

# KIC 003459261

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003459261-01	OBS	No	0.719088	132.367081	5.3	2.933	8.2	2.3	3.79	7103	0.96	89773.68
003459261-02	OBS	No	142.819930	182.736376	197.2	8.699	8.7	6.6	3.79	7103	6.04	77.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003459261-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
003459261-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

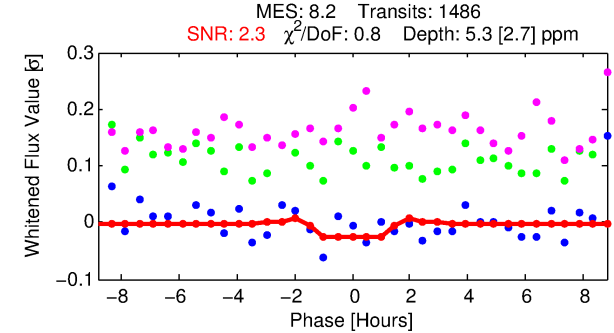
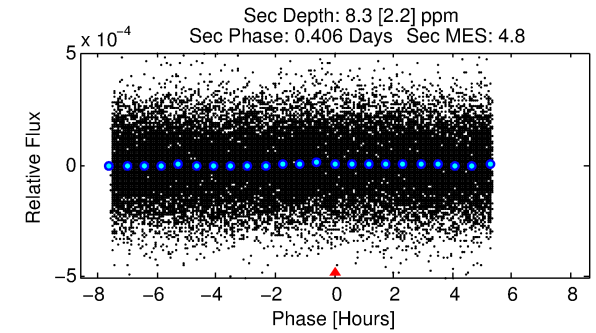
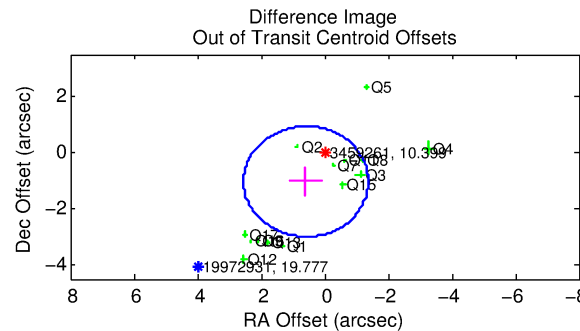
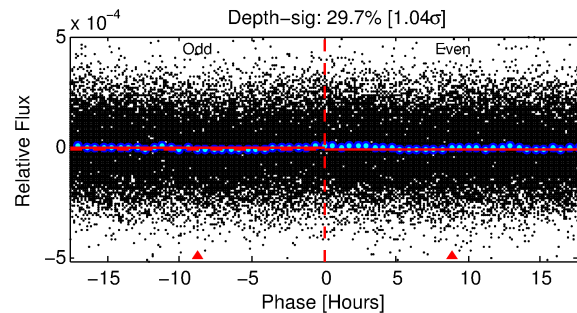
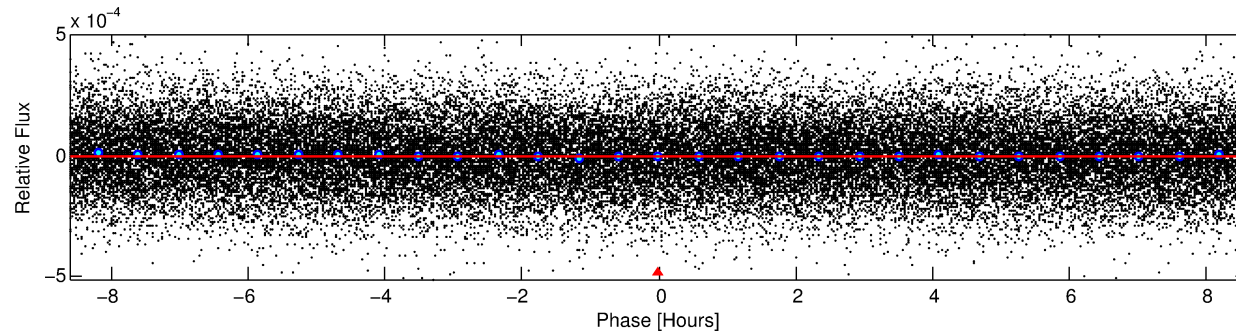
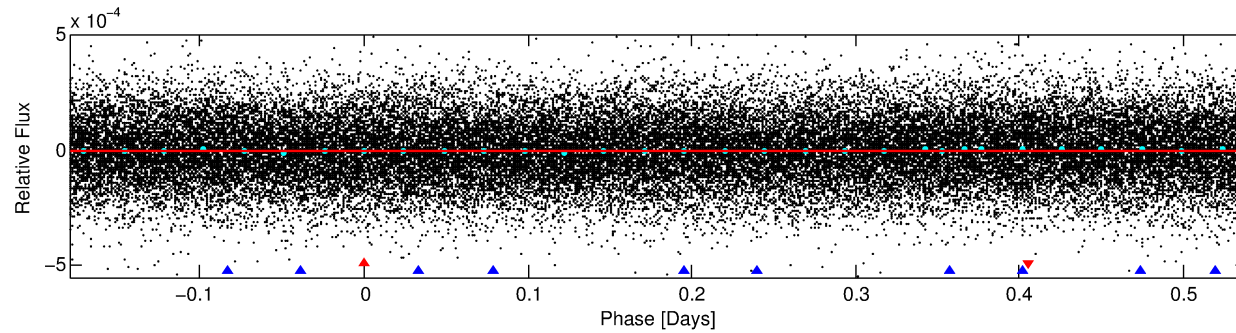
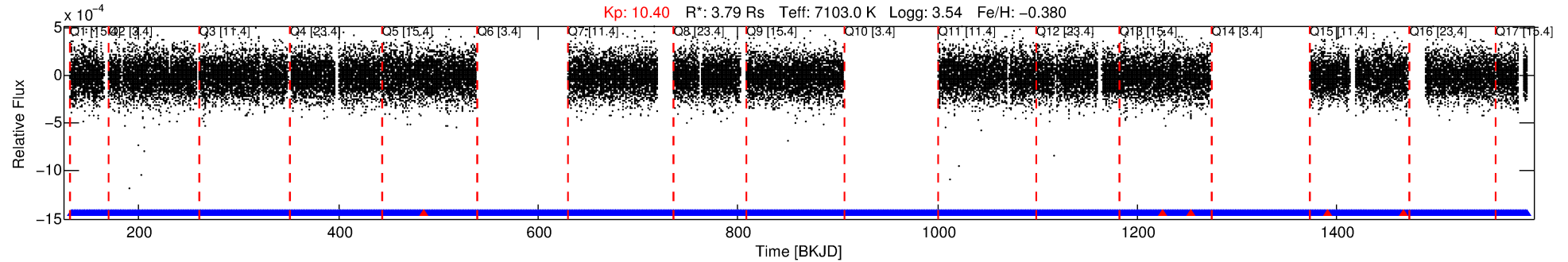
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003459261-01

No Significant Match Found

# DV One-Page Summary

KIC: 3459261 Candidate: 1 of 2 Period: 0.719 d



## DV Fit Results:

Period = 0.71909 [0.00004] d  
Epoch = 132.3671 [0.0099] BKJD  
 $R_p/R^*$  = 0.0023 [0.0009]  
 $a/R^*$  = 1.45 [1.17]  
 $b$  = 0.79 [0.76]  
 $S_{\text{eff}}$  = 89773.68 [52794.15]  
 $T_{\text{eq}}$  = 4414 [649] K  
 $R_p$  = 0.96 [0.50]  $R_e$   
 $a$  = 0.0191 [0.0068] AU  
 $A_g$  = 1.82 [1.77] [0.46 $\sigma$ ]  
 $T_{\text{eff}}$  = 7928 [1586] K [2.05 $\sigma$ ]

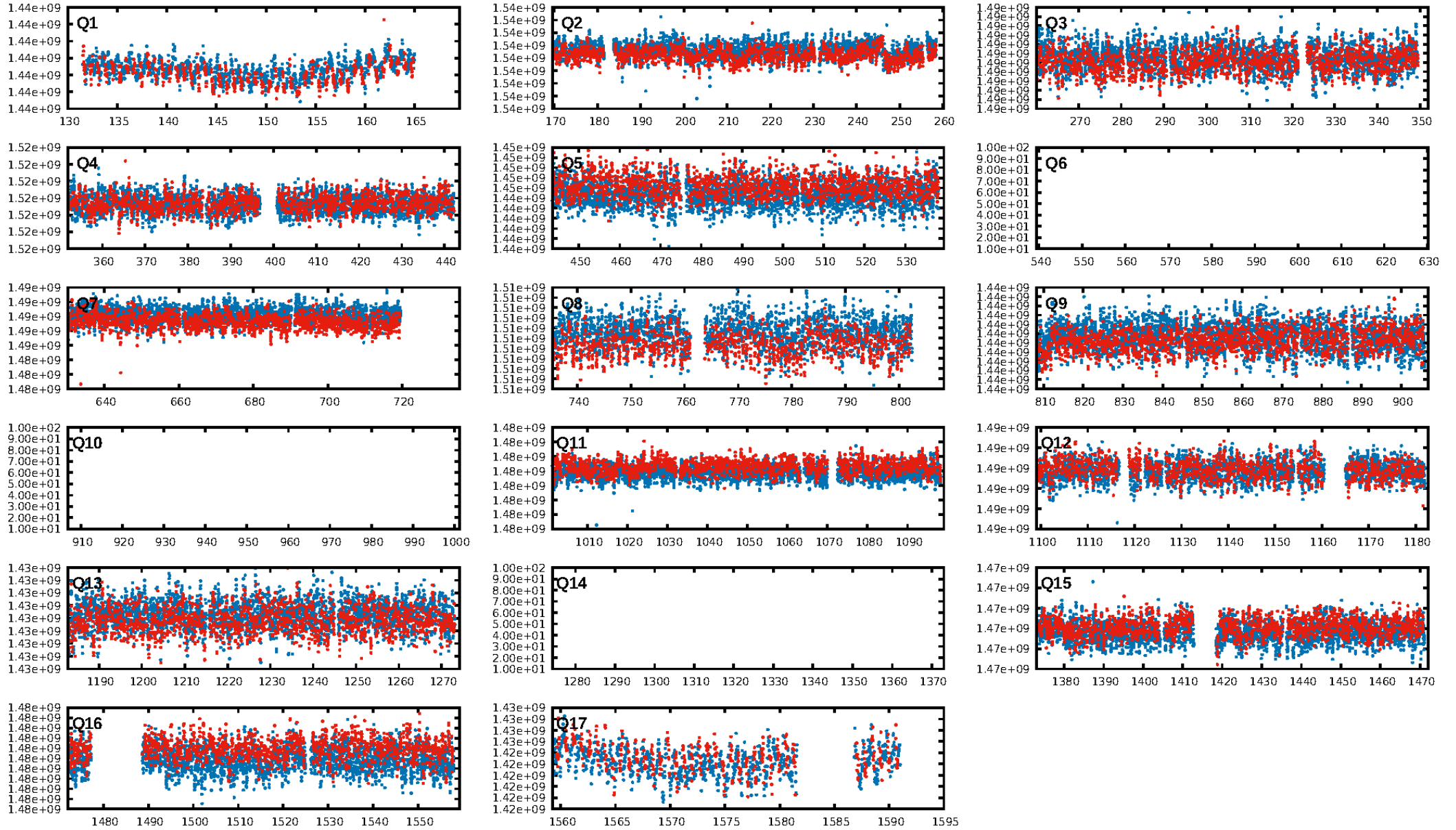
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [371.51 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.71e-11**  
RollingBand-fgt: 1.00 [1397/1402]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 66.7%  
Centroid-so: 1.274 arcsec [0.39 $\sigma$ ]  
OotOffset-rm: 1.184 arcsec [1.81 $\sigma$ ]  
KicOffset-rm: 0.788 arcsec [1.20 $\sigma$ ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.21 [3/14]  
DiffImageOverlap-fno: 1.00 [14/14]

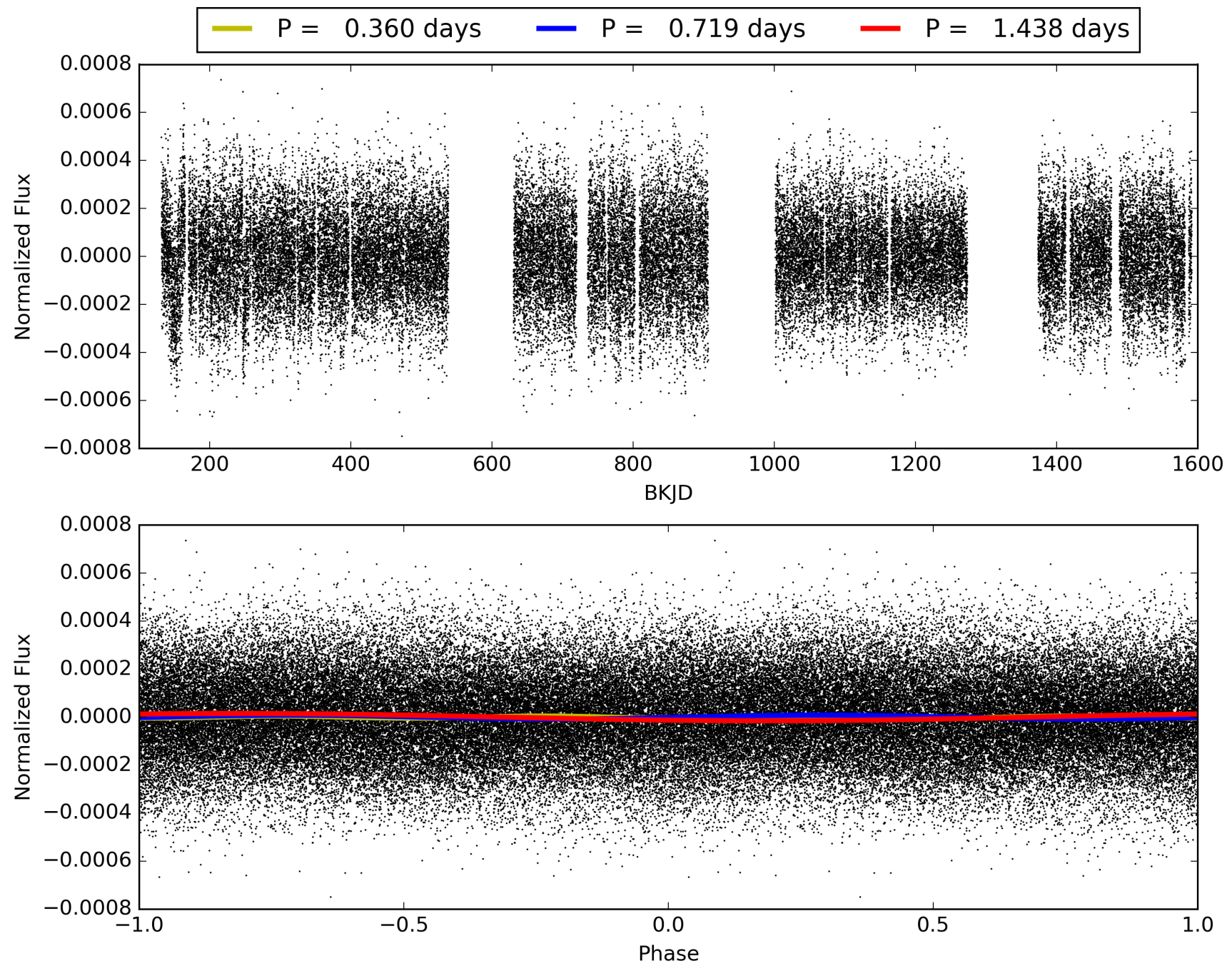
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:40:12 Z

