

# KIC 009032900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032900-01	OBS	No	405.660975	422.132654	5144.5	11.837	104.4	104.0	1.74	6038	13.05	2.59
009032900-02	OBS	0134.01	67.685786	150.885695	401.5	20.696	97.1	11.3	1.74	6038	6.99	28.20
009032900-04	OBS	No	320.537648	220.363044	4986.7	11.552	39.0	83.6	1.74	6038	12.71	3.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032900-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_DV—PERIOD_ALIAS_ALT
009032900-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009032900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—INCONSISTENT_TRANS

**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 009032900-01

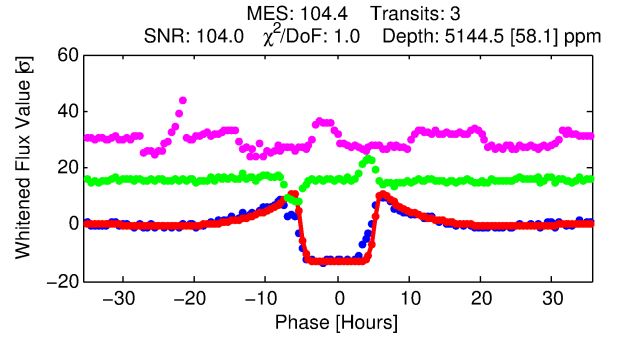
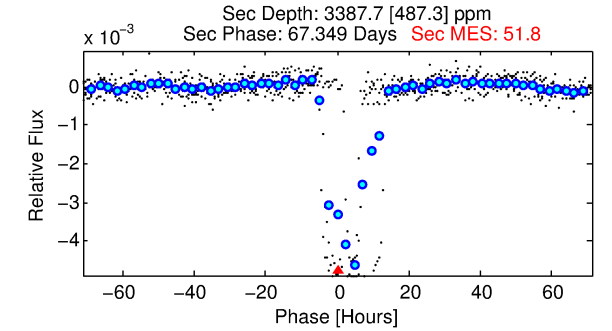
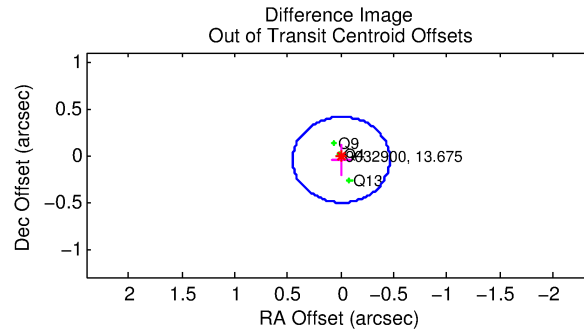
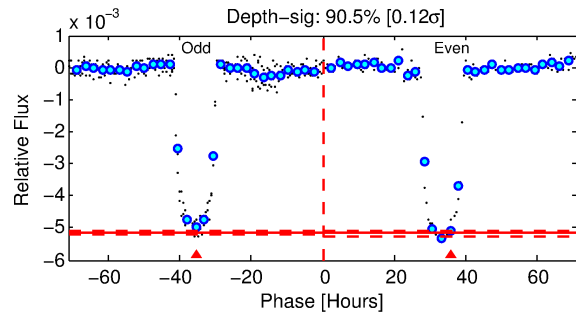
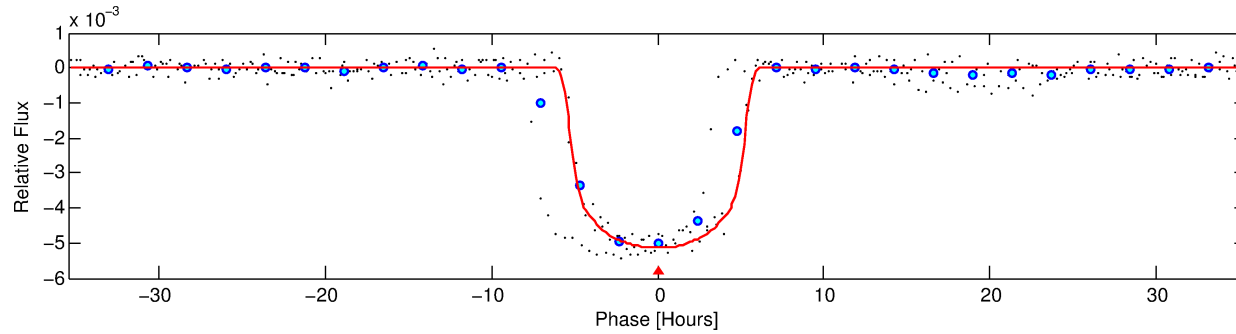
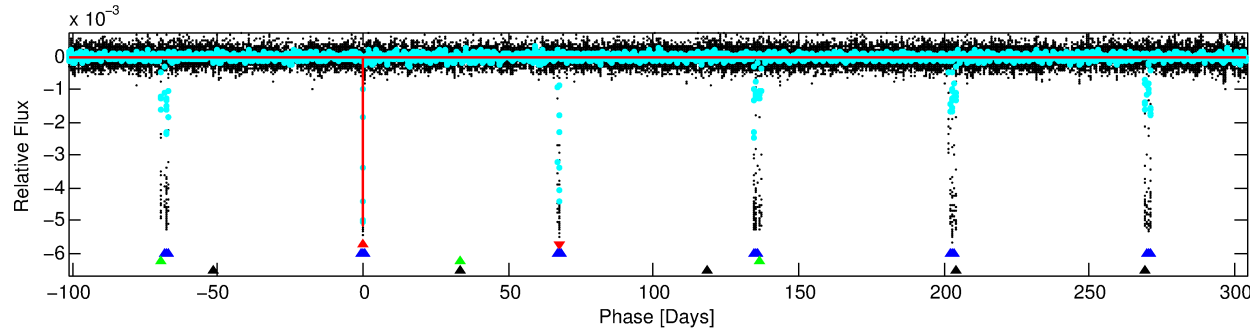
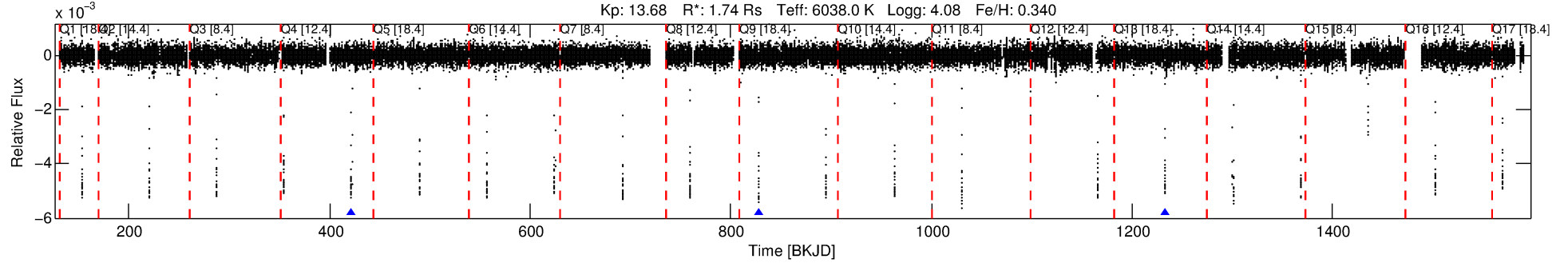
No Significant Match Found

# DV One-Page Summary

KIC: 9032900 Candidate: 1 of 4 Period: 405.661 d

KOI: K00134 Corr: No Ephemeris Match

Kp: 13.68 R\*: 1.74 Rs Teff: 6038.0 K Logg: 4.08 Fe/H: 0.340



## DV Fit Results:

Period = 405.66098 [0.00096] d  
Epoch = 422.1327 [0.0012] BKJD  
Rp/R\* = 0.0686 [0.0009]  
a/R\* = 230.49 [10.55]  
b = 0.61 [0.05]  
Seff = 2.59 [0.84]  
Teq = 323 [26] K  
Rp = 13.05 [2.98] Re  
a = 1.1826 [0.2430] AU  
Ag = 15306.10 [5320.27] [2.88σ]  
Teffp = 5563 [231] K [22.51σ]

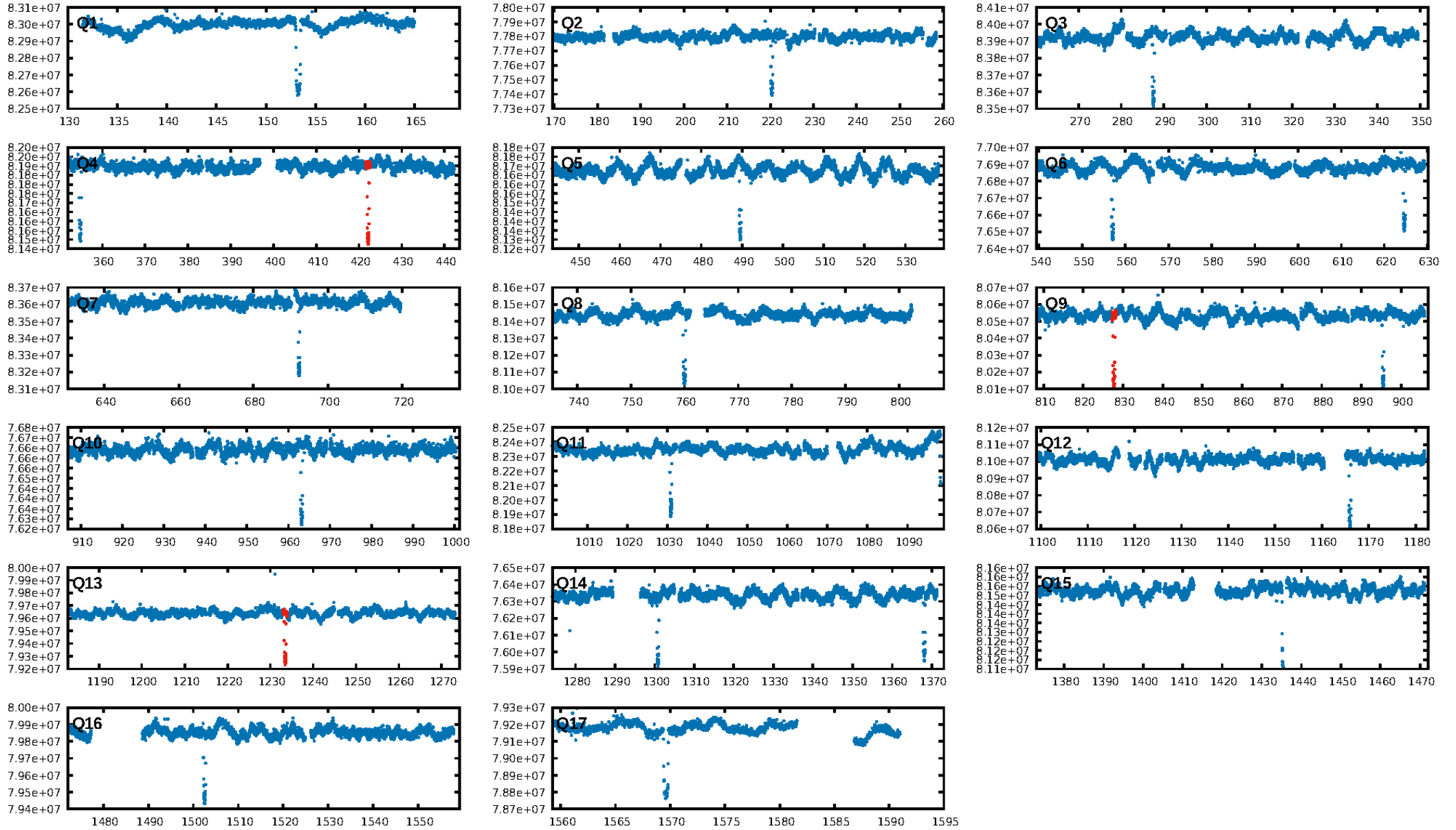
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [123.52σ]  
LongPeriod-sig: 100.0% [436.72σ]  
ModelChiSquare2-sig: 61.8%  
ModelChiSquareGof-sig: 99.1%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.609  
Centroid-sig: 28.4%  
Centroid-so: 0.220 arcsec [3.10σ]  
OotOffset-rm: 0.048 arcsec [0.31σ]  
KicOffset-rm: 0.167 arcsec [0.98σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/3]

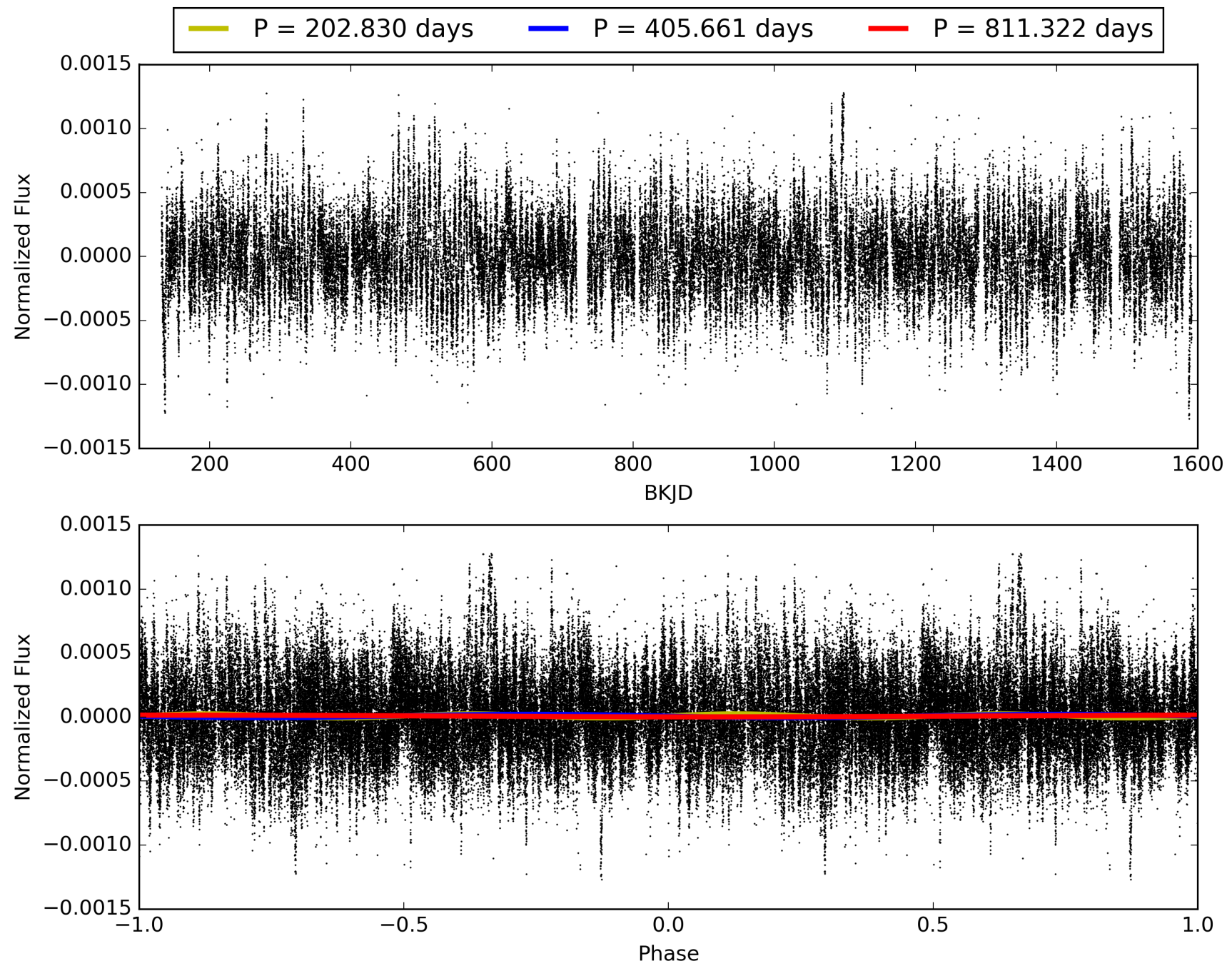
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 17:46:16 Z

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

# TCE 009032900-01, PDC Light Curves

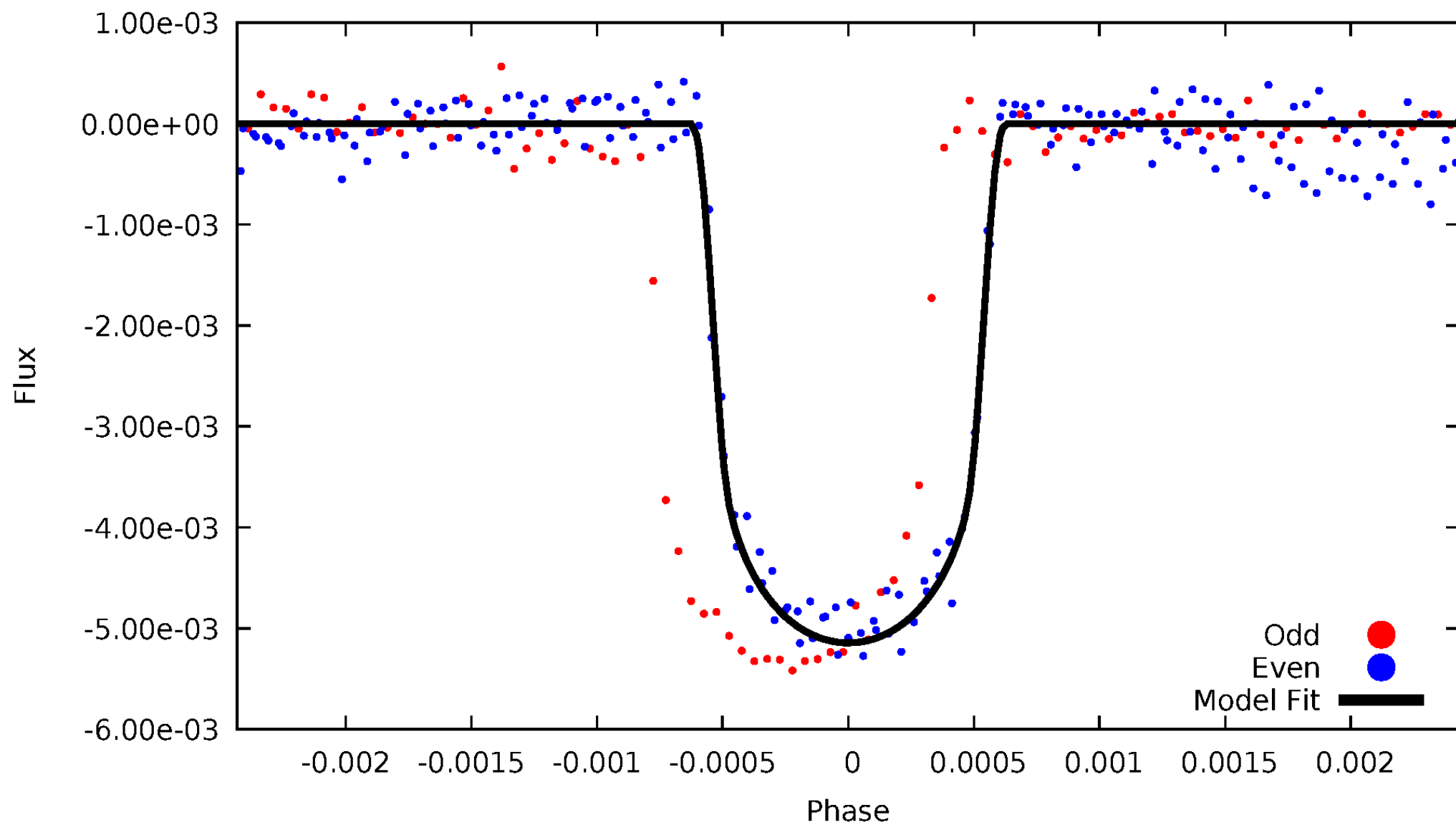


TCE 009032900-01



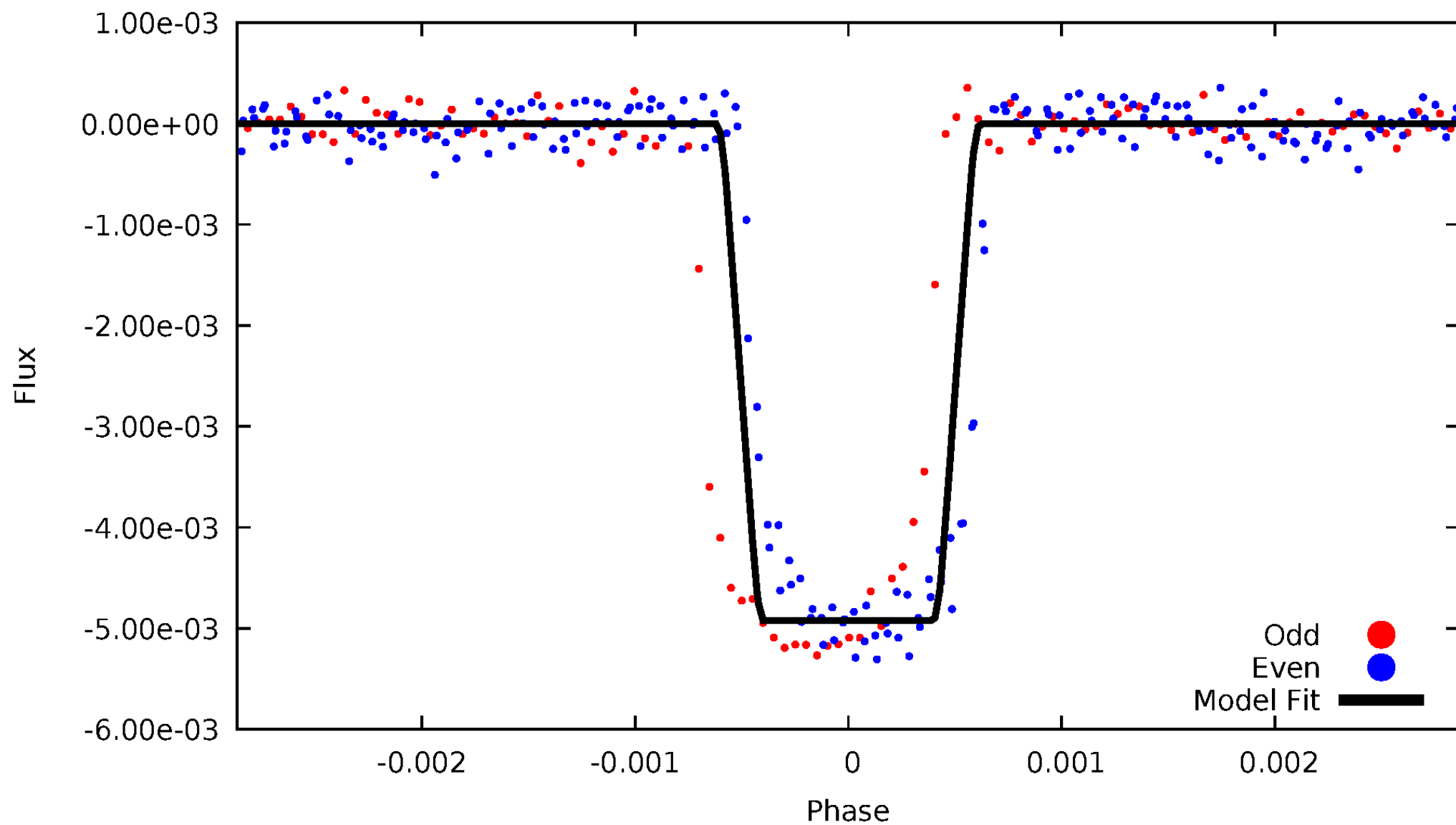
# DV Odd/Even

TCE 009032900-01



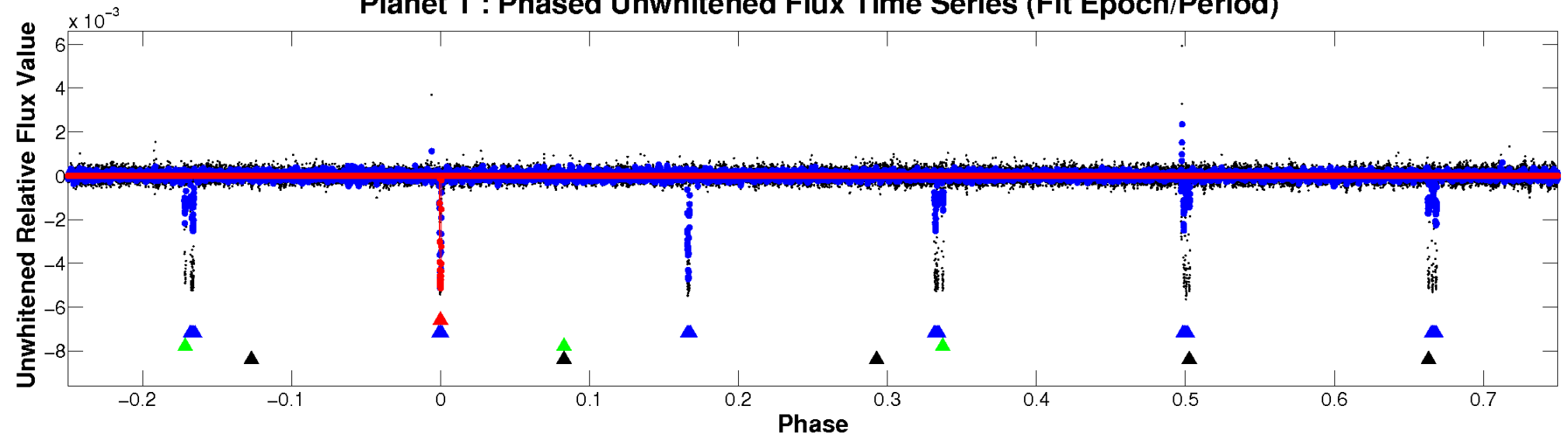
# ALT Odd/Even

TCE 009032900-01

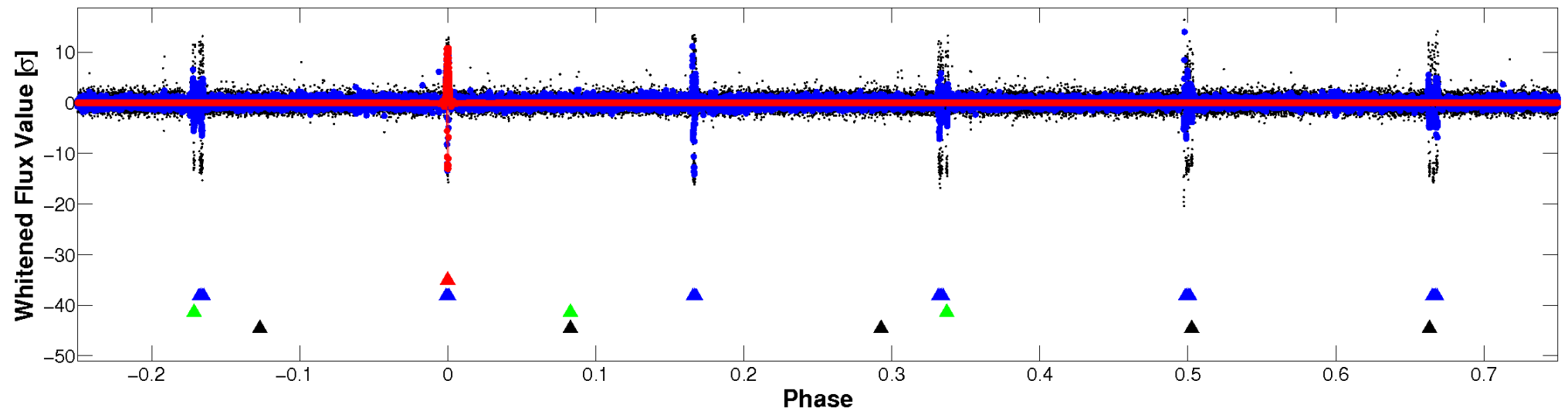


# Non-Whitened Vs. Whitened Light Curve

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

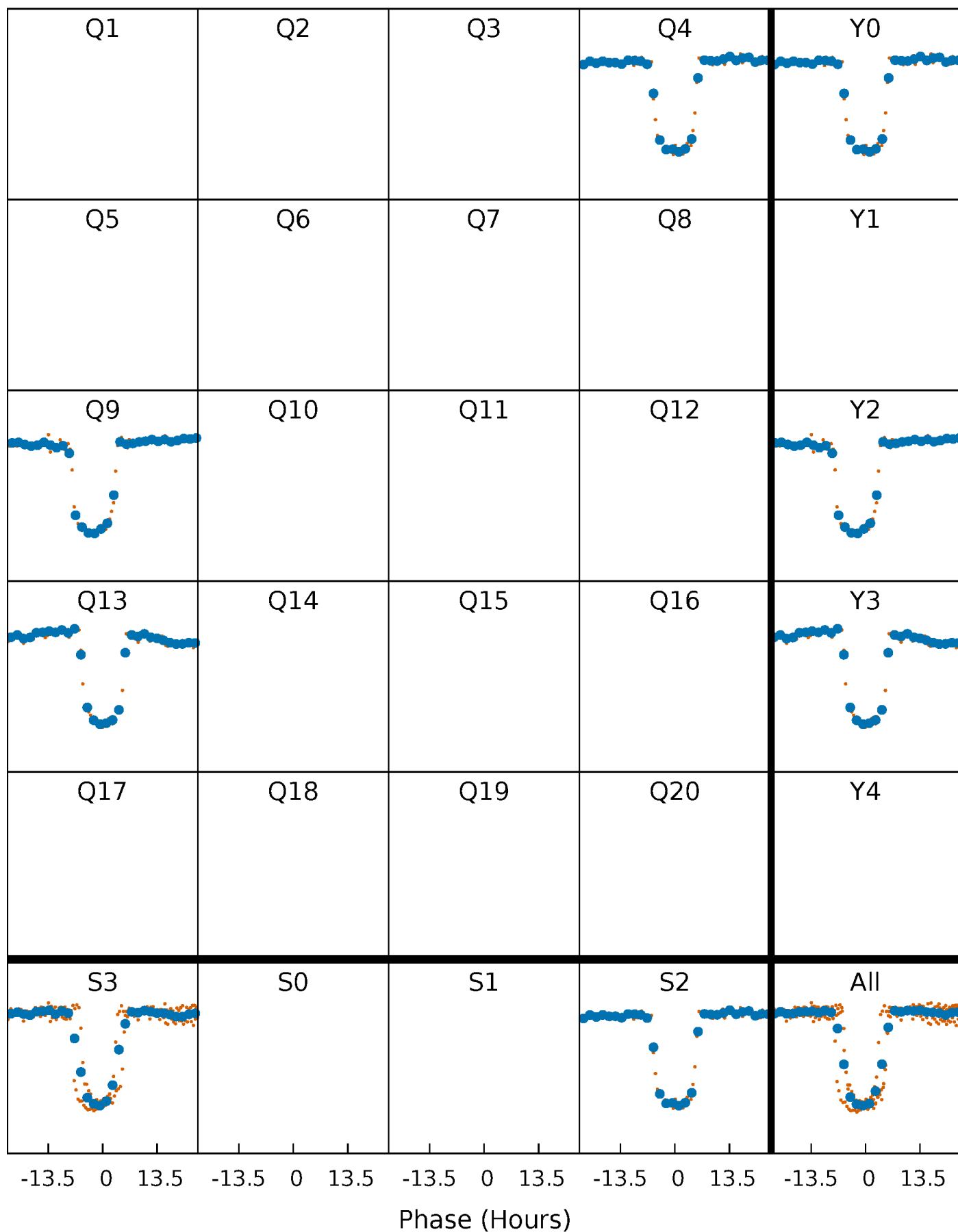


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

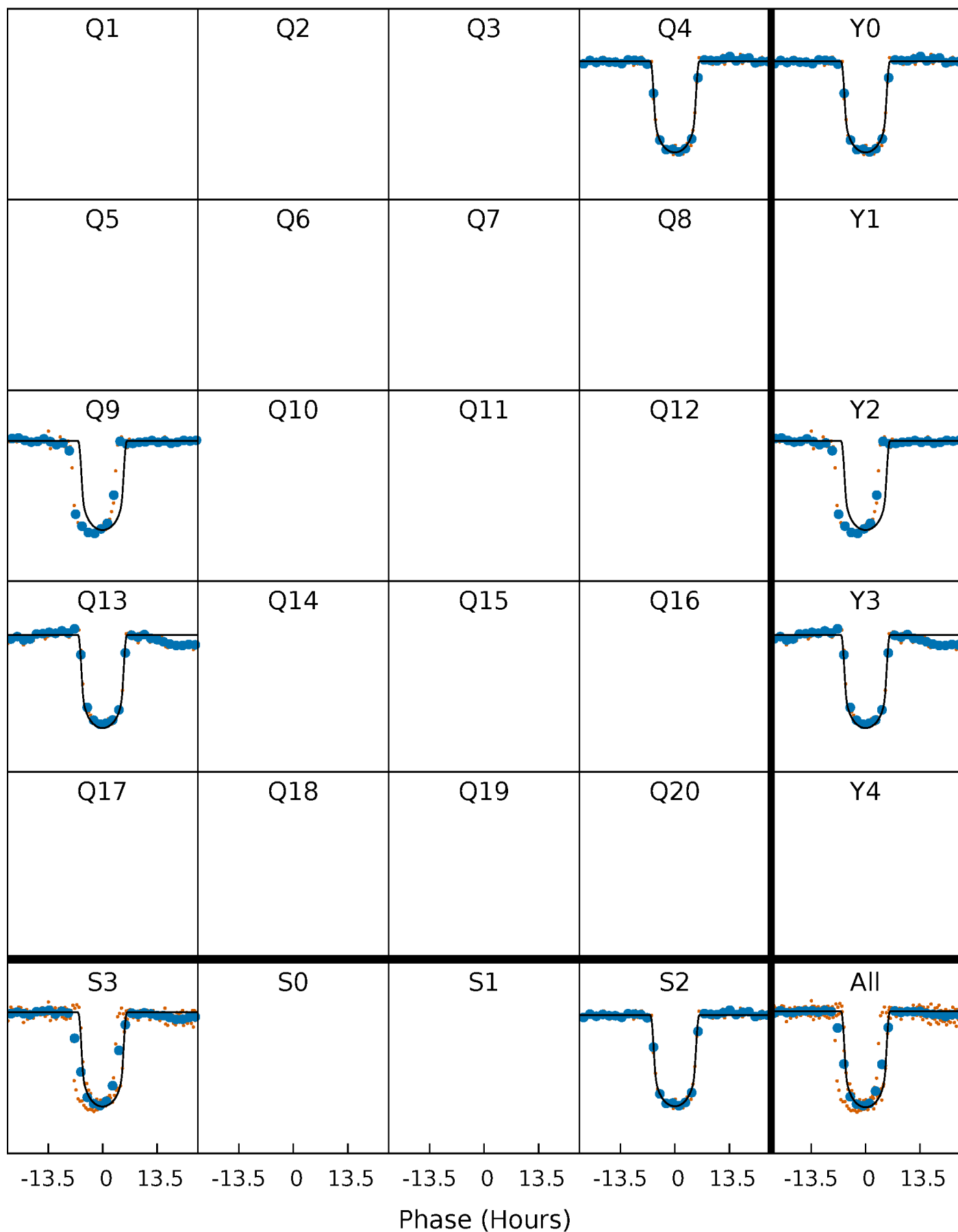
TCE 009032900-01 P=405.660976 Days  $T_0=422.132654$  (BKJD)





