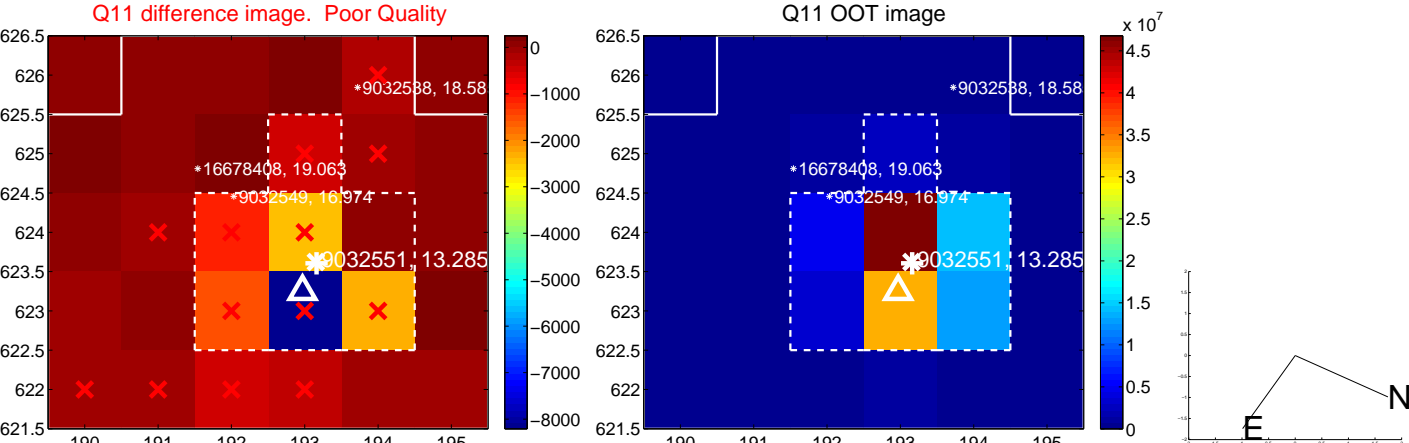
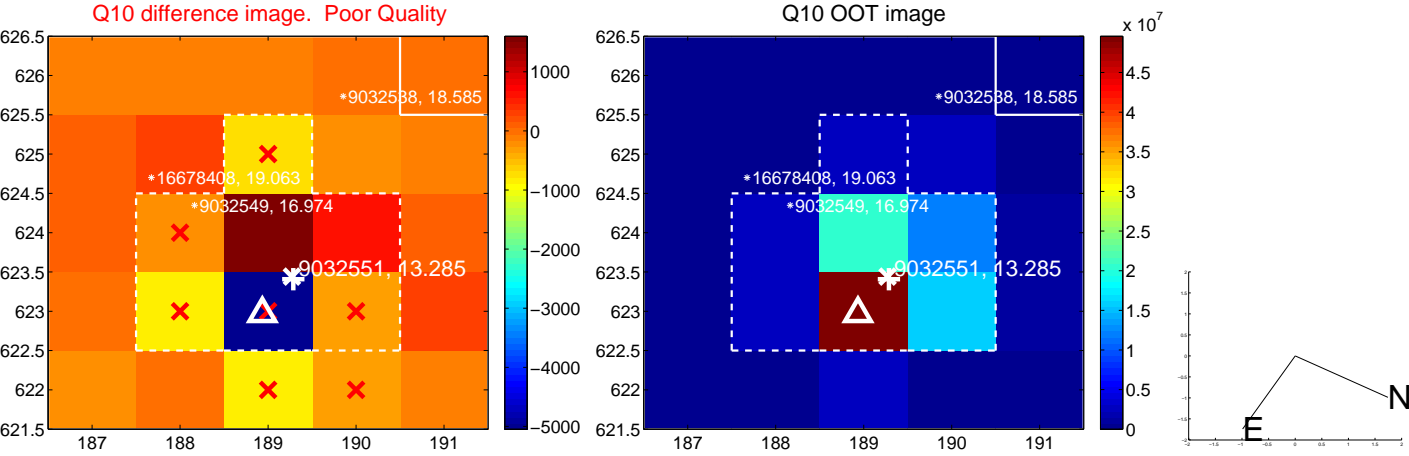
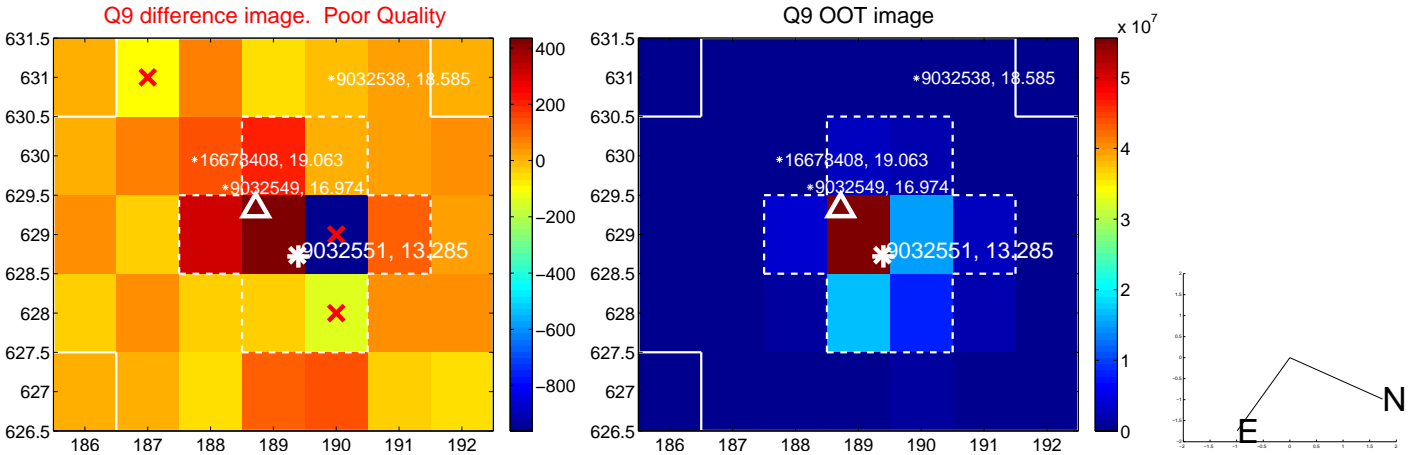