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

# TCE 003459261-01, PDC Light Curves



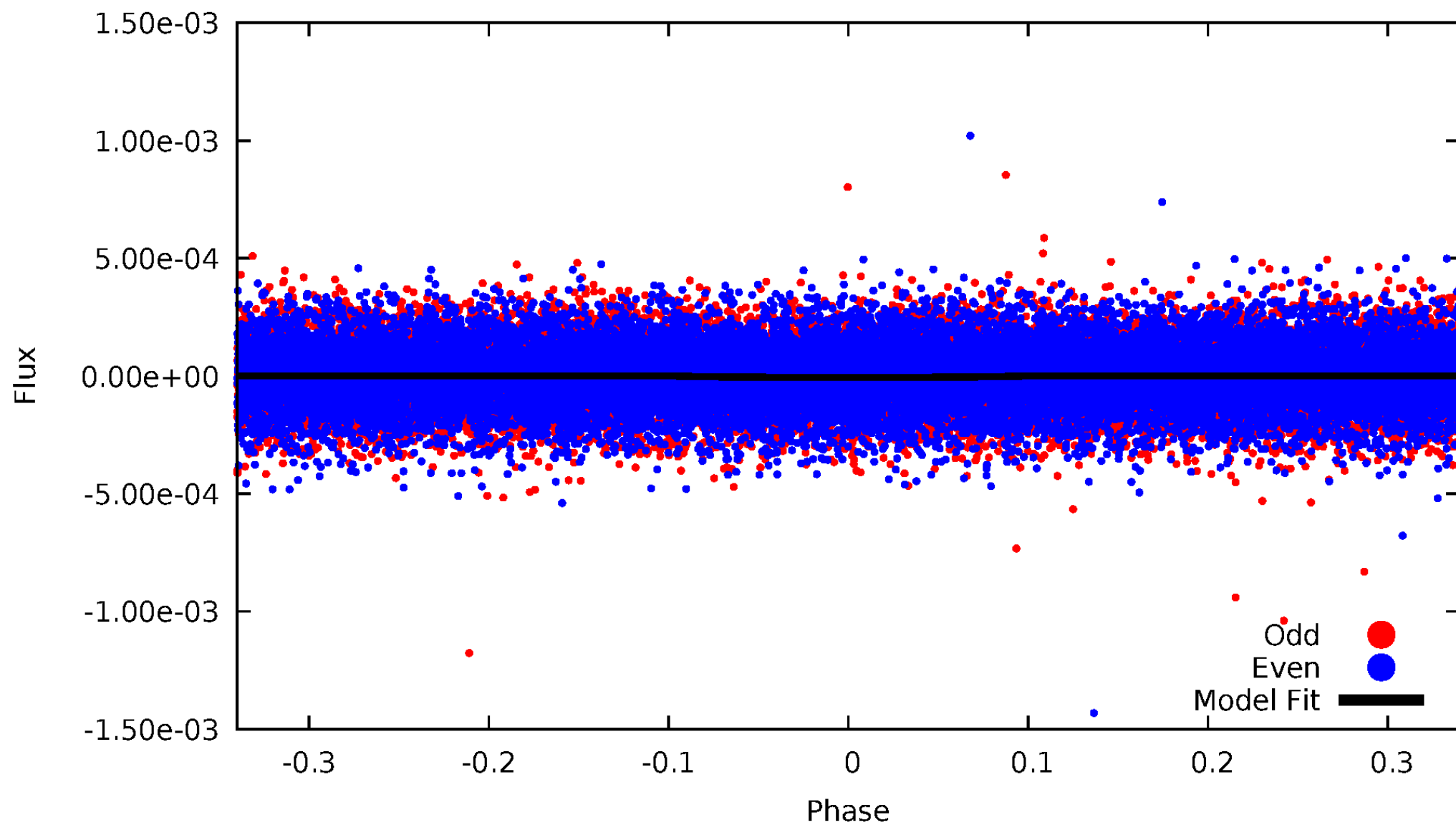
TCE 003459261-01





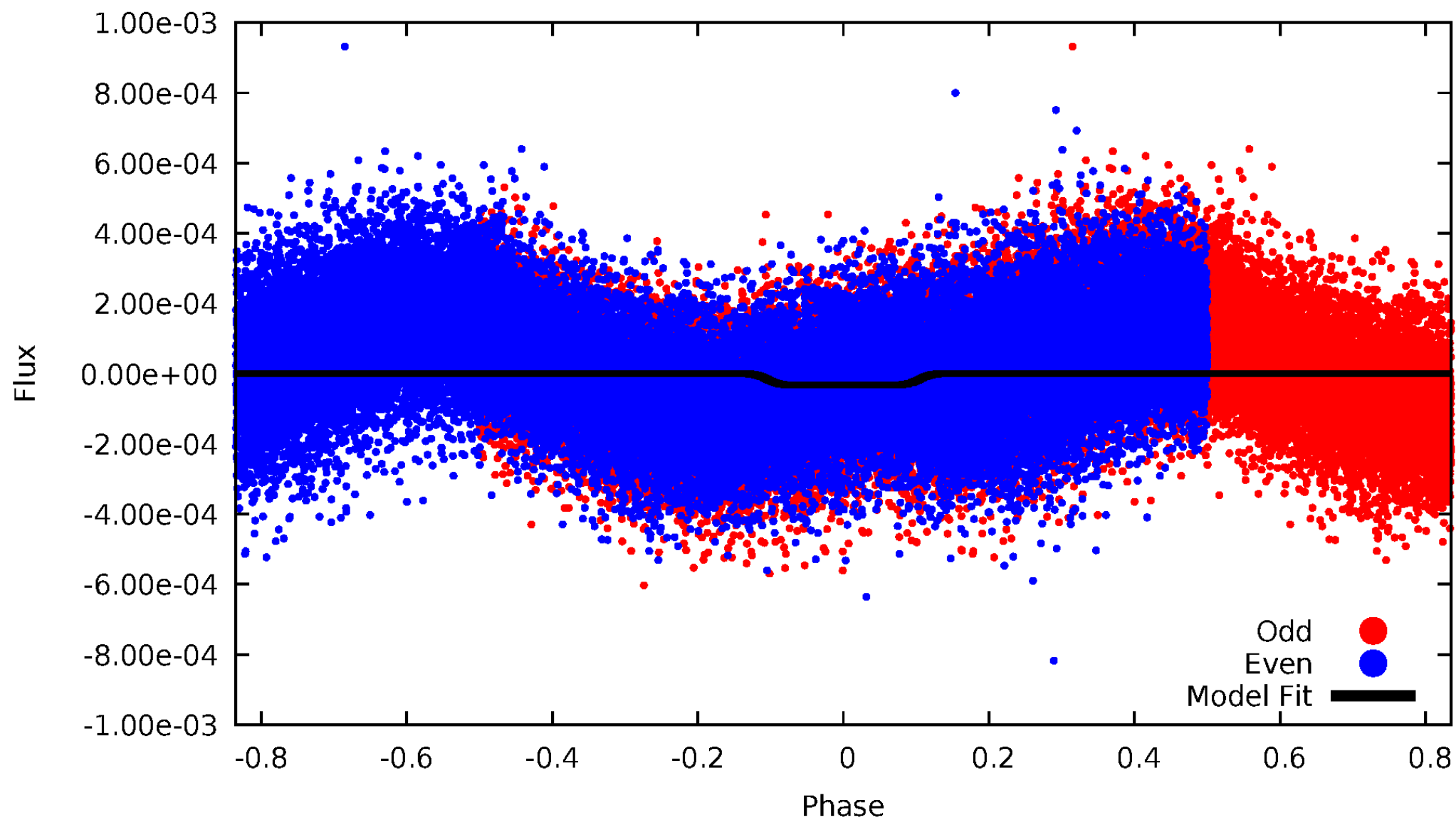
# DV Odd/Even

TCE 003459261-01

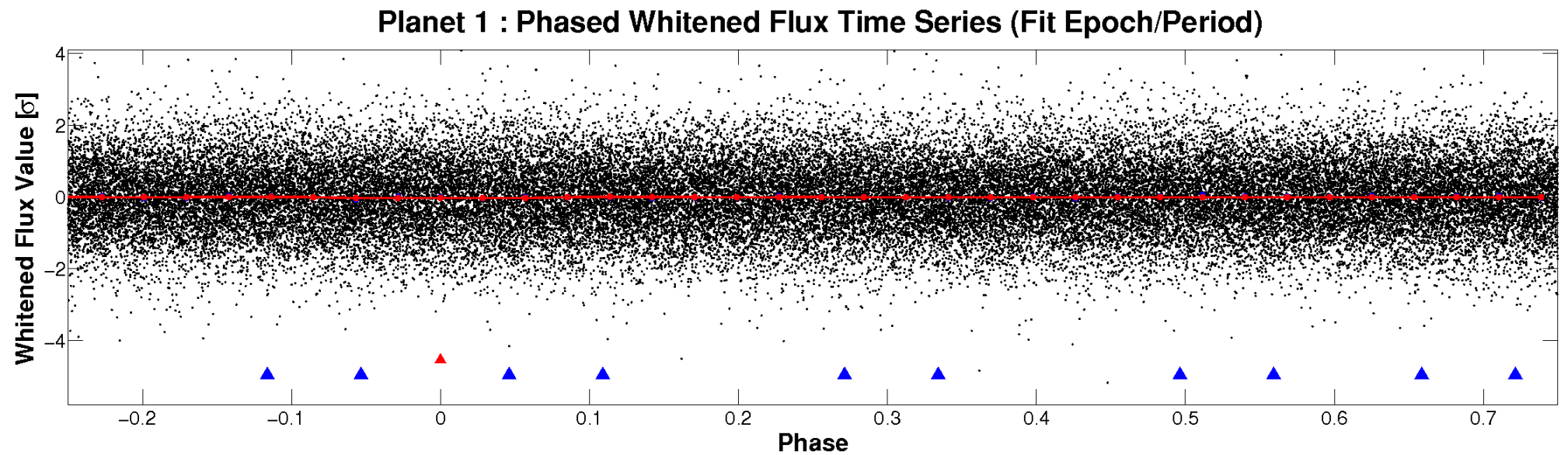
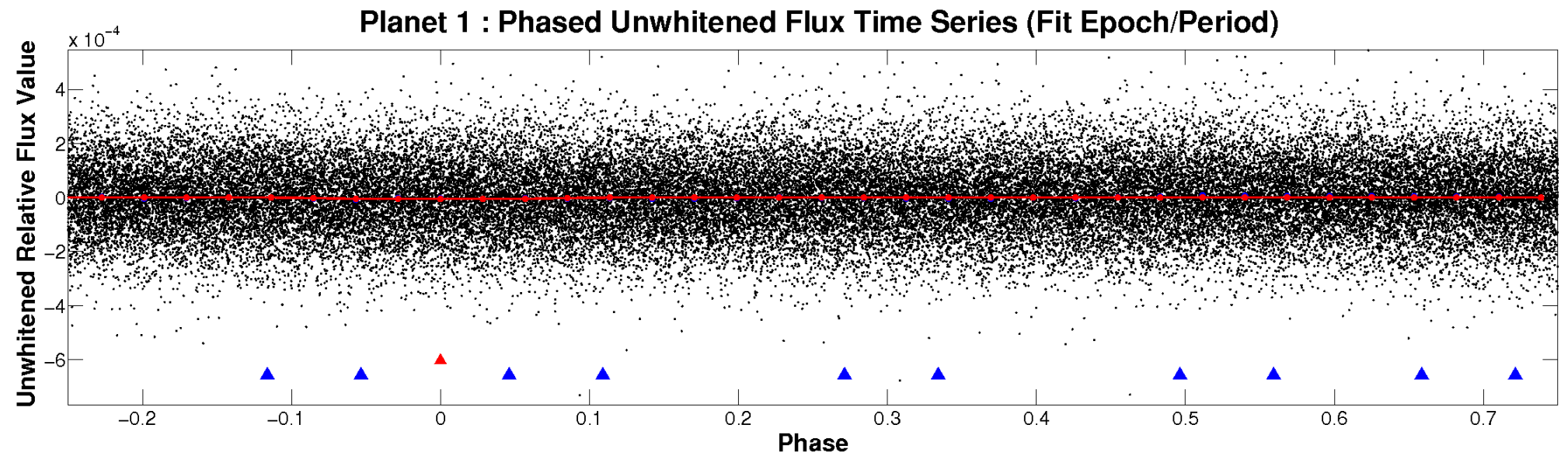


# ALT Odd/Even

TCE 003459261-01

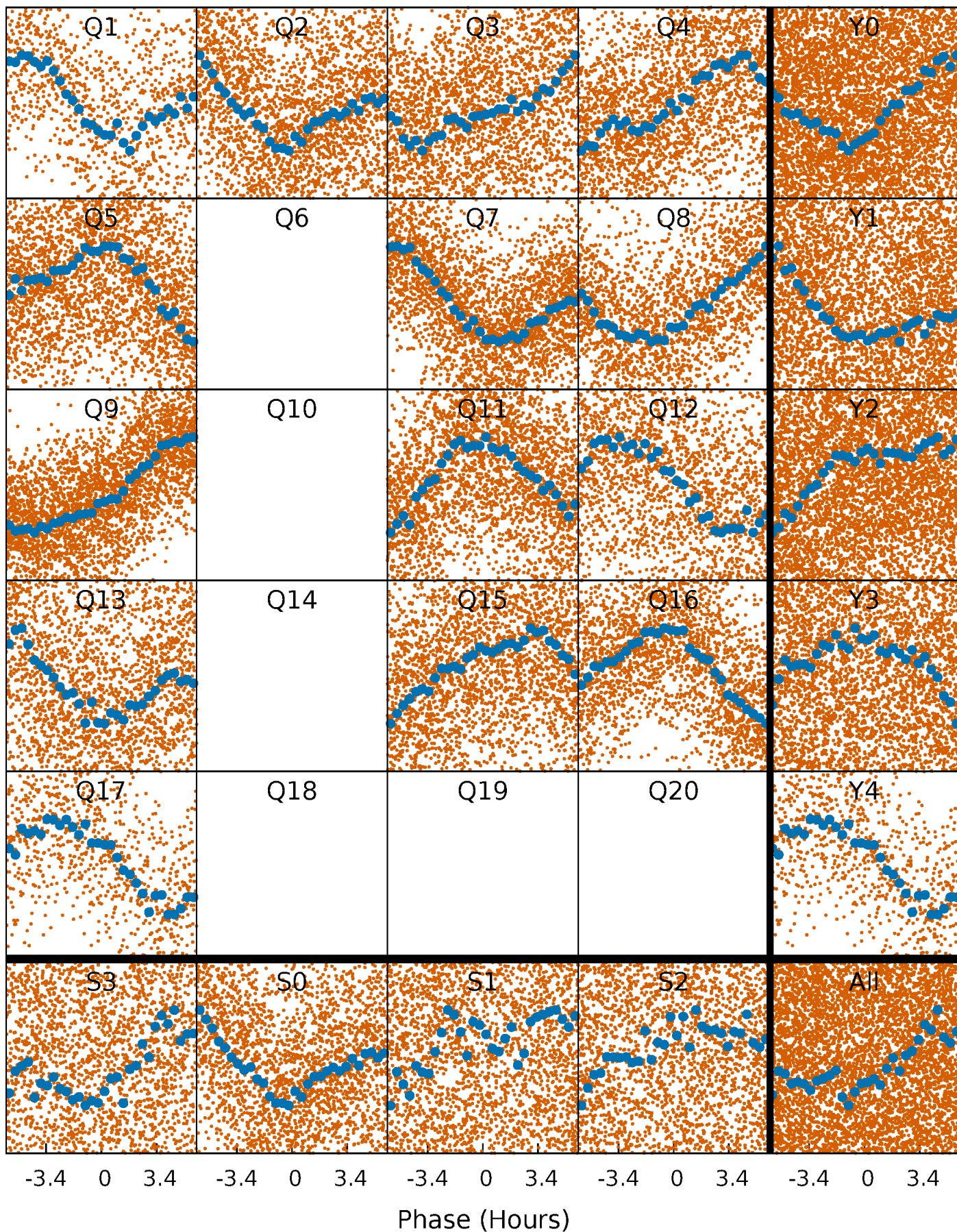


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

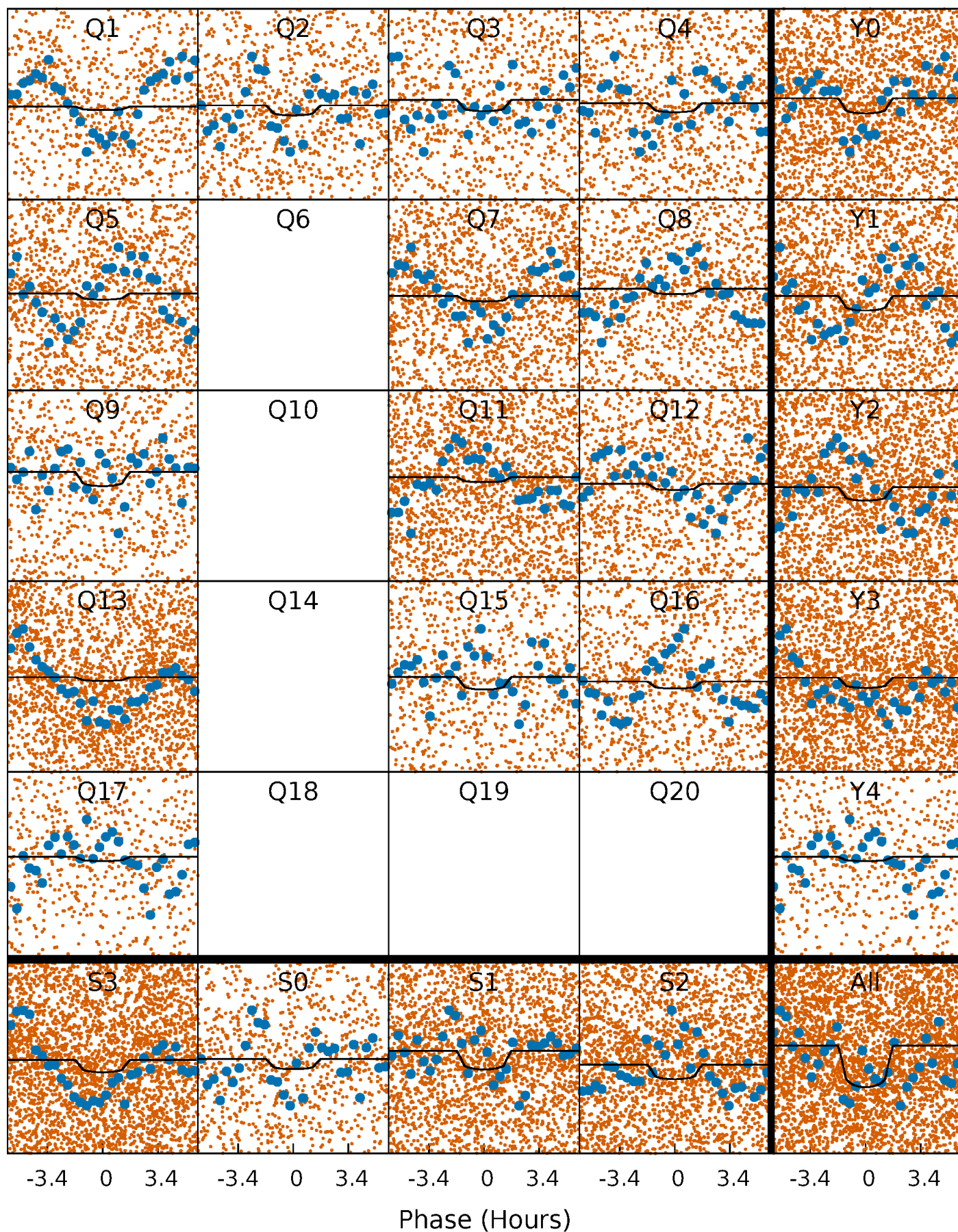
TCE 003459261-01 P= 0.719088 Days  $T_0=132.367081$  (BKJD)