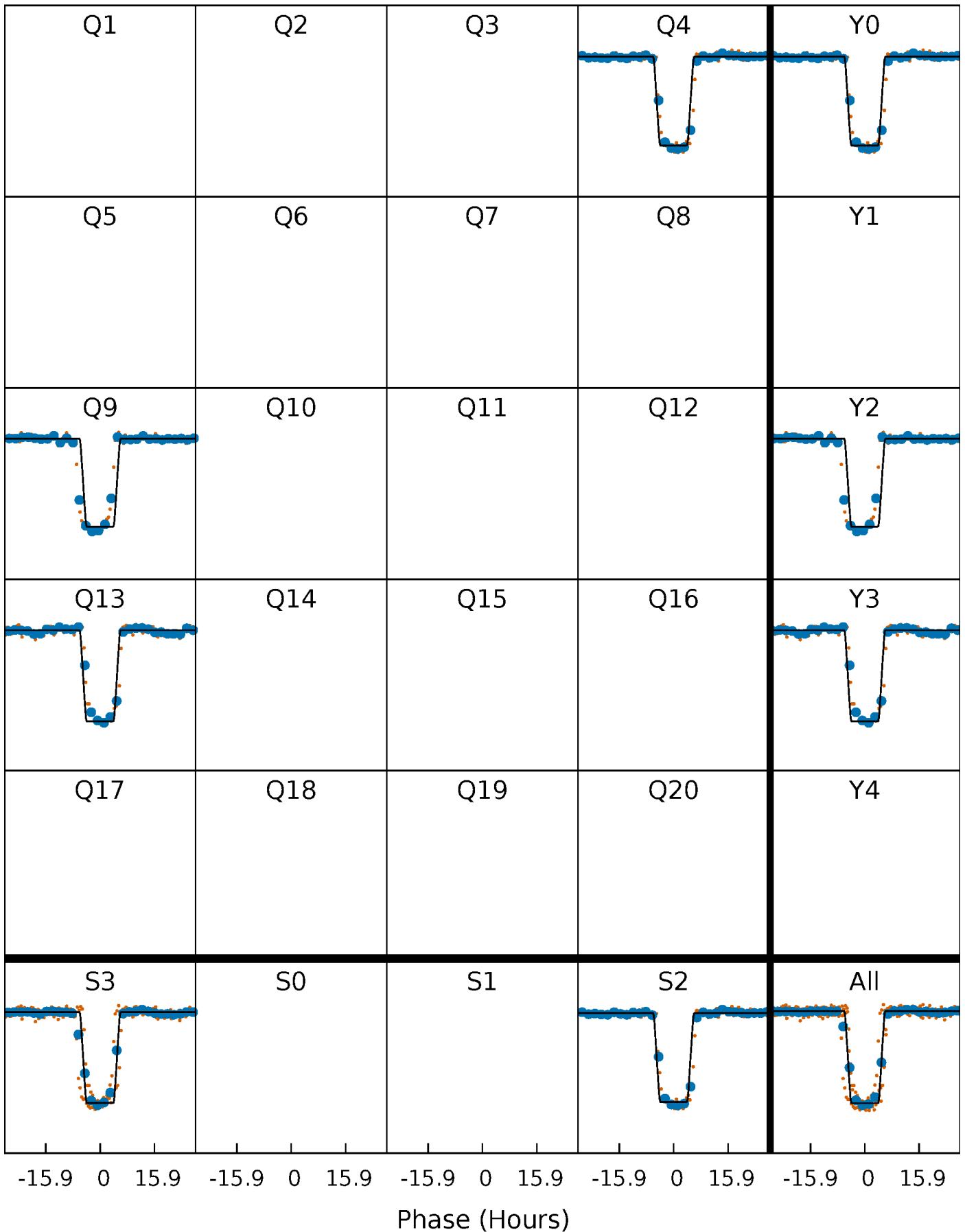
# DV Quarter-Phased Transit Curves

TCE 009032900-01 P=405.660976 Days  $T_0=422.132654$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

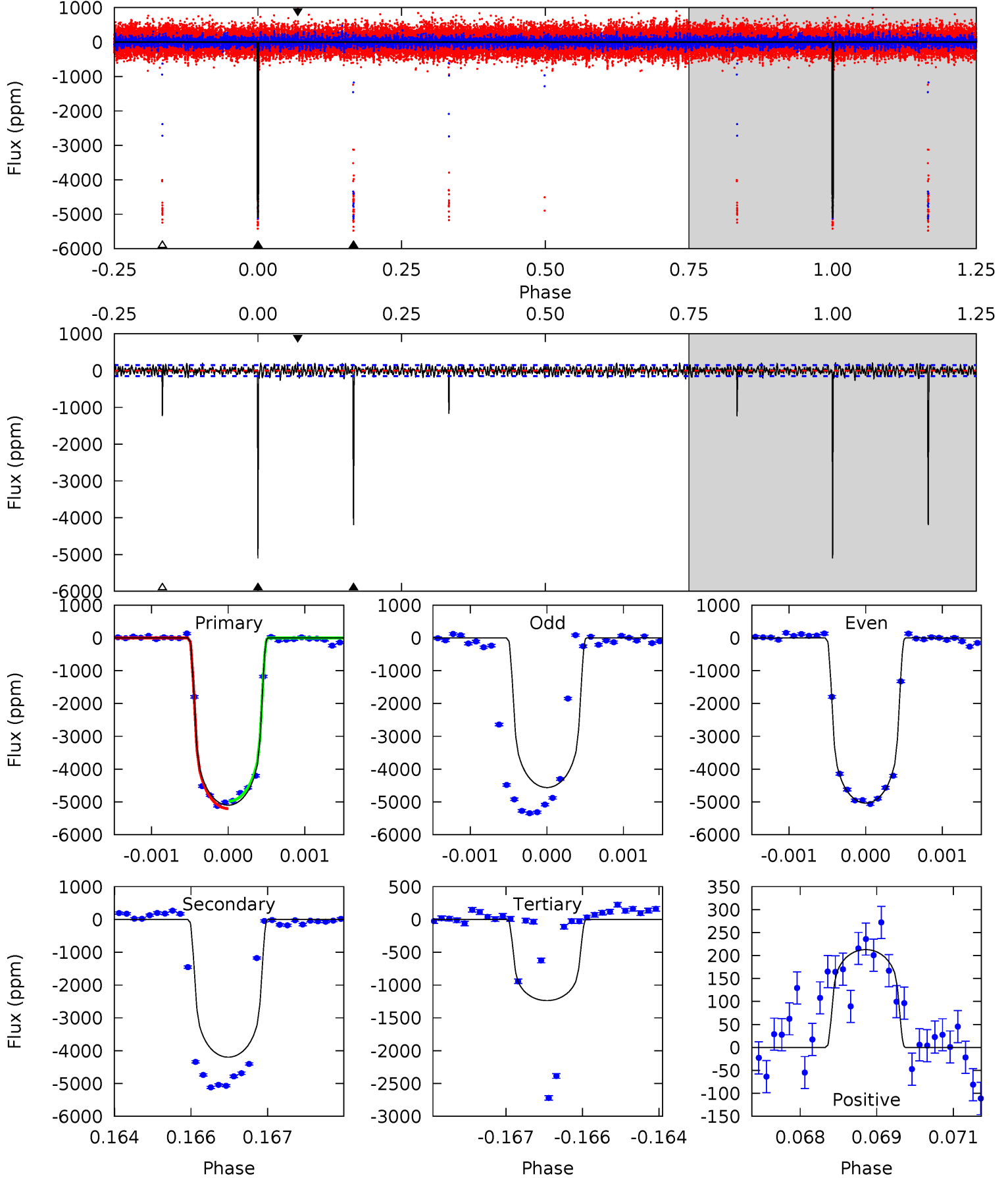
TCE 009032900-01 P=405.660656 Days  $T_0=422.102475$  (BKJD)



# DV Model-Shift Uniqueness Test

009032900-01, P = 405.660976 Days, E = 16.471678 Days

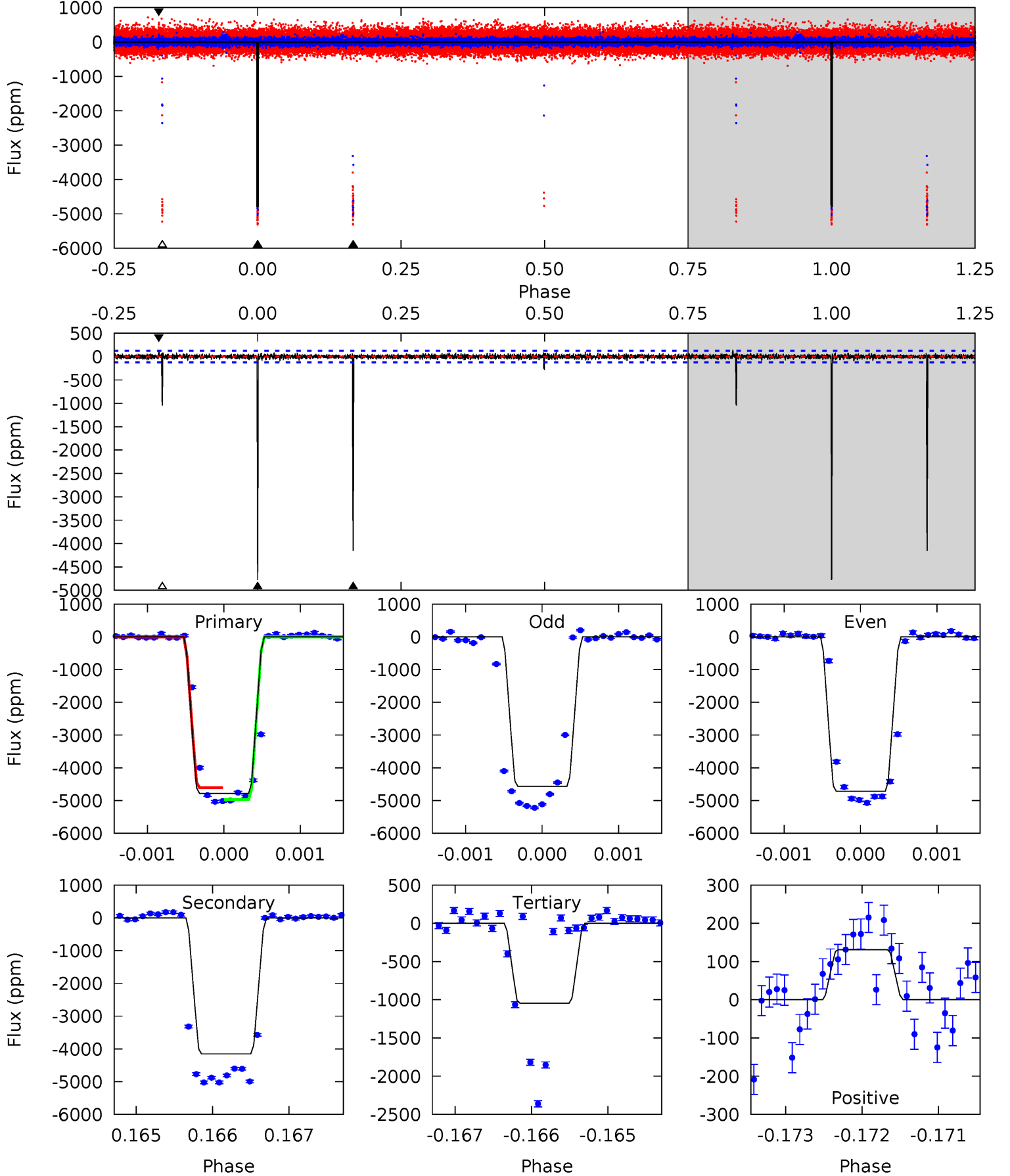
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
185.9	153.0	45.1	7.76	5.42	3.23	3.04	140.8	178.2	107.9	145.2	5.35	1.00	0.04	4.05



# Alt Model-Shift Uniqueness Test

009032900-01, P = 405.660656 Days, E = 16.441819 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
209.6	182.2	45.8	5.75	5.42	3.24	1.57	163.8	203.9	136.4	176.4	1.97	1.02	0.03	7.96



### Stellar Parameters For KIC 009032900

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6038^{+120}_{-120}$	$4.082^{+0.180}_{-0.120}$	$0.340^{+0.100}_{-0.150}$	$1.744^{+0.325}_{-0.398}$	$1.341^{+0.125}_{-0.152}$	$0.356^{+0.341}_{-0.130}$
	+2%/-2%	+4%/-3%	+29%/-44%	+19%/-23%	+9%/-11%	+96%/-36%
Source	SPE18	SPE18	SPE18	DSEP		

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

### Secondary Eclipse Parameters for KIC 009032900-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-4198 \pm 27$	$12.92^{+1.42}_{-1.55}$	$450^{+25}_{-29}$	$5879^{+127}_{-125}$	$19490^{+5263}_{-3615}$
Alt.	$-4154 \pm 23$	$13.22^{+1.36}_{-1.60}$	$449^{+26}_{-26}$	$5797^{+120}_{-111}$	$18489^{+4908}_{-3274}$

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

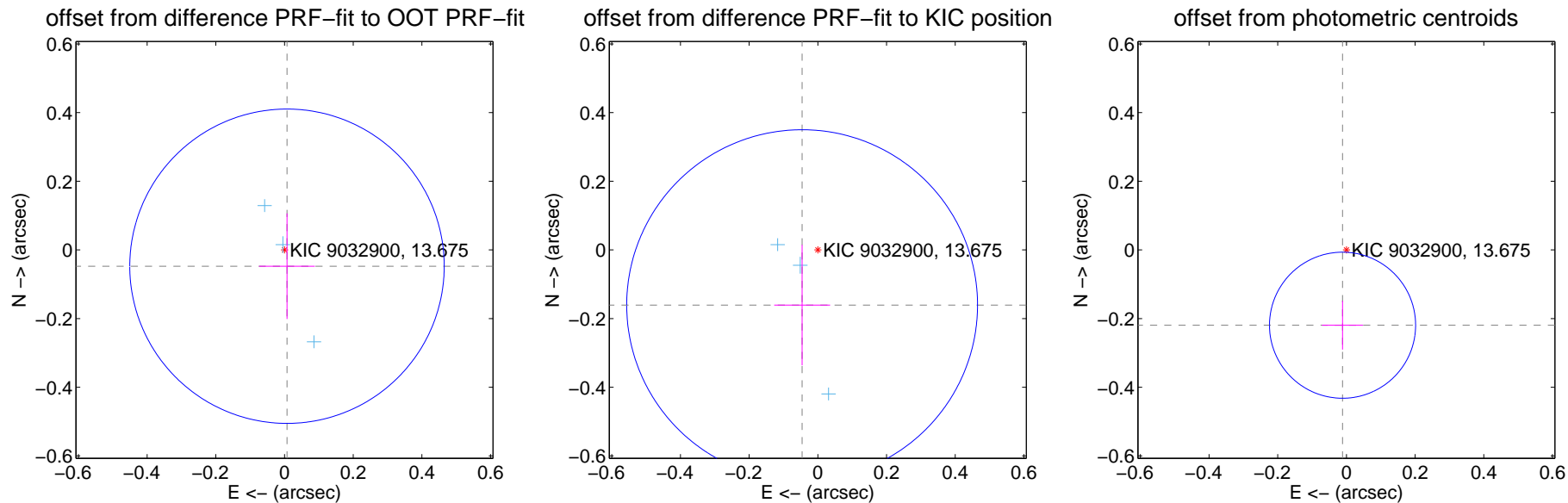
## DV Centroid Data

Supplemental centroid analysis for 009032900-01. Kepler magnitude: 13.68. Transit SNR 103.96

There are 3 quarters with good PRF difference image offsets

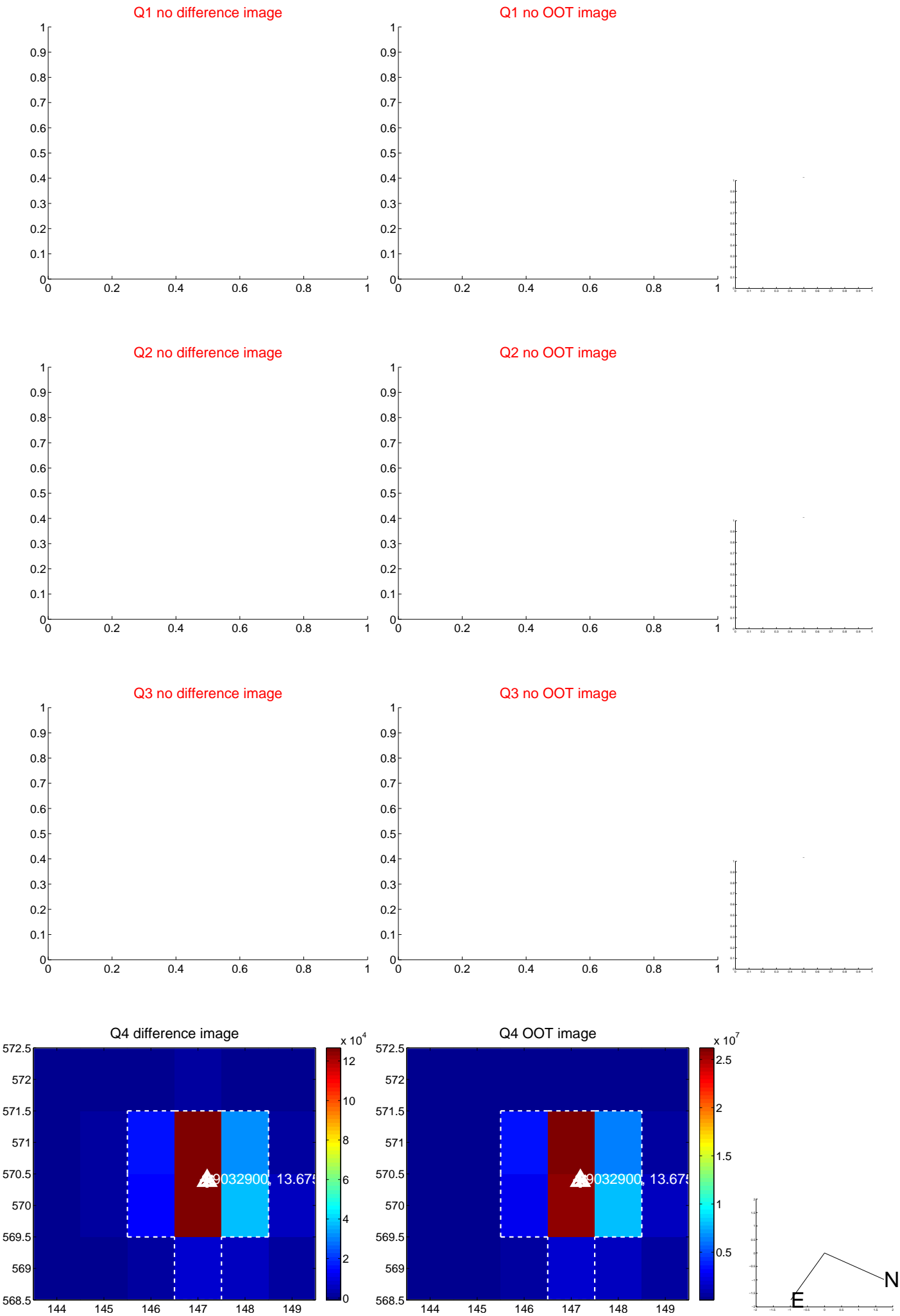
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.048 \pm 0.153$	0.31	$-0.007 \pm 0.081$	$-0.047 \pm 0.154$
PRF-fit source offset from KIC position	$0.167 \pm 0.170$	0.98	$0.046 \pm 0.081$	$-0.161 \pm 0.176$
photometric centroid source offset	$0.22 \pm 0.07$	3.10	$0.01 \pm 0.06$	$-0.22 \pm 0.07$

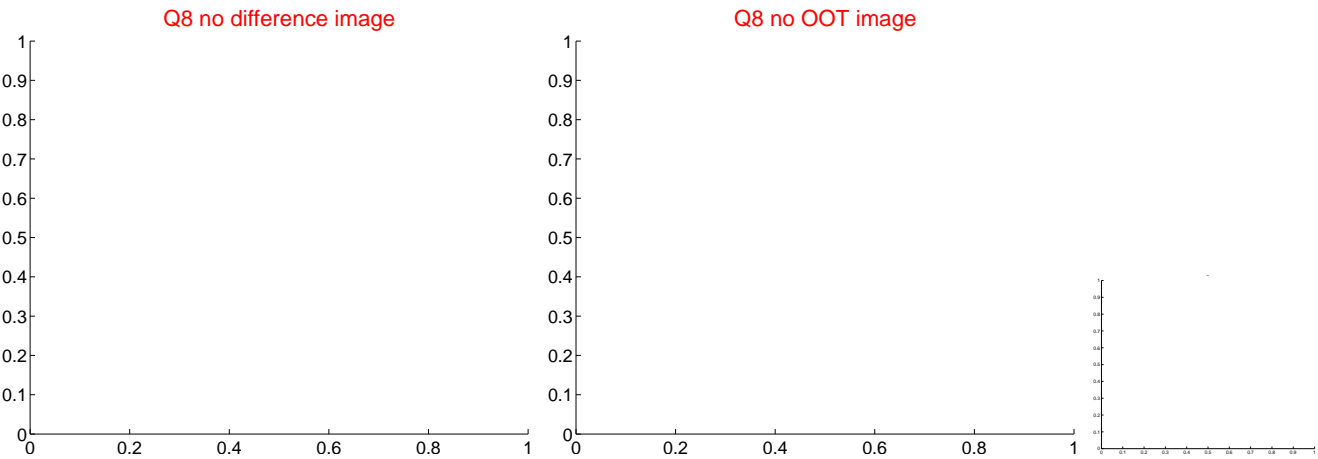
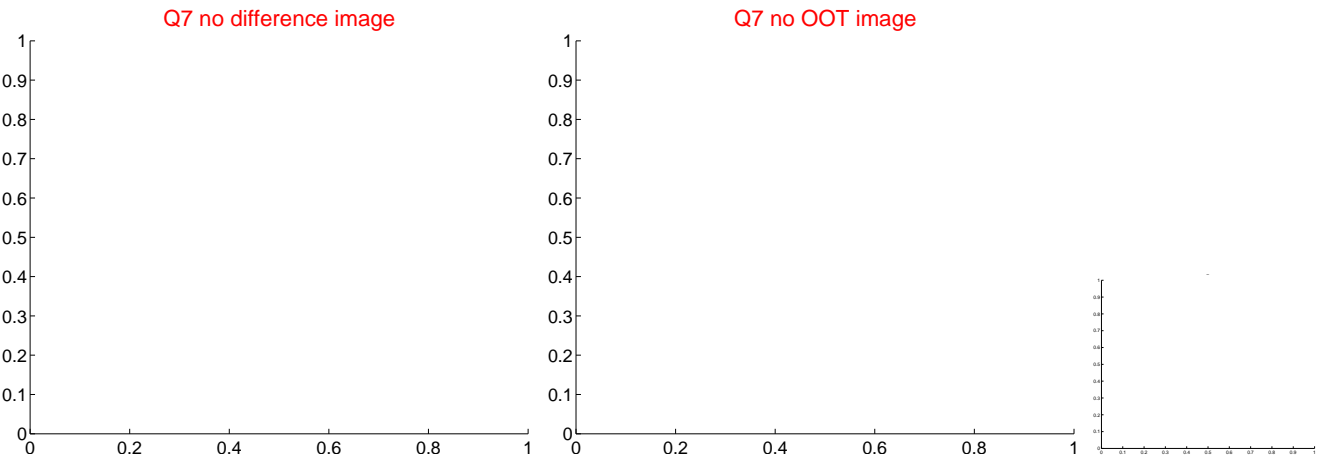
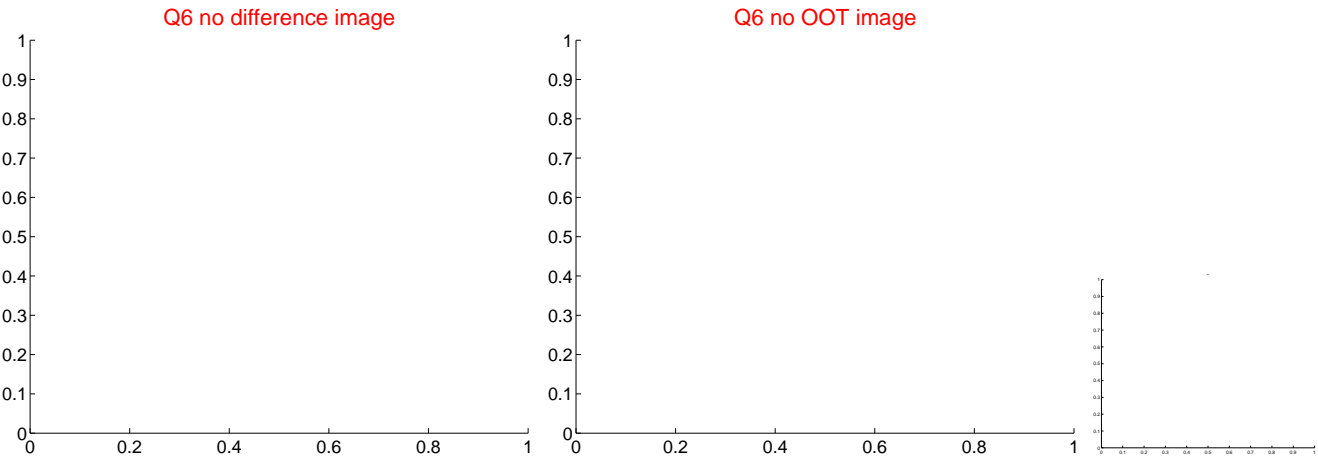
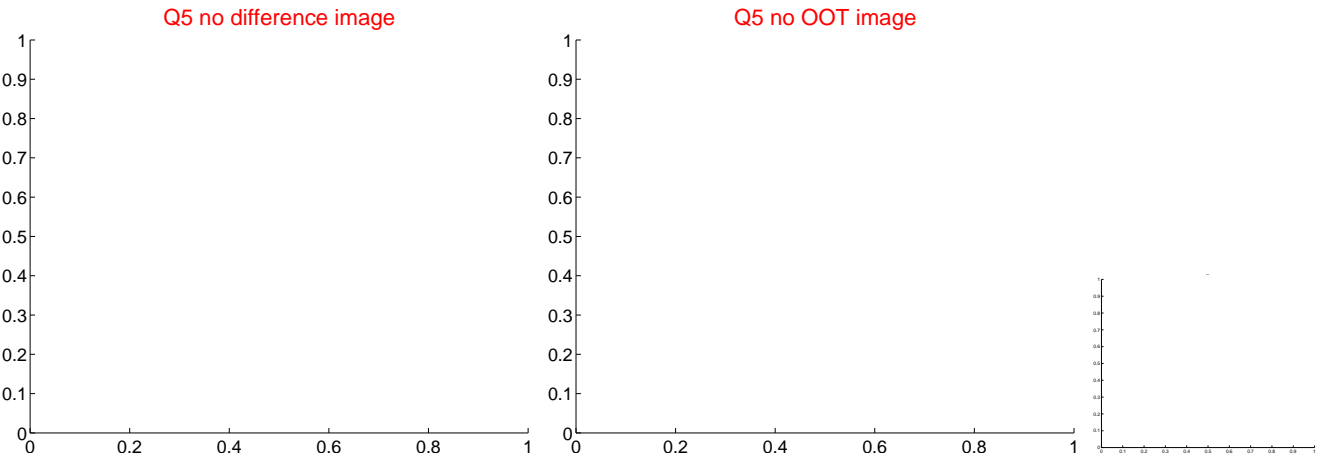