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



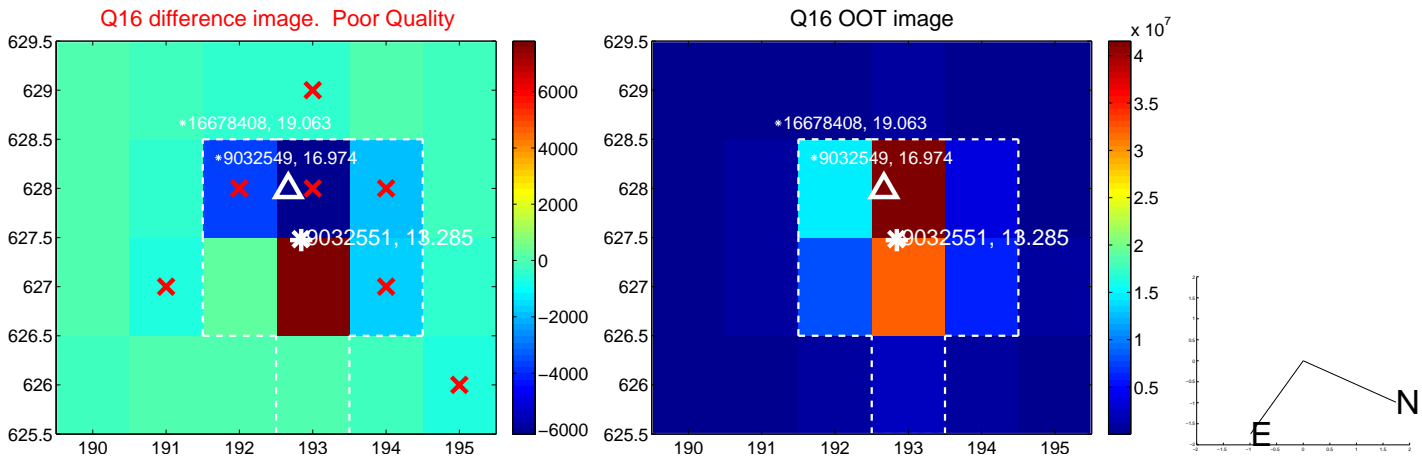