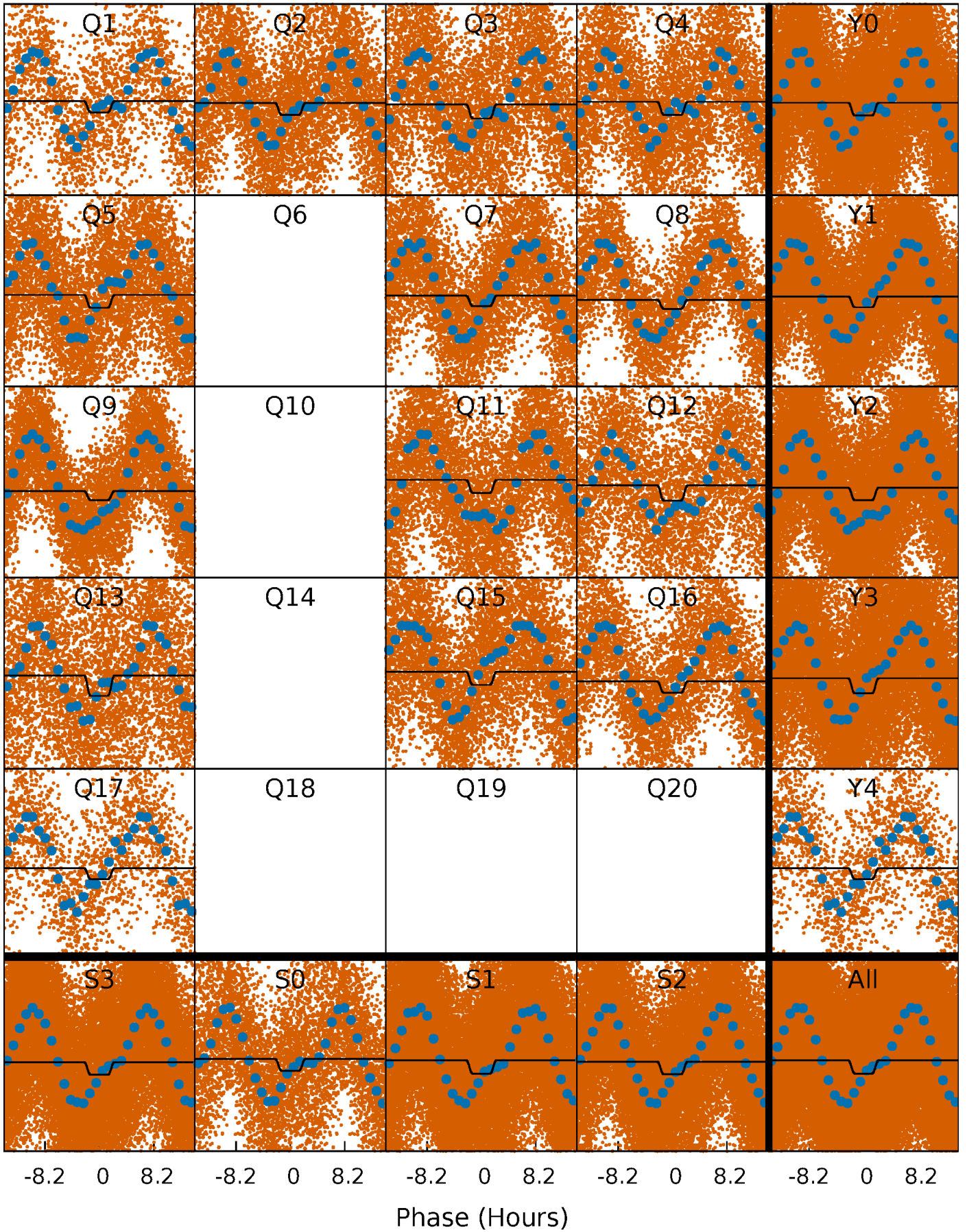
# DV Quarter-Phased Transit Curves

TCE 003459261-01 P= 0.719088 Days  $T_0=132.367081$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

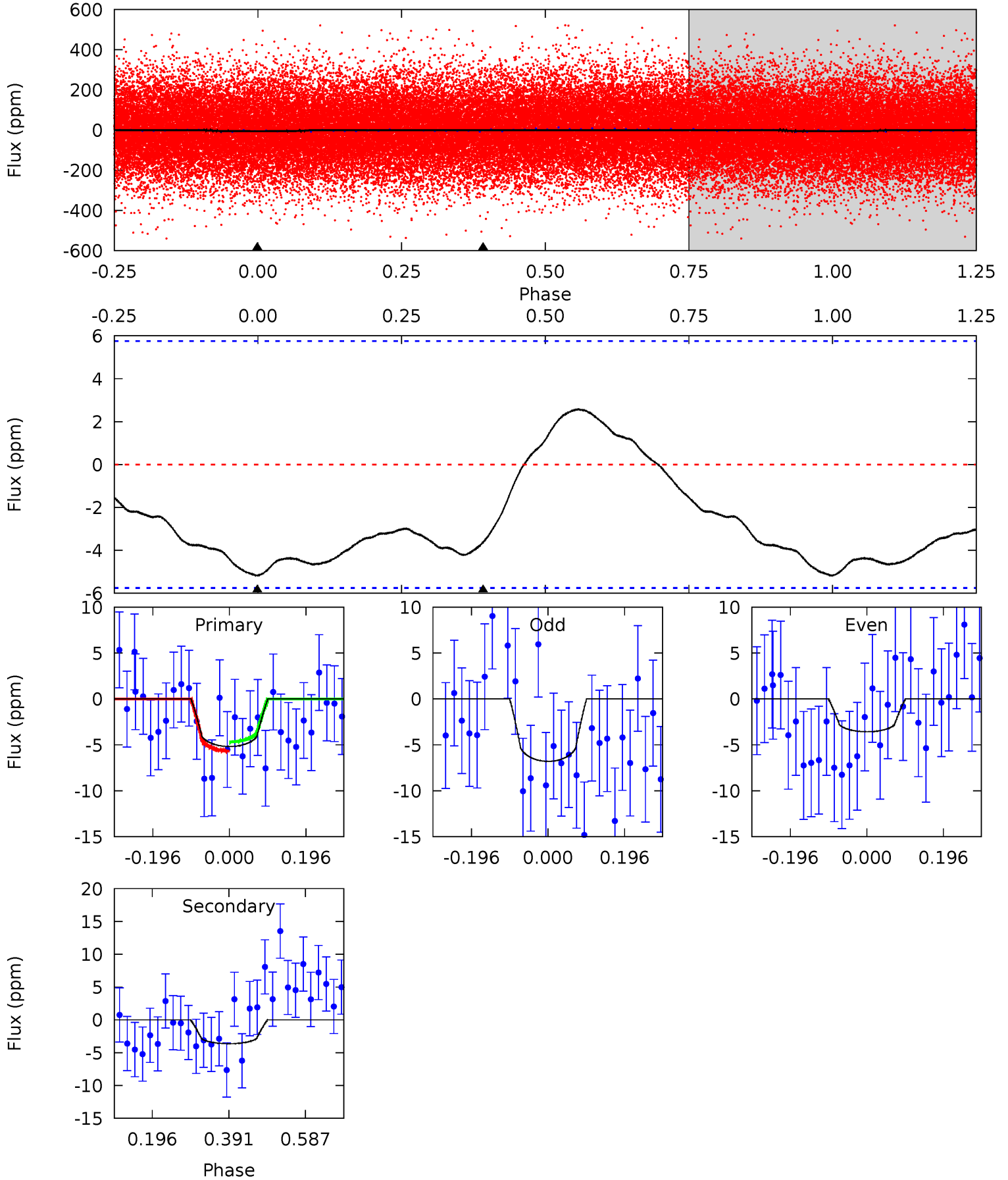
TCE 003459261-01   P= 0.718073 Days    $T_0=131.866984$  (BKJD)



# DV Model-Shift Uniqueness Test

003459261-01, P = 0.719088 Days, E = 130.928905 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
3.98	2.79	0	0	4.42	1.29	1.12	3.98	3.98	2.79	2.79	1.23	0.91	0.33	0.39

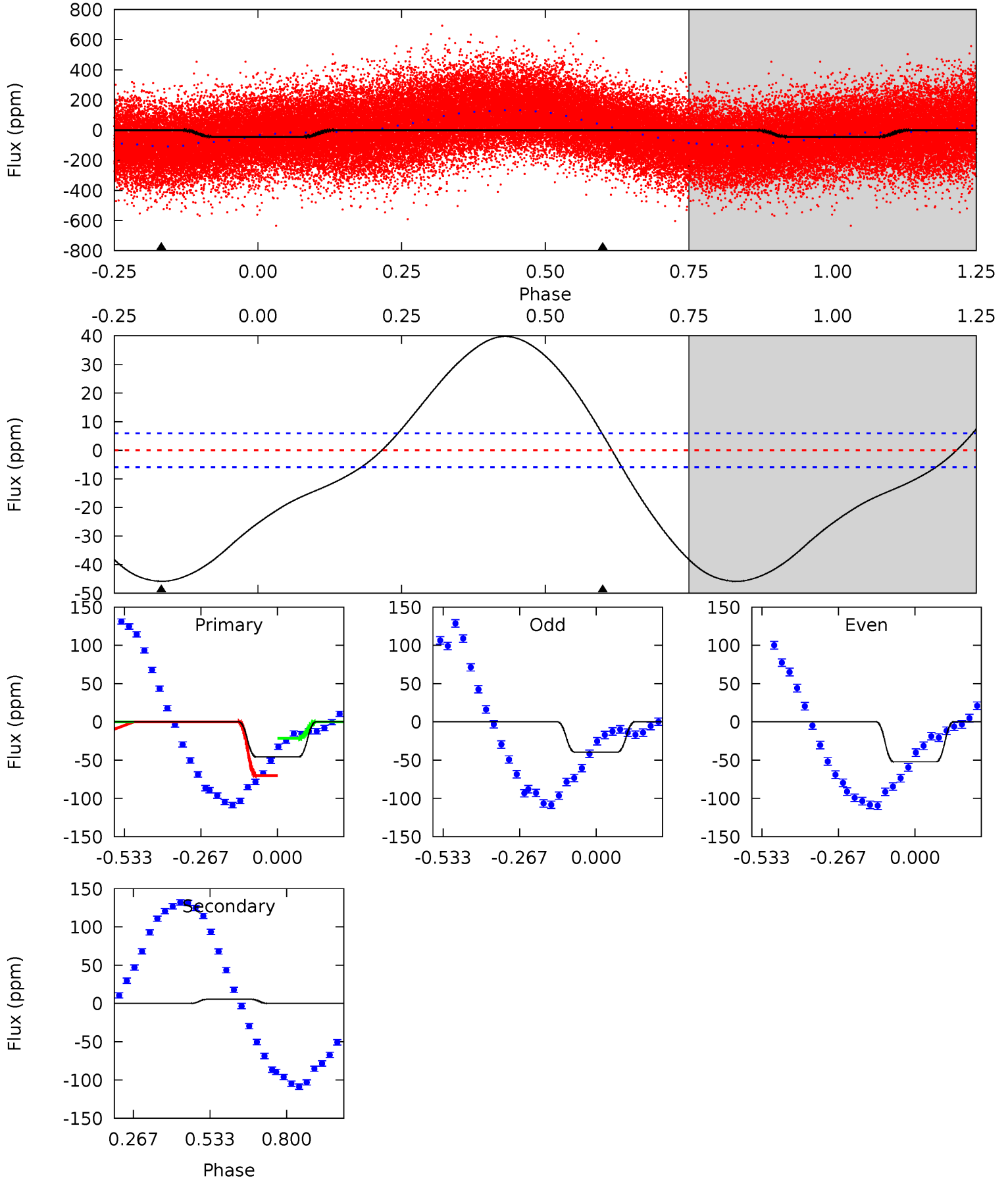




# Alt Model-Shift Uniqueness Test

003459261-01, P = 0.718073 Days, E = 131.148911 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.6	-4.05	0	0	4.35	1.11	9.25	33.6	33.6	-4.05	-4.05	4.65	1.01	0.46	18.9





### Stellar Parameters For KIC 003459261

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7103^{+191}_{-255}$	$3.535^{+0.336}_{-0.084}$	$-0.380^{+0.300}_{-0.250}$	$3.787^{+0.369}_{-1.382}$	$1.794^{+0.192}_{-0.357}$	$0.047^{+0.123}_{-0.012}$
	+3%/-4%	+10%/-2%	+79%/-66%	+10%/-36%	+11%/-20%	+264%/-26%
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 003459261-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-4 \pm 1$	$0.89^{+0.37}_{-0.35}$	$6047^{+339}_{-572}$	$5590^{+2325}_{-1829}$	$0.847^{+1.633}_{-0.479}$
Alt.	$6 \pm 1$	$2.21^{+0.49}_{-0.45}$	$6027^{+337}_{-505}$	$-5604^{+292}_{-390}$	$-0.224^{+0.090}_{-0.149}$

$T_{max}$  = 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

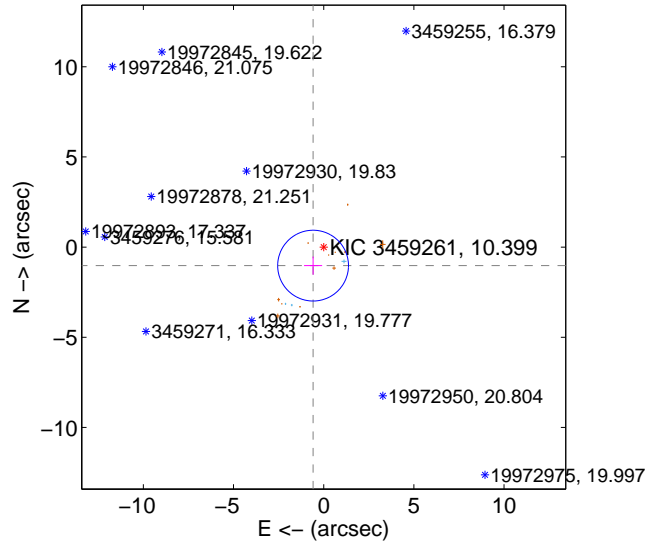
Supplemental centroid analysis for 003459261-01. **Kepler magnitude: 10.40.** Transit SNR 2.30

**There are 3 quarters with good PRF difference image offsets**

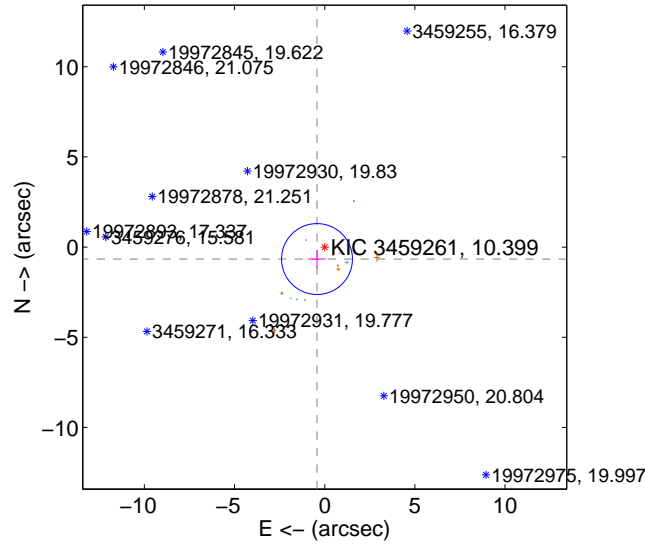
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.184 \pm 0.654$	1.81	$0.588 \pm 0.502$	$-1.028 \pm 0.501$
PRF-fit source offset from KIC position	$0.788 \pm 0.655$	1.20	$0.427 \pm 0.498$	$-0.662 \pm 0.502$
photometric centroid source offset	$1.27 \pm 3.30$	0.39	$-0.51 \pm 2.09$	$1.17 \pm 3.49$

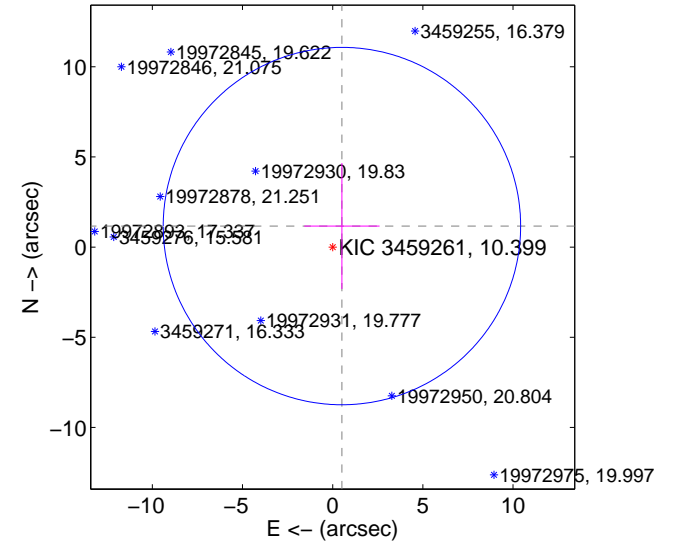
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