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

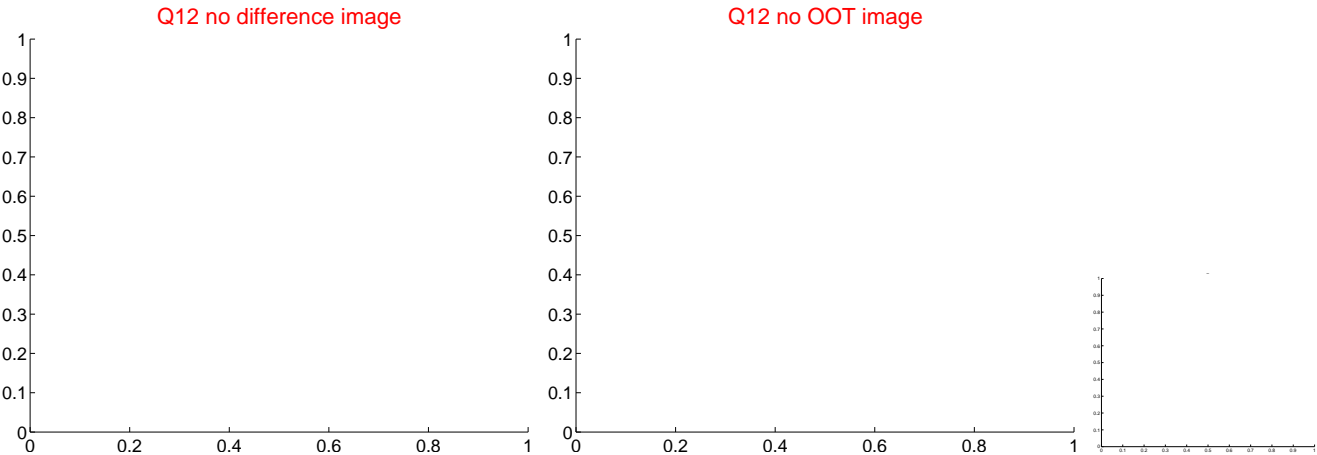
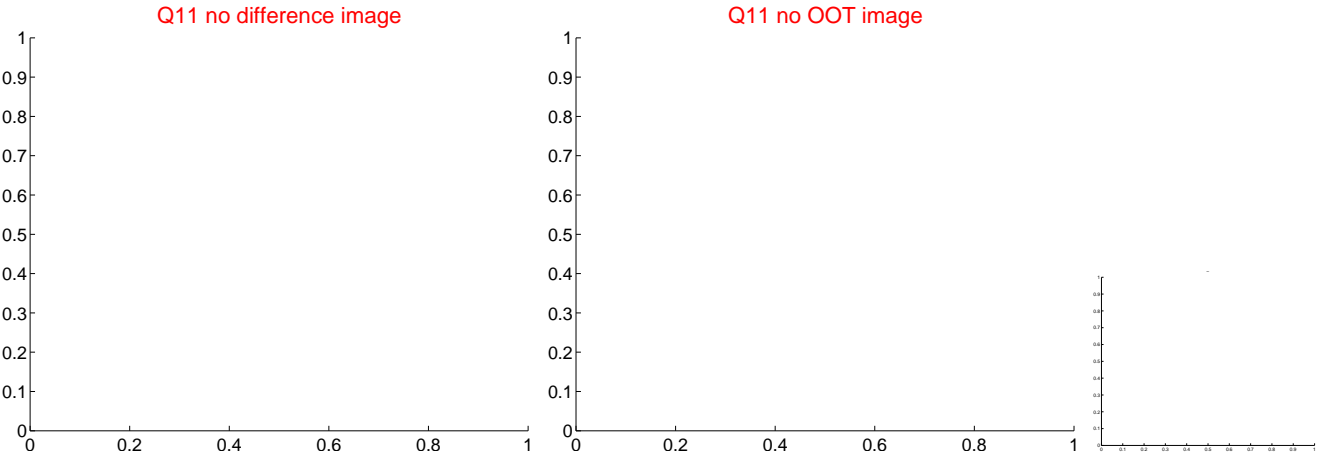
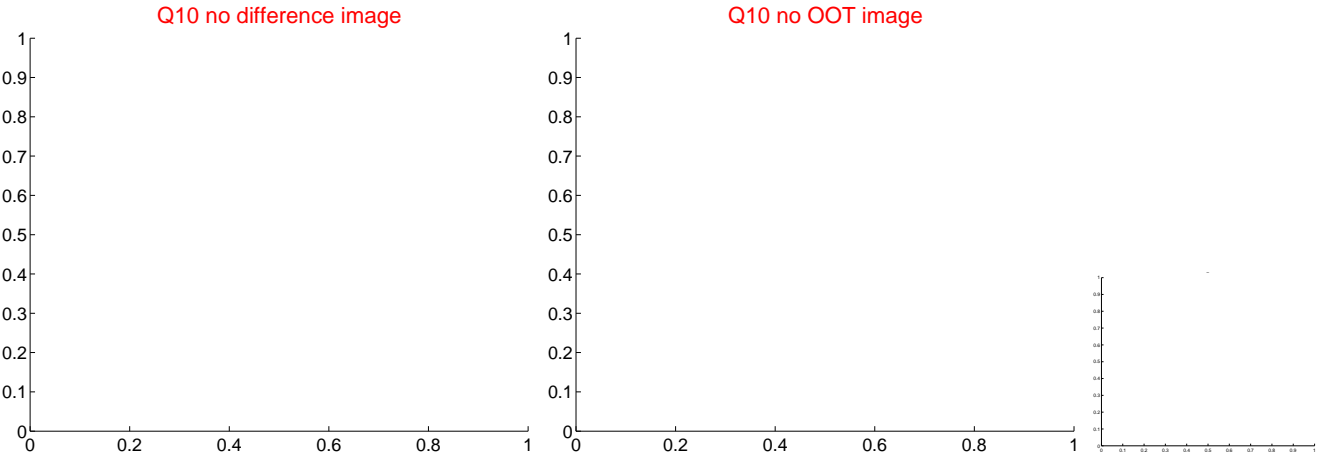
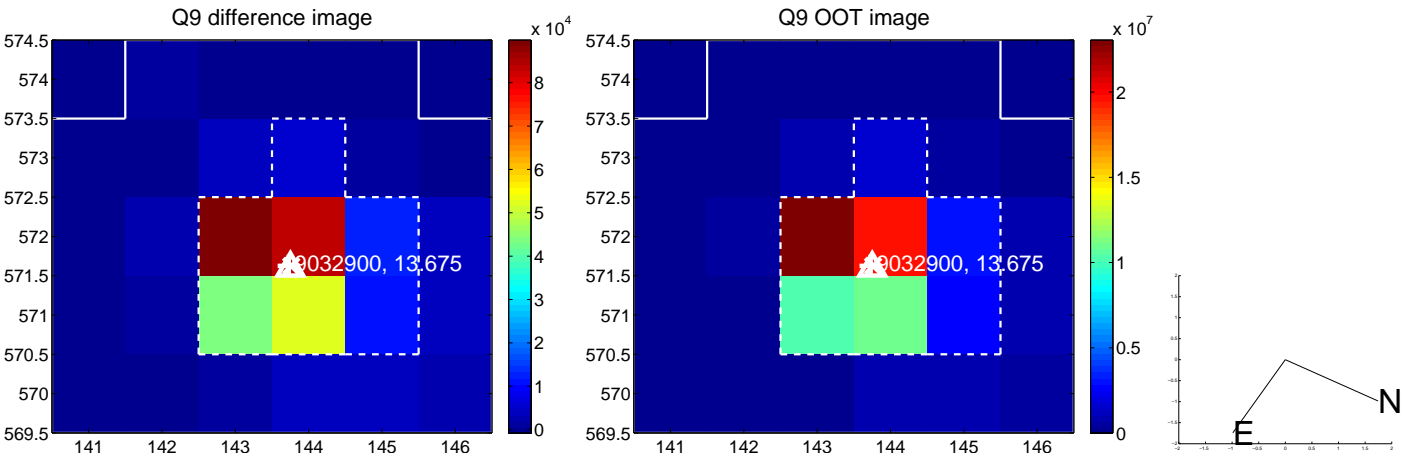


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

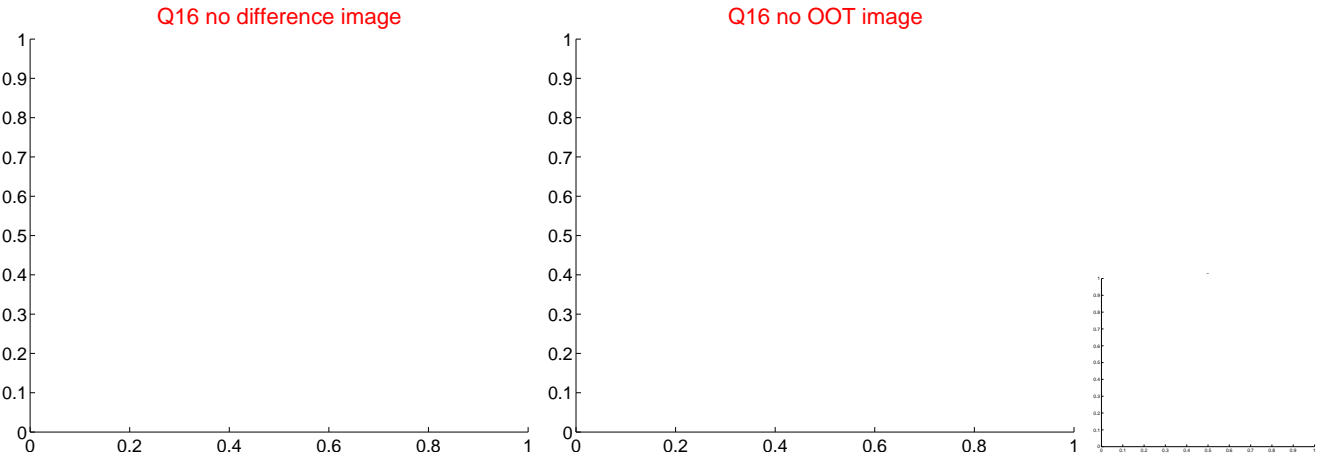
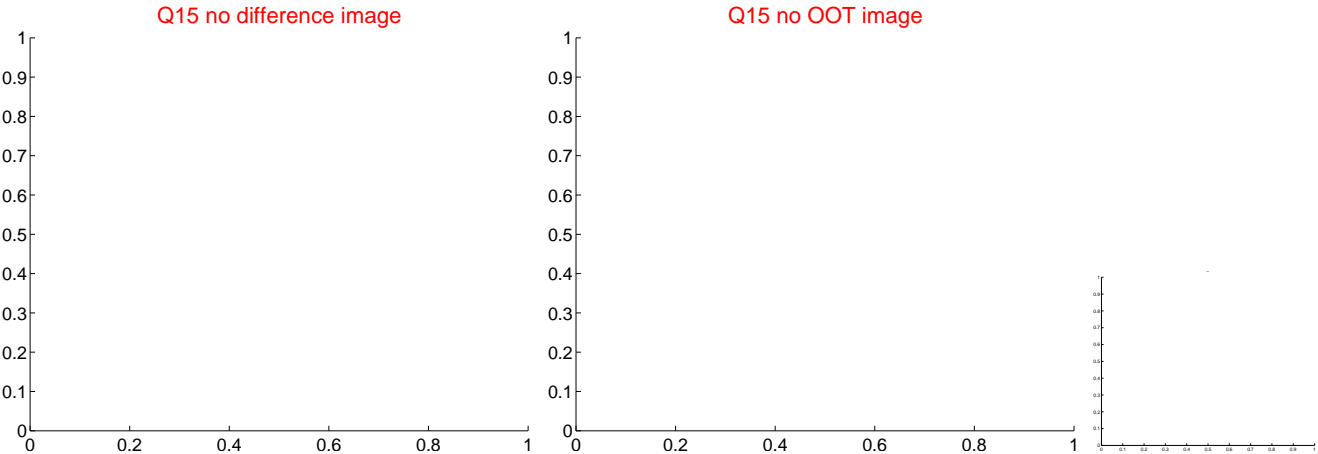
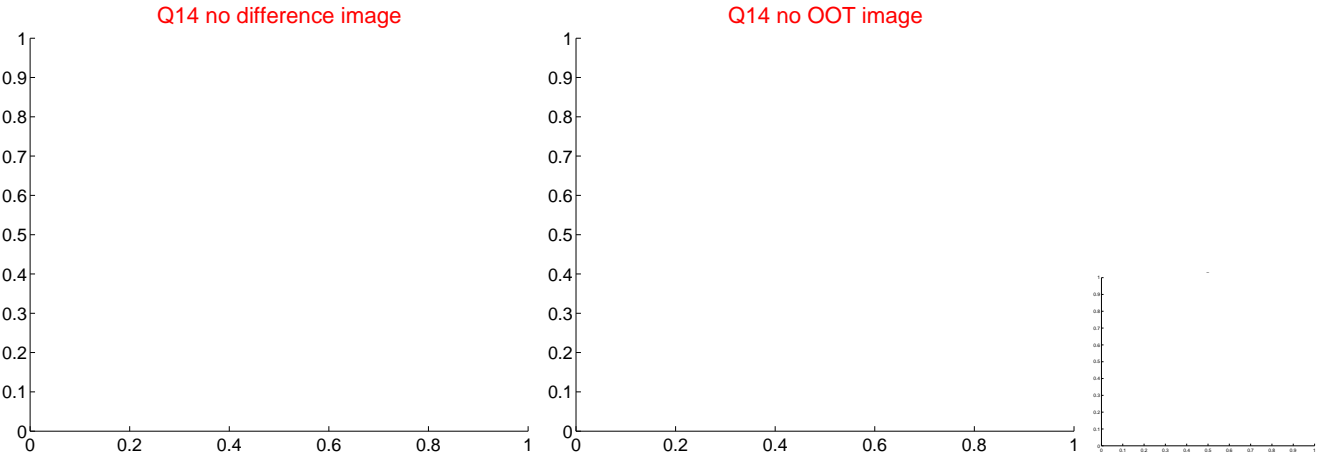
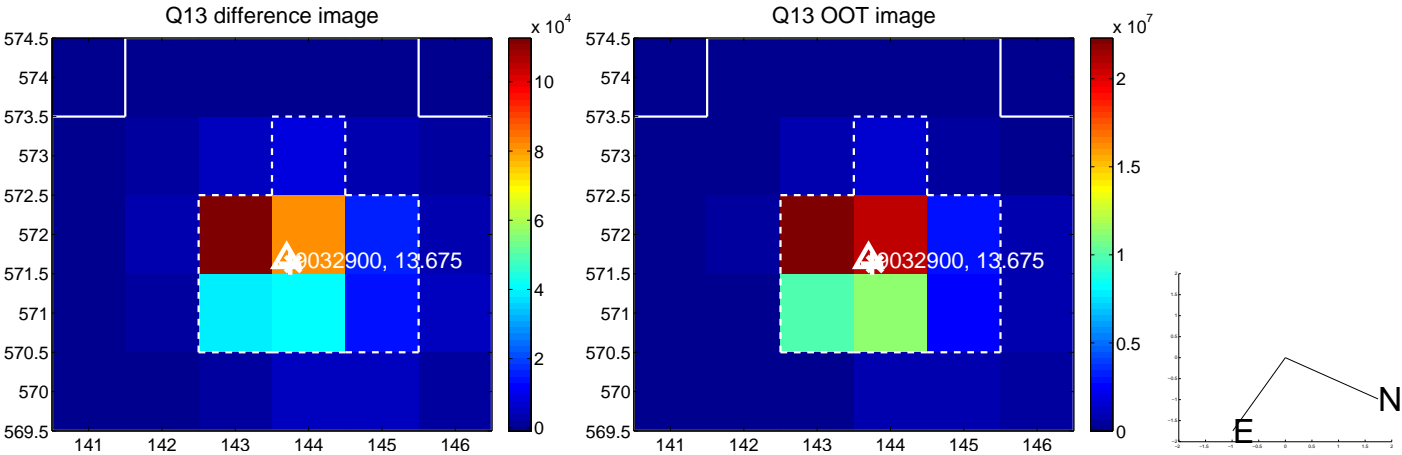




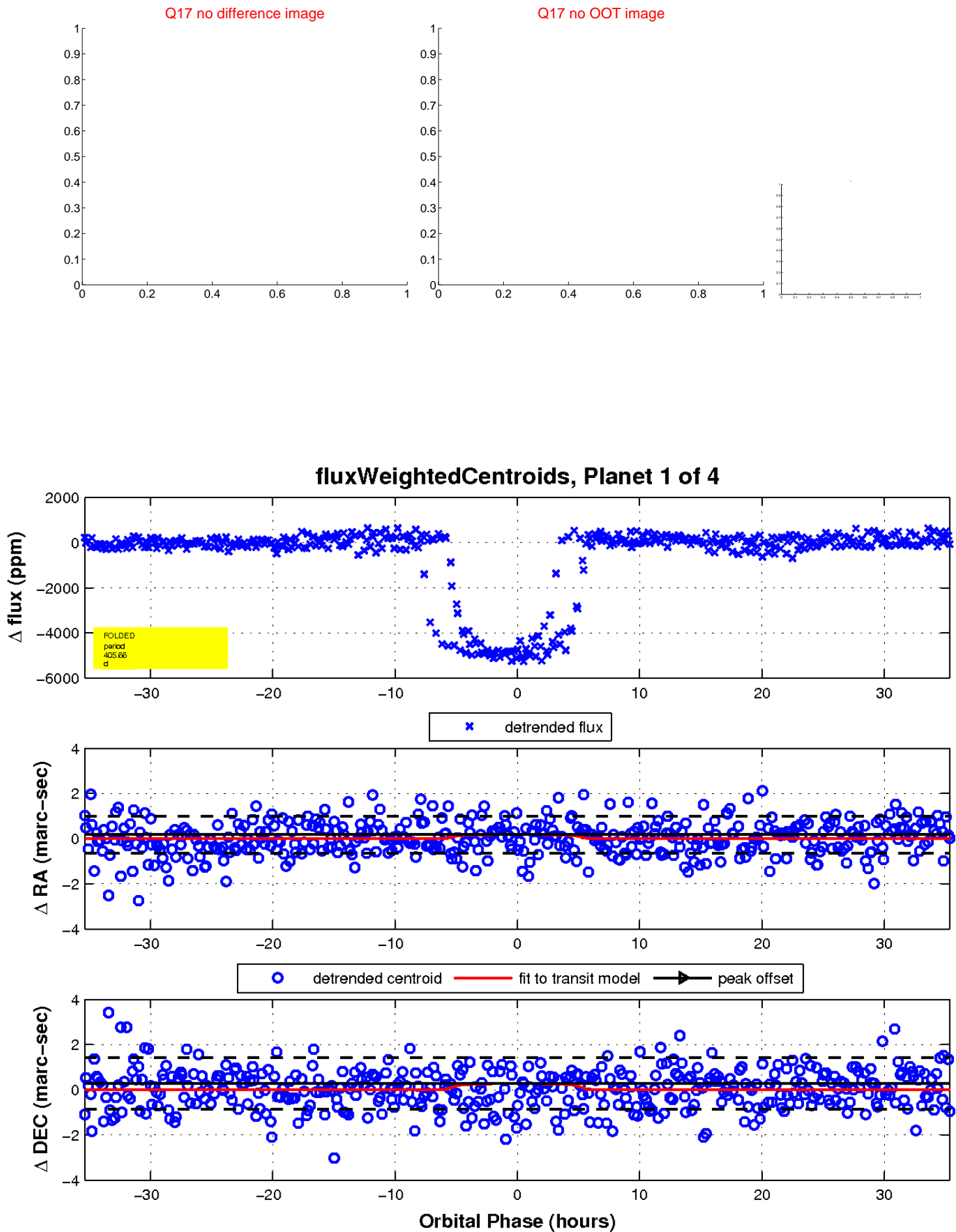
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

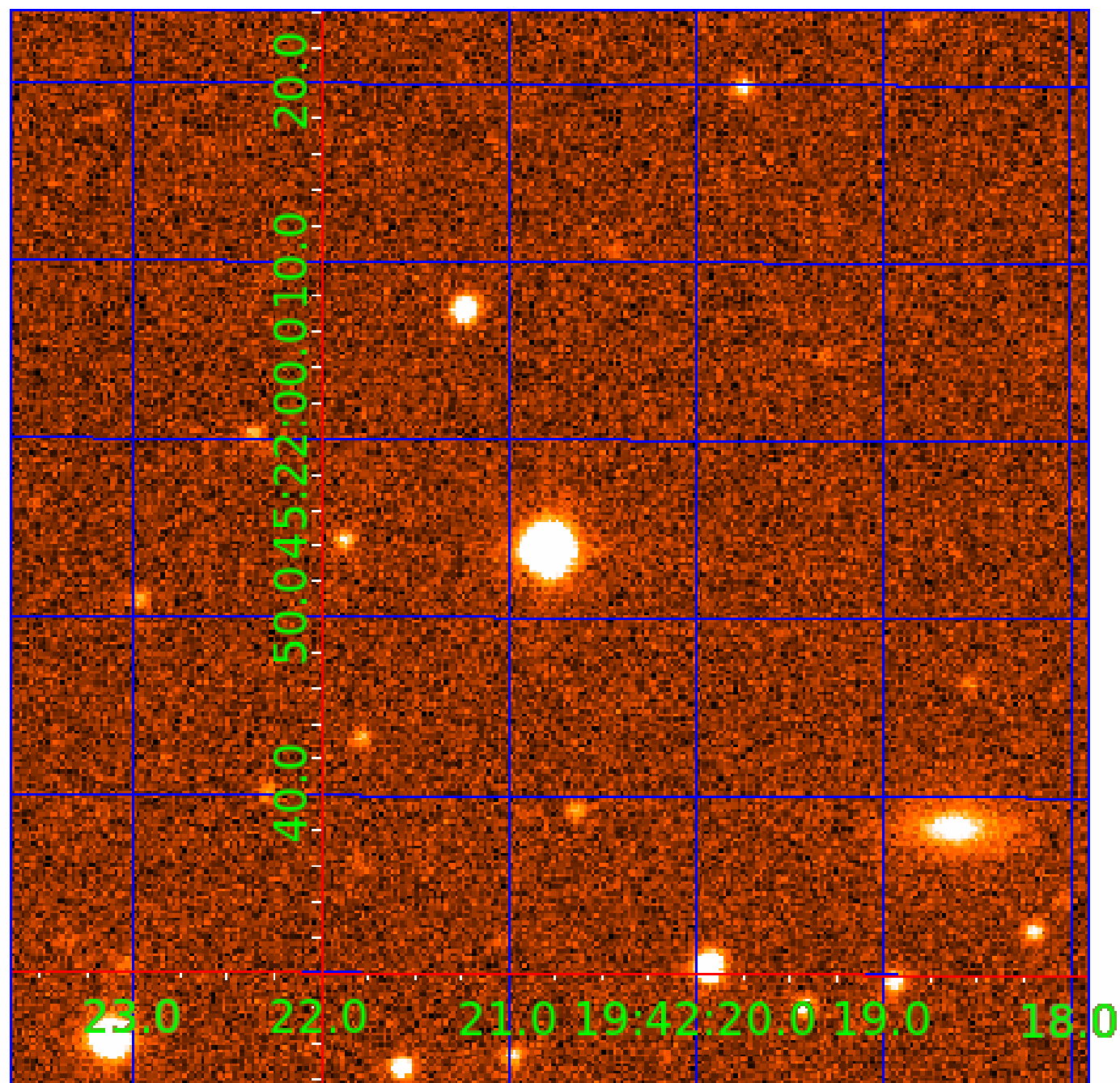


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009032900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032900-01	OBS	No	405.660975	422.132654	5144.5	11.837	104.4	104.0	1.74	6038	13.05	2.59
009032900-02	OBS	0134.01	67.685786	150.885695	401.5	20.696	97.1	11.3	1.74	6038	6.99	28.20
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032900-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_DV—PERIOD_ALIAS_ALT
009032900-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009032900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—INCONSISTENT_TRANS

**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 009032900-02

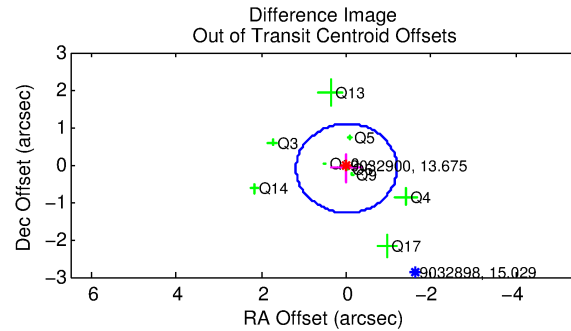
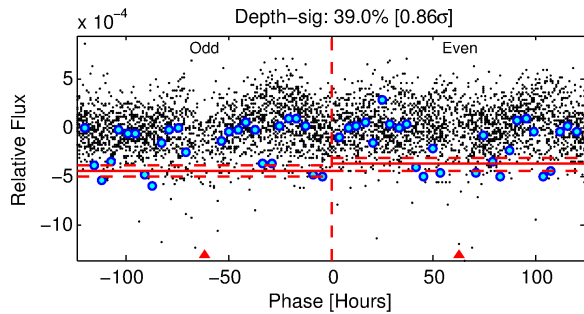
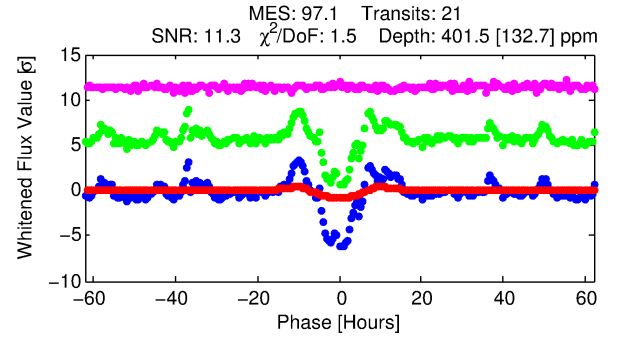
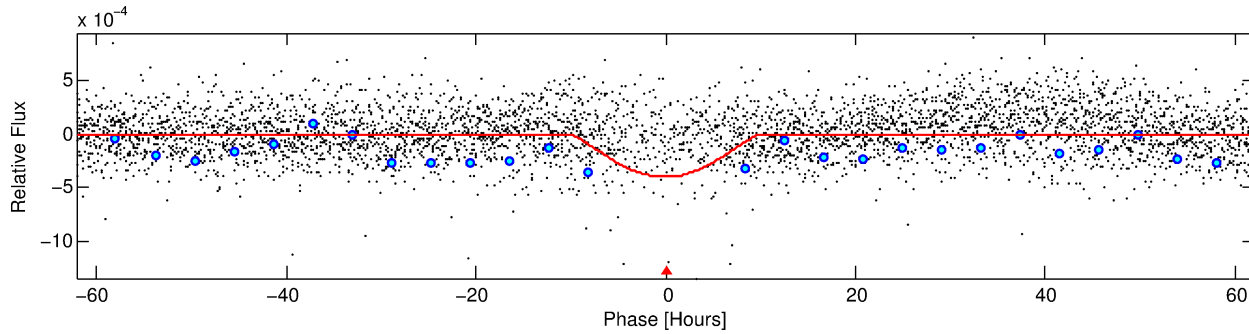
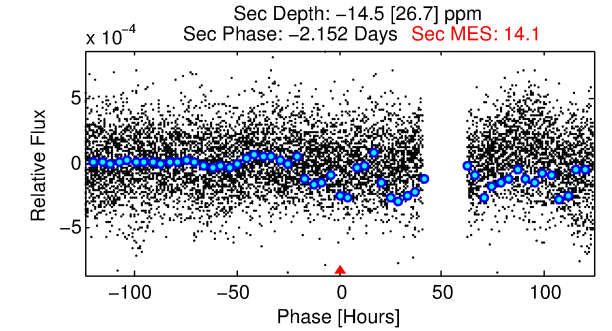
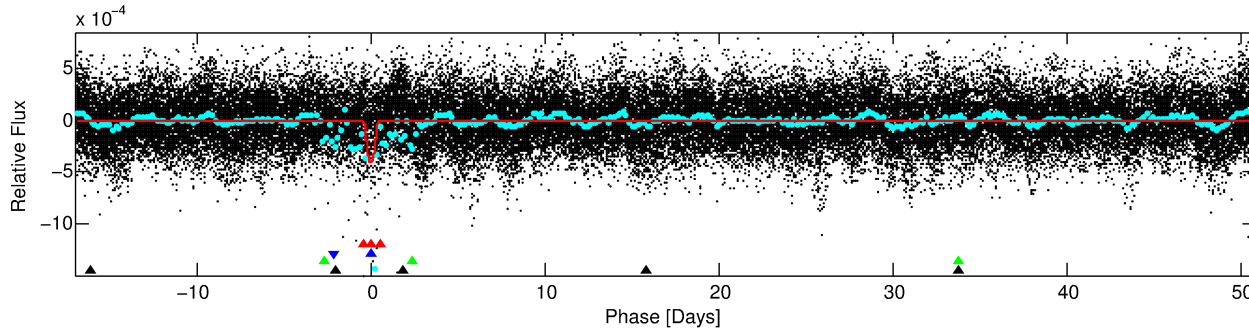
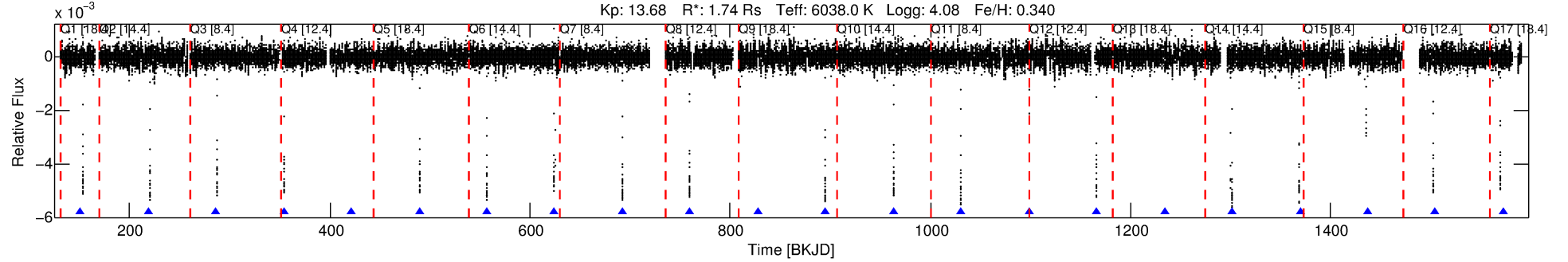
No Significant Match Found

# DV One-Page Summary

KIC: 9032900 Candidate: 2 of 4 Period: 67.686 d

KOI: K00134 Corr: No Ephemeris Match

Kp: 13.68 R\*: 1.74 Rs Teff: 6038.0 K Logg: 4.08 Fe/H: 0.340



## DV Fit Results:

Period = 67.68579 [0.00221] d  
Epoch = 150.8857 [0.0267] BKJD  
Rp/R\* = 0.0367 [0.0504]  
a/R\* = 6.91 [2.33]  
b = 1.00 [0.06]  
Seff = 28.19 [9.17]  
Teff = 588 [48] K  
Rp = 6.99 [9.72] Re  
a = 0.3584 [0.0737] AU  
Ag = N/A  
Teffp = N/A