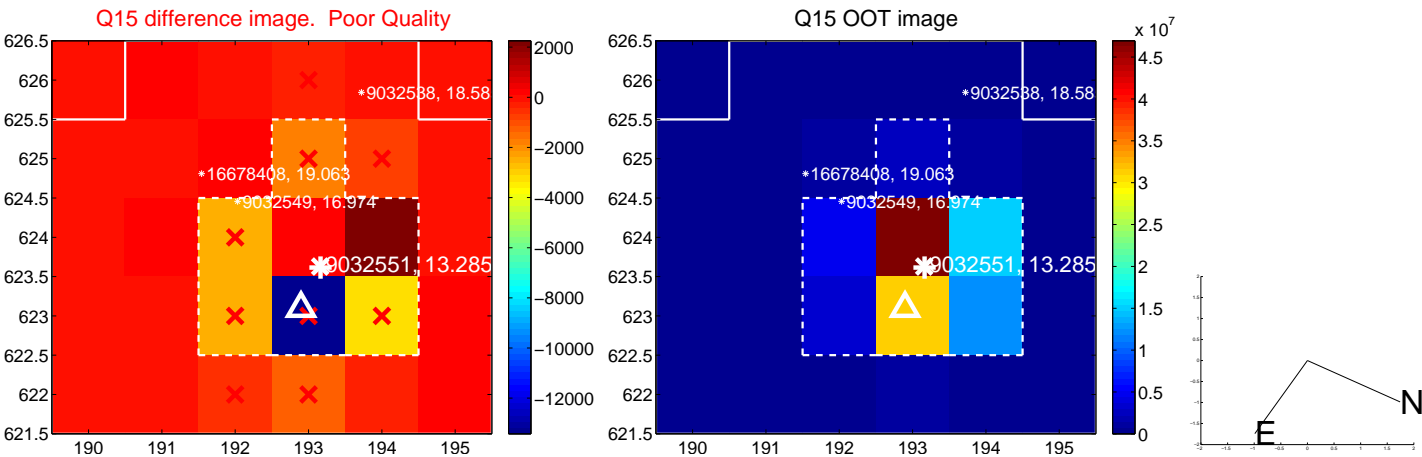
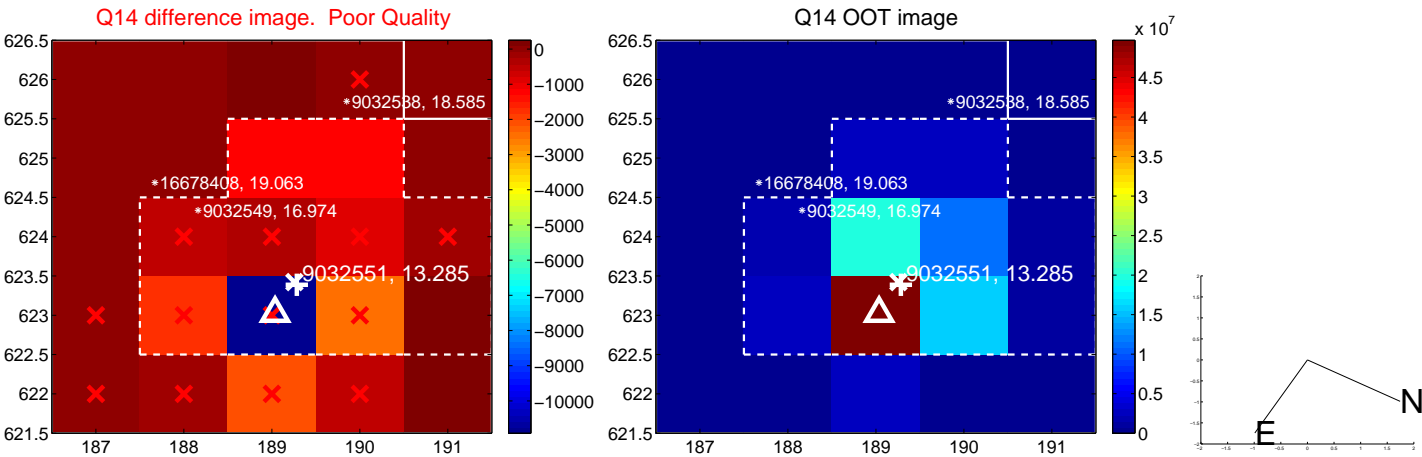
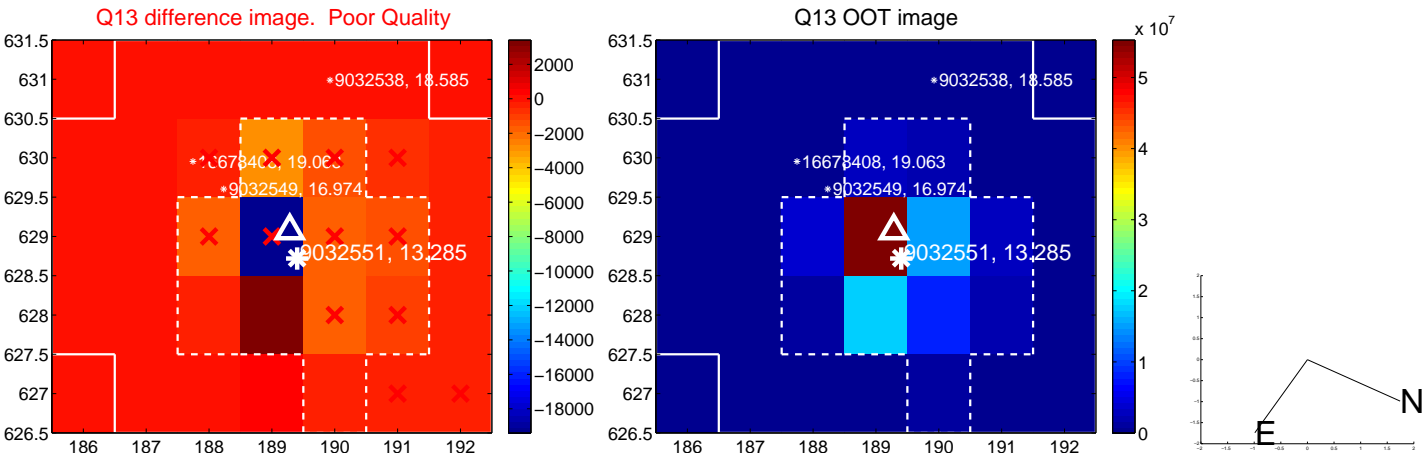