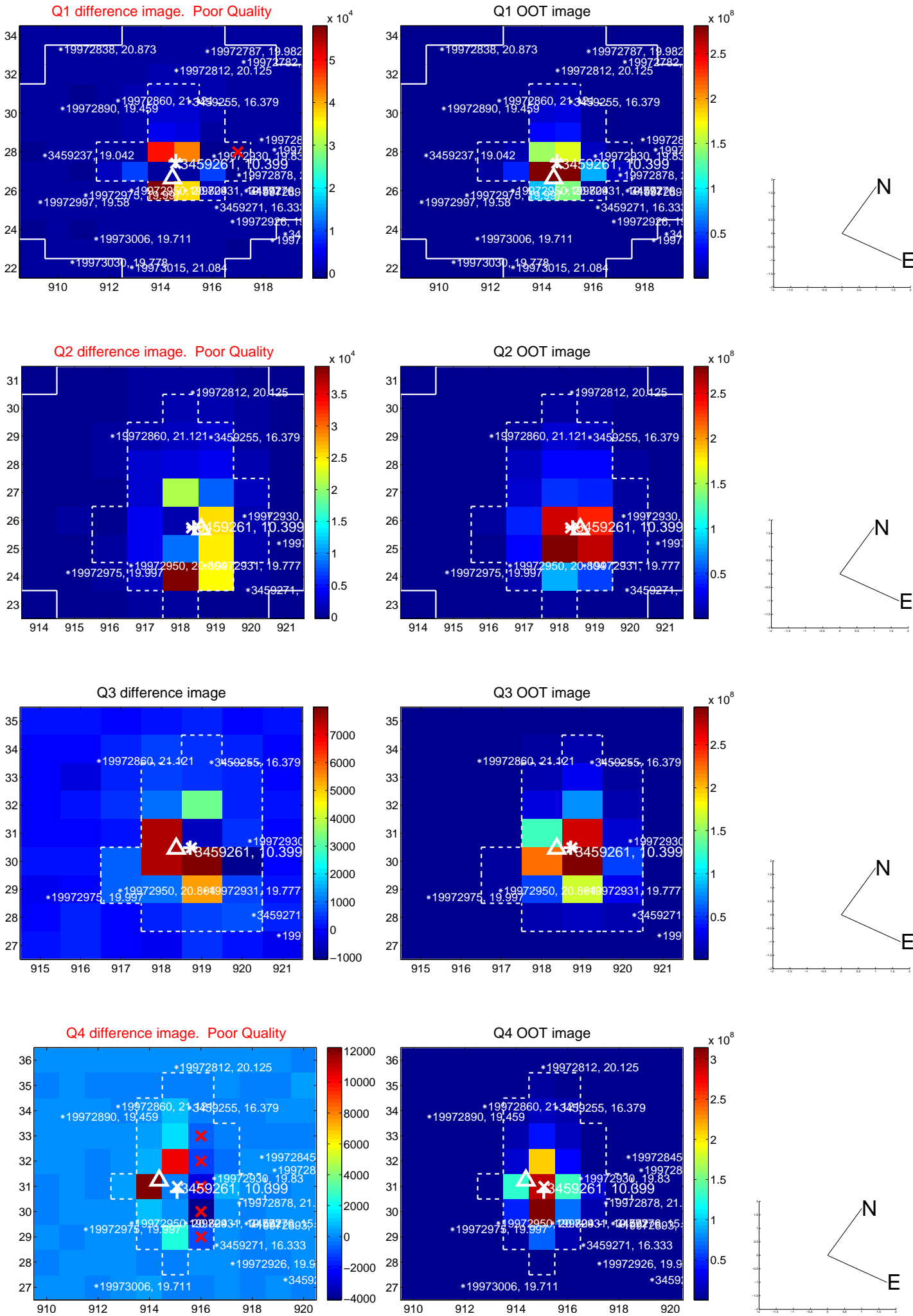


offset from photometric centroids

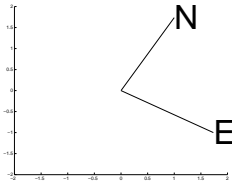
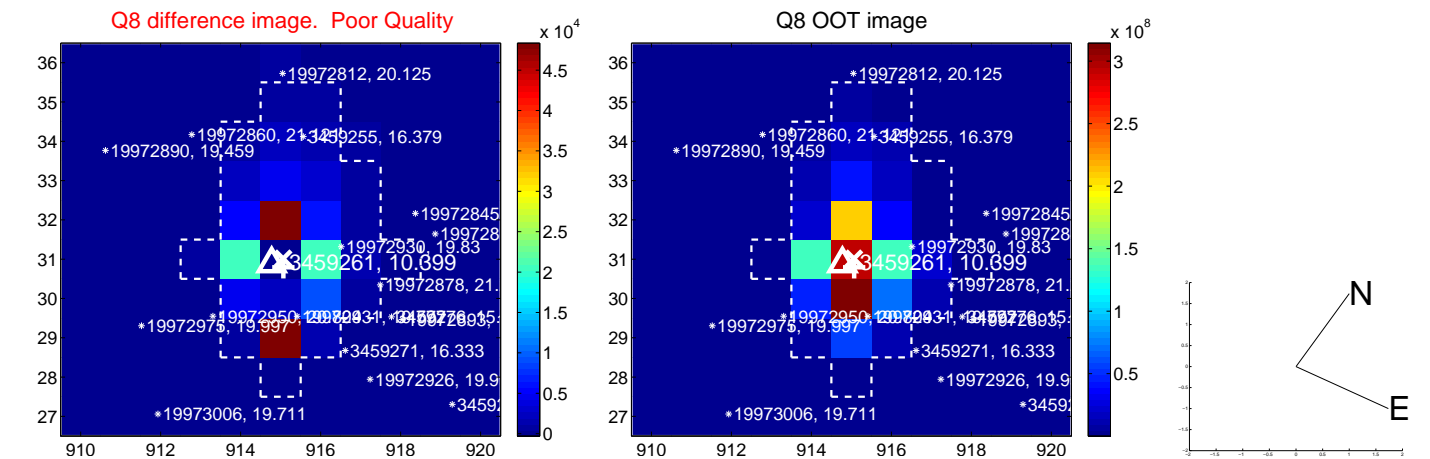
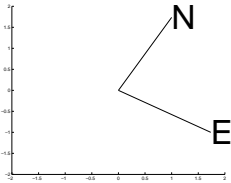
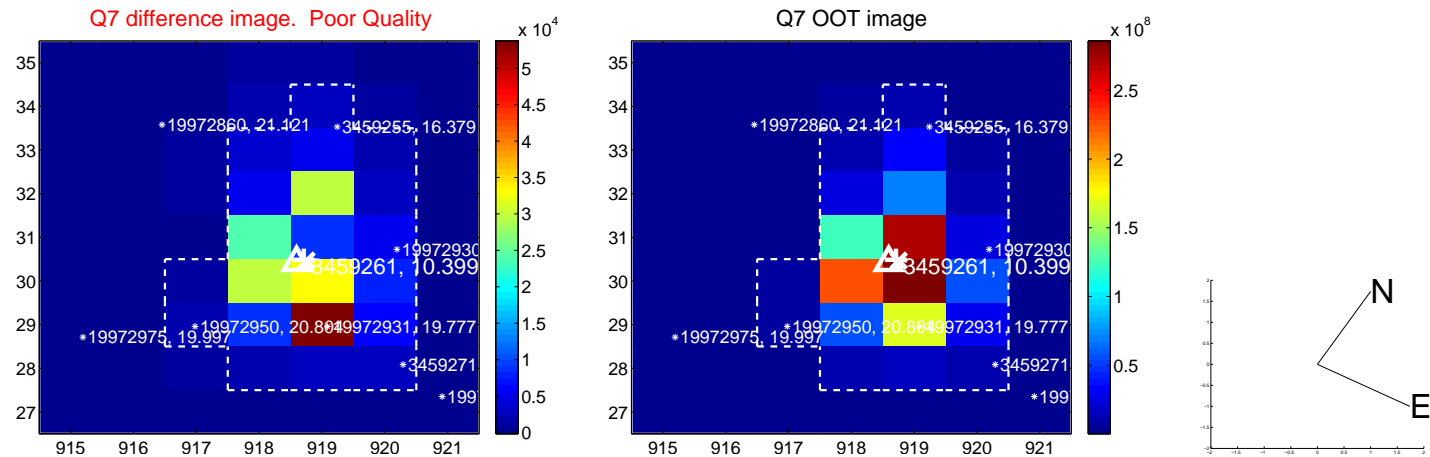
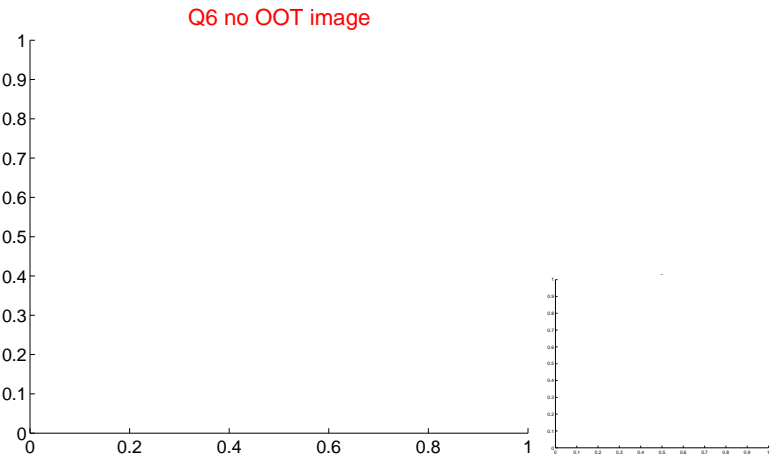
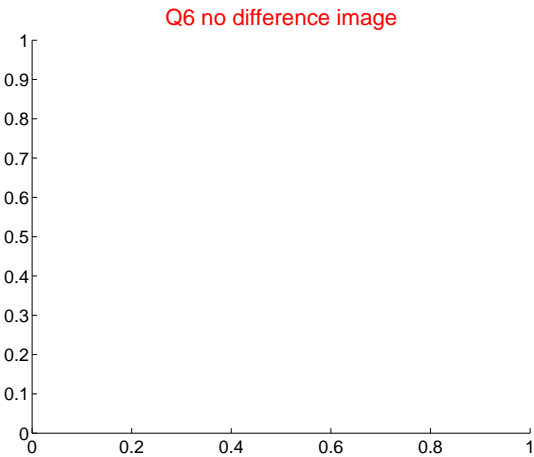
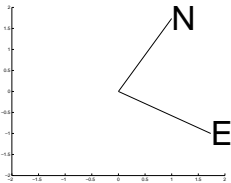
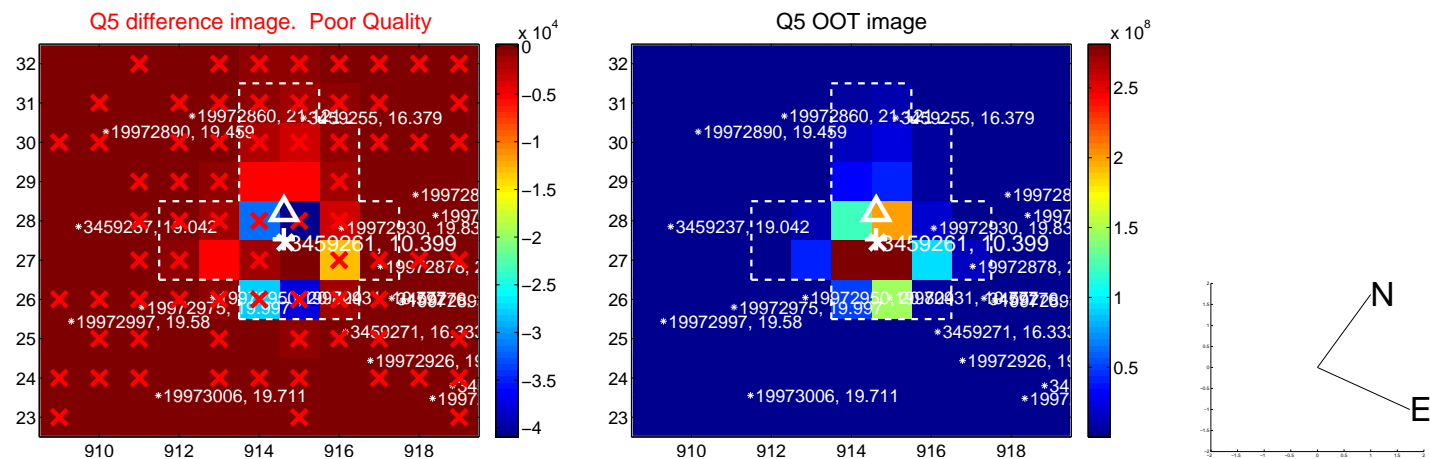


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

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

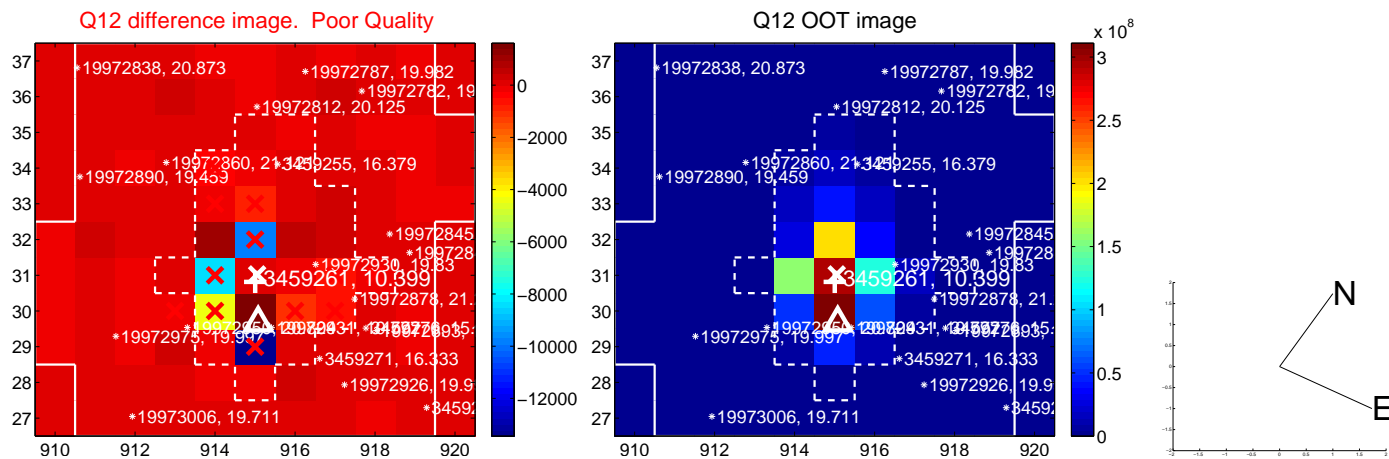
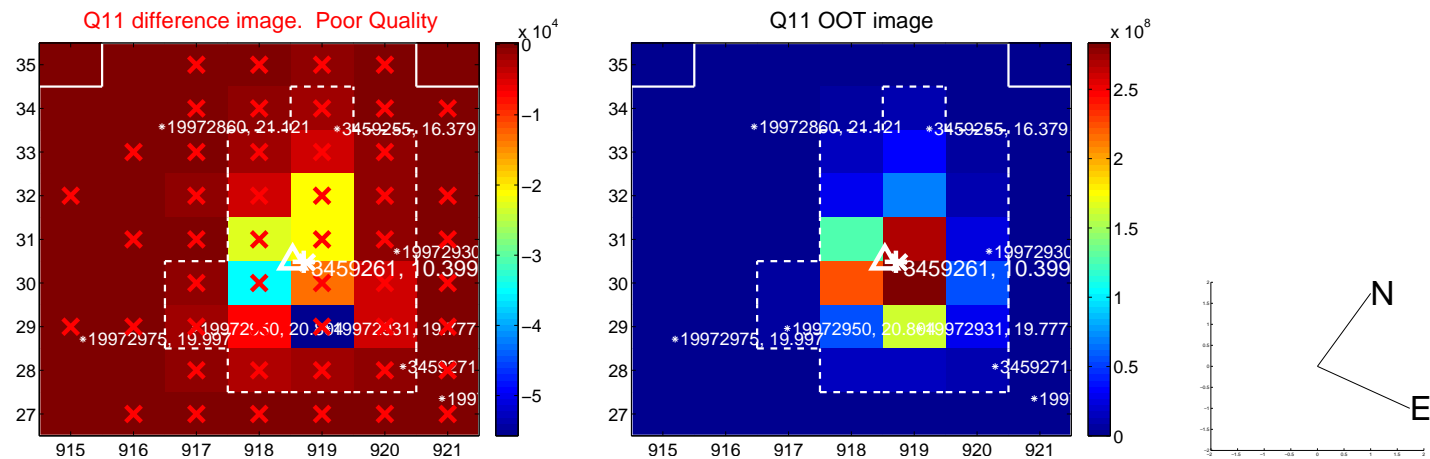
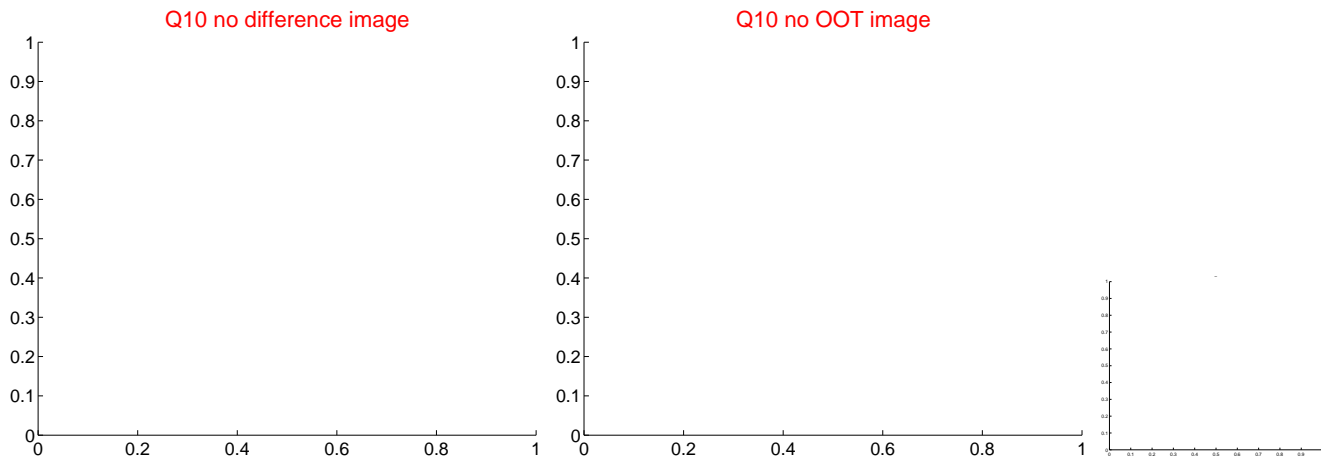
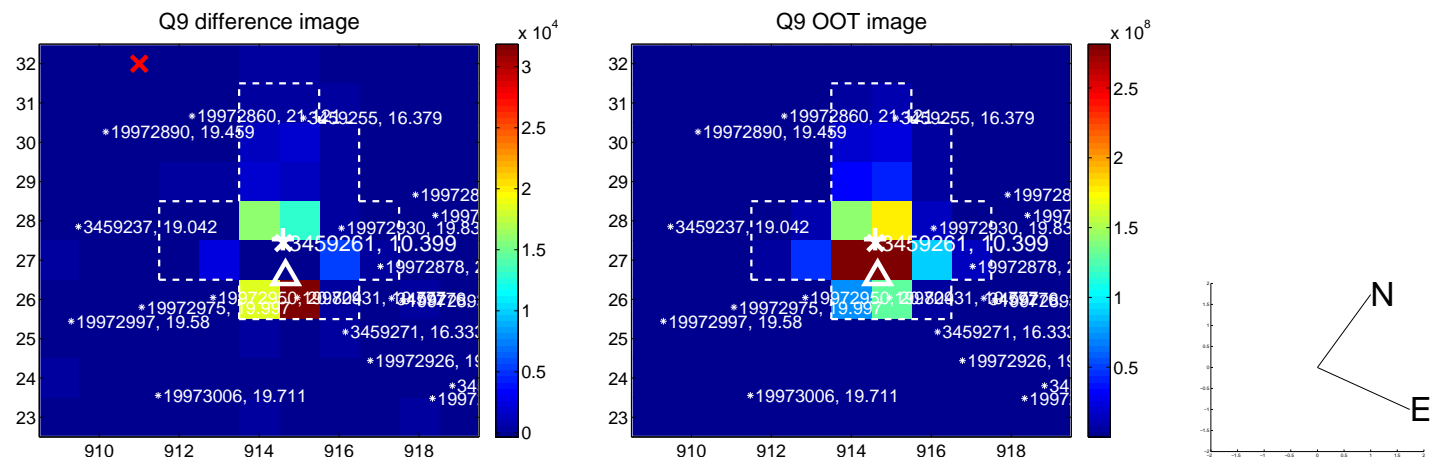