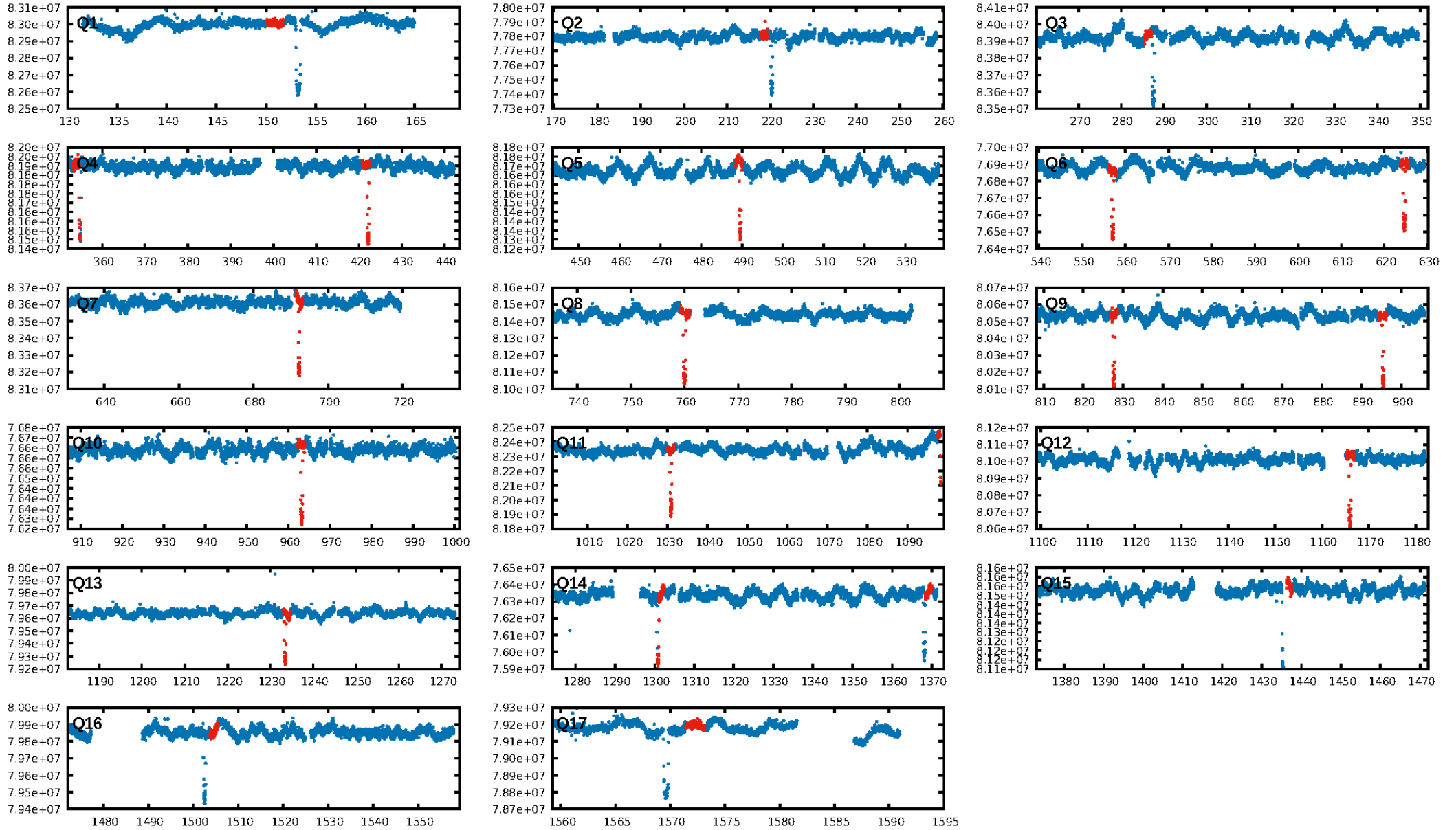
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [256.03σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [19/19]  
GhostDiagnostic-chr: -16.52  
Centroid-sig: 12.3%  
Centroid-so: 0.453 arcsec [1.54σ]  
OotOffset-rm: 0.099 arcsec [0.25σ]  
KicOffset-rm: 0.160 arcsec [0.47σ]  
OotOffset-st: 3/1/1/4 [9]  
KicOffset-st: 3/1/1/4 [9]  
DiffImageQuality-fgm: 0.44 [4/9]  
DiffImageOverlap-fno: 0.82 [9/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 17:46:22 Z

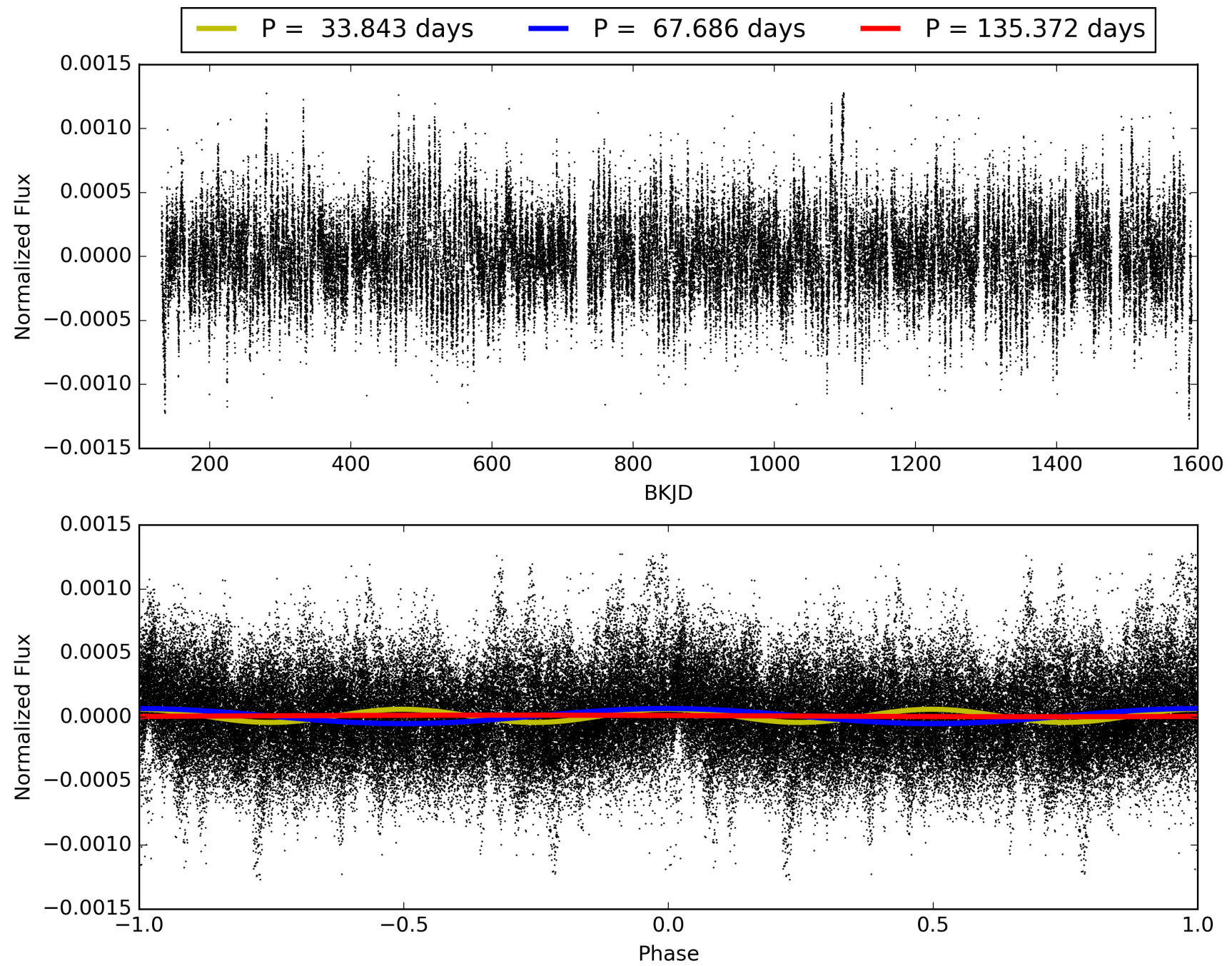
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009032900-02, PDC Light Curves





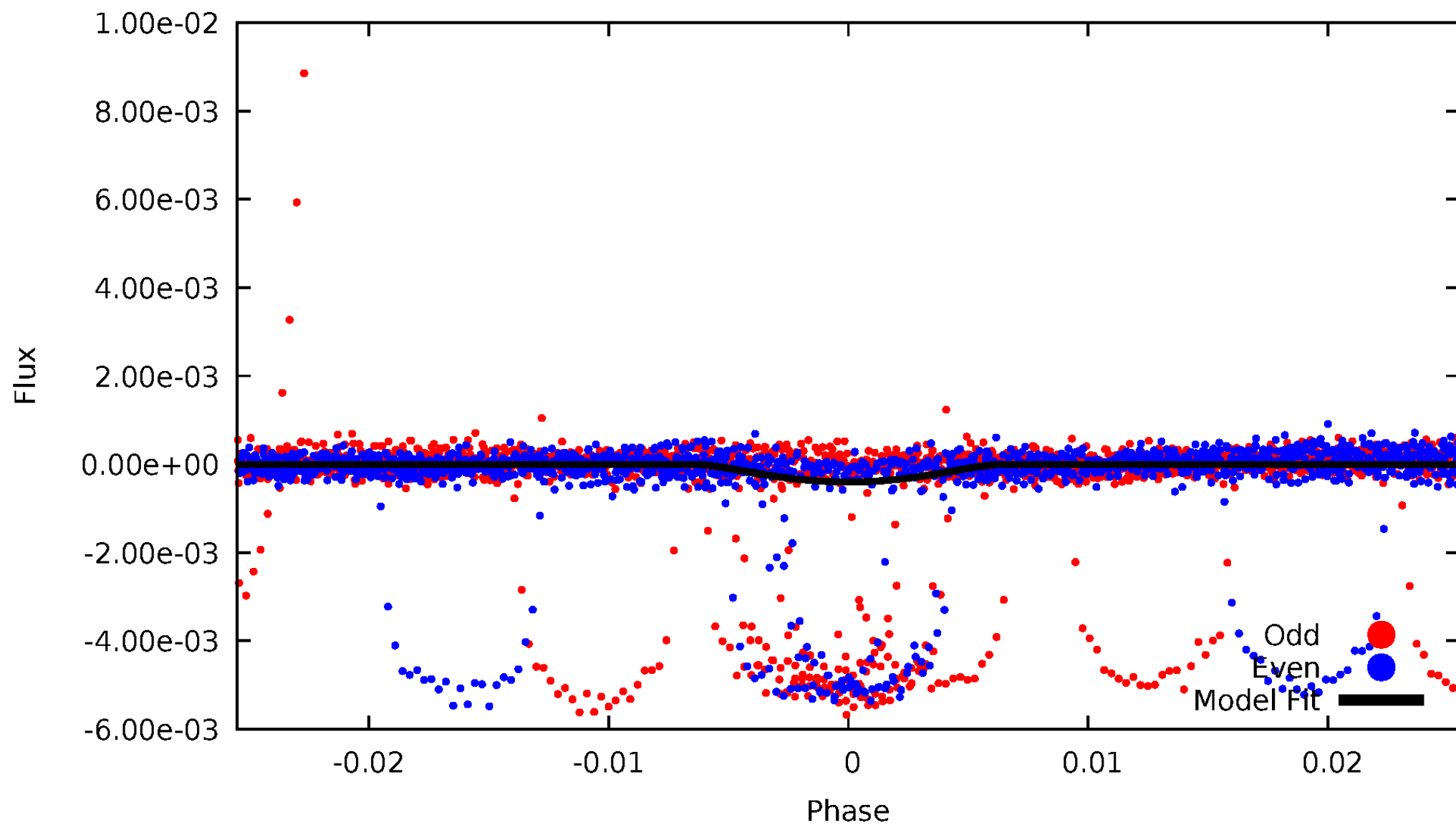
TCE 009032900-02





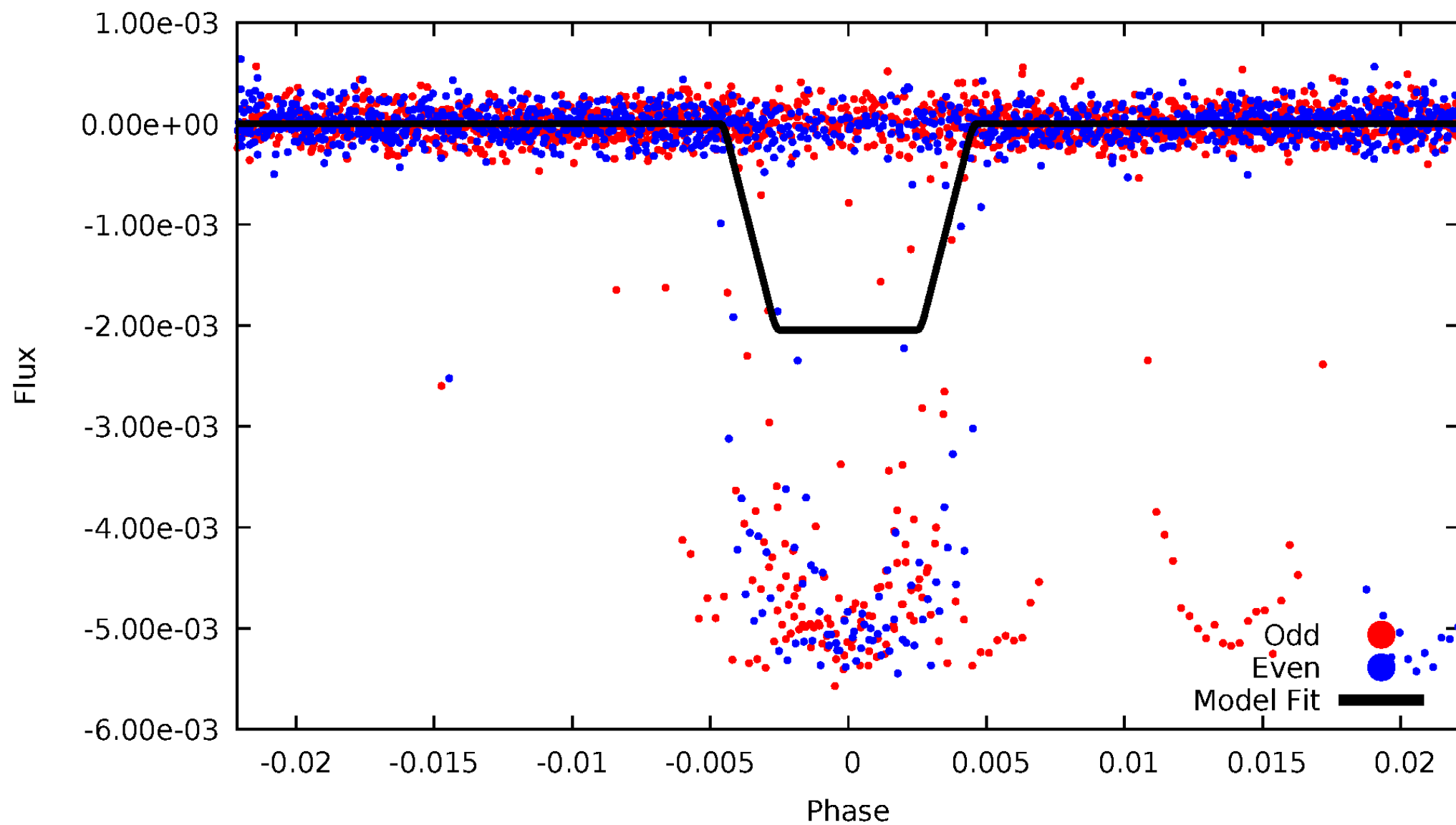
# DV Odd/Even

TCE 009032900-02



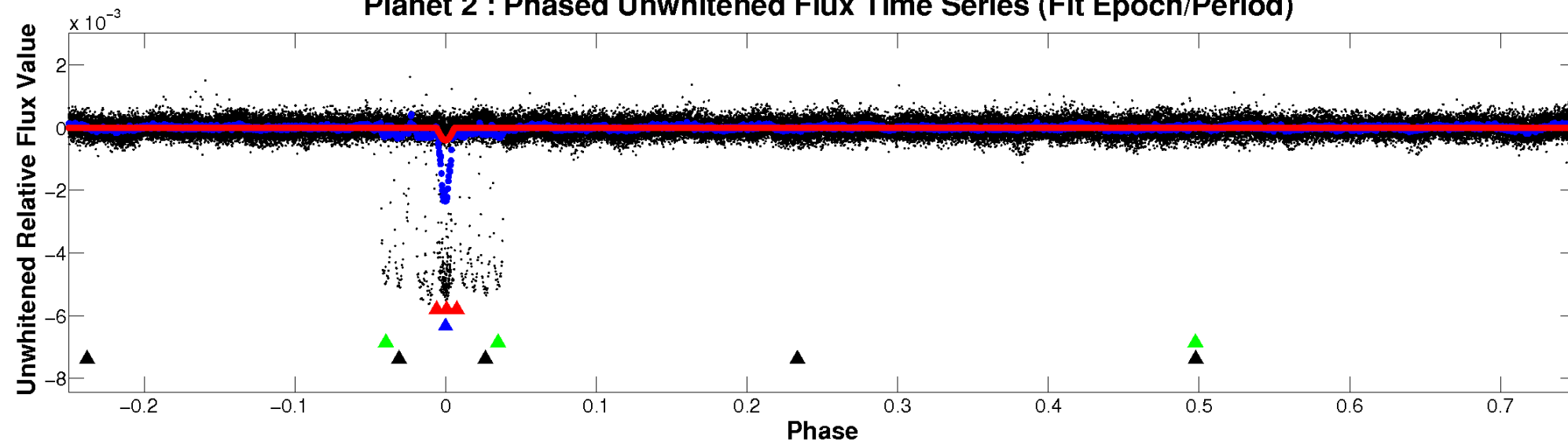
# ALT Odd/Even

TCE 009032900-02

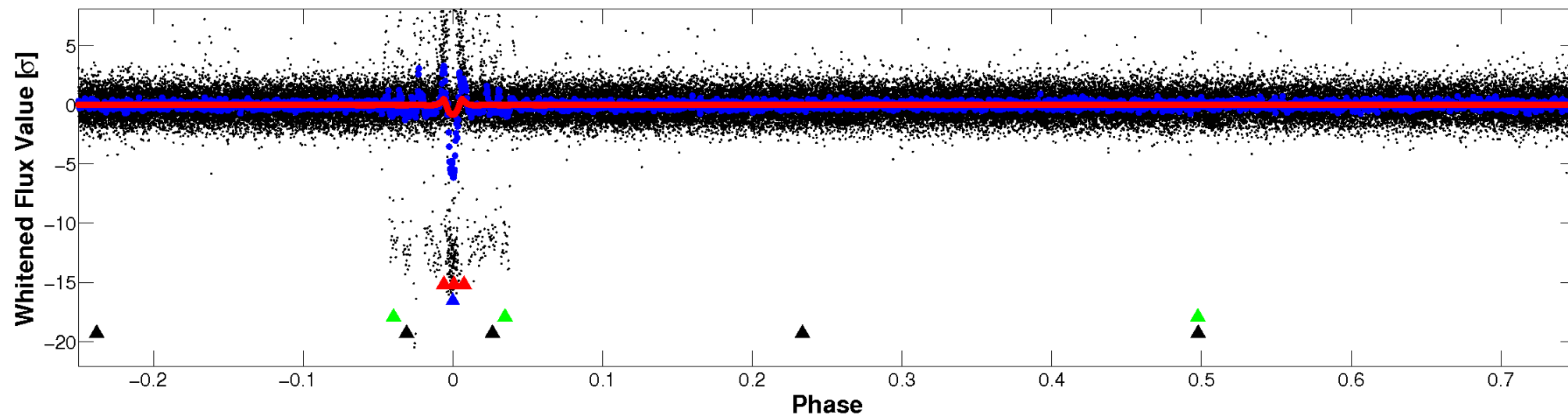


# Non-Whitened Vs. Whitened Light Curve

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

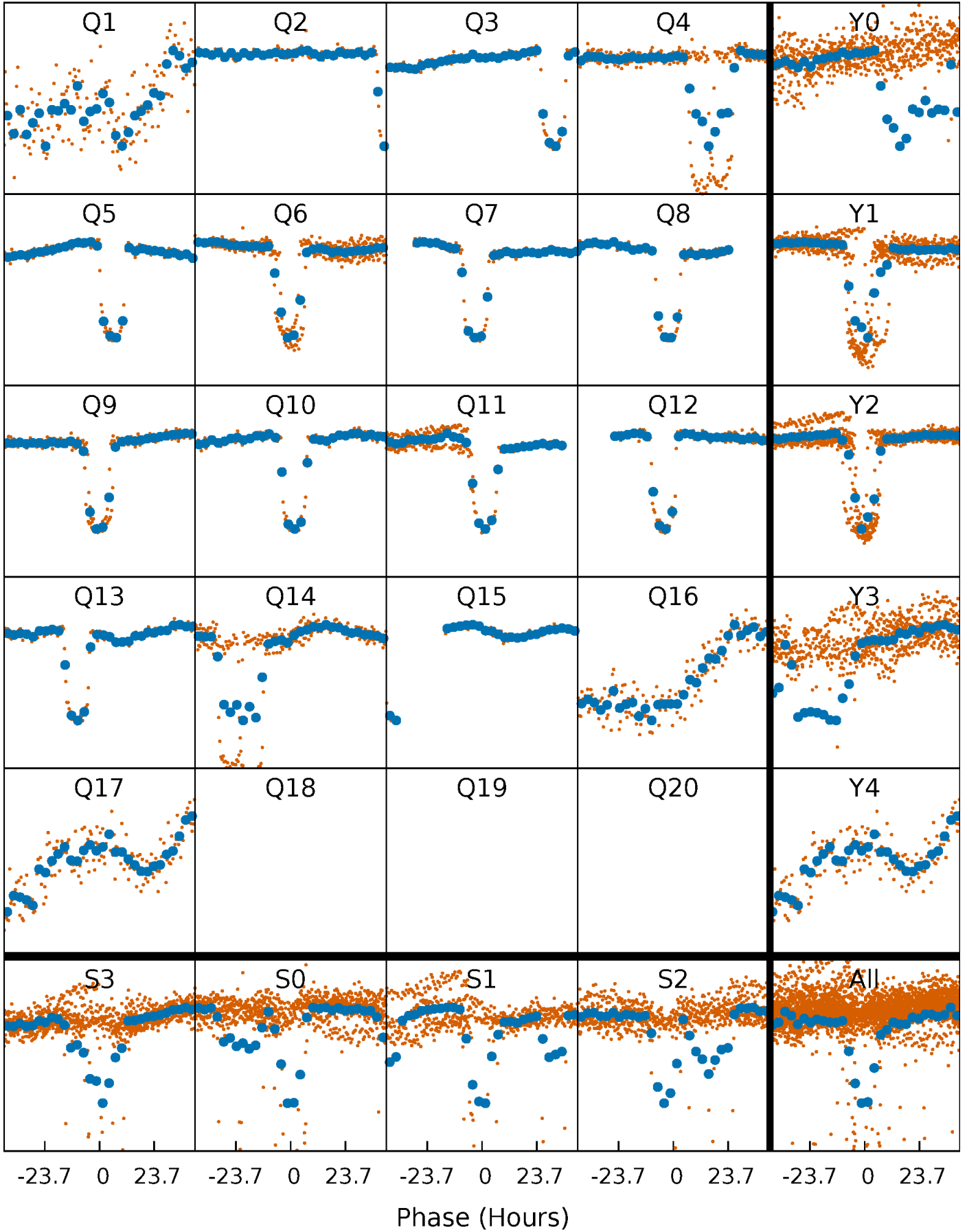


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



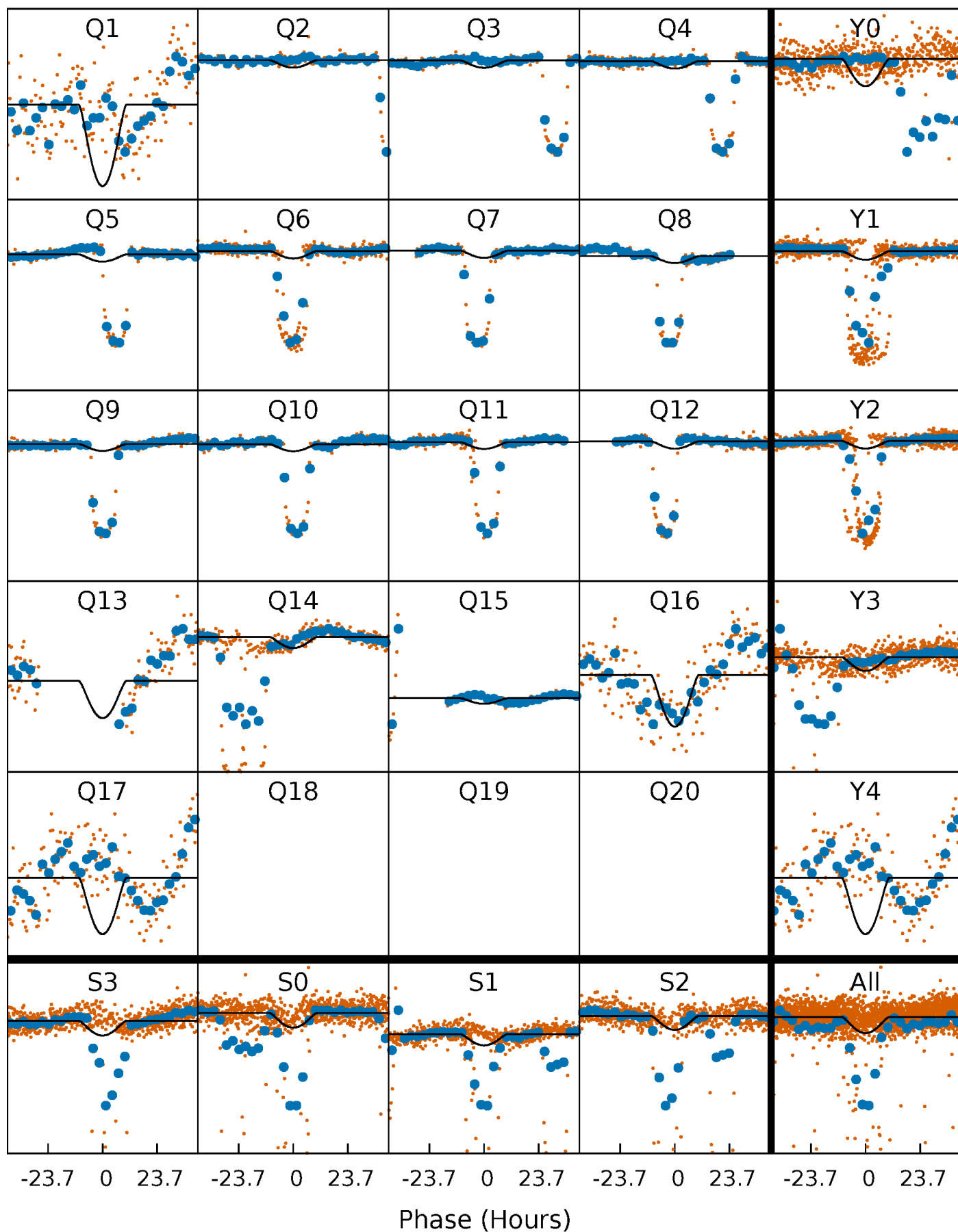
# PDC Quarter-Phased Transit Curves

TCE 009032900-02     $P = 67.685786$  Days     $T_0 = 150.885695$  (BKJD)



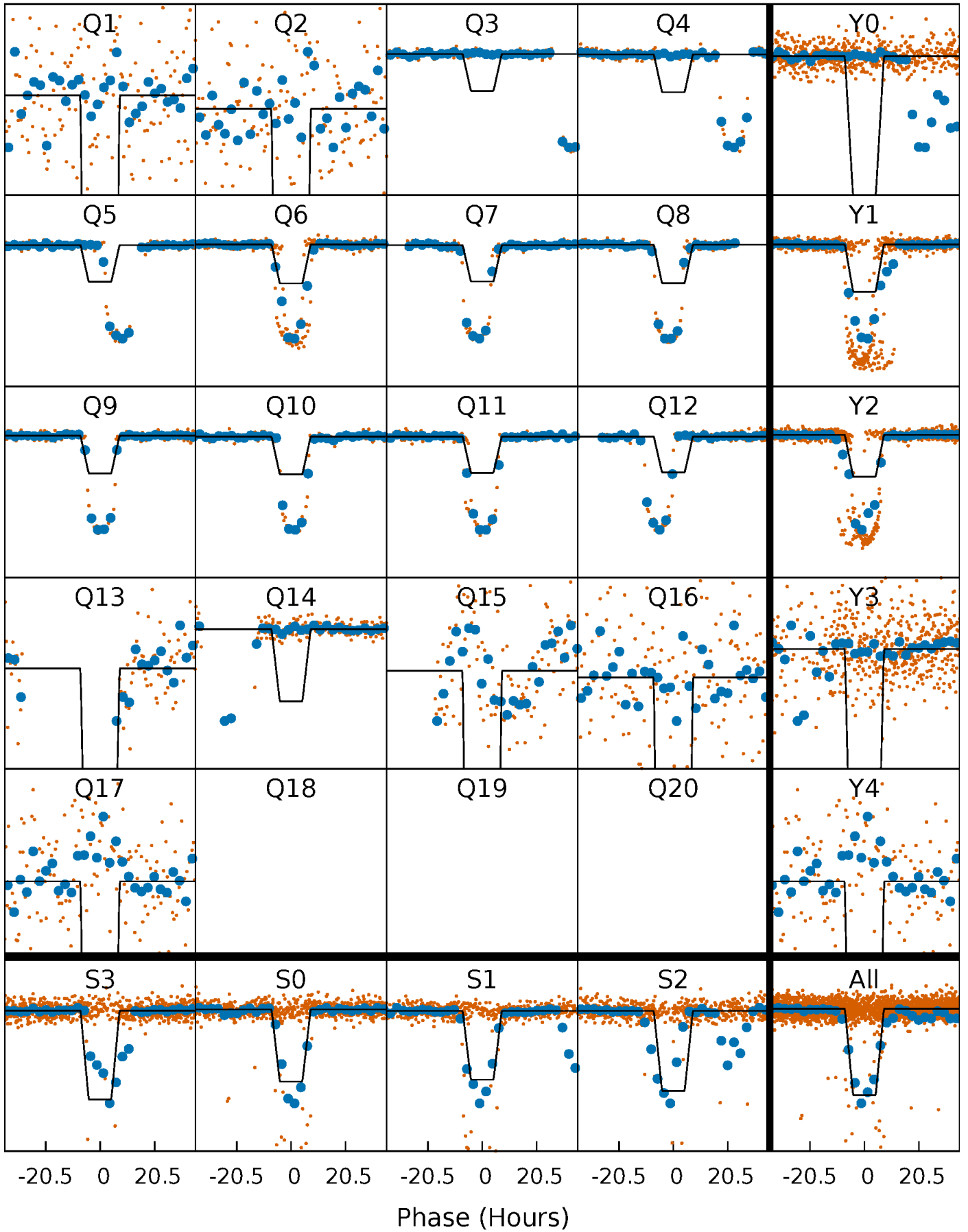
# DV Quarter-Phased Transit Curves

TCE 009032900-02     $P = 67.685786$  Days     $T_0 = 150.885695$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

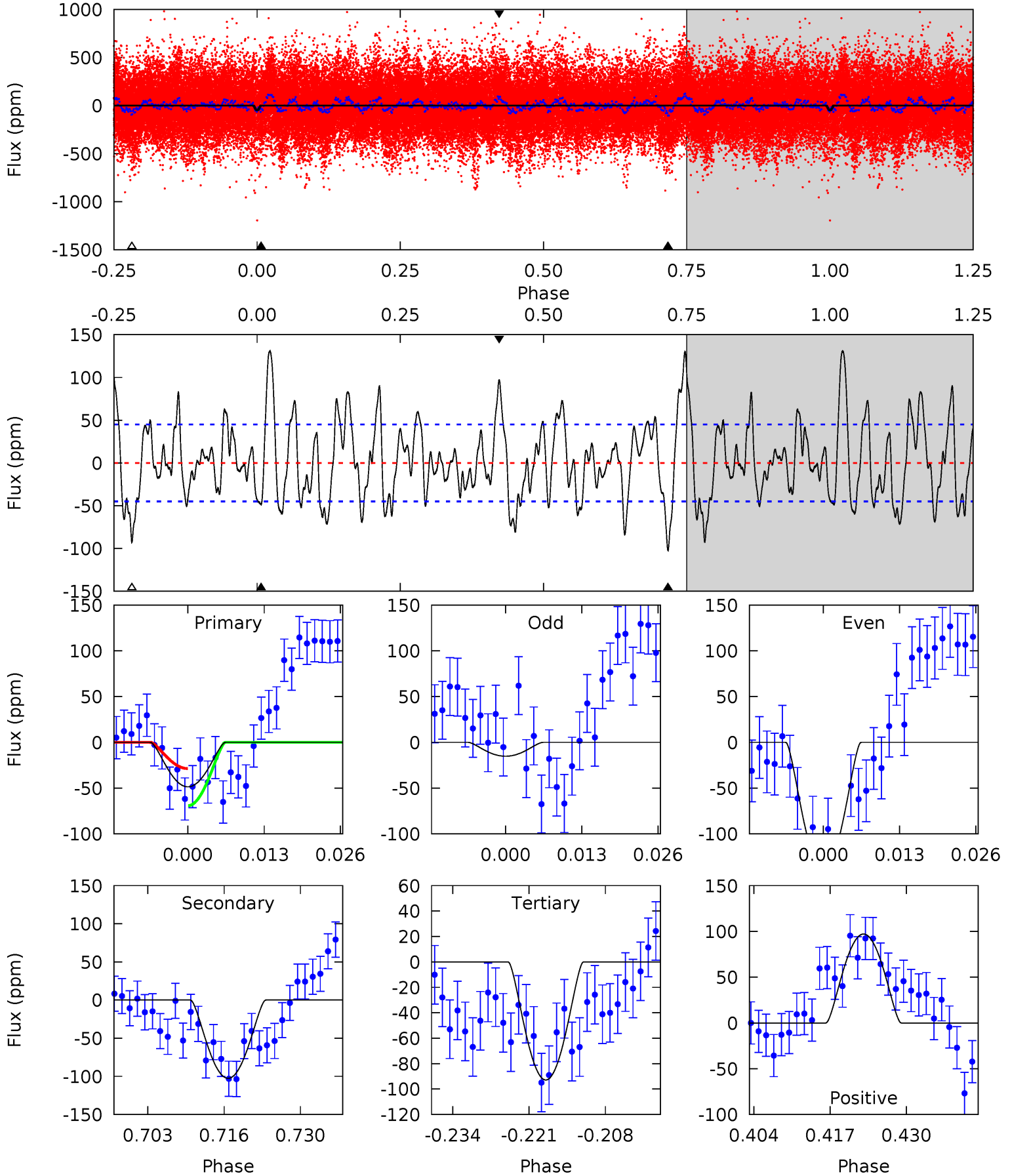
TCE 009032900-02     $P = 67.697923$  Days     $T_0 = 150.755336$  (BKJD)