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



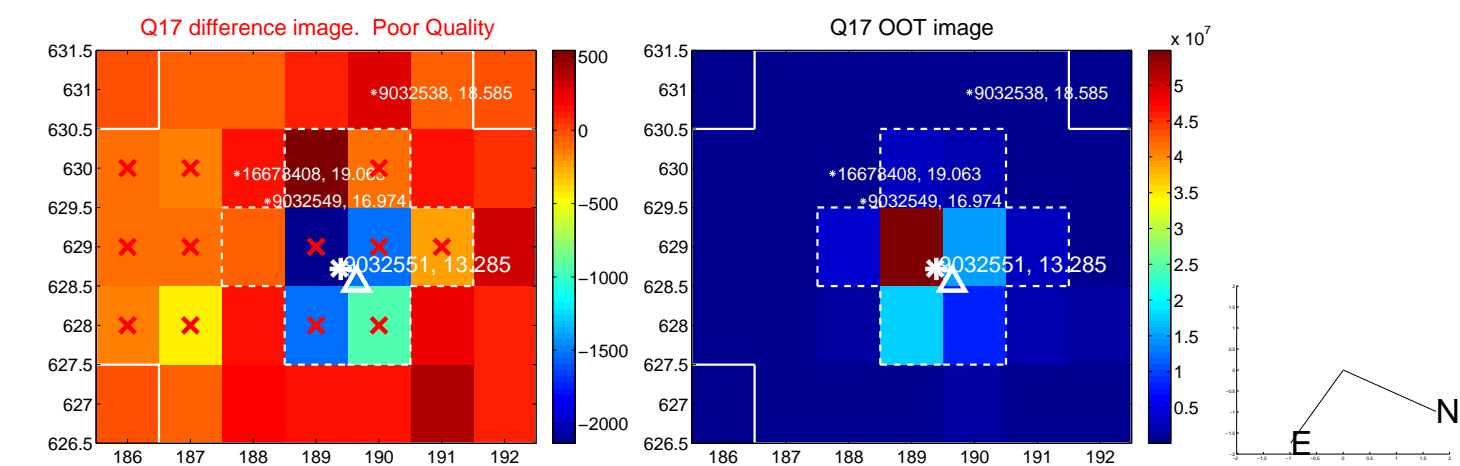
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