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

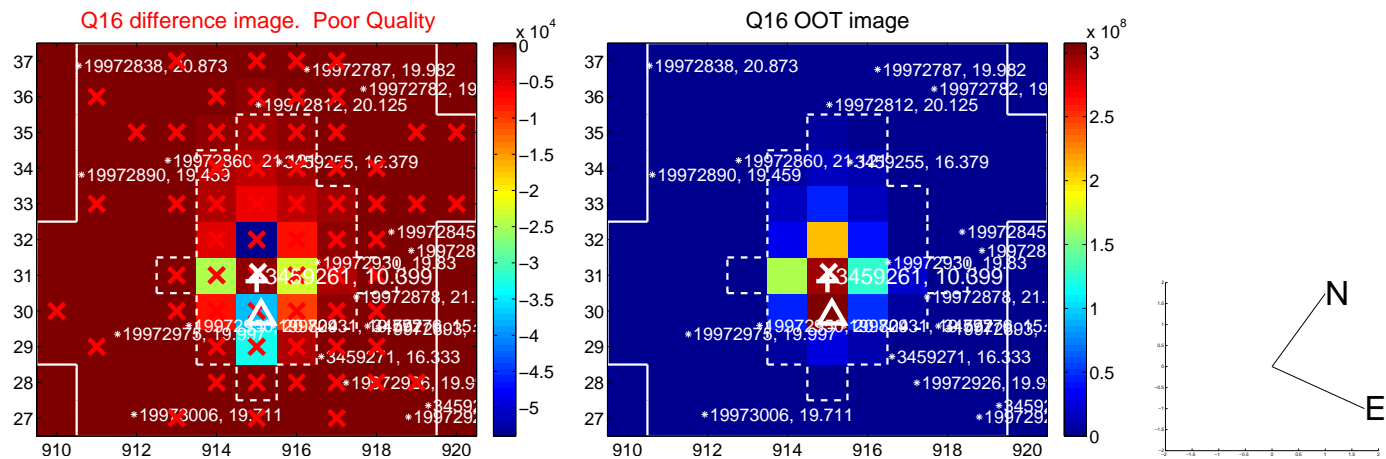
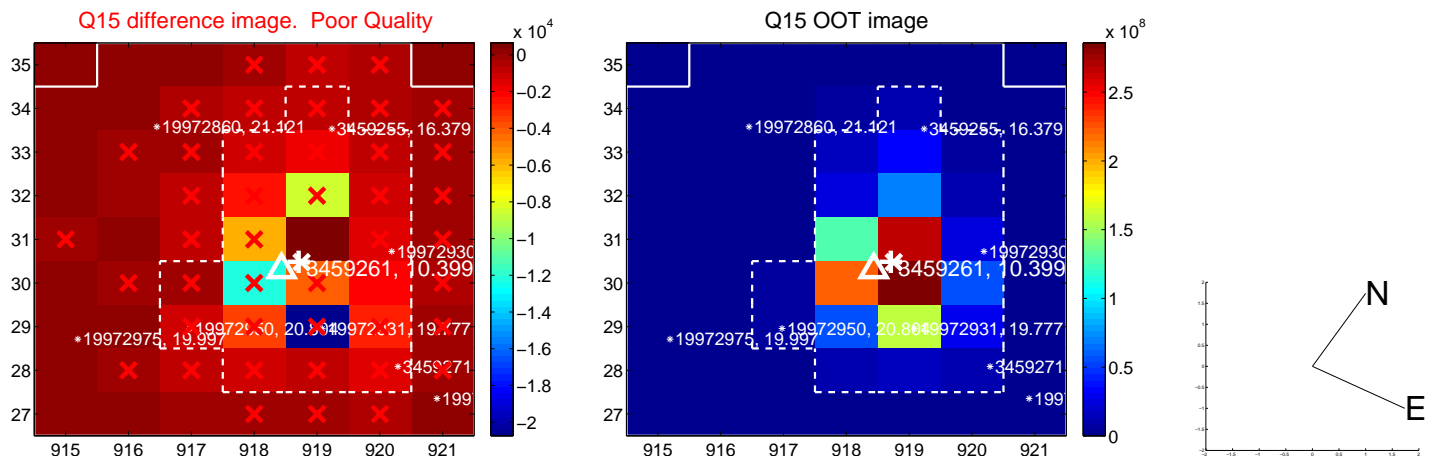
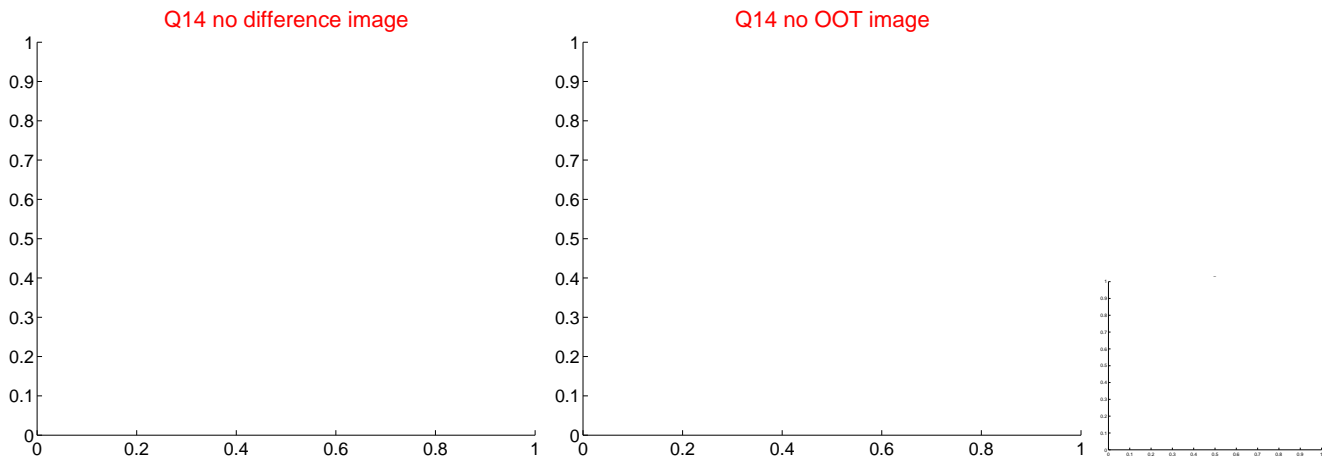
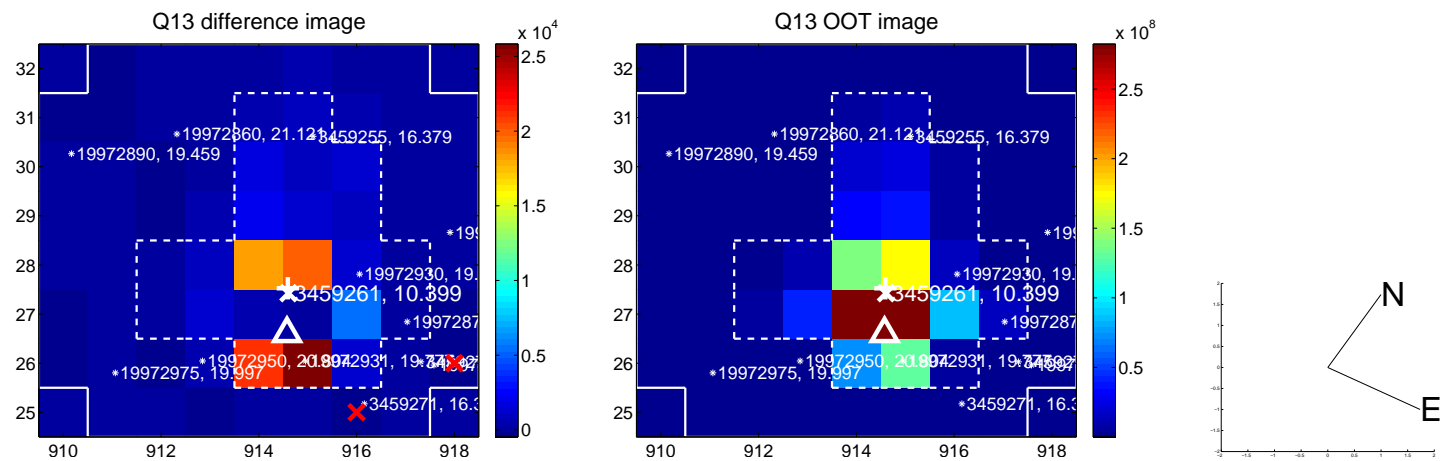




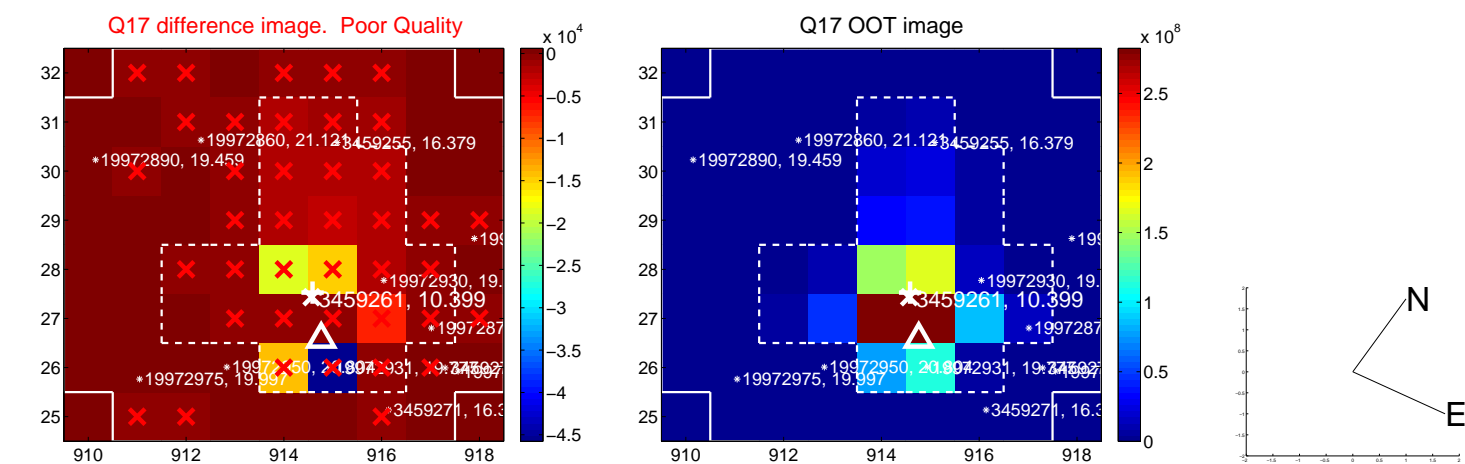
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



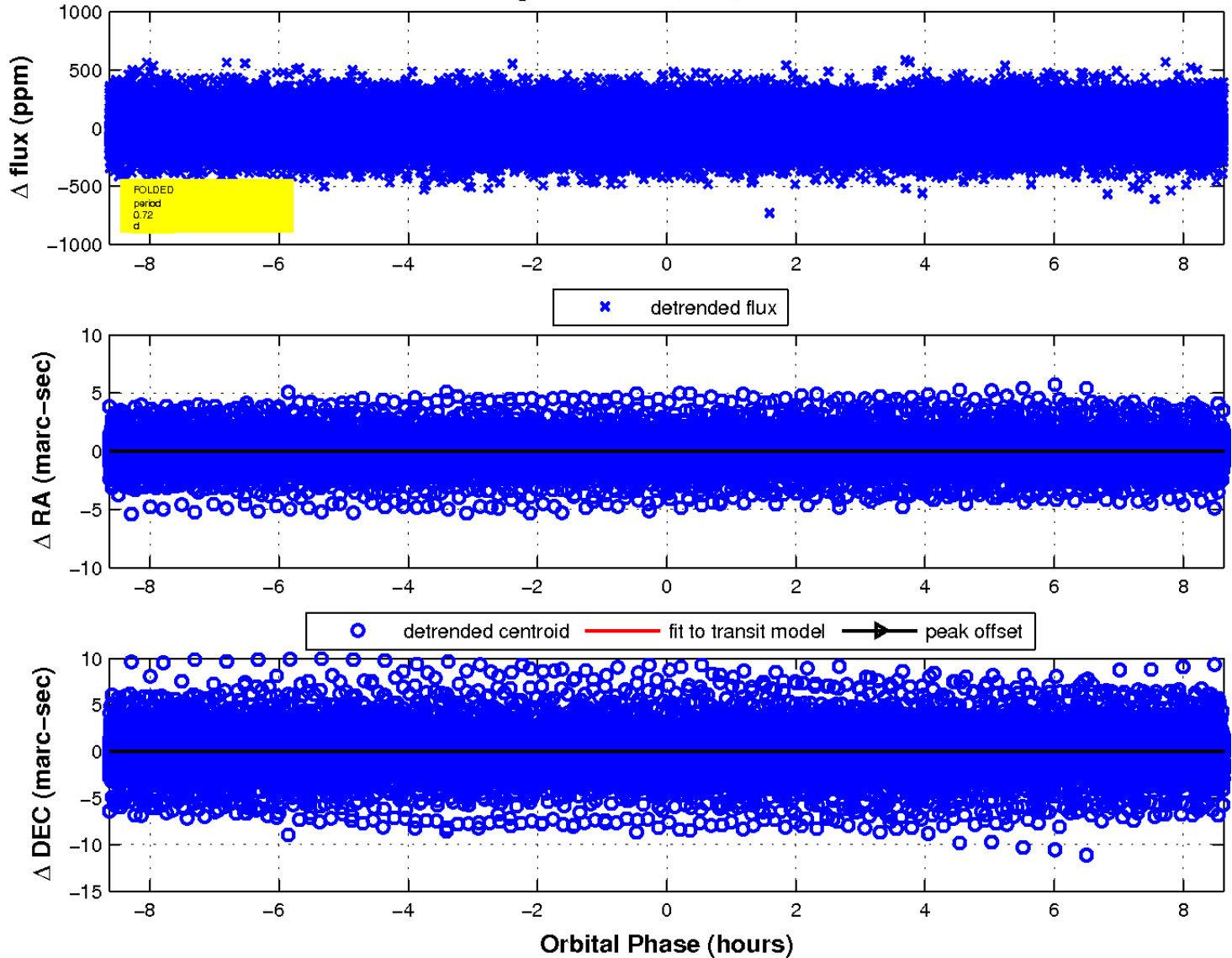
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

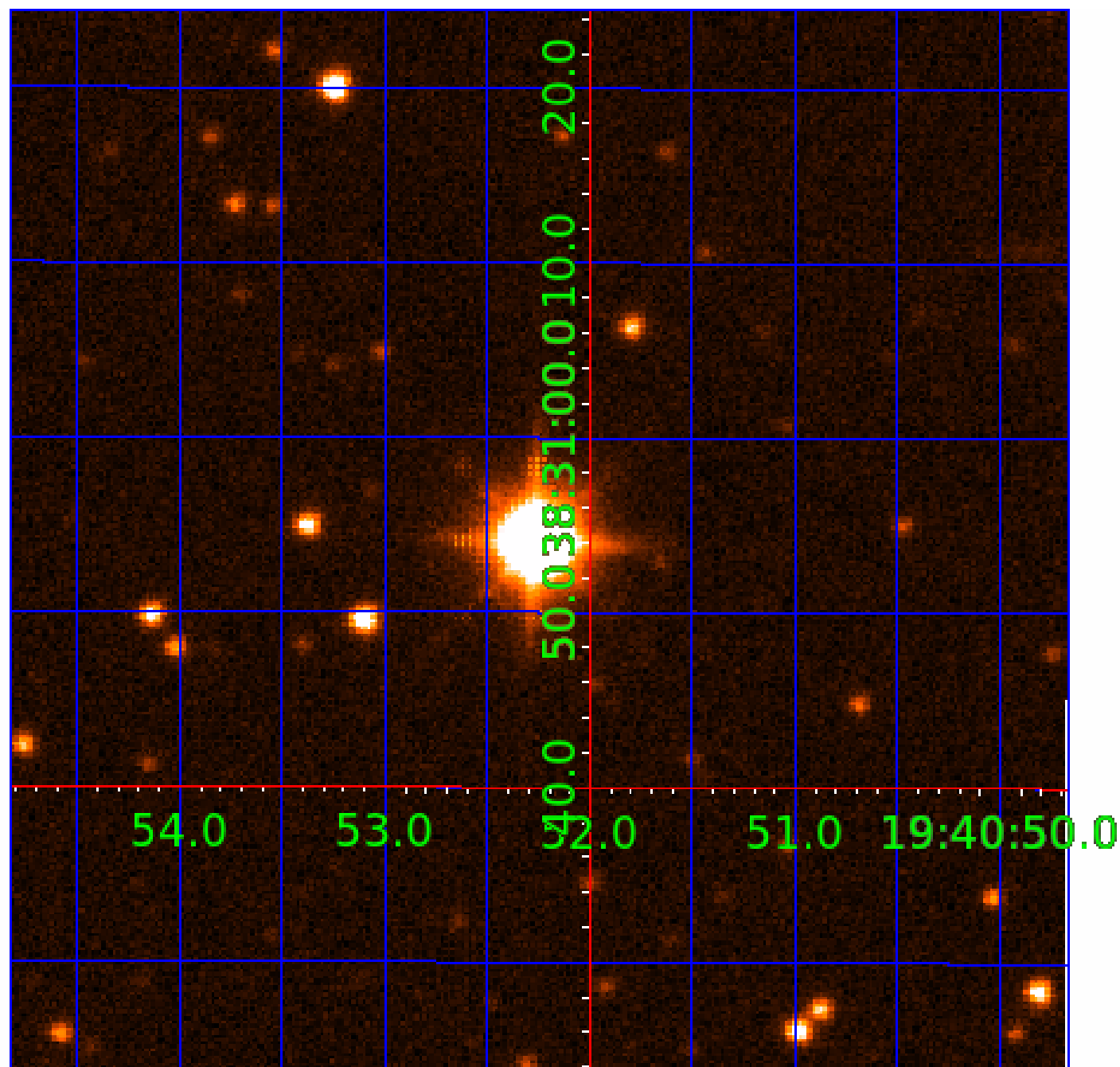


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 003459261

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003459261-01	OBS	No	0.719088	132.367081	5.3	2.933	8.2	2.3	3.79	7103	0.96	89773.68
003459261-02	OBS	No	142.819930	182.736376	197.2	8.699	8.7	6.6	3.79	7103	6.04	77.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003459261-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_SATURATED
003459261-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