# DV Model-Shift Uniqueness Test

009032900-02, P = 67.685786 Days, E = 83.199909 Days

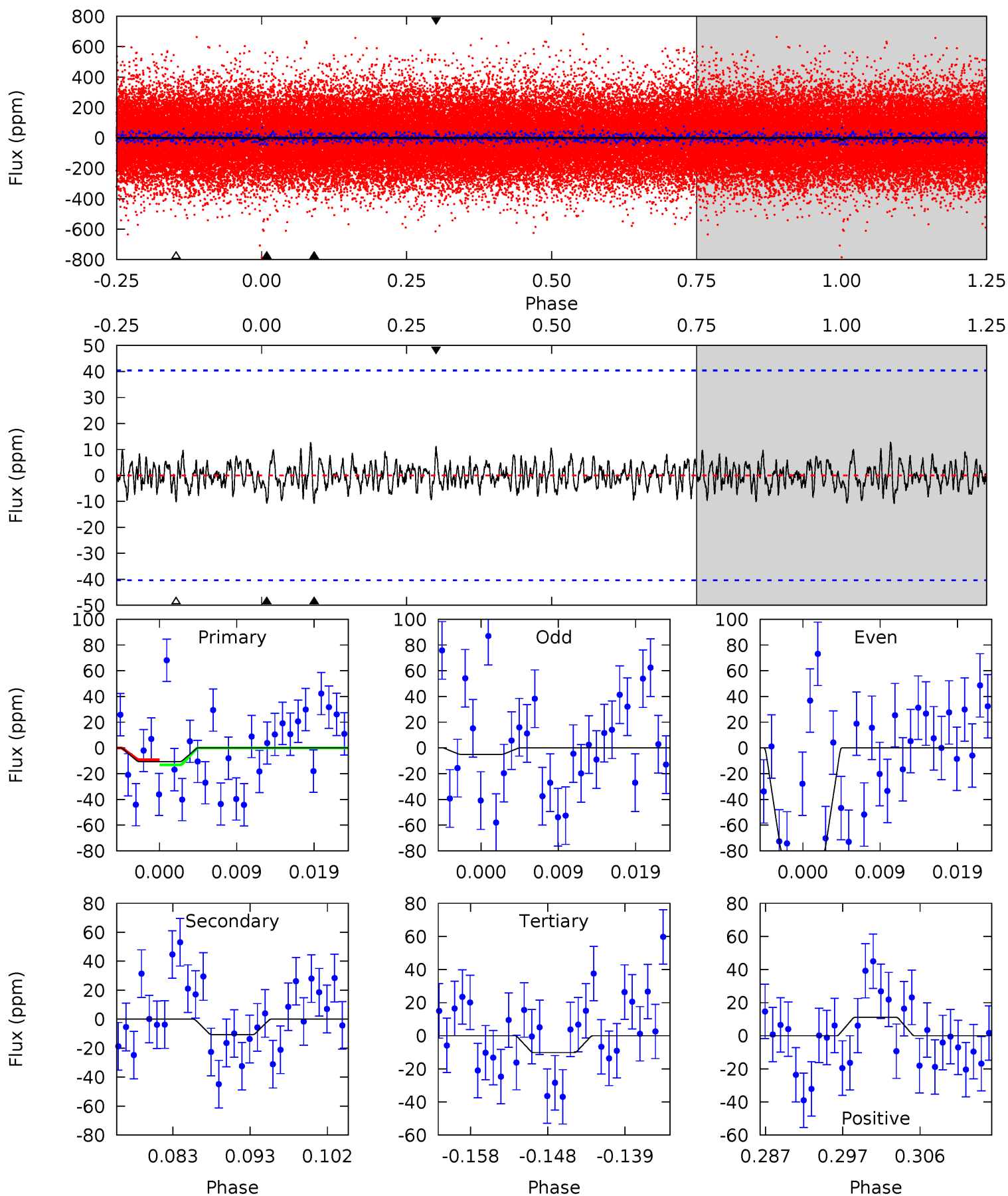
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.38	11.3	10.3	10.7	4.98	2.48	4.57	-4.89	-5.36	1.07	0.60	6.81	1.79	0.56	2.24



# Alt Model-Shift Uniqueness Test

009032900-02, P = 67.697923 Days, E = 83.057413 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
1.32	1.33	1.27	1.39	5.04	2.60	0.48	0.05	-0.07	0.06	-0.06	4.69	1.21	0.54	0.25





### Stellar Parameters For KIC 009032900

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6038^{+120}_{-120}$	$4.082^{+0.180}_{-0.120}$	$0.340^{+0.100}_{-0.150}$	$1.744^{+0.325}_{-0.398}$	$1.341^{+0.125}_{-0.152}$	$0.356^{+0.341}_{-0.130}$
	+2%/-2%	+4%/-3%	+29%/-44%	+19%/-23%	+9%/-11%	+96%/-36%
Source	SPE18	SPE18	SPE18	DSEP		

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

### Secondary Eclipse Parameters for KIC 009032900-02 / KOI 0134.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-103 \pm 9$	$9.87^{+8.12}_{-6.65}$	$817^{+41}_{-47}$	$3221^{+1554}_{-488}$	$73^{+608}_{-51}$
Alt.	$-11 \pm 8$	$10.77^{+8.38}_{-6.44}$	$816^{+43}_{-52}$	$2279^{+642}_{-462}$	$5.457^{+29.828}_{-4.614}$

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

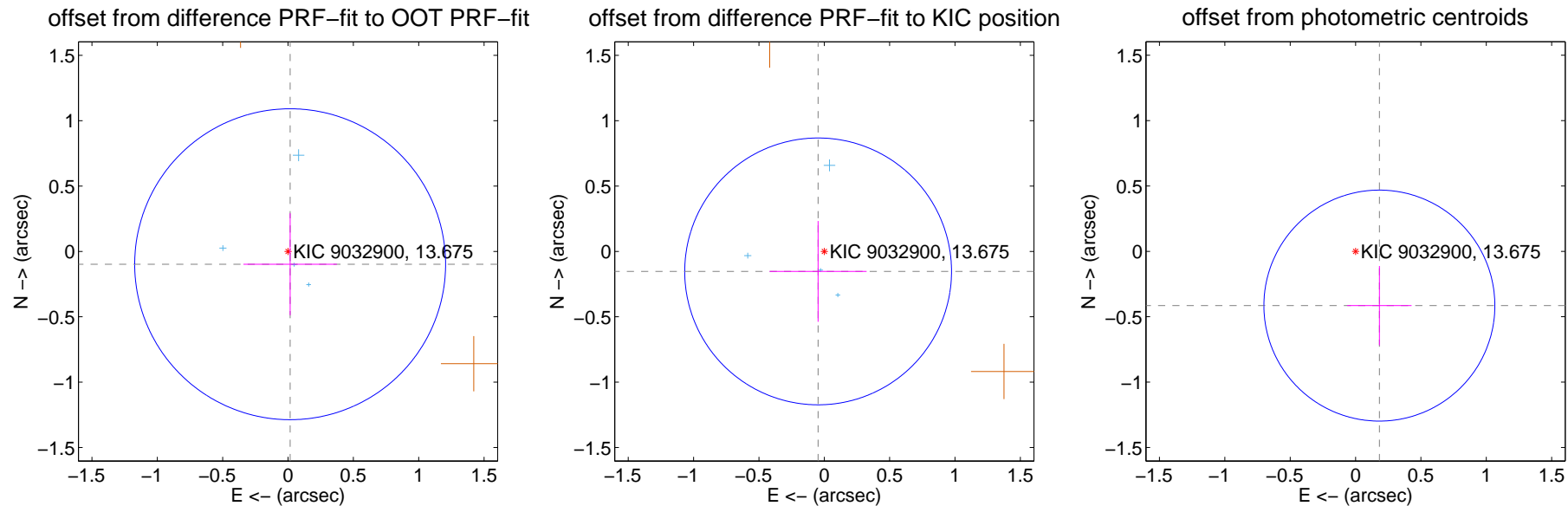
## DV Centroid Data

Supplemental centroid analysis for 009032900-02. Kepler magnitude: 13.68. Transit SNR 11.27

There are 4 quarters with good PRF difference image offsets

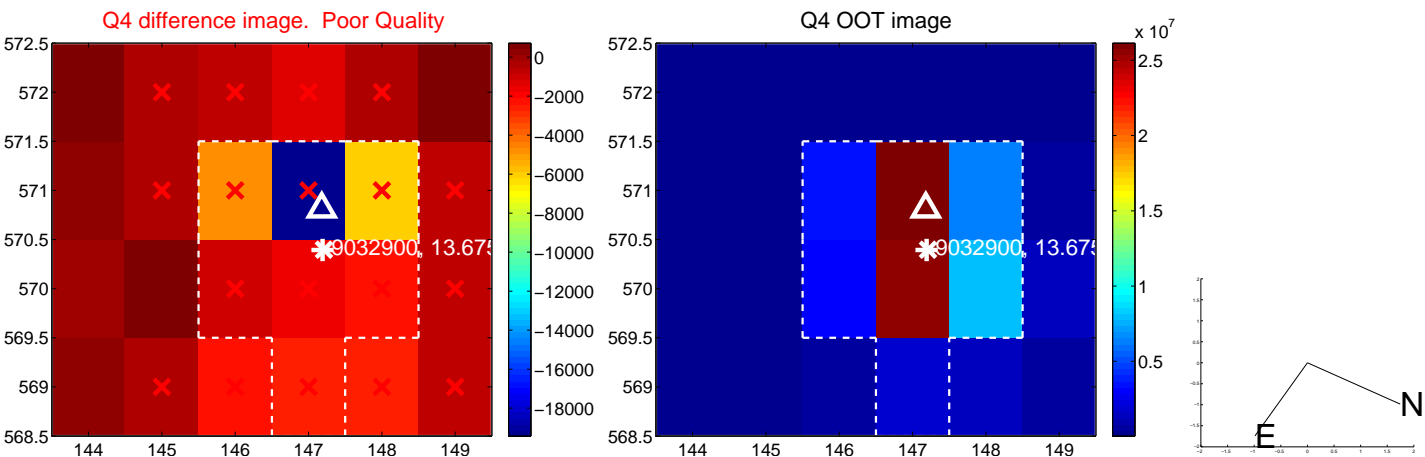
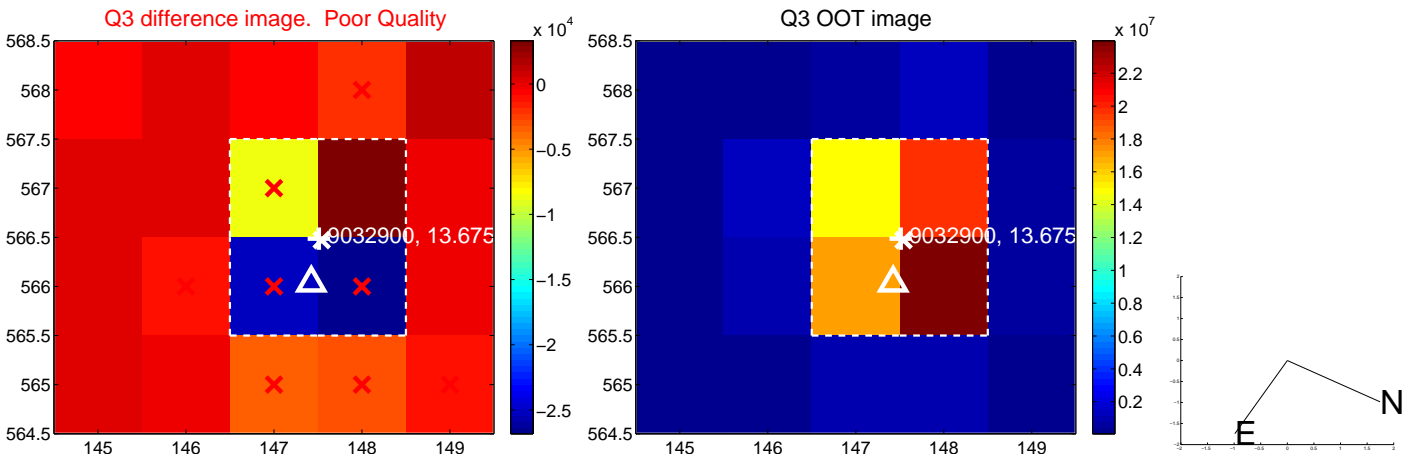
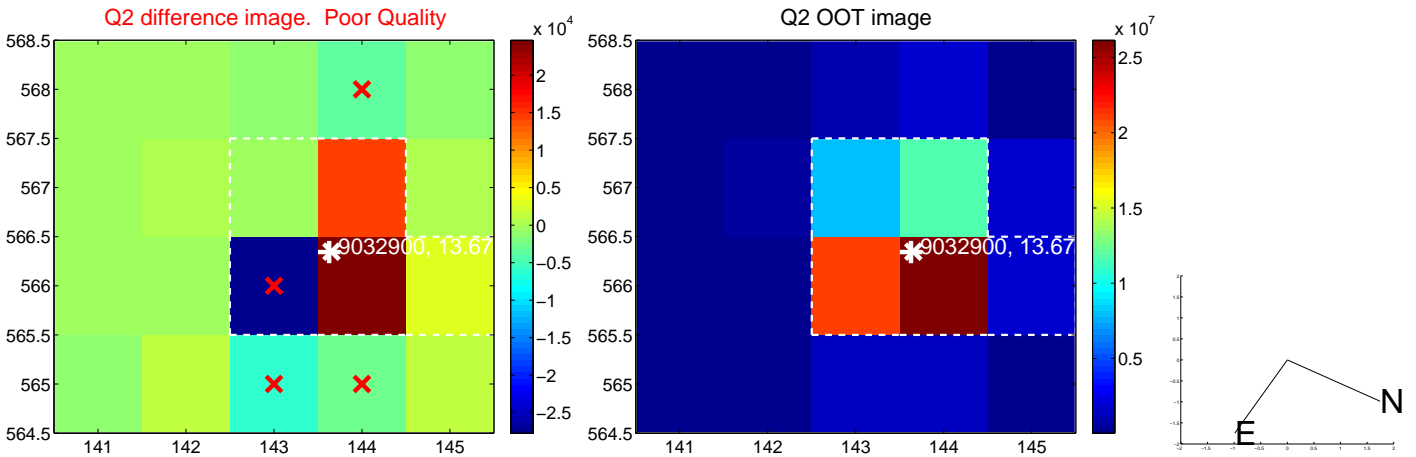
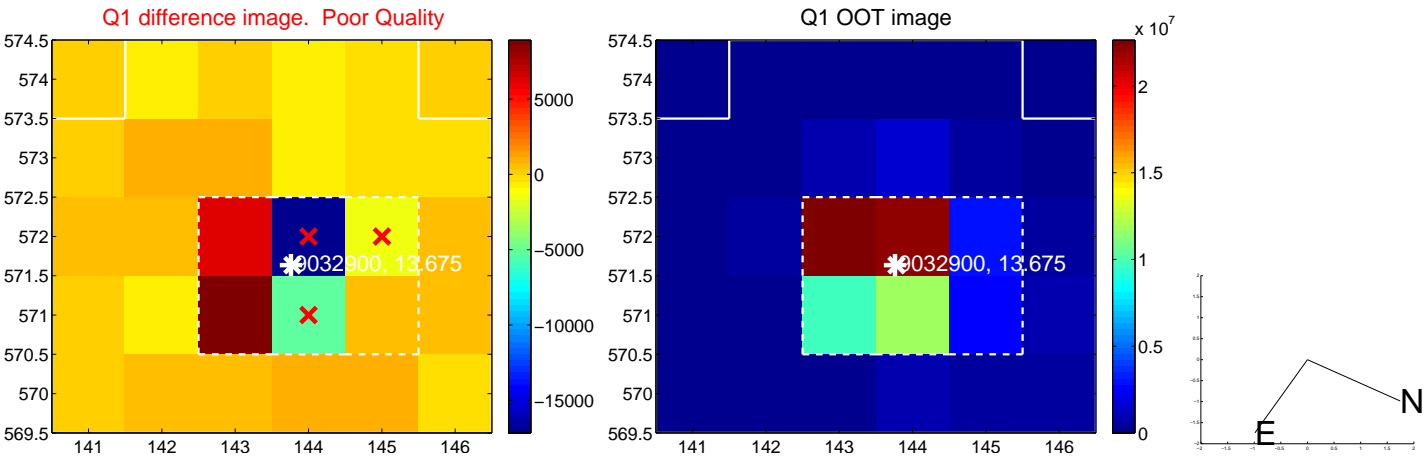
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.099 \pm 0.396$	0.25	$-0.016 \pm 0.357$	$-0.098 \pm 0.389$
PRF-fit source offset from KIC position	$0.160 \pm 0.340$	0.47	$0.047 \pm 0.371$	$-0.153 \pm 0.385$
photometric centroid source offset	$0.45 \pm 0.29$	1.54	$-0.18 \pm 0.25$	$-0.41 \pm 0.30$

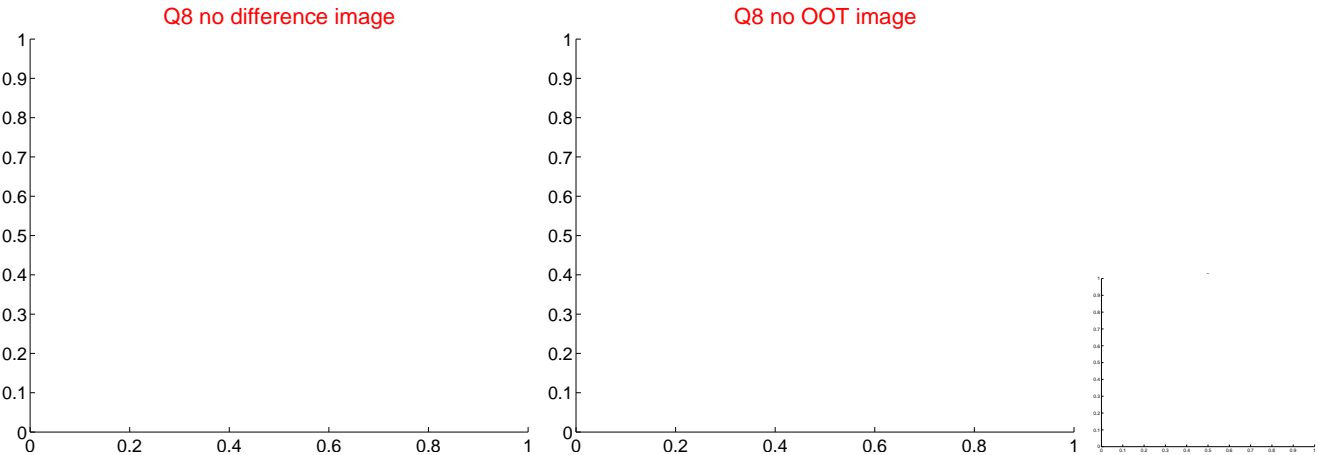
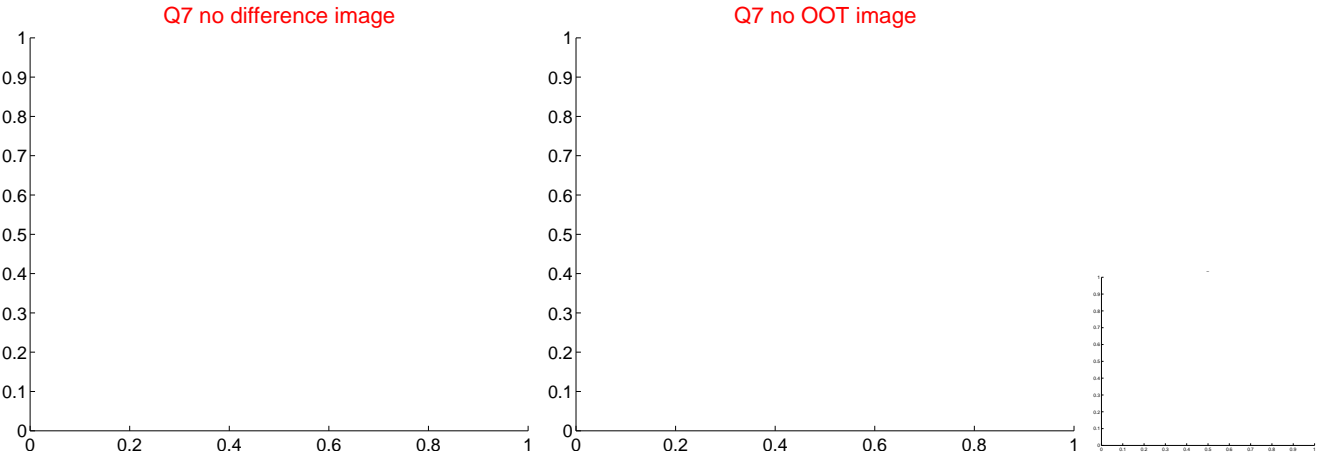
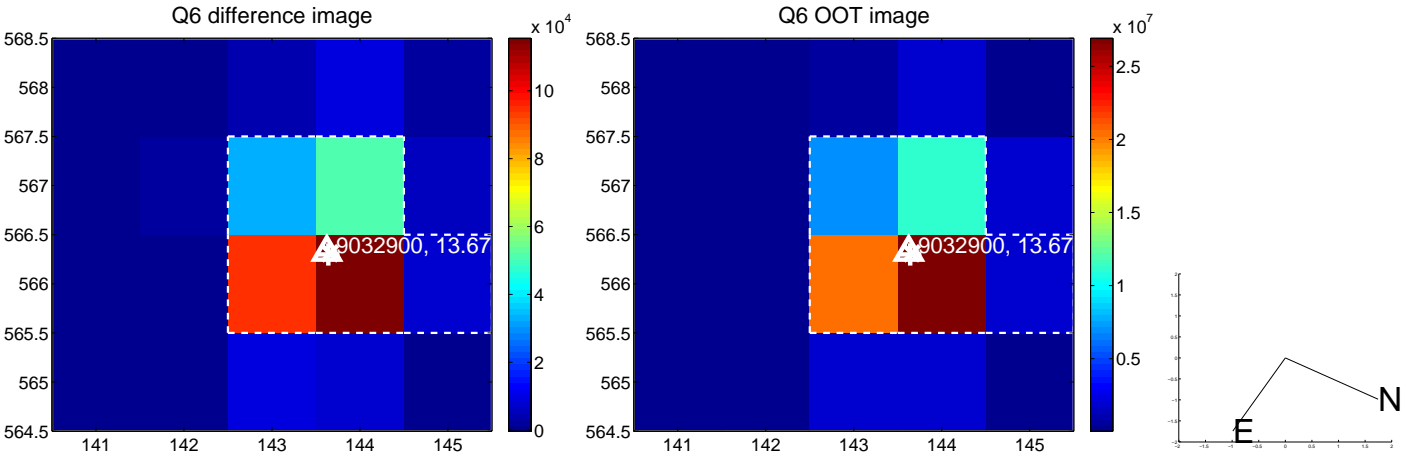
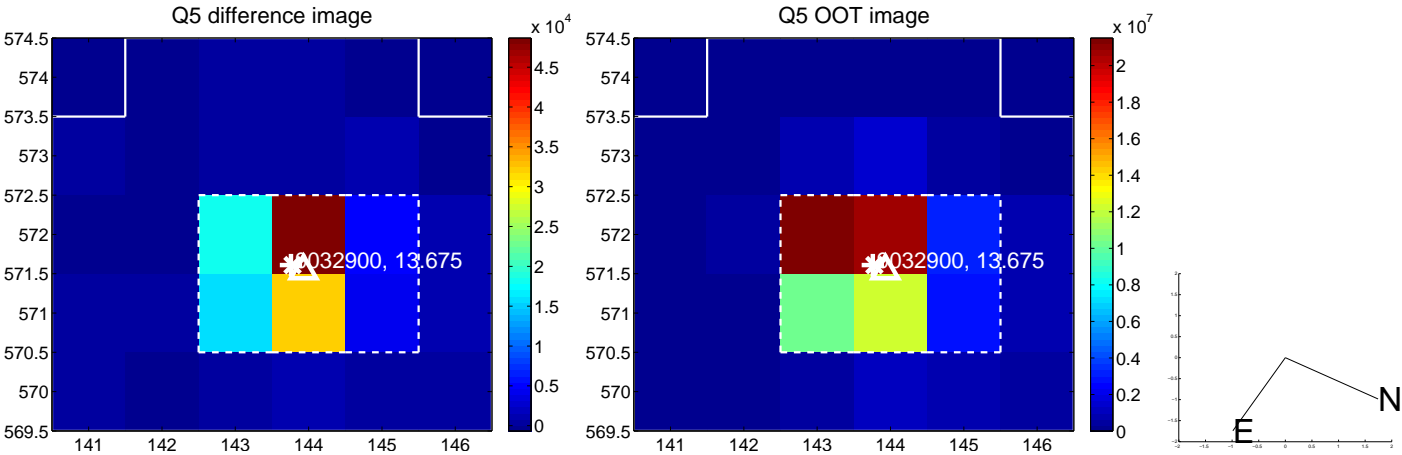


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

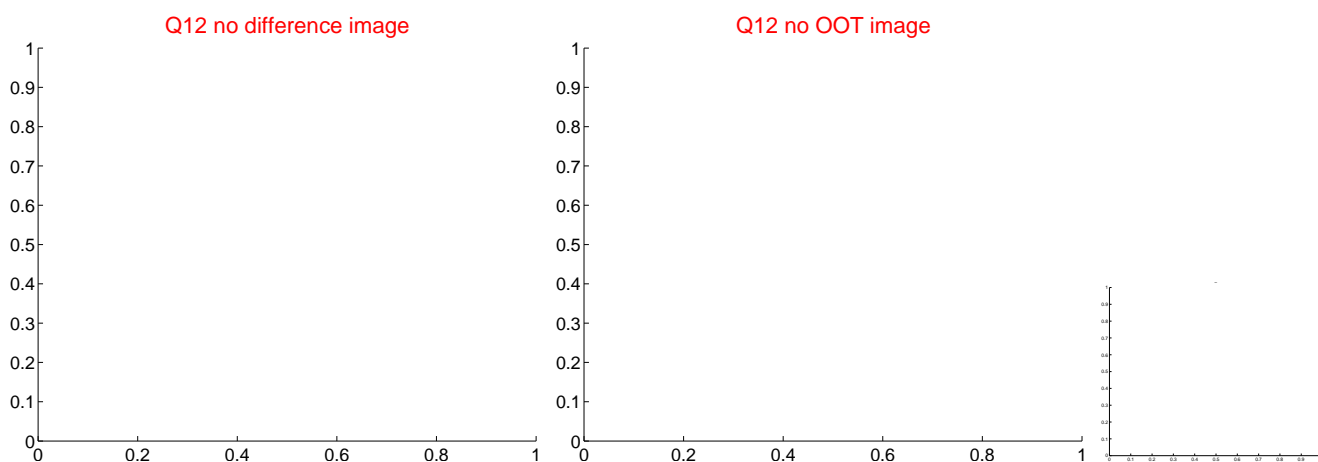
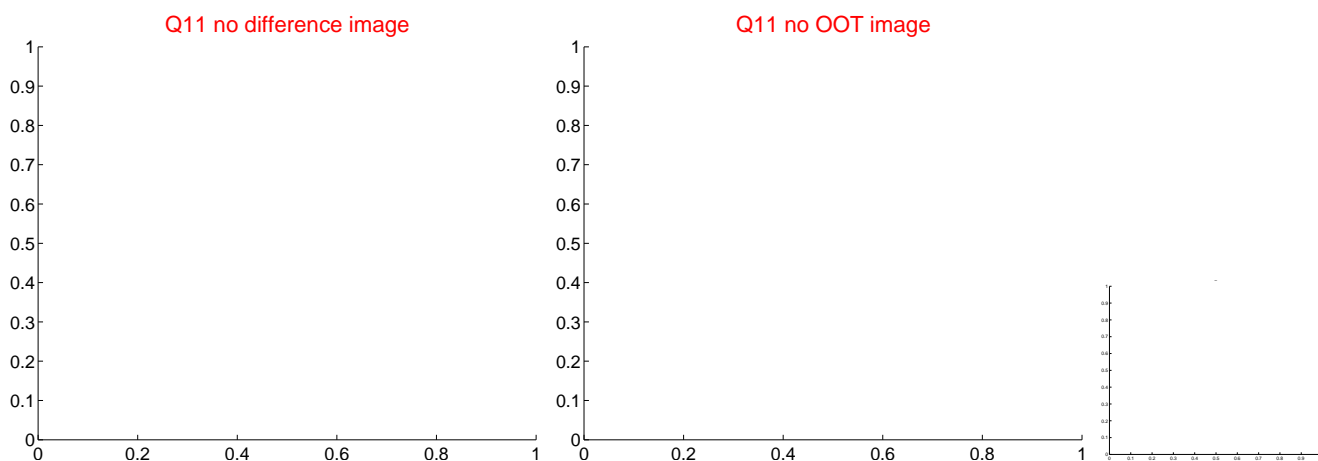
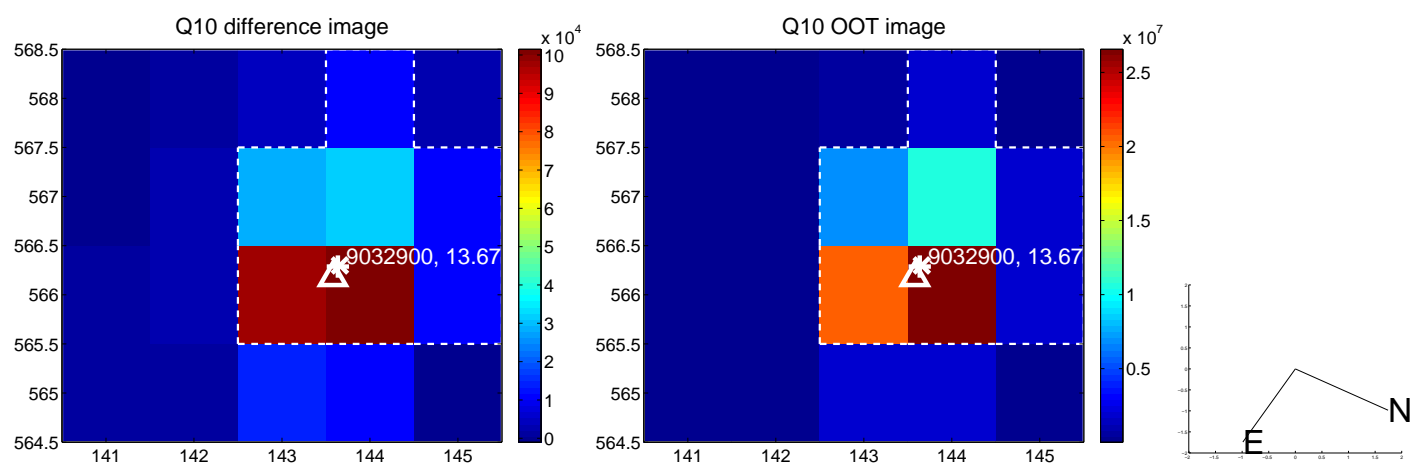
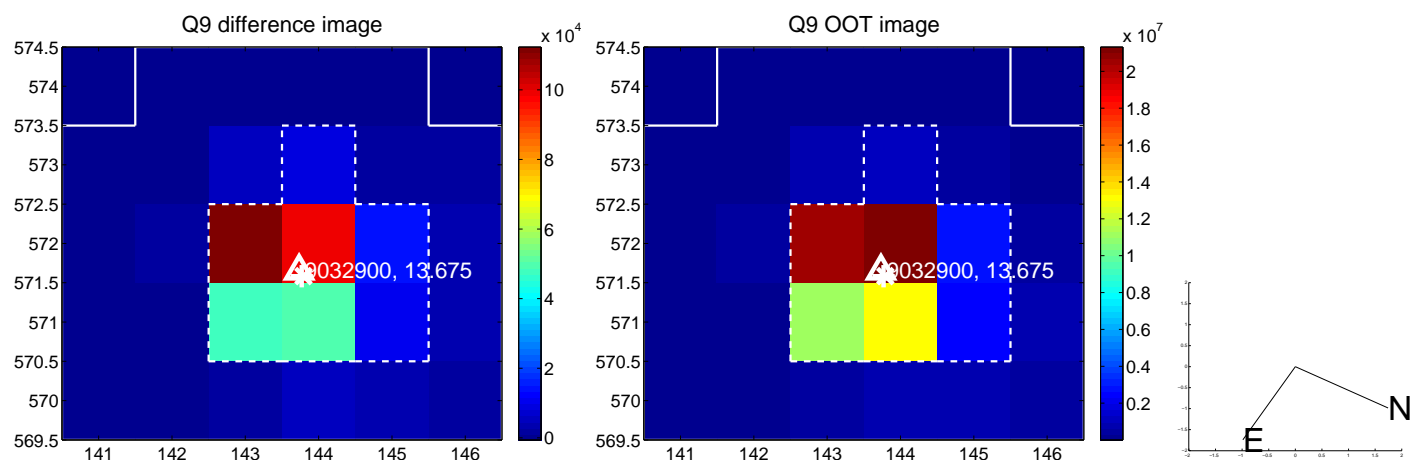
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