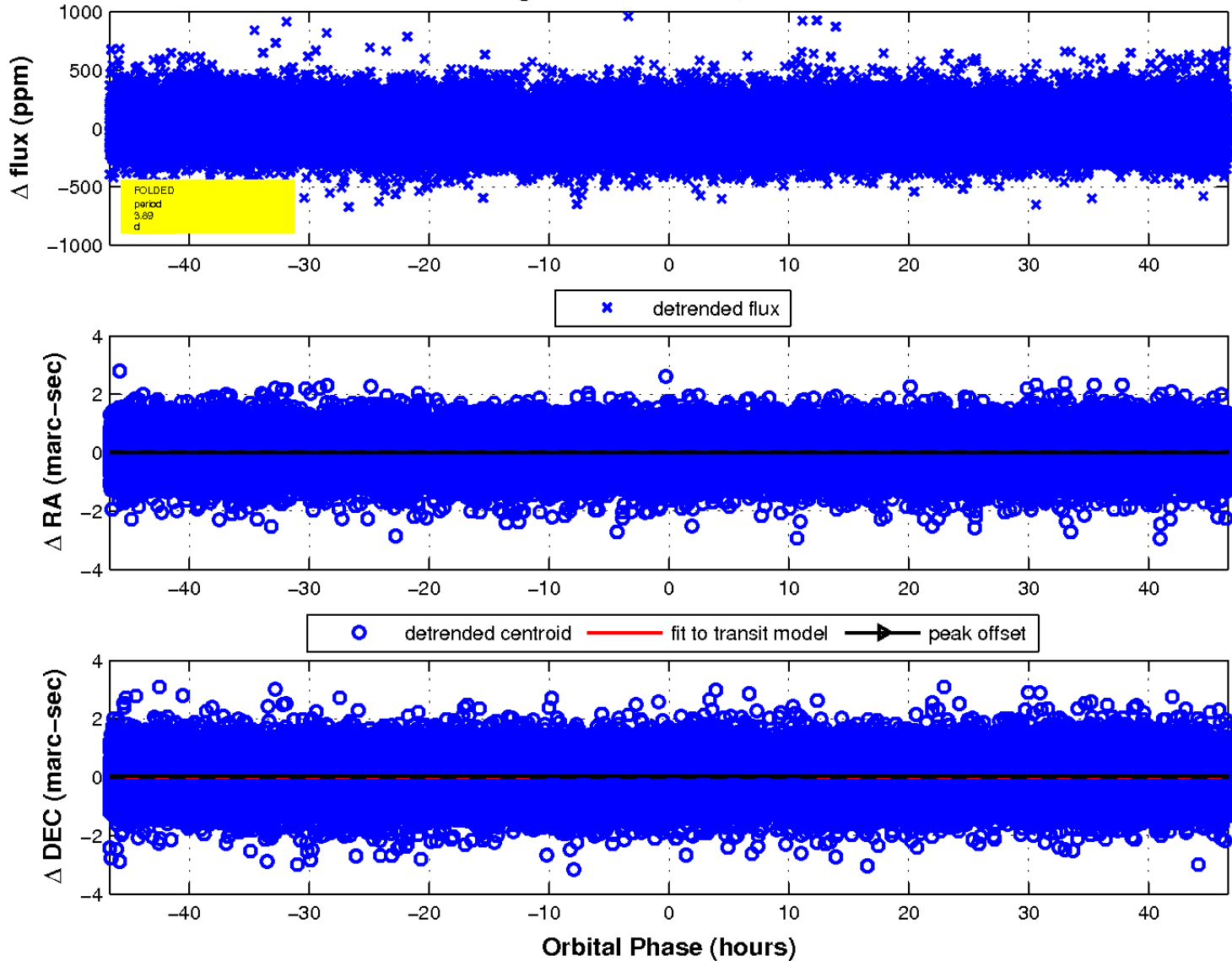
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