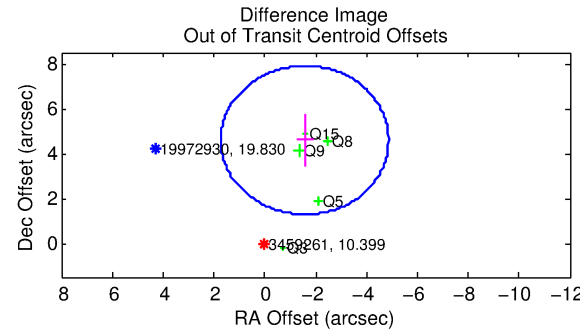
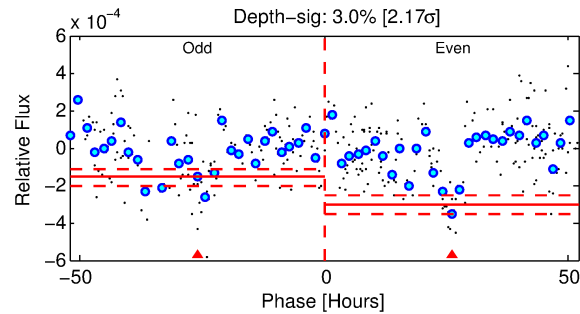
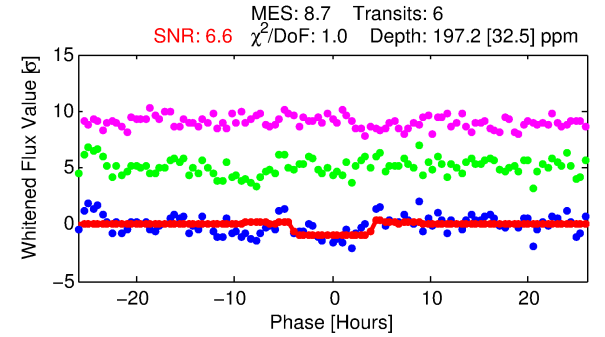
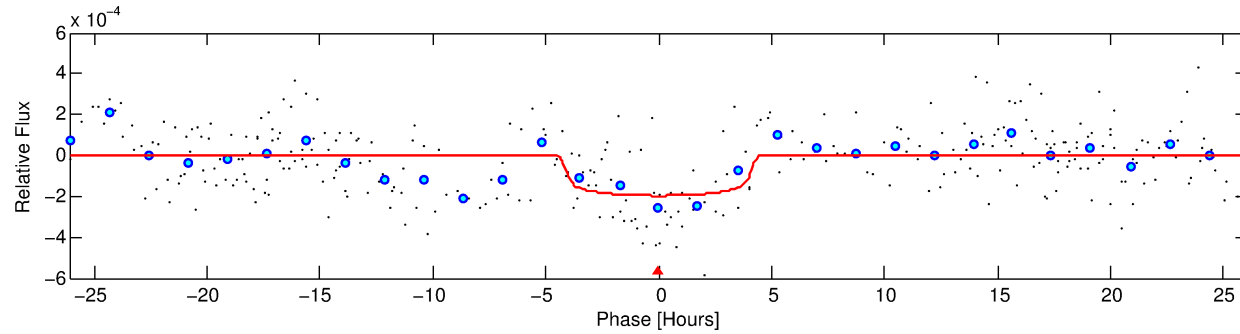
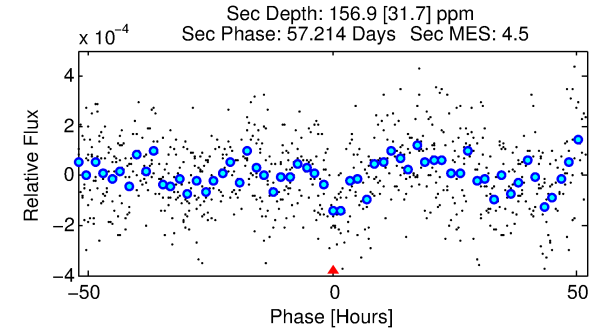
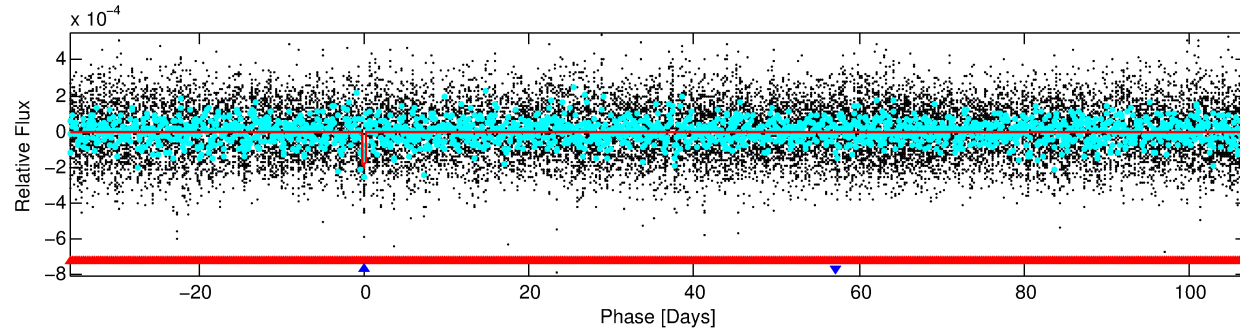
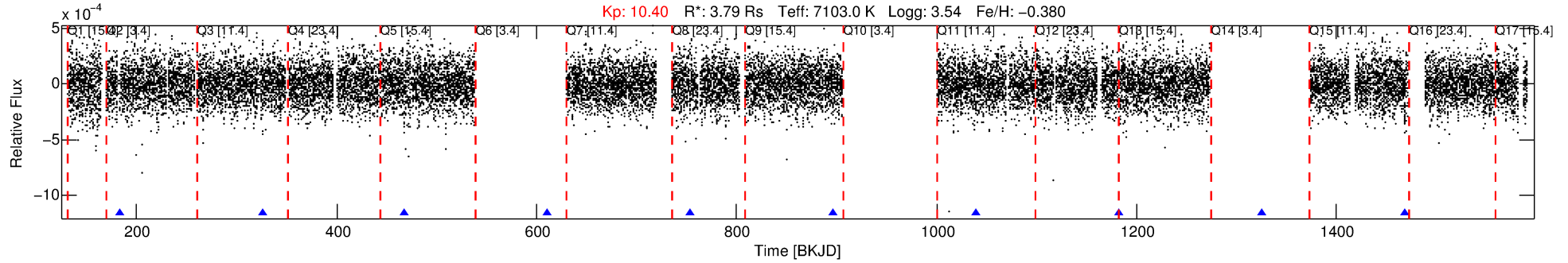
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003459261-02

No Significant Match Found

# DV One-Page Summary

KIC: 3459261 Candidate: 2 of 2 Period: 142.820 d



## DV Fit Results:

Period = 142.81993 [0.00330] d  
Epoch = 182.7364 [0.0169] BKJD  
 $R_p/R^*$  = 0.0146 [0.0041]  
 $a/R^*$  = 68.18 [103.71]  
 $b$  = 0.86 [0.47]  
 $S_{\text{eff}}$  = 77.47 [45.56]  
 $T_{\text{eq}}$  = 757 [111] K  
 $R_p$  = 6.03 [2.78]  $R_e$   
 $a$  = 0.6498 [0.2304] AU  
 $A_g$  = 1000.85 [828.18] [1.21σ]  
 $T_{\text{effp}}$  = 6579 [1014] K [5.71σ]

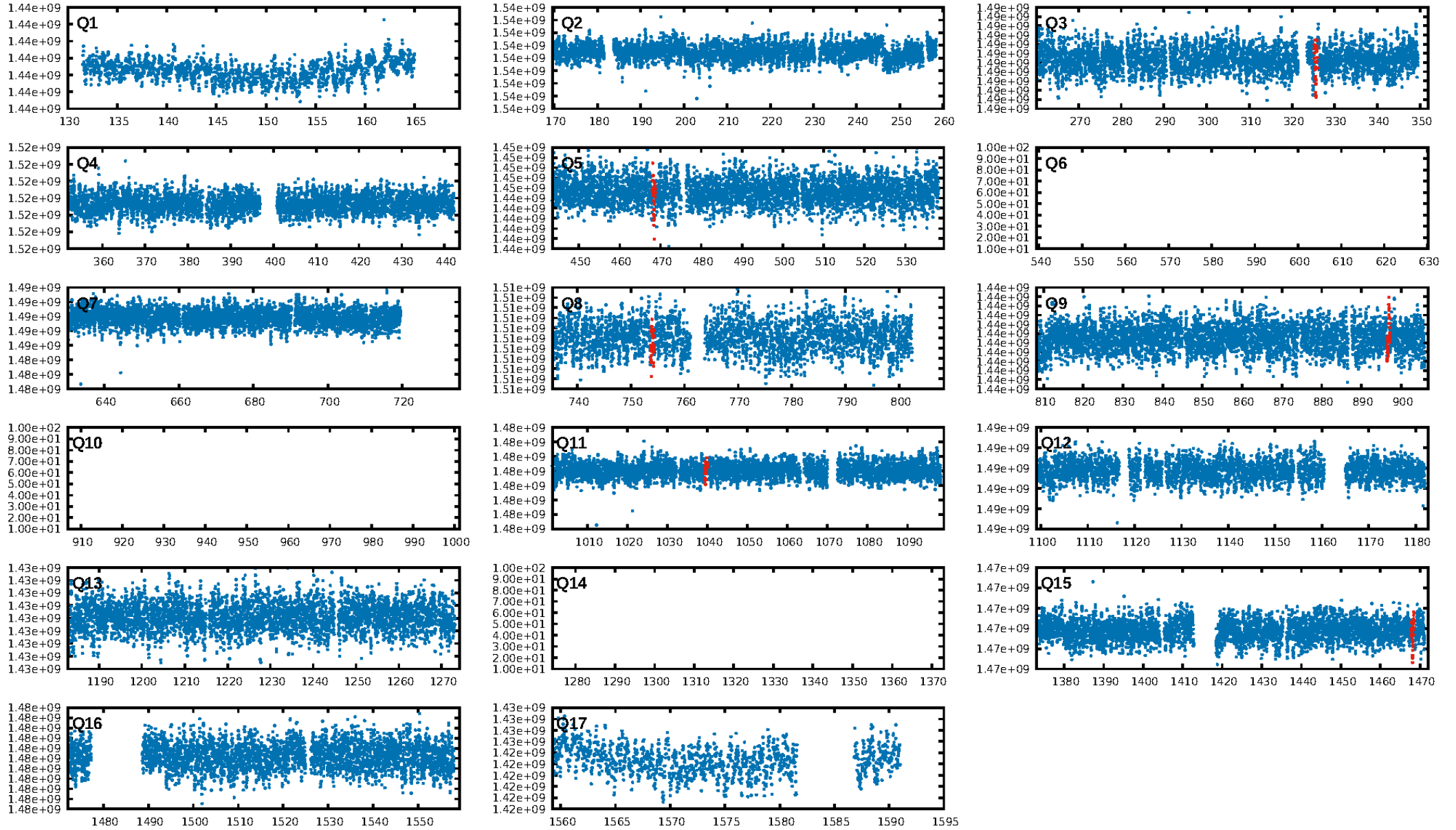
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [371.51σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.05e-13  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 12.1%  
Centroid-so: 1.265 arcsec [1.54σ]  
OotOffset-rm: 4.848 arcsec [4.40σ]  
KicOffset-rm: 4.558 arcsec [5.48σ]  
OotOffset-st: 0/2/1/2 [5]  
KicOffset-st: 0/2/1/2 [5]  
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DiffImageOverlap-fno: 0.00 [0/6]

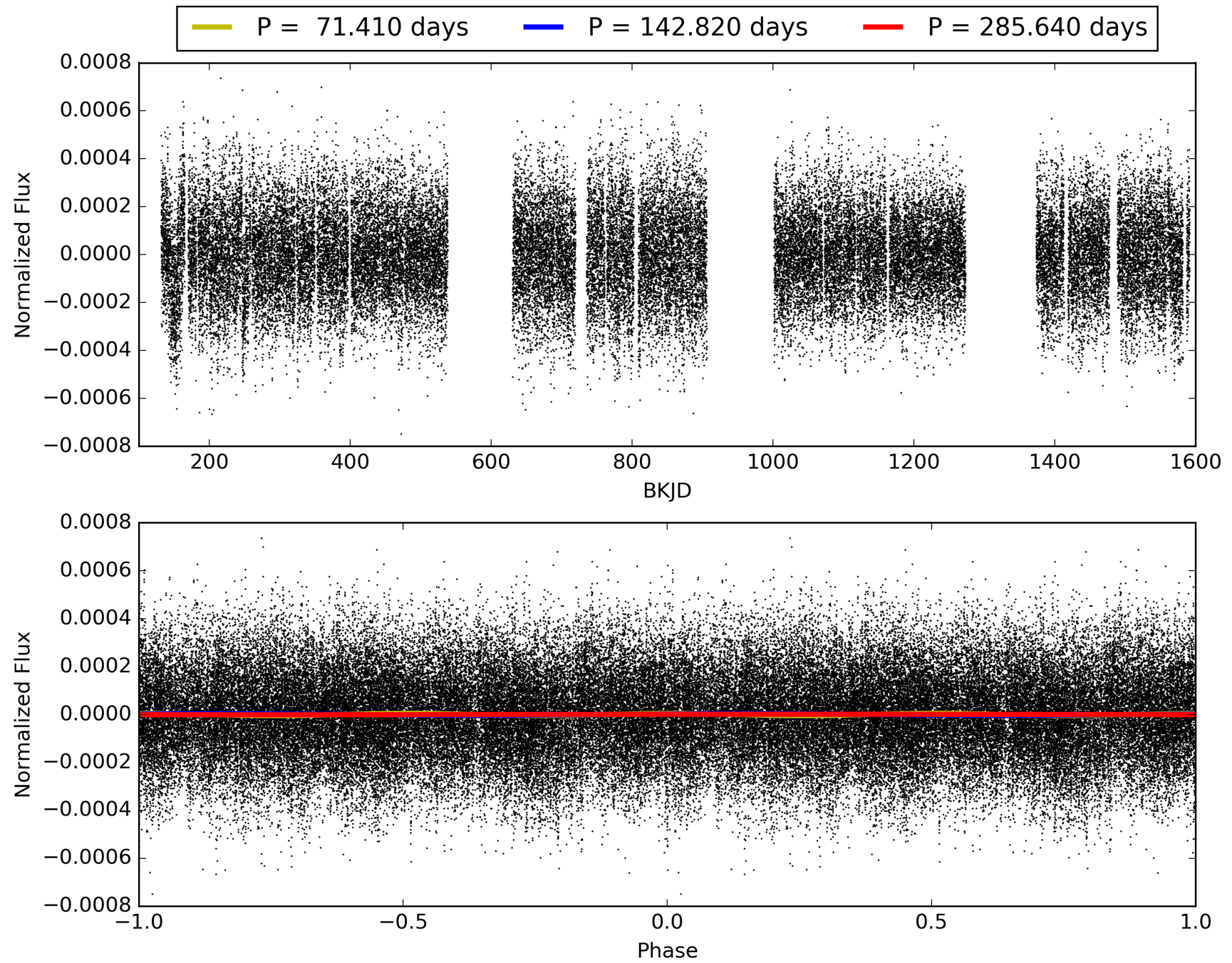
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:40:21 Z