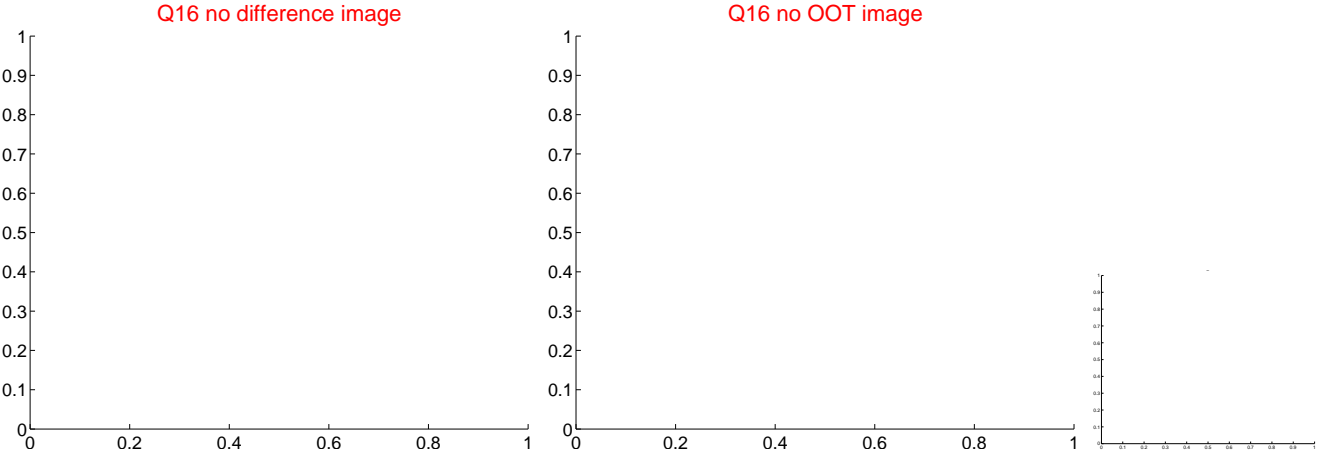
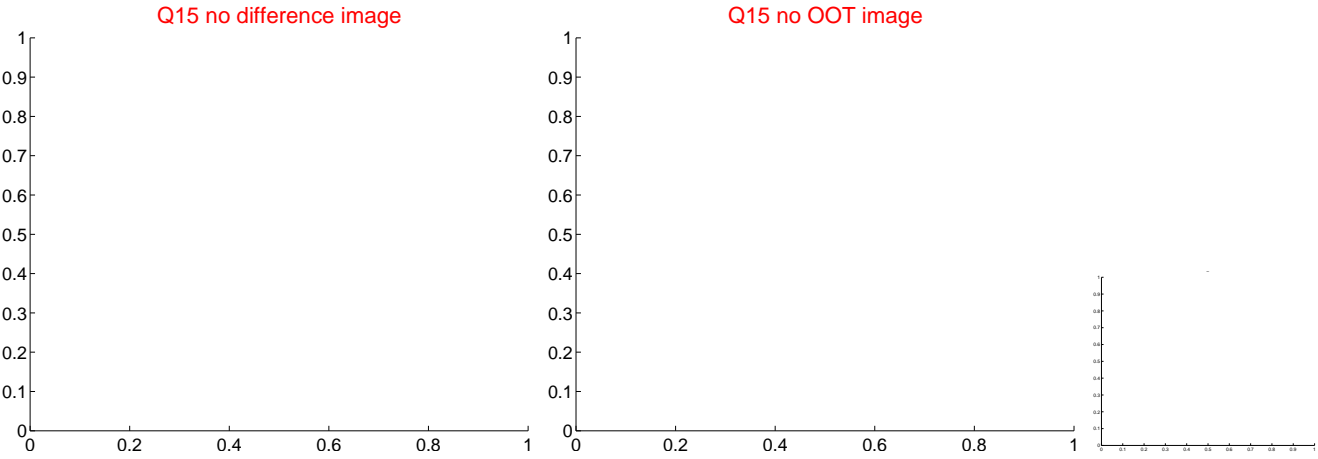
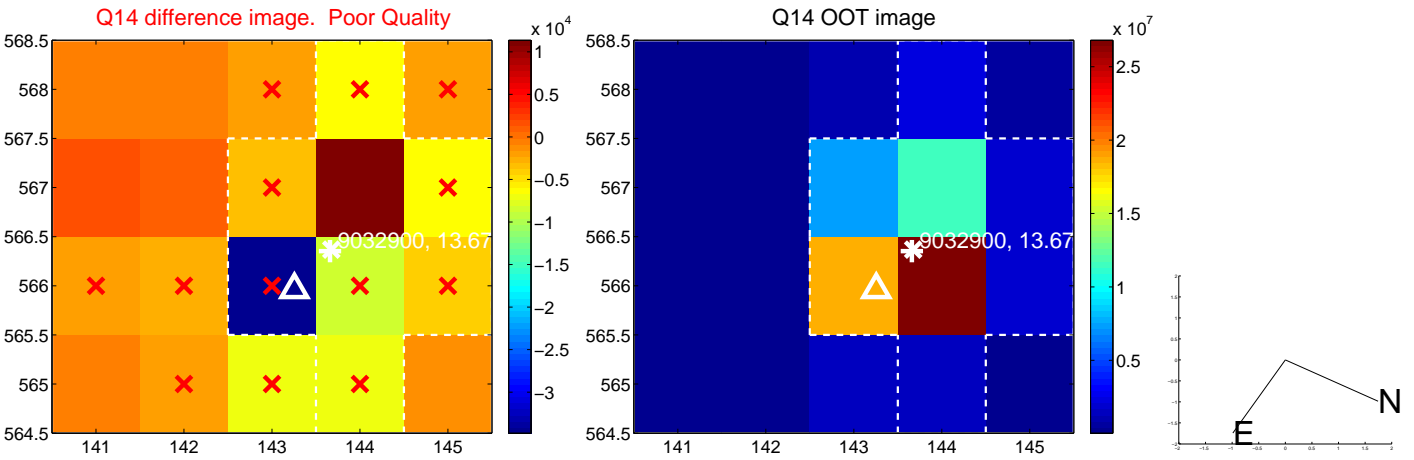
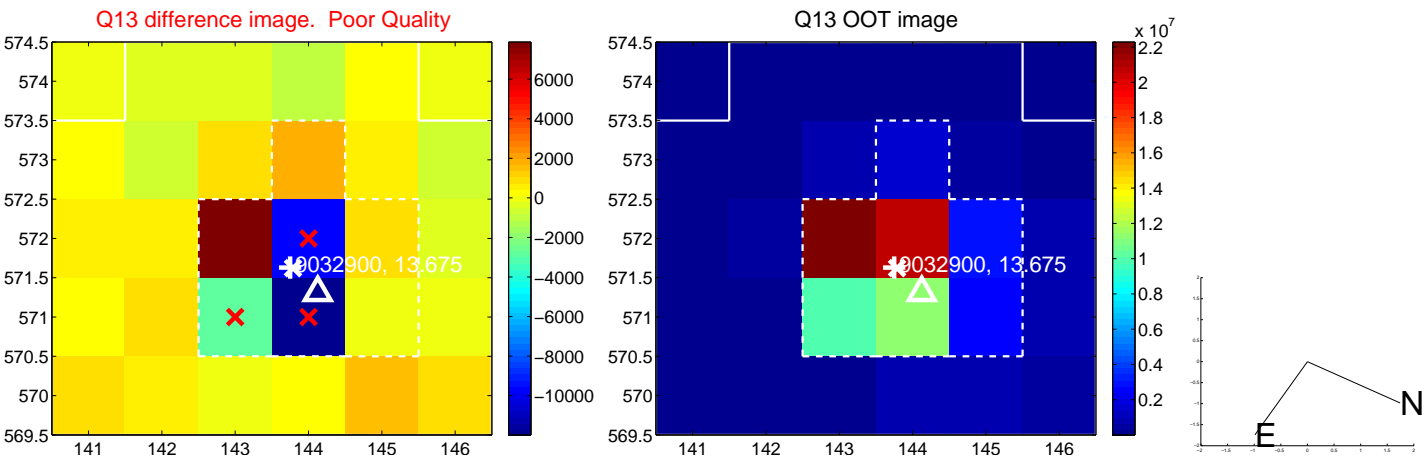
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



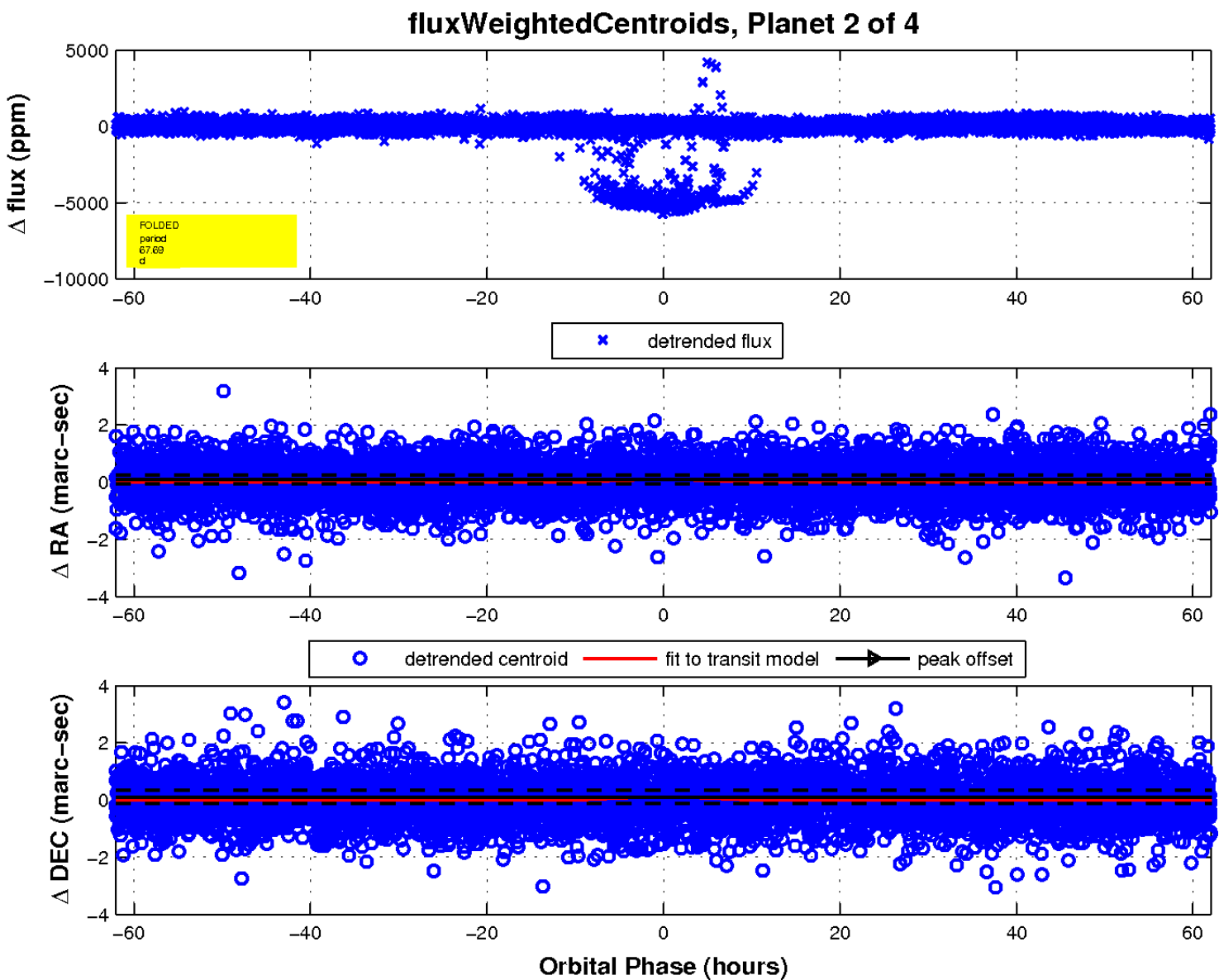
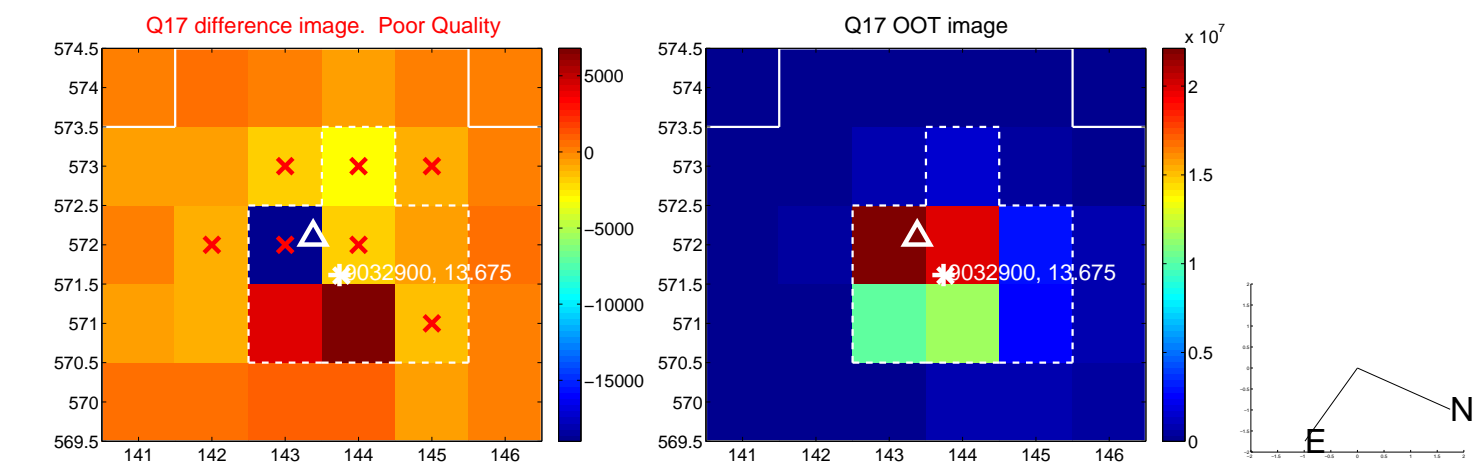
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

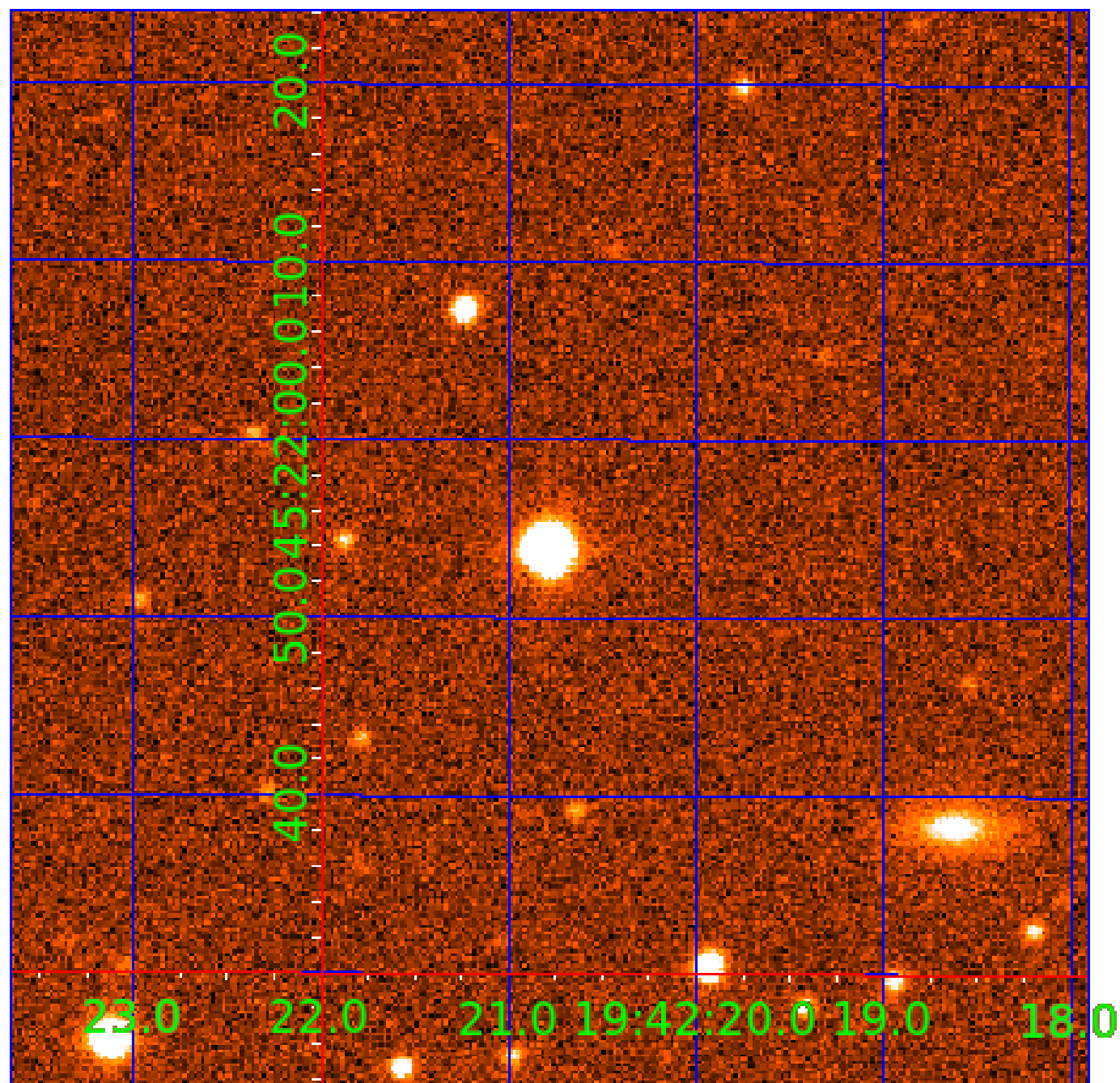


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009032900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009032900-01	OBS	No	405.660975	422.132654	5144.5	11.837	104.4	104.0	1.74	6038	13.05	2.59
009032900-02	OBS	0134.01	67.685786	150.885695	401.5	20.696	97.1	11.3	1.74	6038	6.99	28.20
009032900-04	OBS	No	320.537648	220.363044	4986.7	11.552	39.0	83.6	1.74	6038	12.71	3.54

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009032900-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—PERIOD_ALIAS_DV—PERIOD_ALIAS_ALT
009032900-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009032900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—INCONSISTENT_TRANS

**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 009032900-04

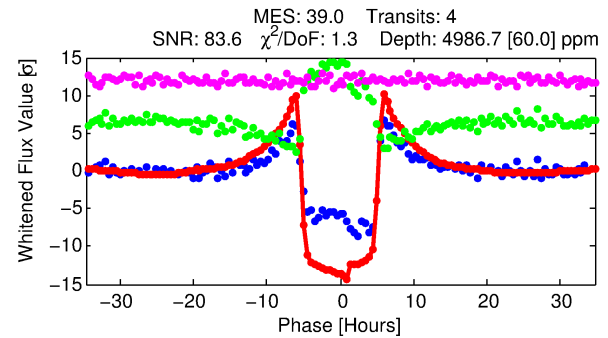
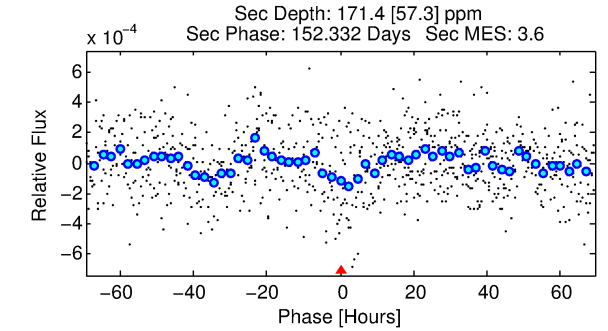
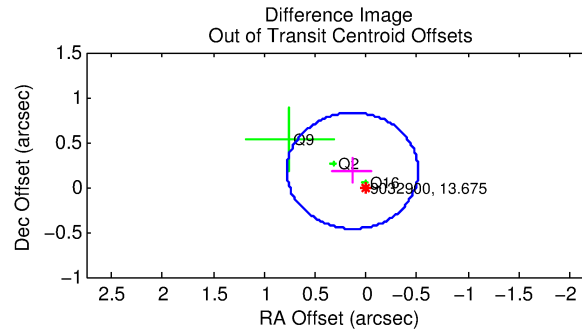
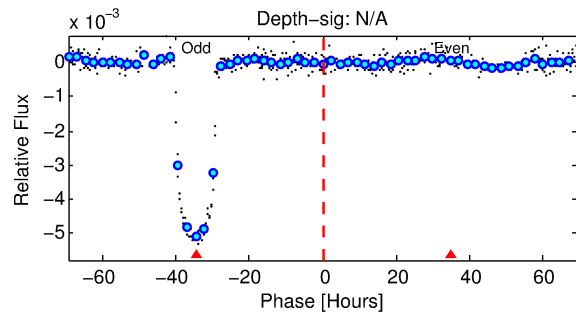
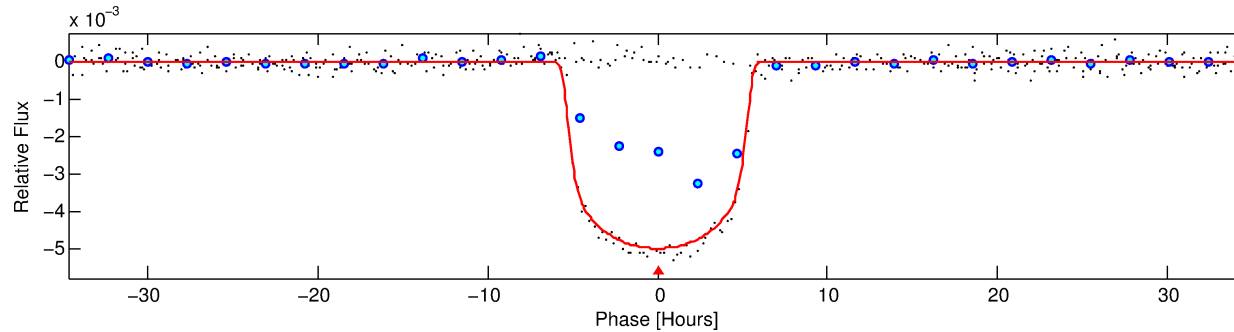
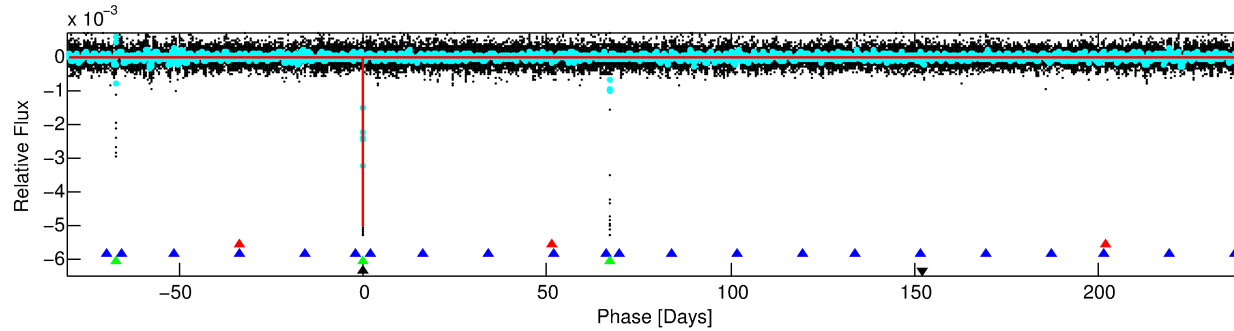
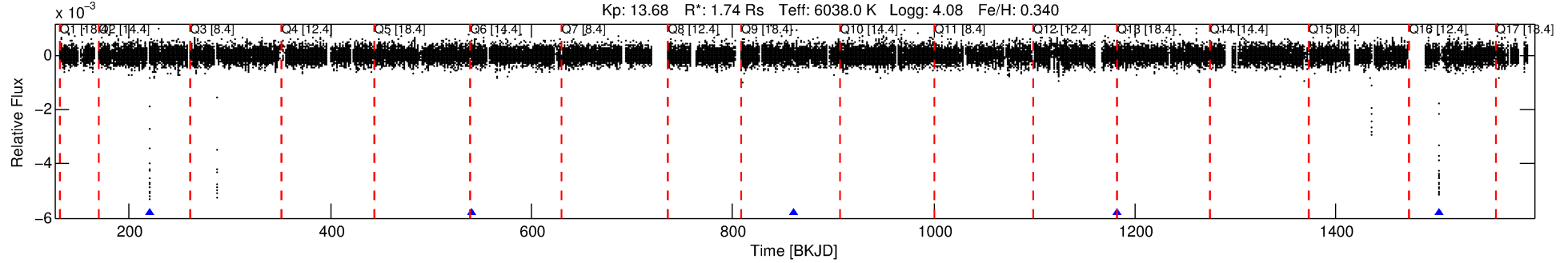
No Significant Match Found

# DV One-Page Summary

KIC: 9032900 Candidate: 4 of 4 Period: 320.538 d

KOI: K00134 Corr: No Ephemeris Match

Kp: 13.68 R\*: 1.74 Rs Teff: 6038.0 K Logg: 4.08 Fe/H: 0.340



## DV Fit Results:

Period = 320.53765 [0.00048] d  
Epoch = 220.3630 [0.0013] BKJD  
Rp/R\* = 0.0668 [0.0010]  
a/R\* = 193.50 [11.51]  
b = 0.55 [0.08]  
Seff = 3.55 [1.15]  
Teq = 350 [28] K  
Rp = 12.72 [2.91] Re  
a = 1.0108 [0.2077] AU  
Ag = 595.82 [274.50] [2.17σ]  
Teffp = 2673 [231] K [10.00σ]

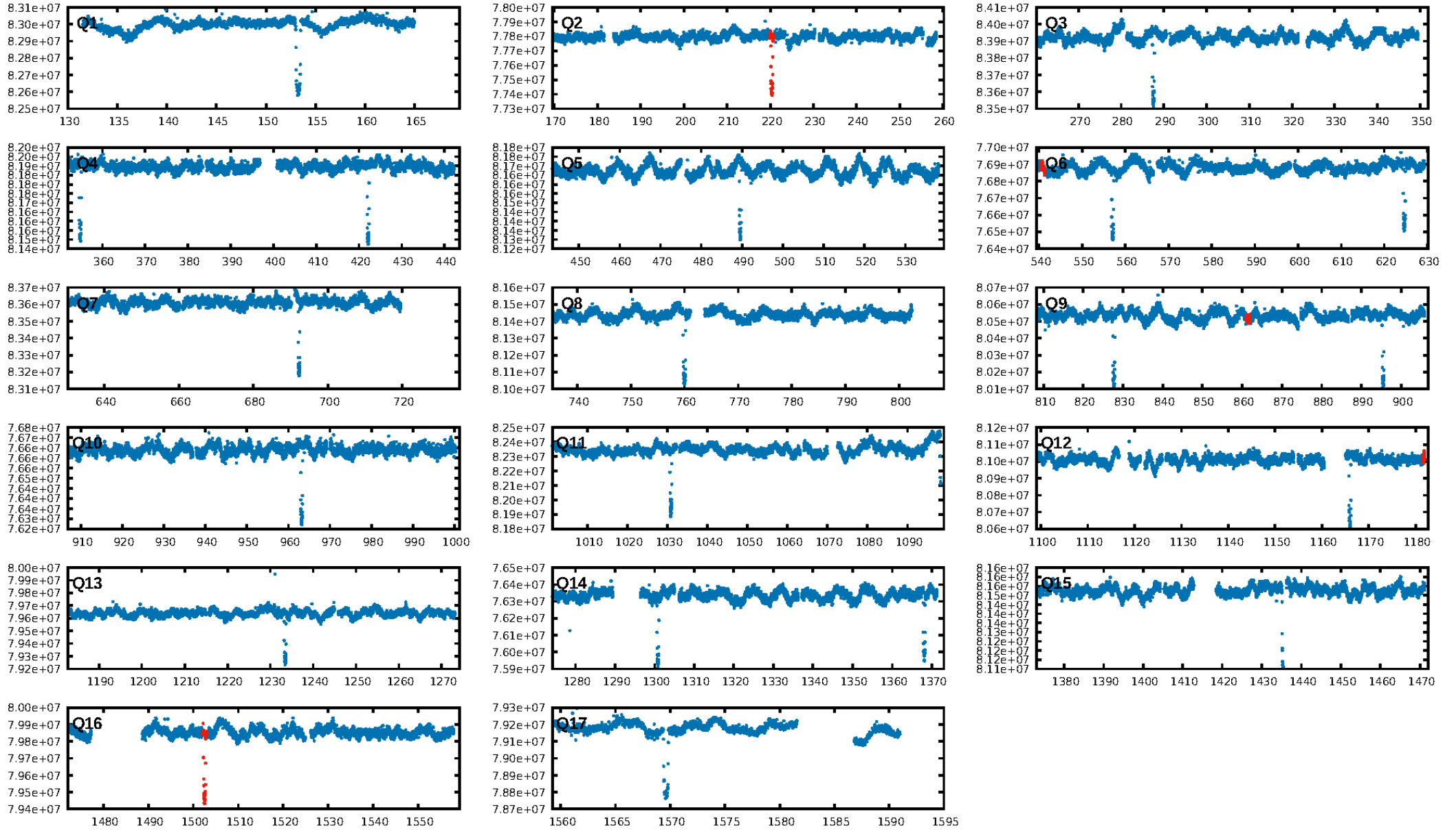
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [256.03σ]  
LongPeriod-sig: 100.0% [123.52σ]  
ModelChiSquare2-sig: 16.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.02e-250  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.649  
Centroid-sig: 87.5%  
Centroid-so: 0.162 arcsec [2.84σ]  
OotOffset-rm: 0.225 arcsec [1.04σ]  
KicOffset-rm: 0.204 arcsec [0.92σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.67 [2/3]

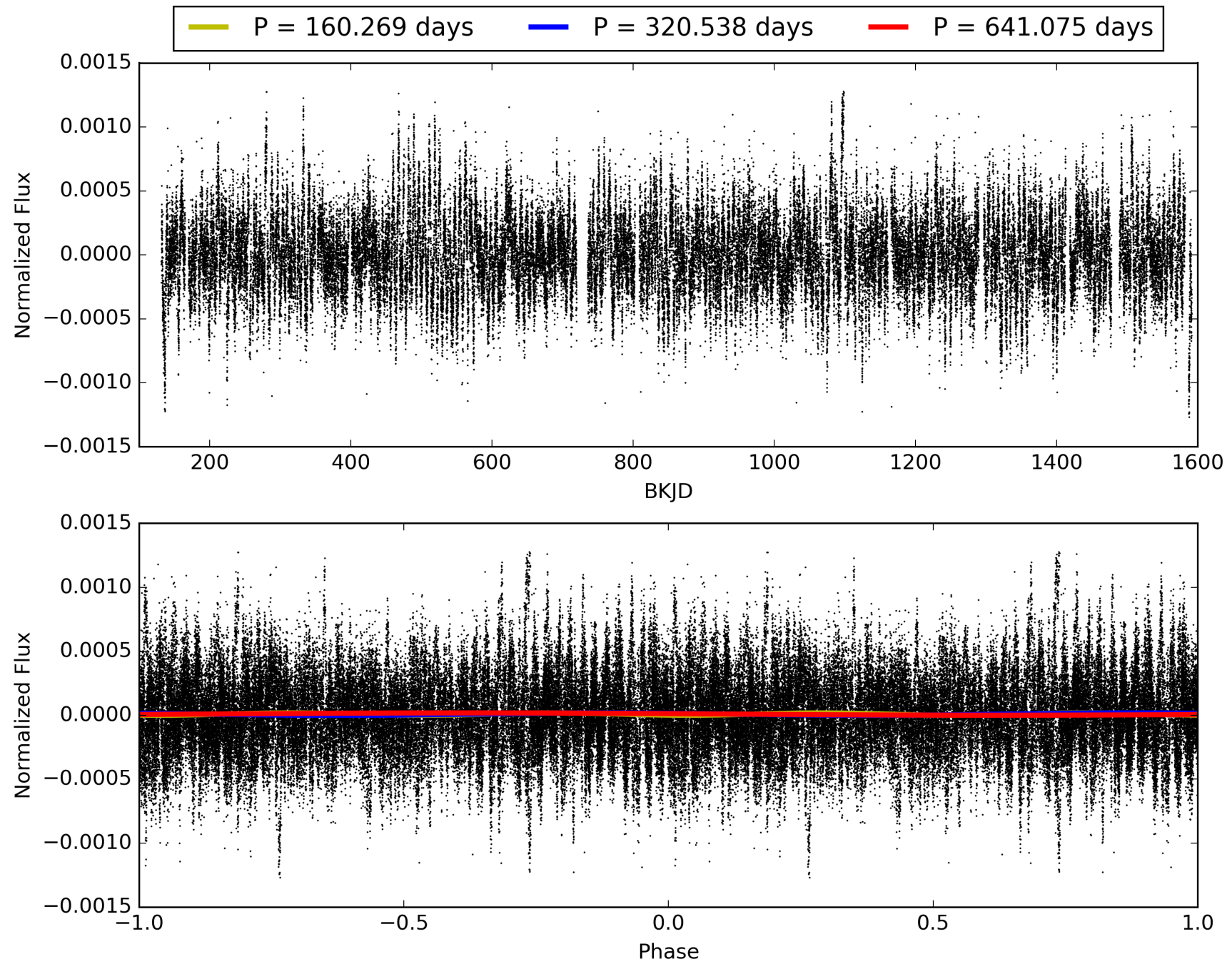
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 17:46:42 Z

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

# TCE 009032900-04, PDC Light Curves

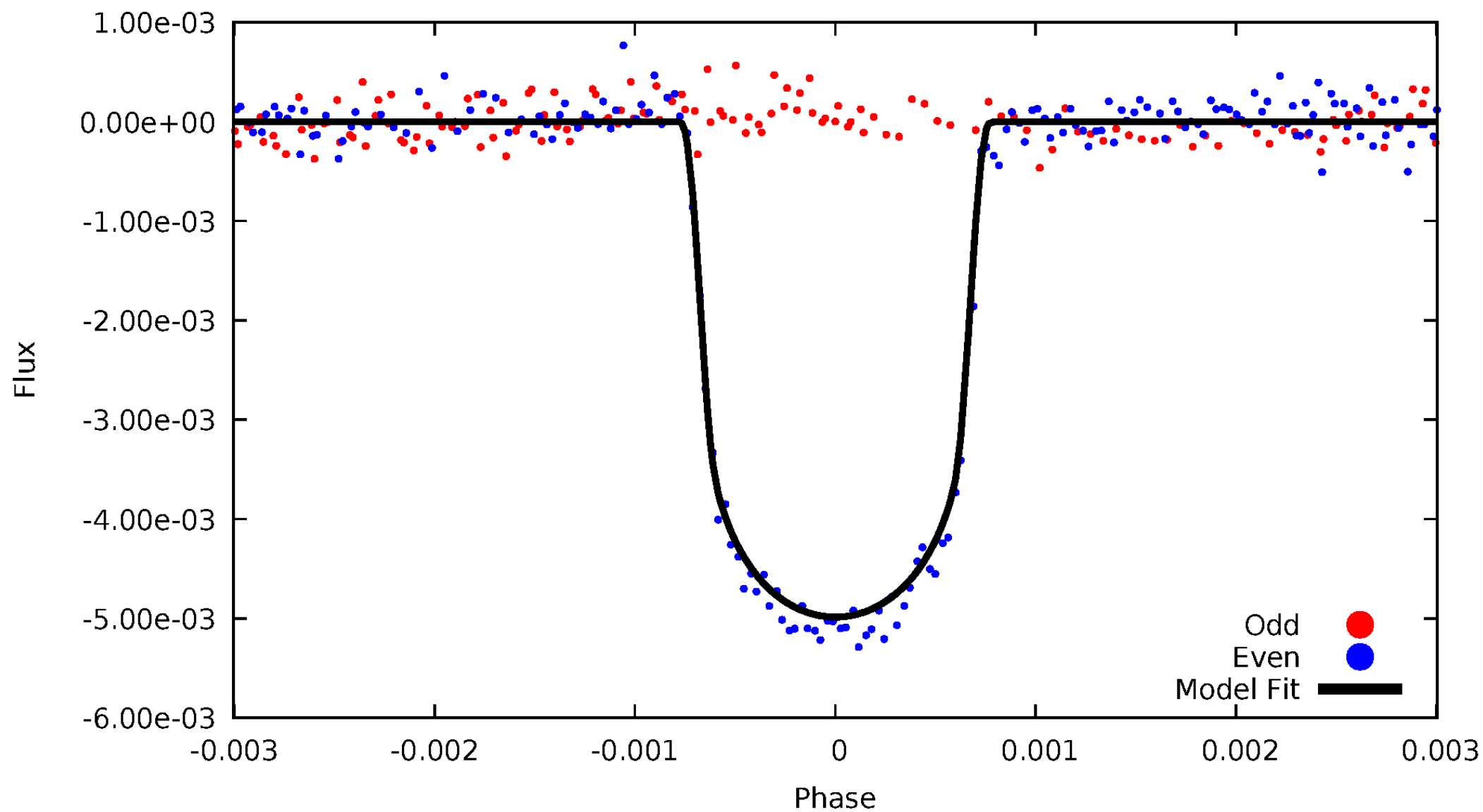


TCE 009032900-04



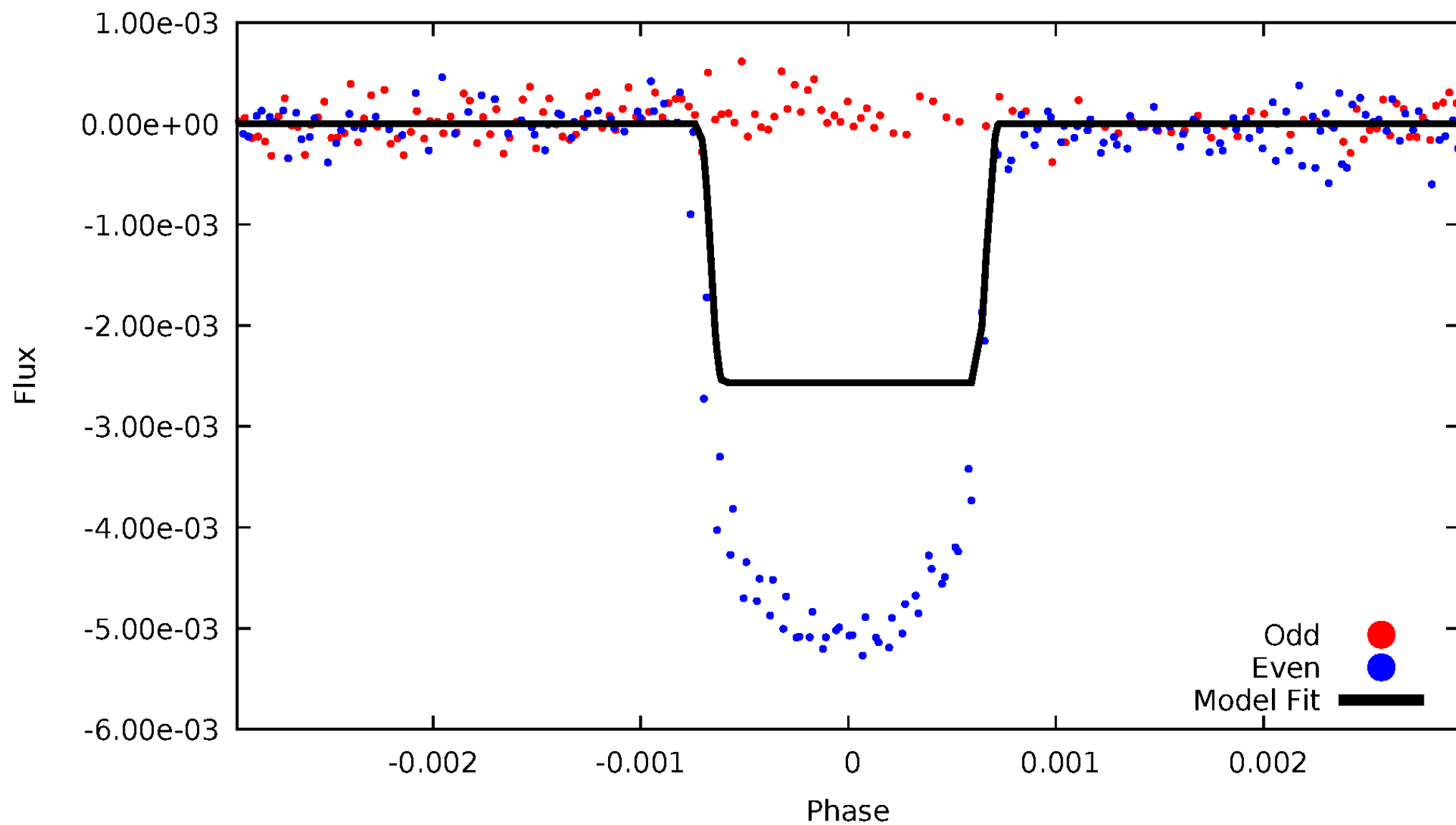
# DV Odd/Even

TCE 009032900-04



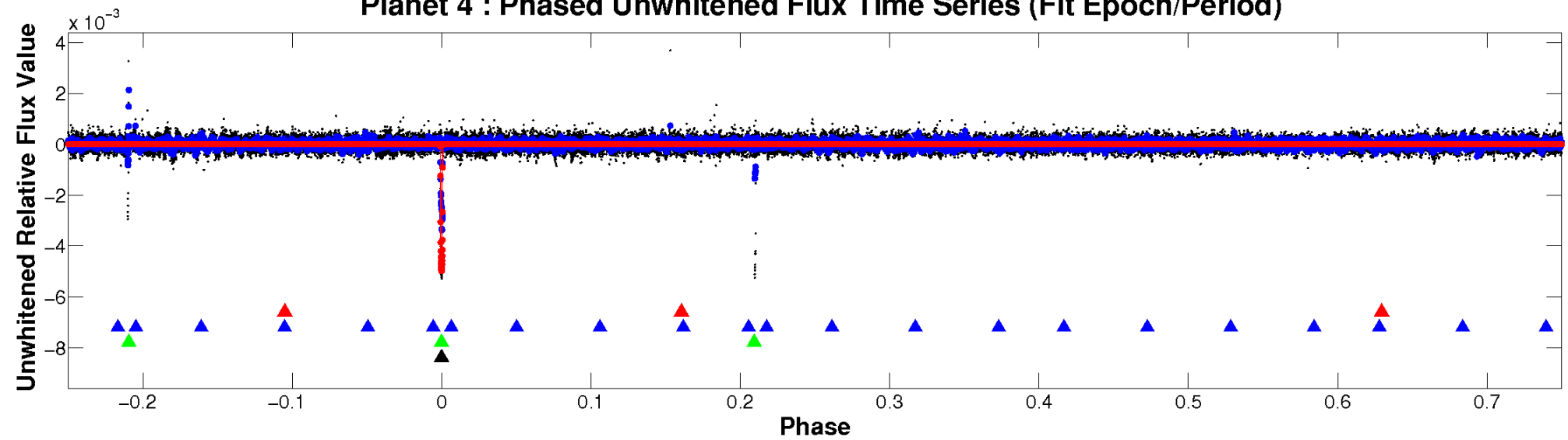
# ALT Odd/Even

TCE 009032900-04

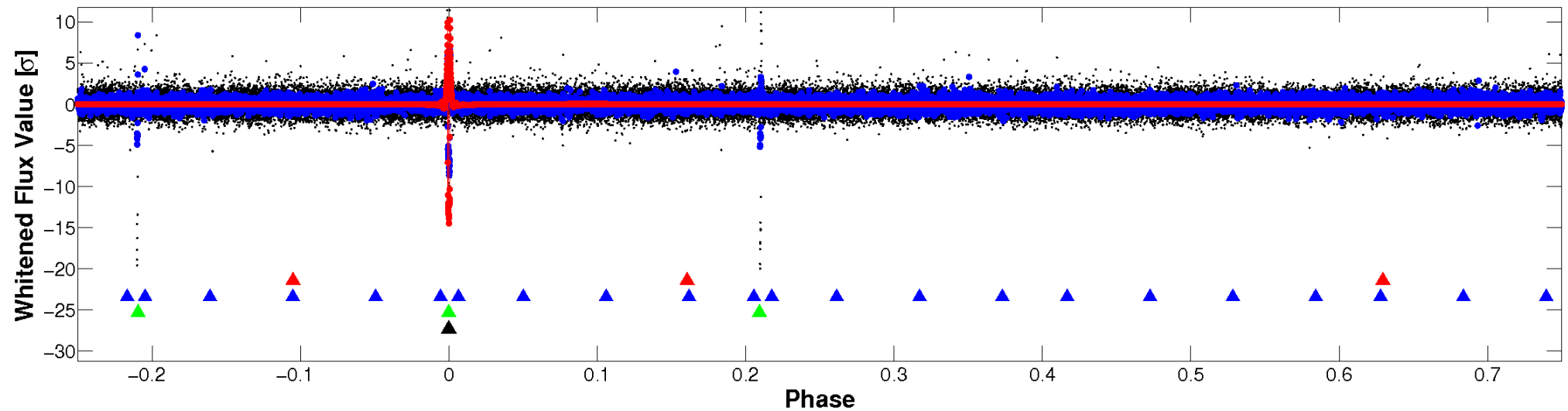


# Non-Whitened Vs. Whitened Light Curve

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

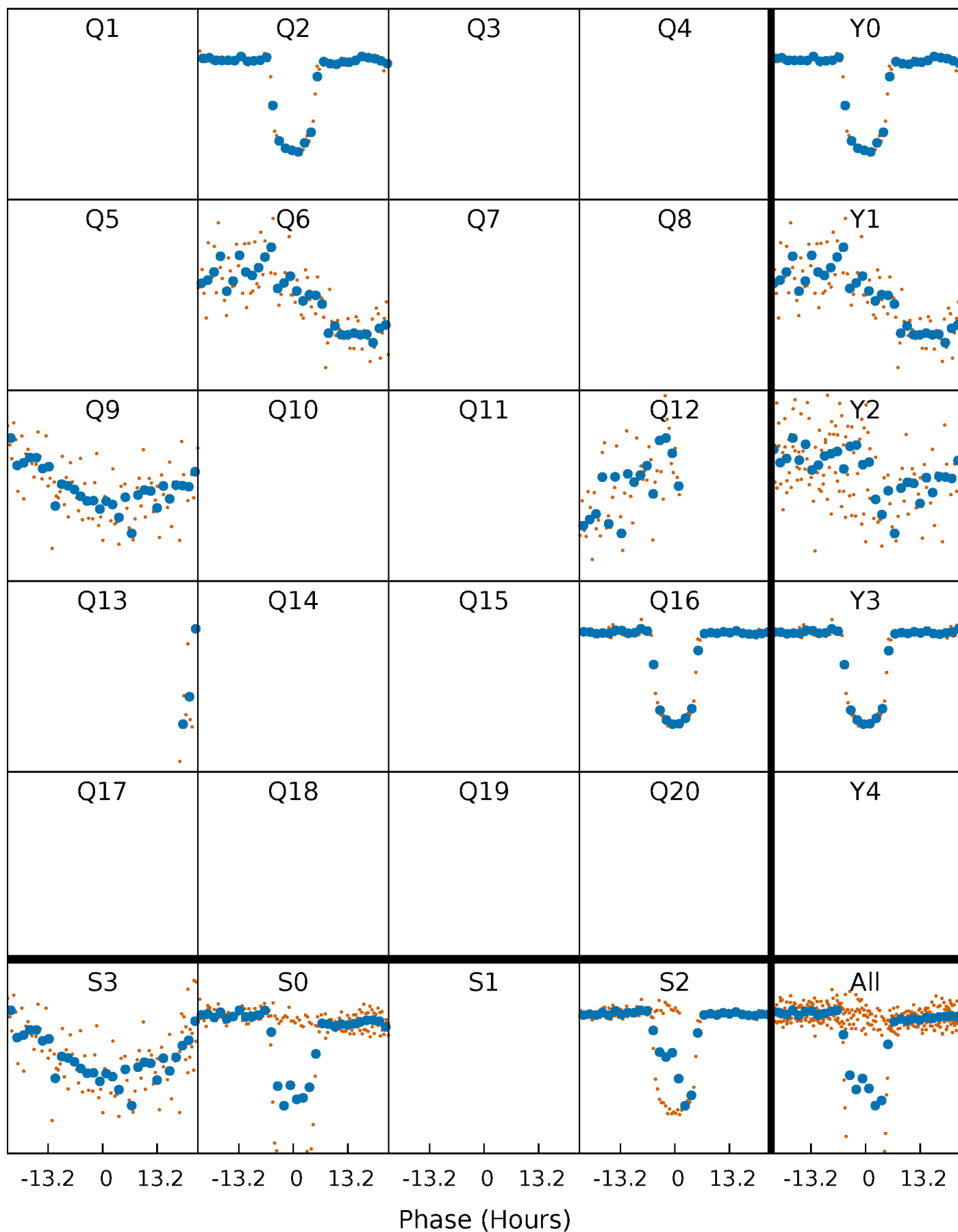


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

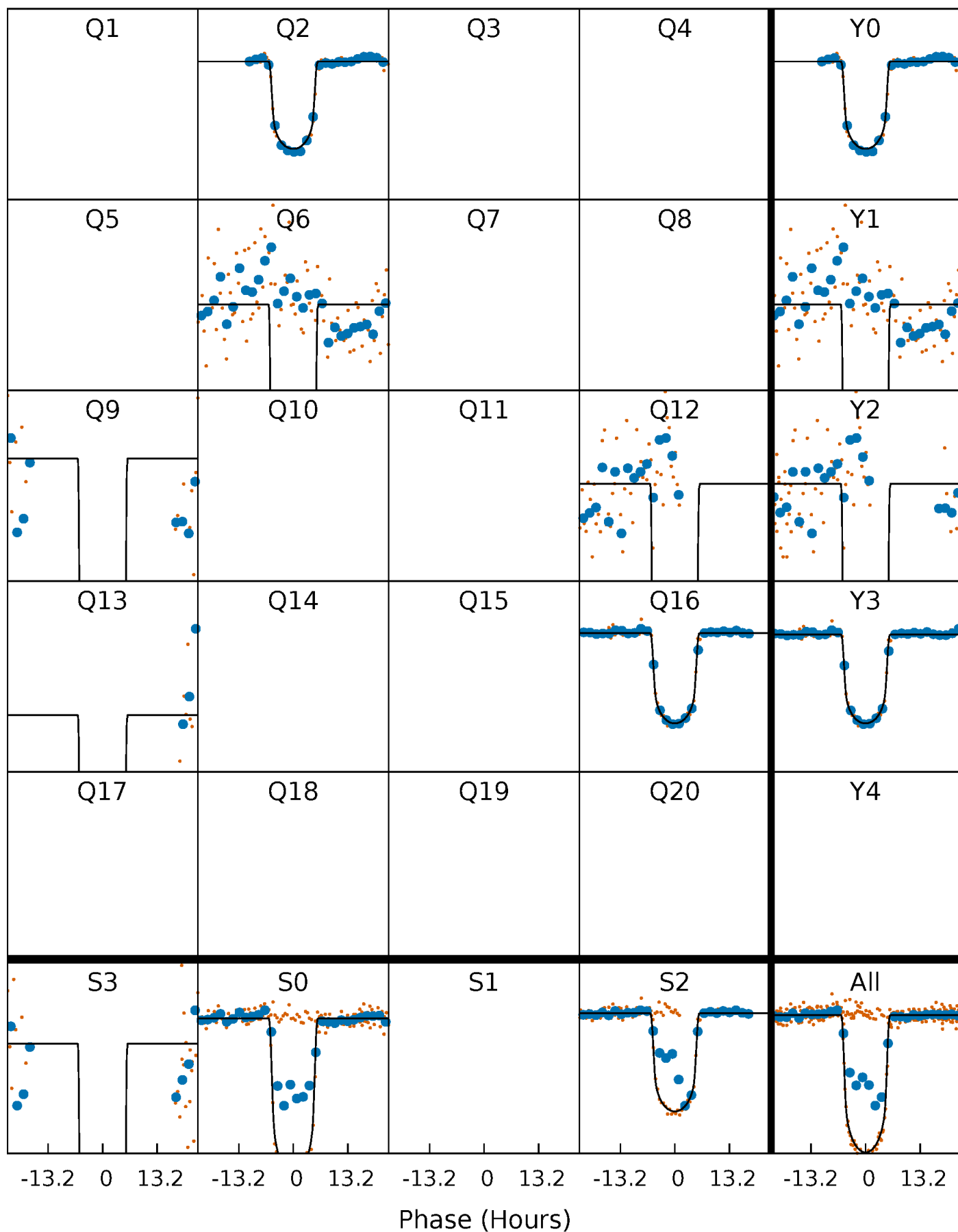
TCE 009032900-04 P=320.537648 Days  $T_0=220.363045$  (BKJD)





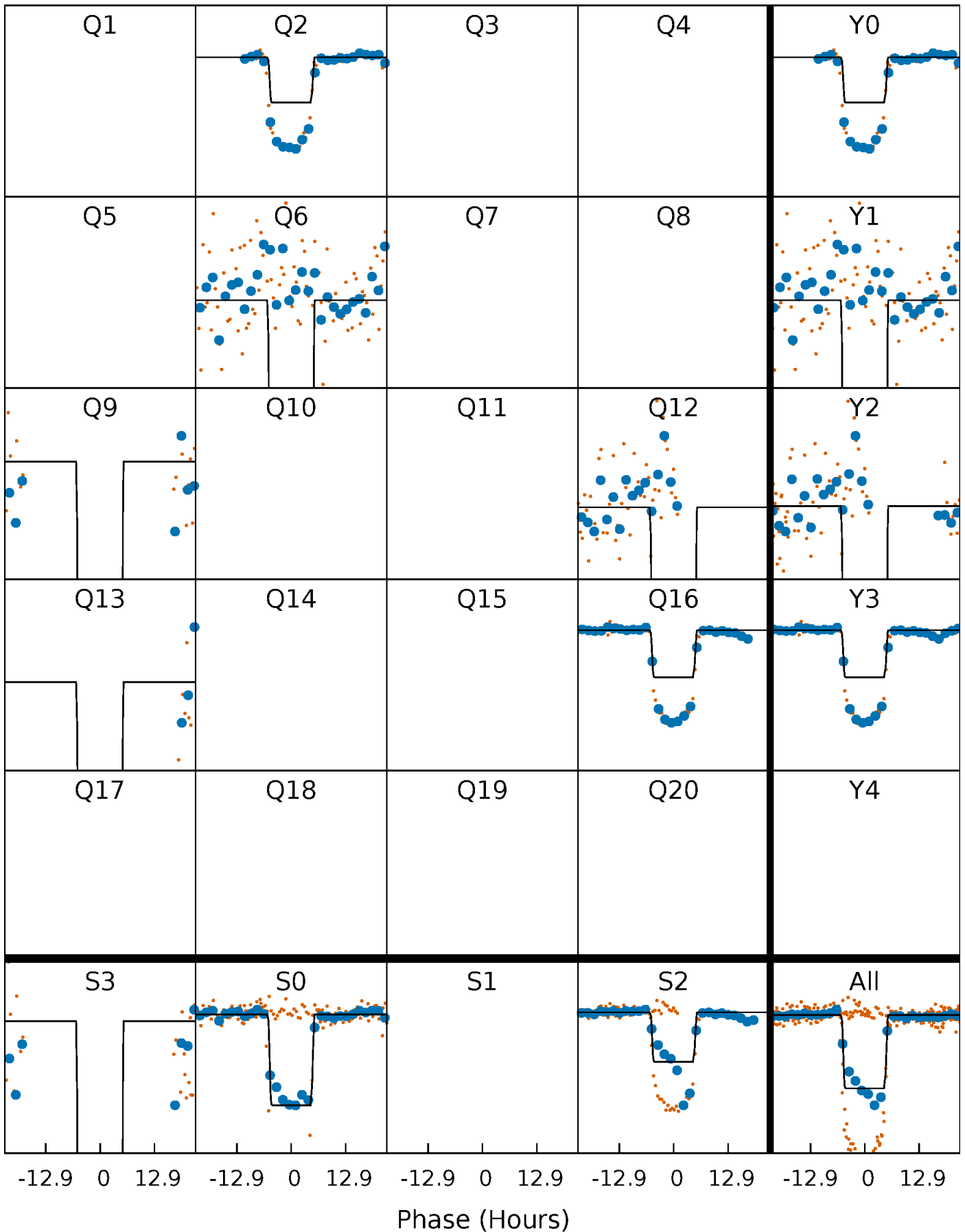
# DV Quarter-Phased Transit Curves

TCE 009032900-04     $P=320.537648$  Days     $T_0=220.363045$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

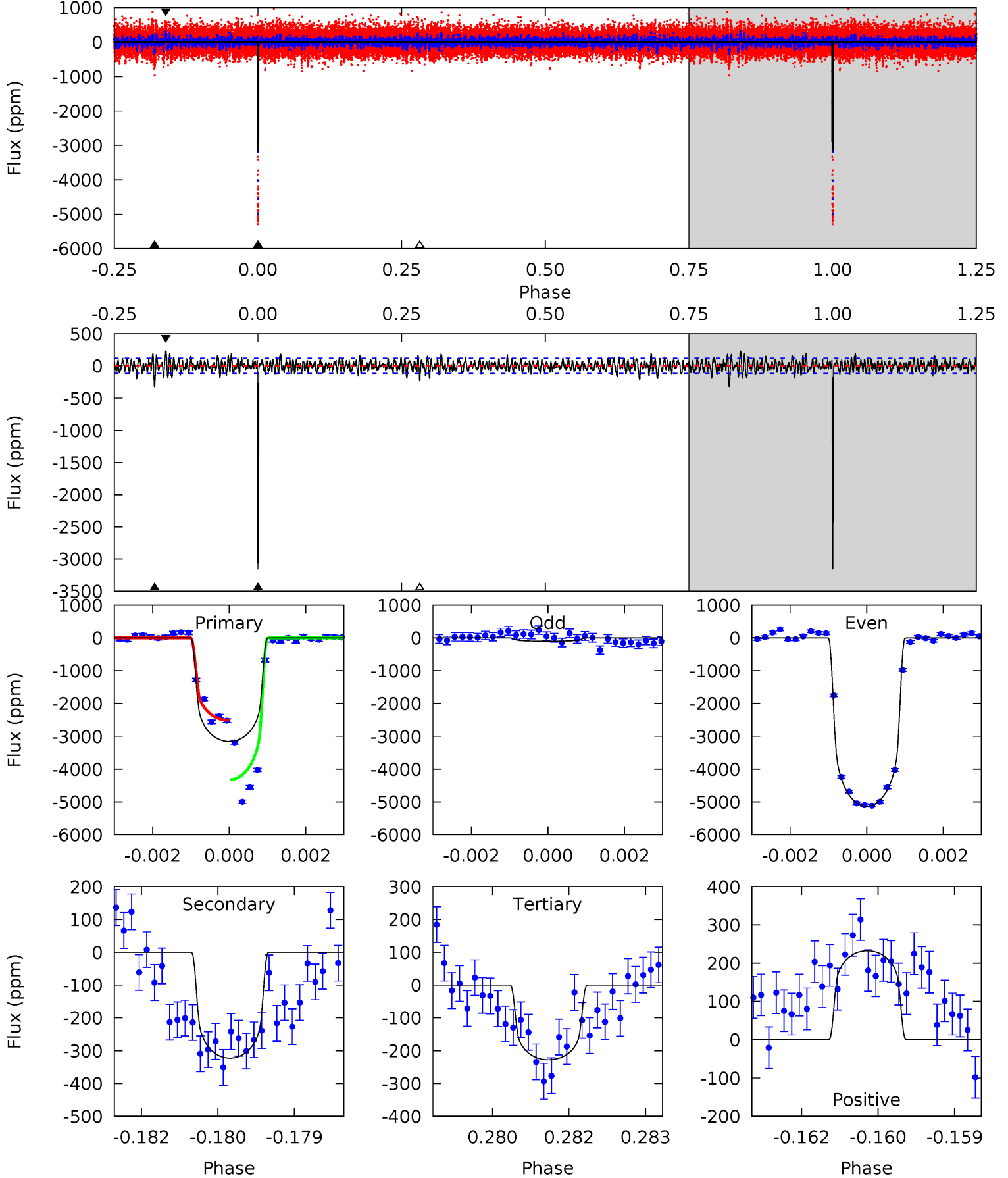
TCE 009032900-04 P=320.534445 Days  $T_0=220.378290$  (BKJD)