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

# TCE 003459261-02, PDC Light Curves



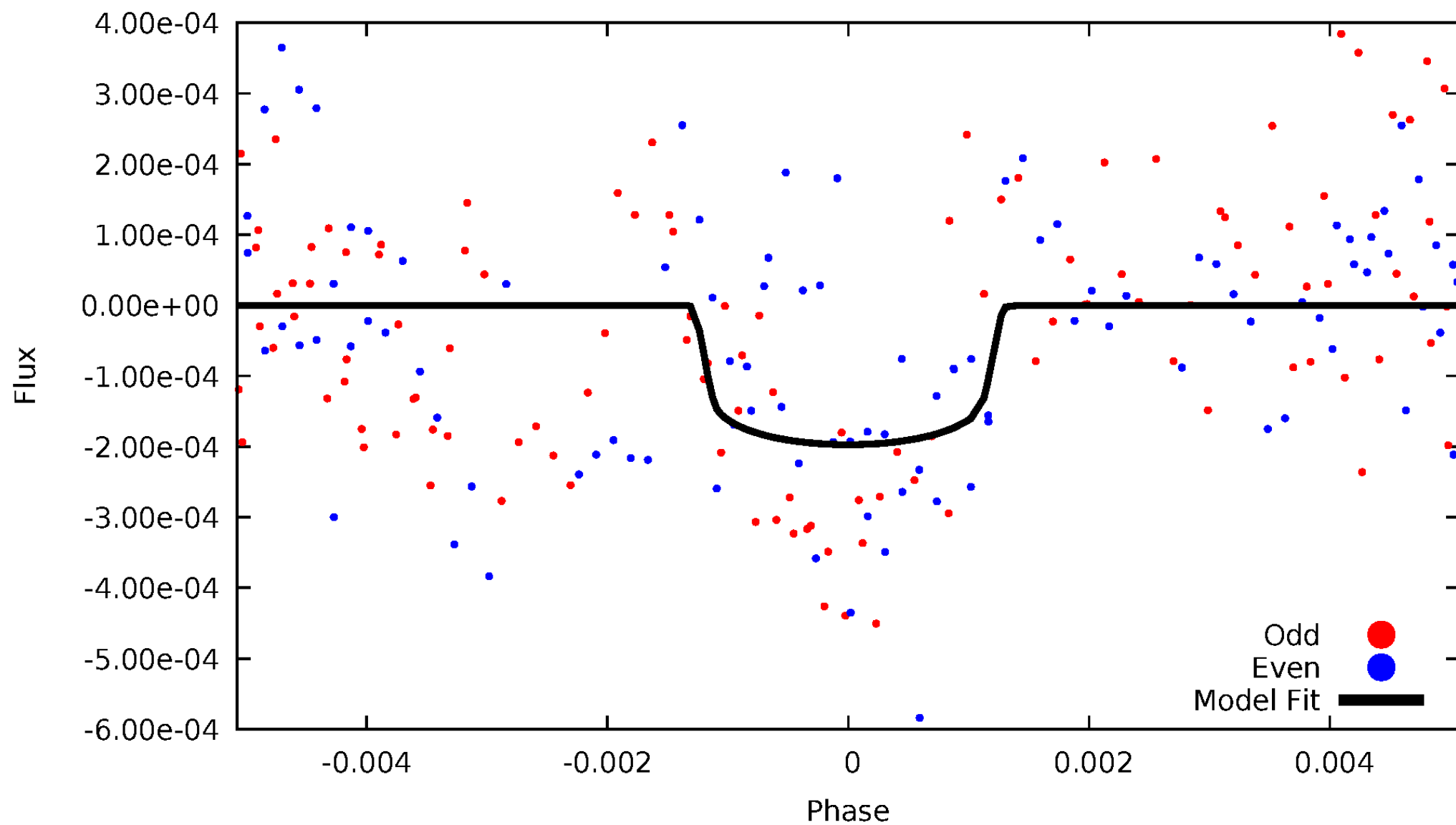
TCE 003459261-02





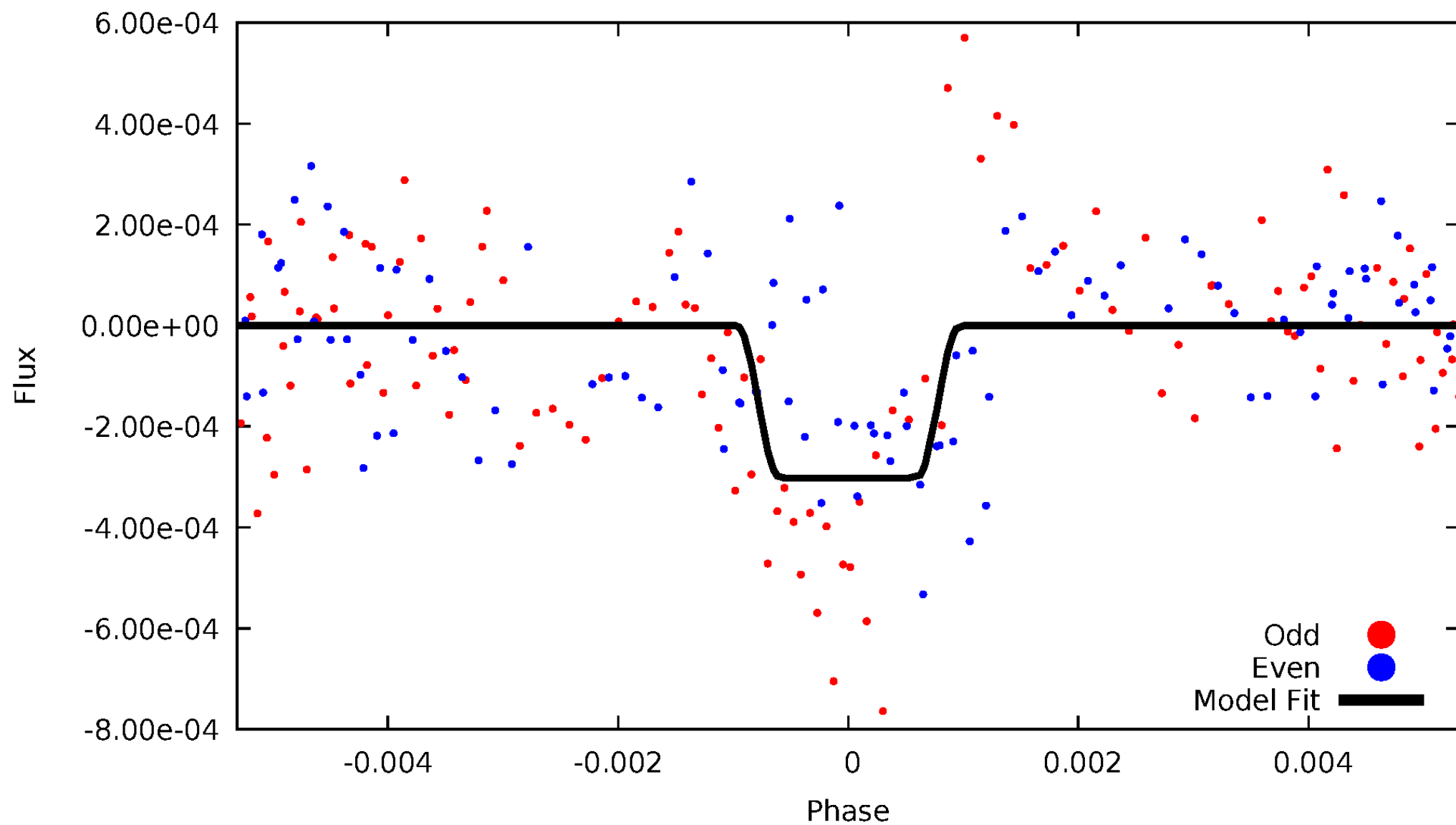
# DV Odd/Even

TCE 003459261-02



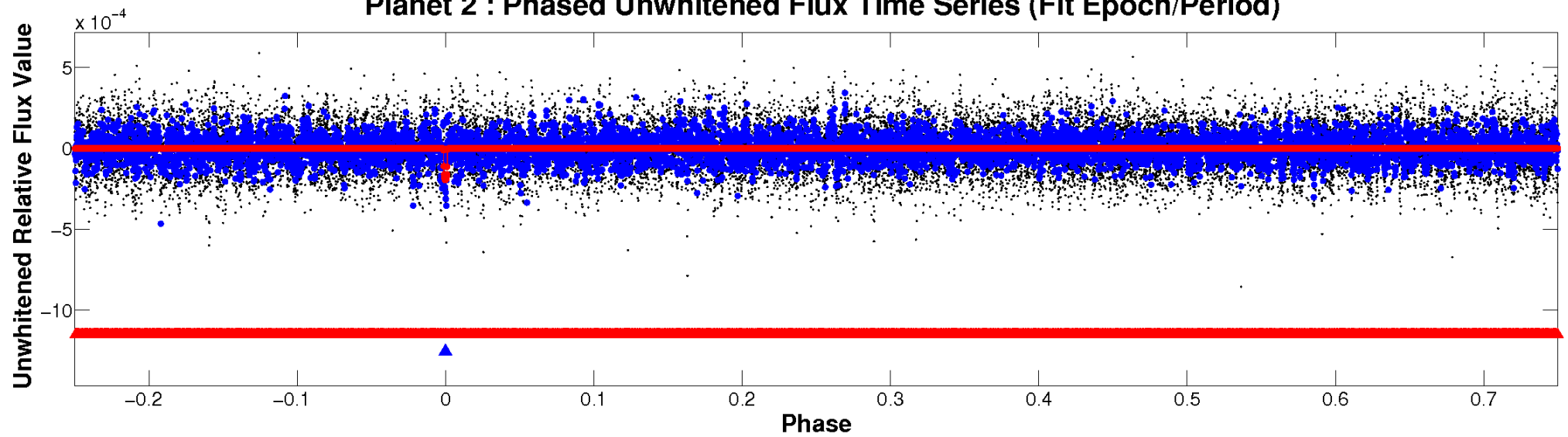
# ALT Odd/Even

TCE 003459261-02

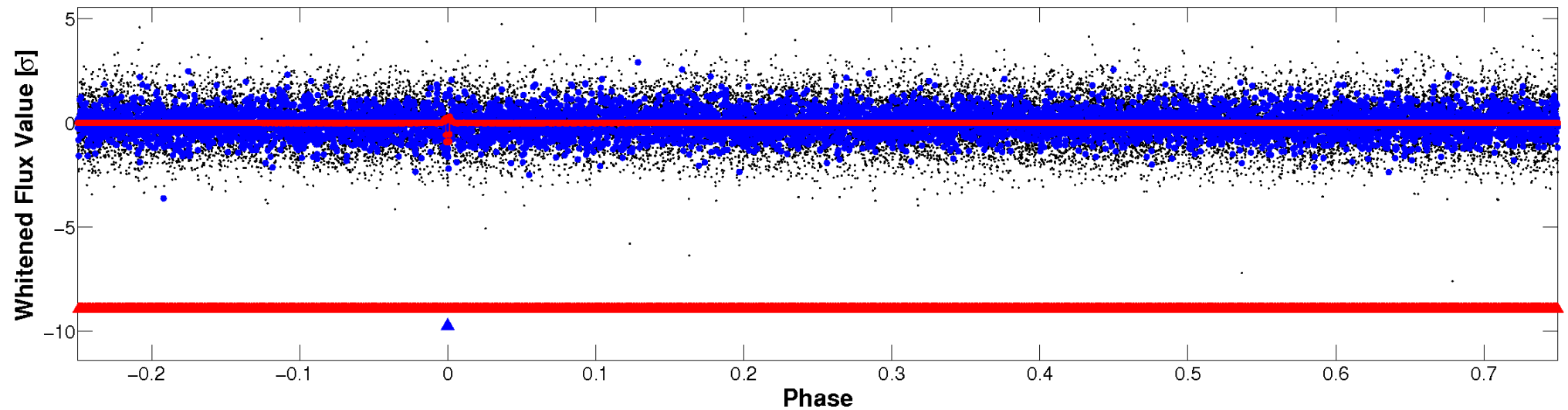


# Non-Whitened Vs. Whitened Light Curve

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

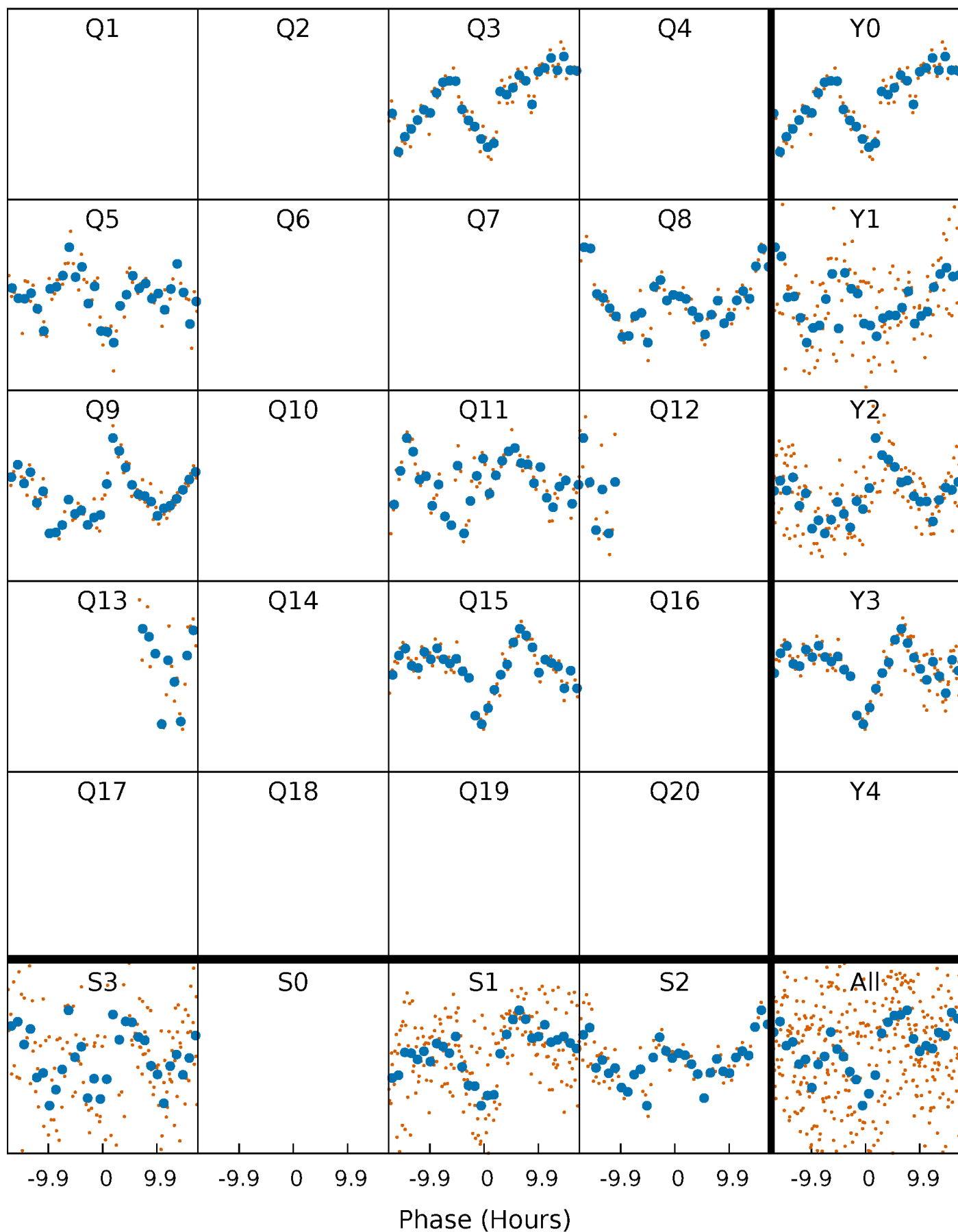


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



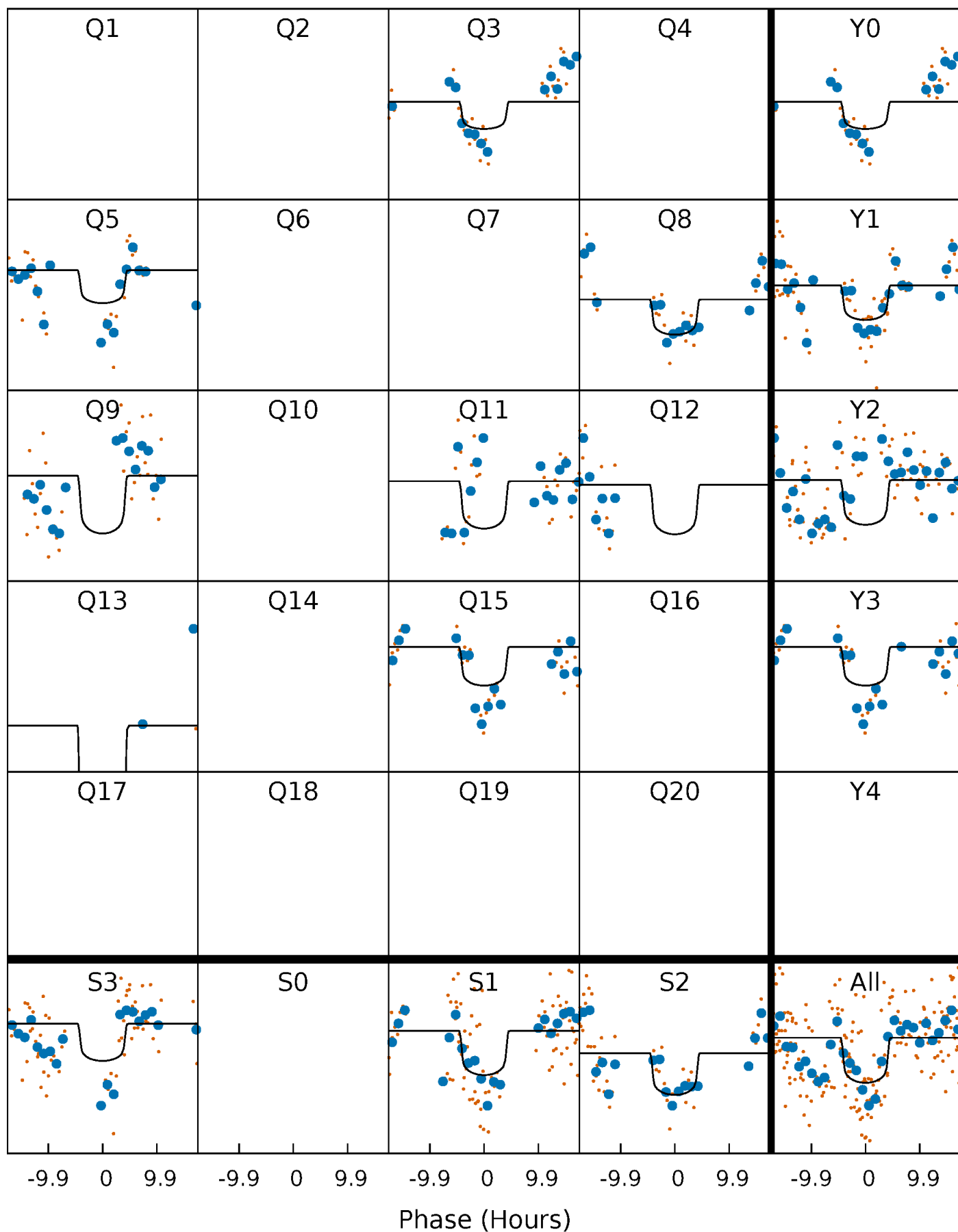
# PDC Quarter-Phased Transit Curves

TCE 003459261-02   P=142.819930 Days    $T_0=182.736376$  (BKJD)



# DV Quarter-Phased Transit Curves

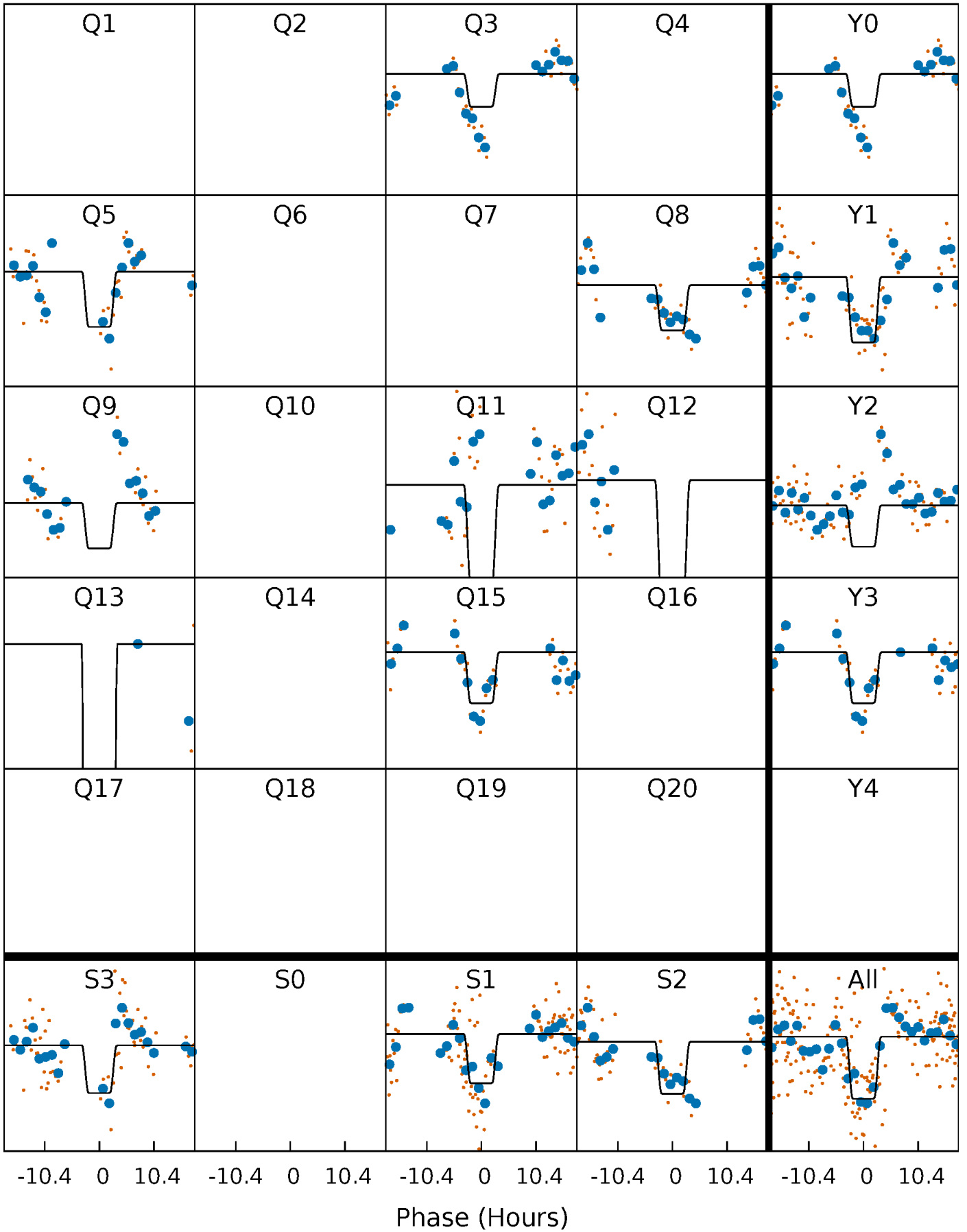
TCE 003459261-02     $P=142.819930$  Days     $T_0=182.736376$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