# DV Model-Shift Uniqueness Test

009032900-04, P = 320.537648 Days, E = 220.363045 Days

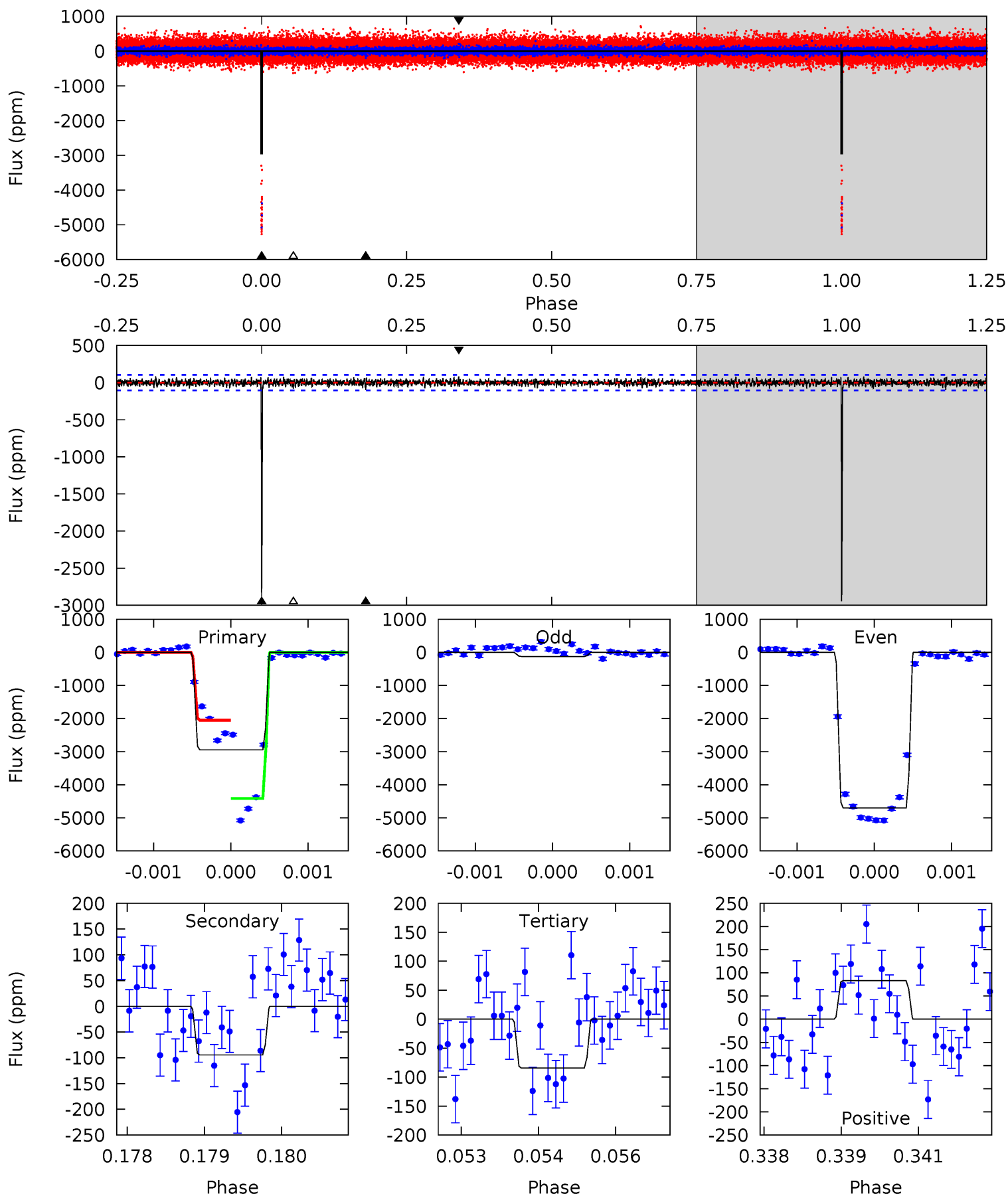
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
143.9	14.7	10.4	10.6	5.37	3.17	2.91	133.5	133.3	4.33	4.11	120.4	1.01	0.07	38.5



# Alt Model-Shift Uniqueness Test

009032900-04, P = 320.534445 Days, E = 220.378290 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
150.2	4.82	4.30	4.24	5.39	3.19	1.12	145.9	146.0	0.52	0.58	125.1	1.00	0.03	57.1



### Stellar Parameters For KIC 009032900

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6038^{+120}_{-120}$	$4.082^{+0.180}_{-0.120}$	$0.340^{+0.100}_{-0.150}$	$1.744^{+0.325}_{-0.398}$	$1.341^{+0.125}_{-0.152}$	$0.356^{+0.341}_{-0.130}$
	+2%/-2%	+4%/-3%	+29%/-44%	+19%/-23%	+9%/-11%	+96%/-36%
Source	SPE18	SPE18	SPE18	DSEP		

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

### Secondary Eclipse Parameters for KIC 009032900-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-323 \pm 22$	$12.76^{+1.32}_{-1.57}$	$490^{+25}_{-30}$	$3585^{+66}_{-62}$	$1104^{+322}_{-201}$
Alt.	$-94 \pm 20$	$9.56^{+1.08}_{-1.24}$	$486^{+28}_{-30}$	$3226^{+107}_{-115}$	$577^{+216}_{-154}$

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

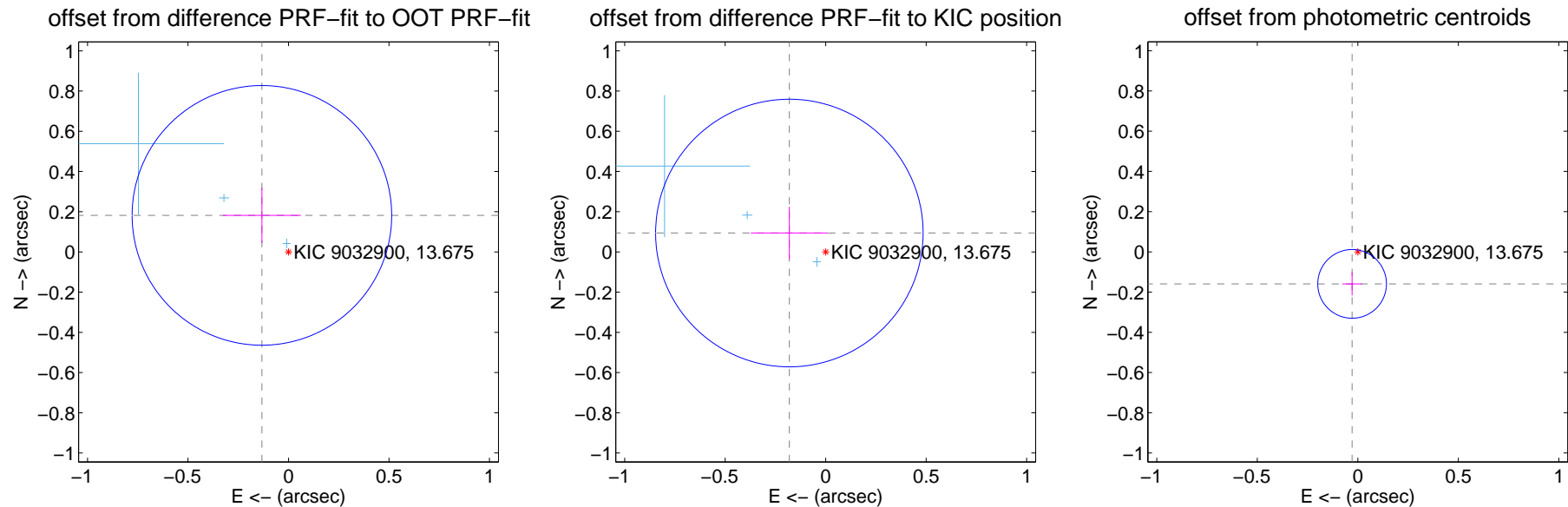
## DV Centroid Data

Supplemental centroid analysis for 009032900-04. Kepler magnitude: 13.68. Transit SNR 83.61

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

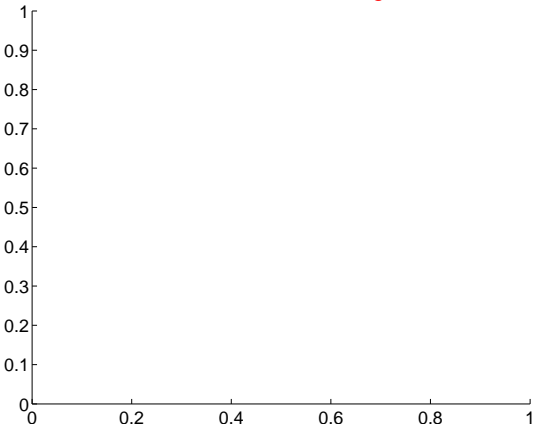
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.225 \pm 0.215$	1.04	$0.132 \pm 0.194$	$0.182 \pm 0.138$
PRF-fit source offset from KIC position	$0.204 \pm 0.222$	0.92	$0.181 \pm 0.192$	$0.094 \pm 0.131$
photometric centroid source offset	$0.16 \pm 0.06$	2.84	$0.03 \pm 0.05$	$-0.16 \pm 0.06$



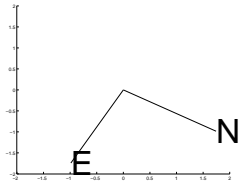
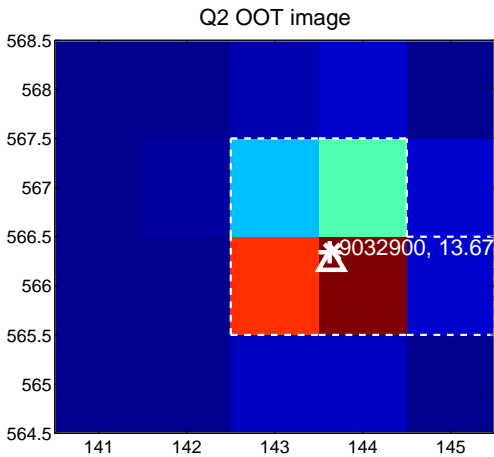
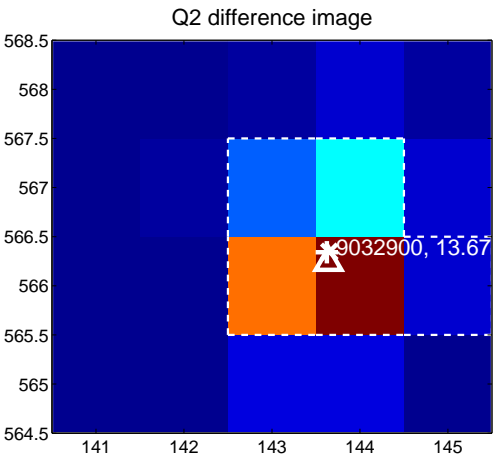
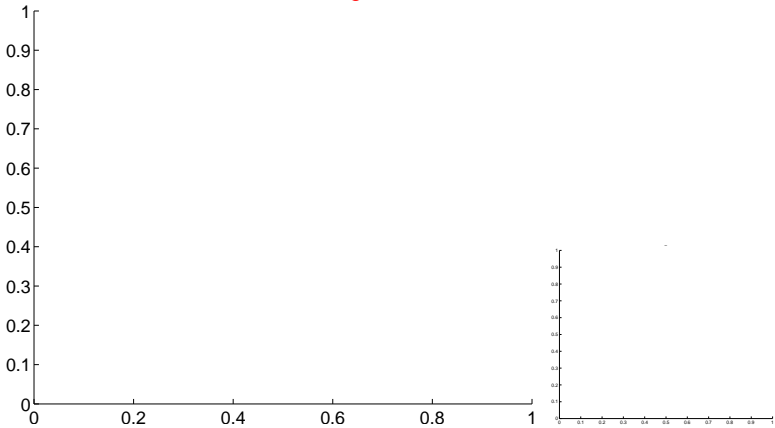
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

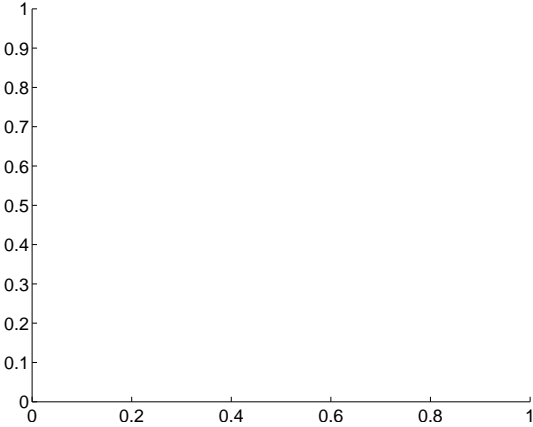
Q1 no difference image



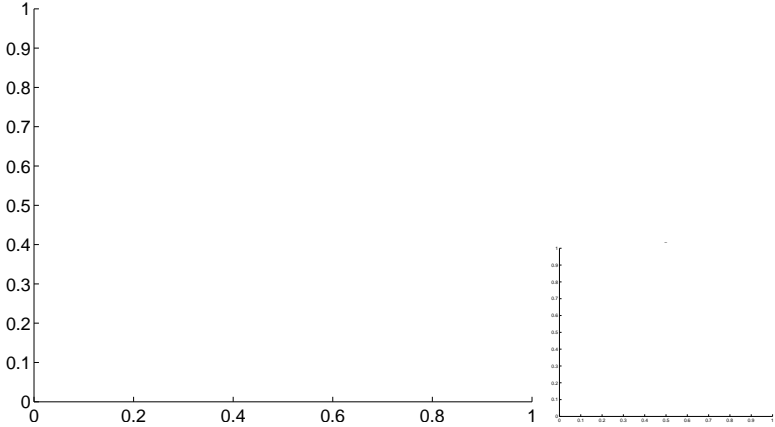
Q1 no OOT image



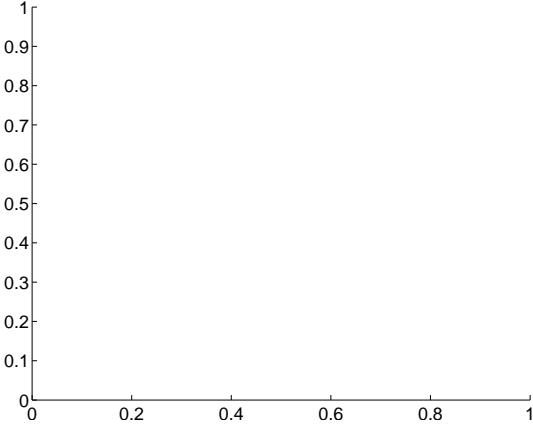
Q3 no difference image



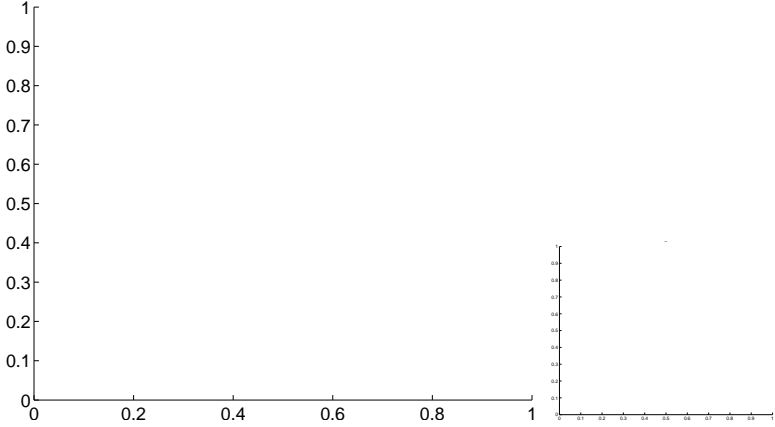
Q3 no OOT image



Q4 no difference image



Q4 no OOT image

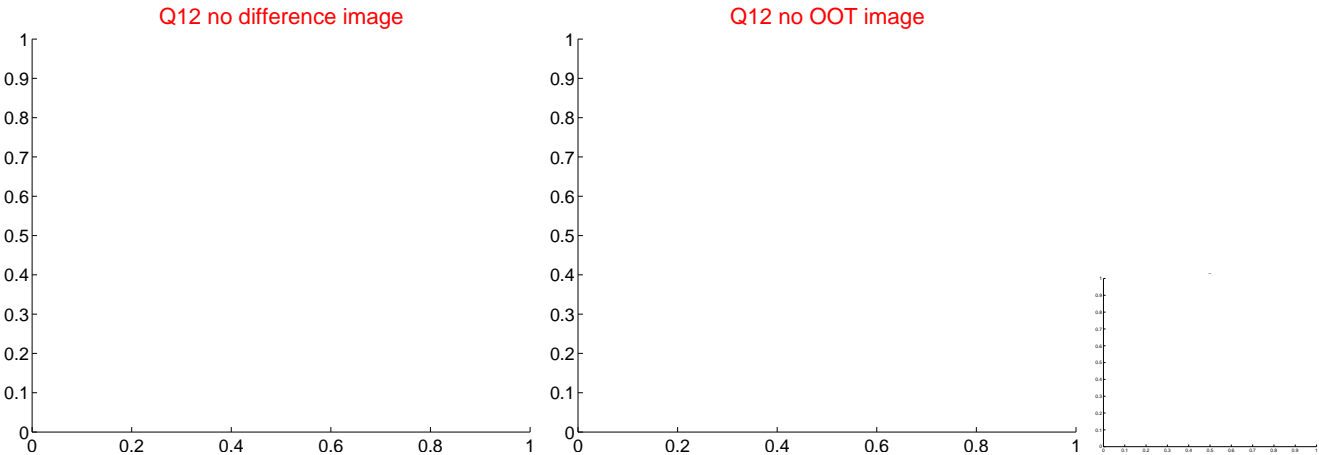
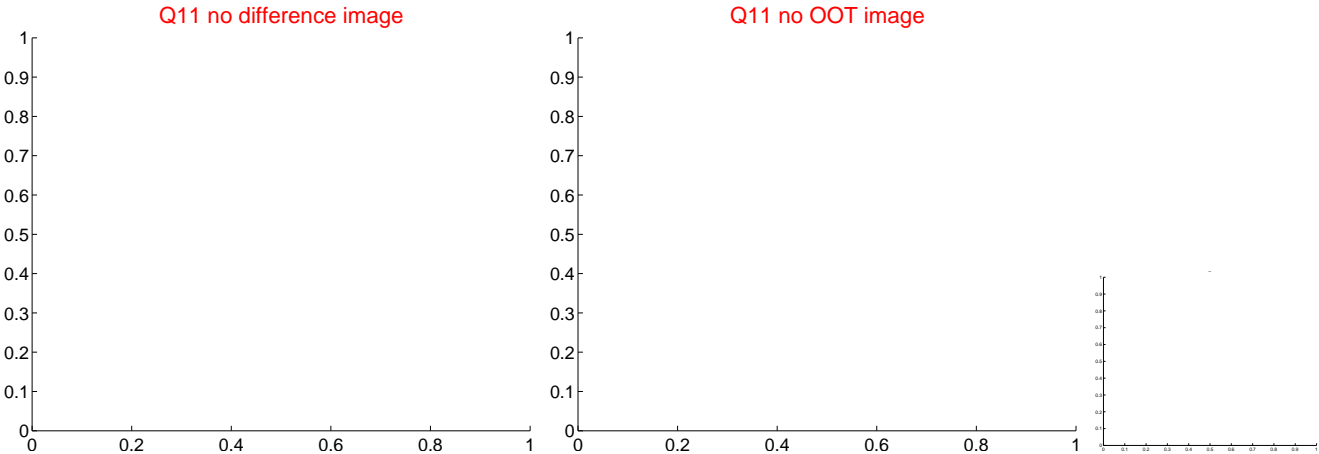
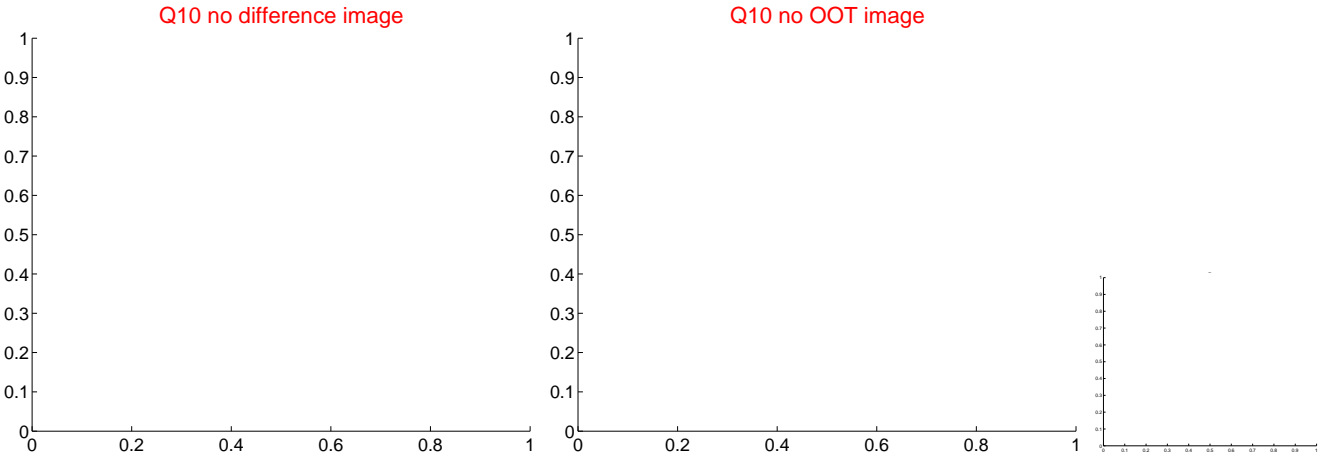
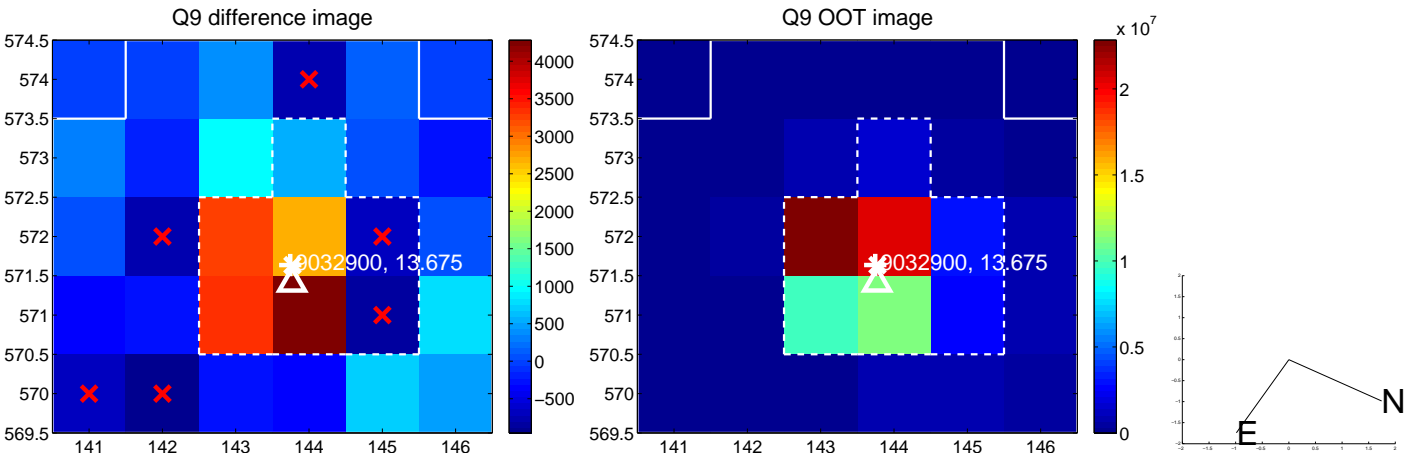


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

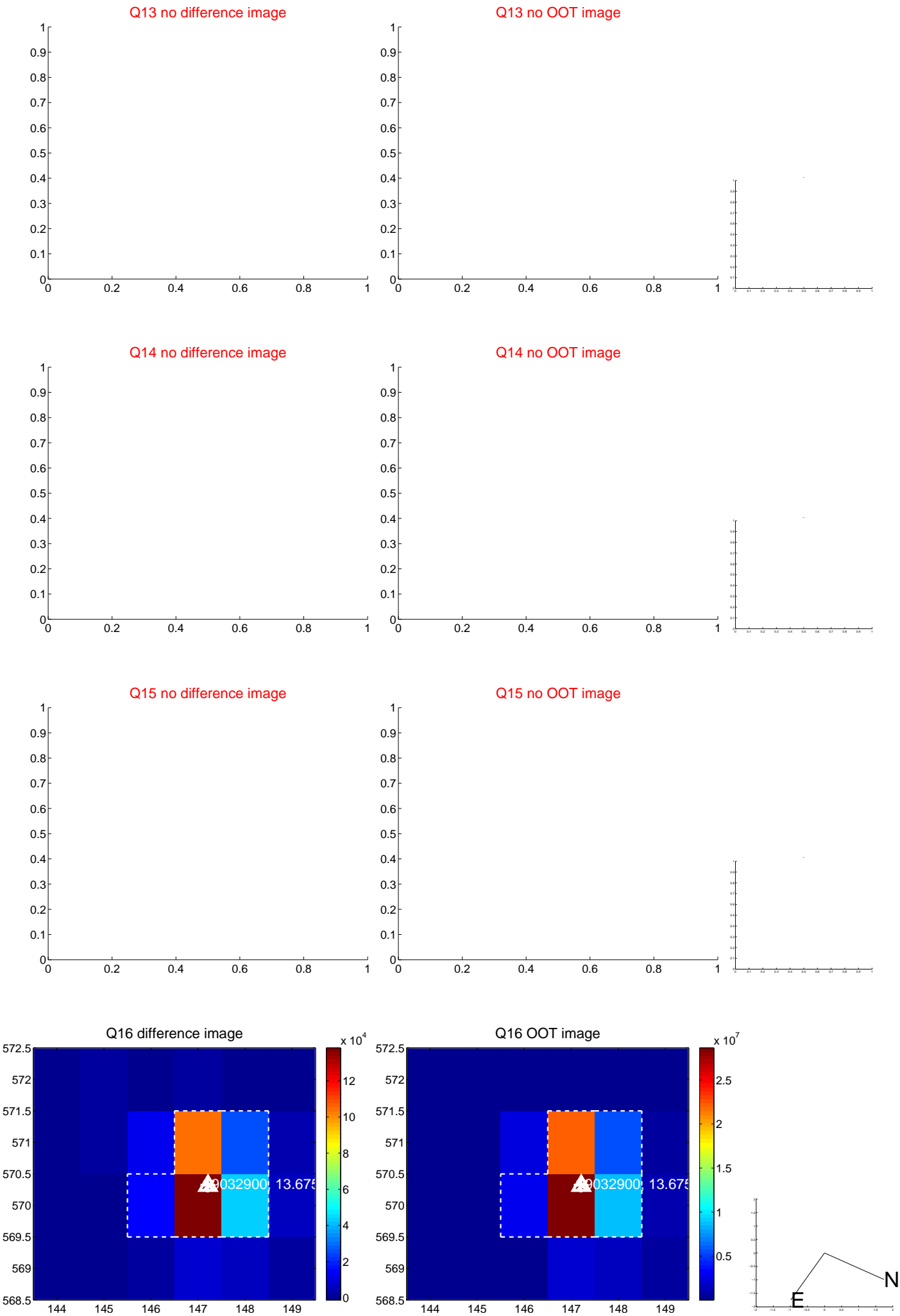




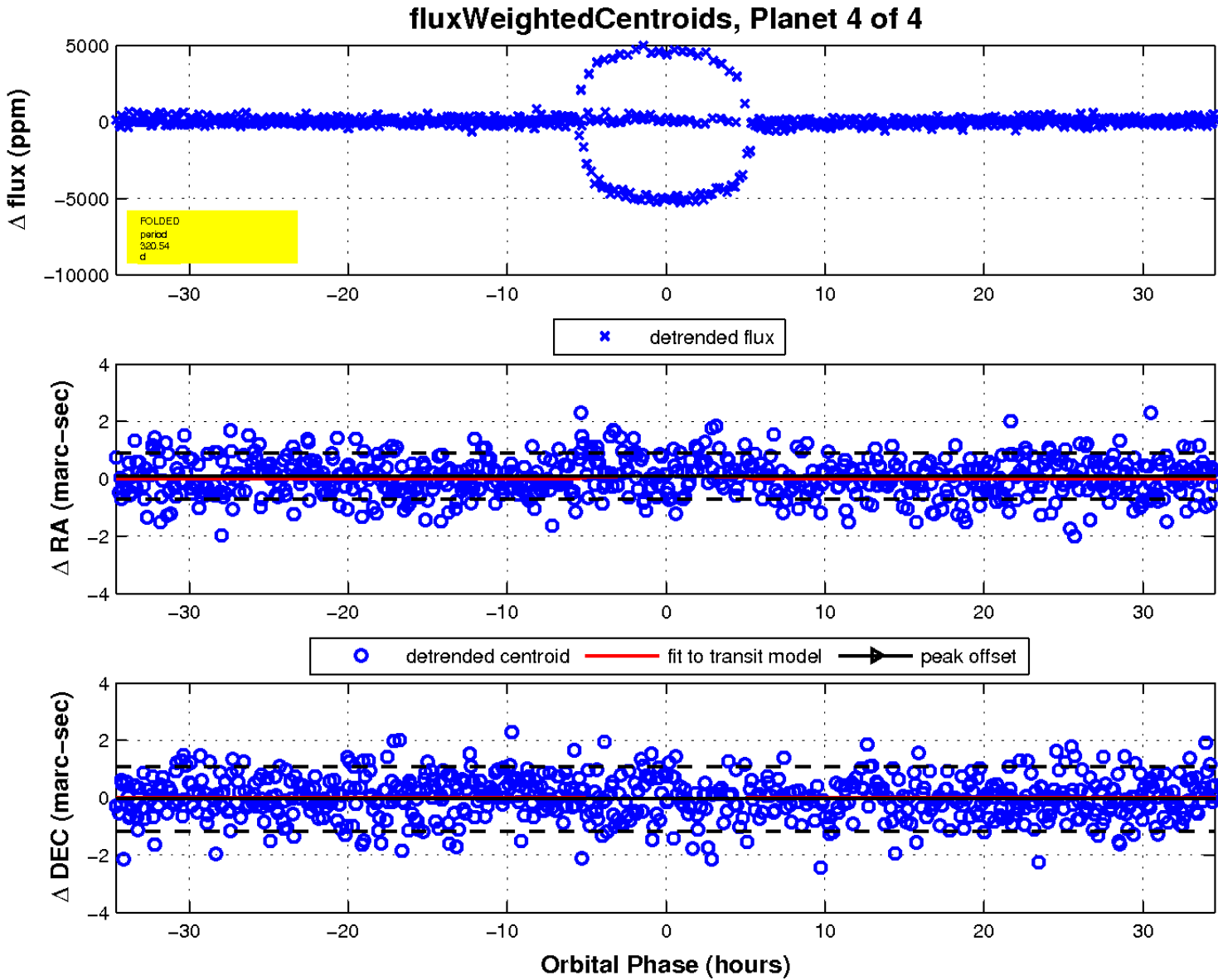
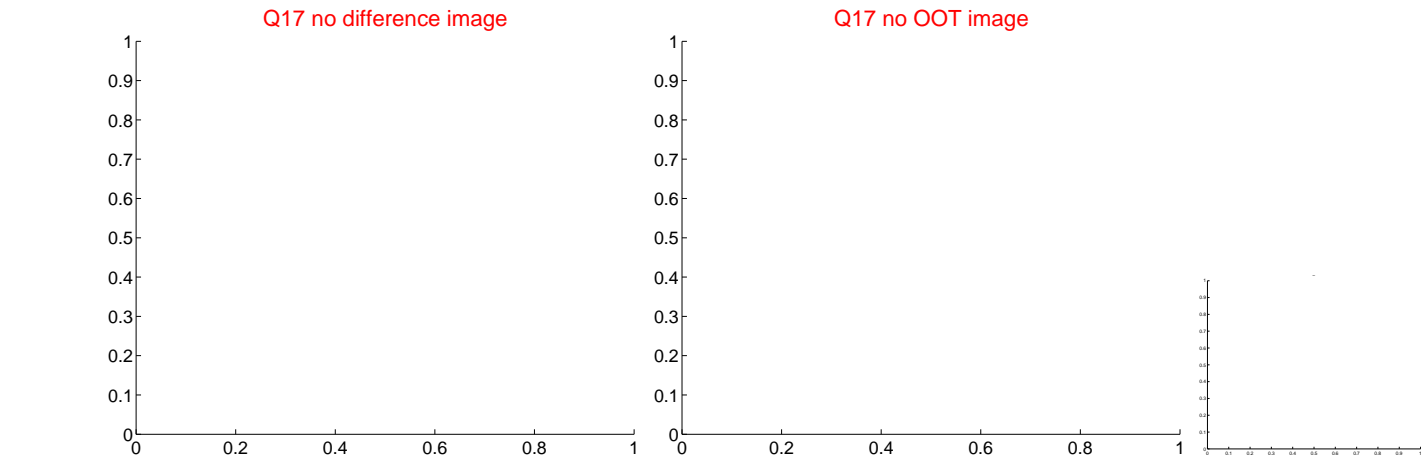
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