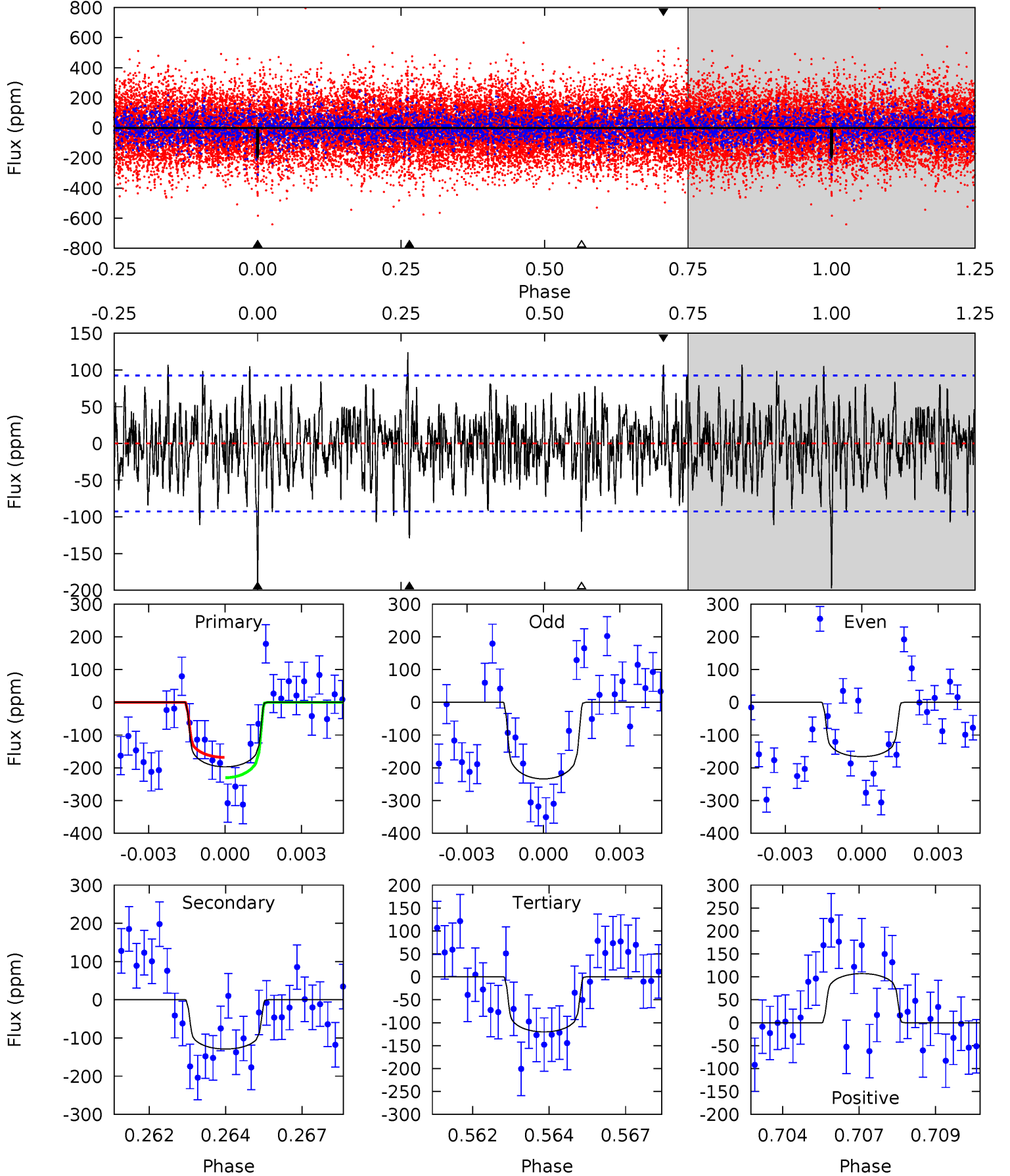
TCE 003459261-02 P=142.821597 Days  $T_0=182.724485$  (BKJD)



# DV Model-Shift Uniqueness Test

003459261-02,  $P = 142.819930$  Days,  $E = 39.916446$  Days

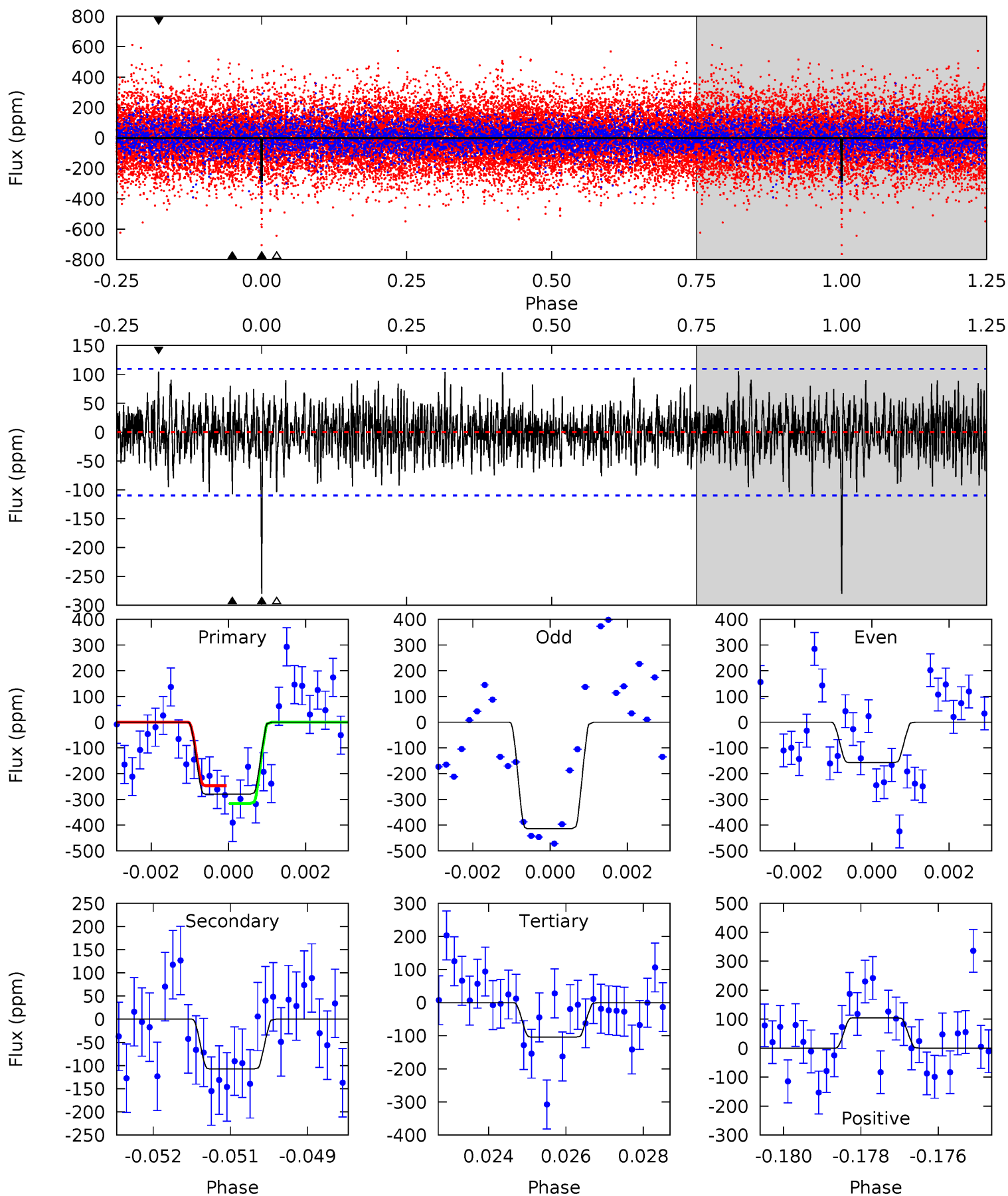
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	7.36	6.85	6.11	5.28	3.02	1.98	4.39	5.14	0.50	1.25	1.95	0.68	0.39	1.77



# Alt Model-Shift Uniqueness Test

003459261-02, P = 142.821597 Days, E = 39.902888 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
13.6	5.22	5.07	5.09	5.34	3.11	1.49	8.54	8.51	0.15	0.12	6.32	0.84	0.27	1.69



### Stellar Parameters For KIC 003459261

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7103^{+191}_{-255}$	$3.535^{+0.336}_{-0.084}$	$-0.380^{+0.300}_{-0.250}$	$3.787^{+0.369}_{-1.382}$	$1.794^{+0.192}_{-0.357}$	$0.047^{+0.123}_{-0.012}$
	+3%/-4%	+10%/-2%	+79%/-66%	+10%/-36%	+11%/-20%	+264%/-26%
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 003459261-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-129 \pm 18$	$5.66^{+1.92}_{-1.80}$	$1037^{+57}_{-93}$	$6183^{+1237}_{-715}$	$935^{+1101}_{-414}$
Alt.	$-107 \pm 21$	$6.81^{+2.02}_{-1.96}$	$1036^{+58}_{-93}$	$5416^{+873}_{-499}$	$533^{+484}_{-203}$

$T_{max}$  = 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

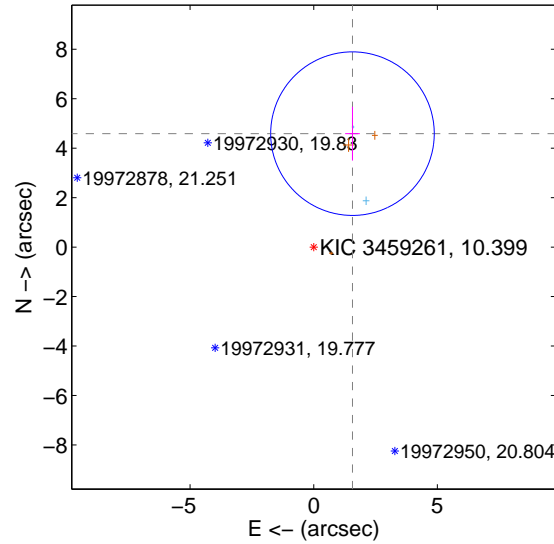
Supplemental centroid analysis for 003459261-02. **Kepler magnitude: 10.40.** Transit SNR 6.65

**There are 2 quarters with good PRF difference image offsets**

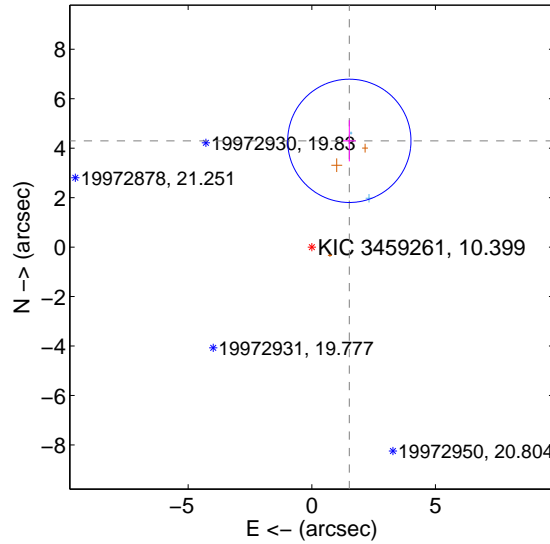
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>4.848 <math>\pm</math> 1.102</b>	<b>4.40</b>	-1.567 $\pm$ 0.295	4.588 $\pm$ 1.088
PRF-fit source offset from KIC position	<b>4.558 <math>\pm</math> 0.831</b>	<b>5.48</b>	-1.518 $\pm$ 0.258	4.297 $\pm$ 0.833
photometric centroid source offset	1.26 $\pm$ 0.82	1.54	1.22 $\pm$ 0.77	-0.32 $\pm$ 1.33

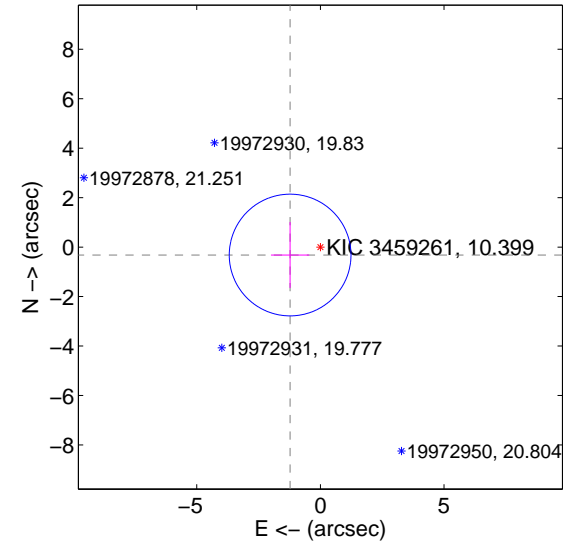
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



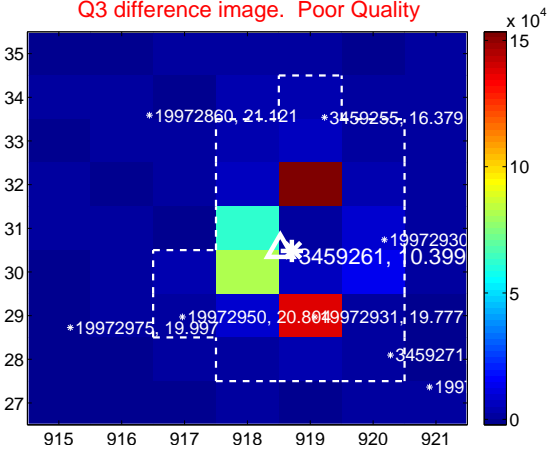
Q2 no difference image



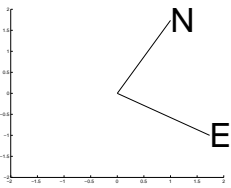
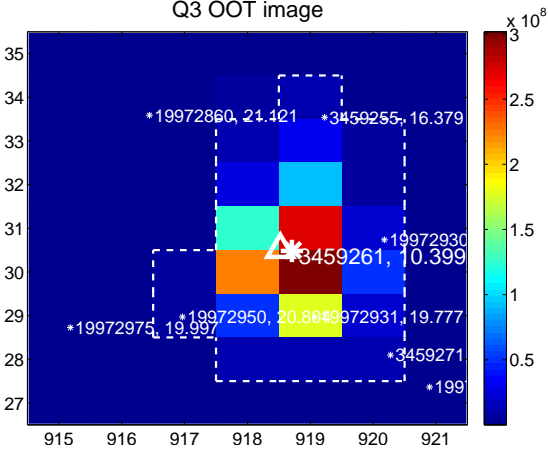
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



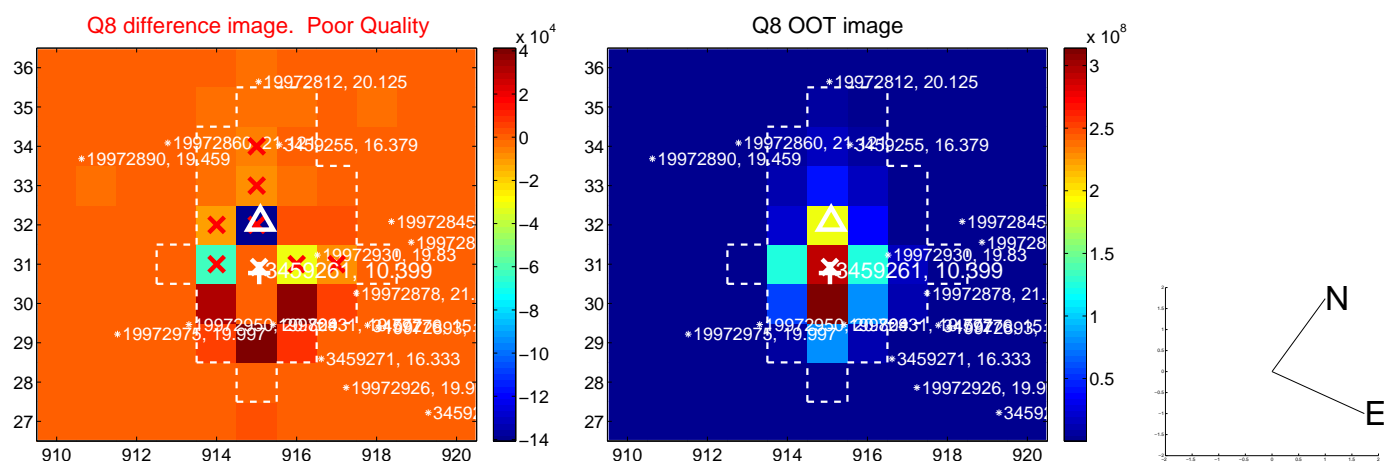
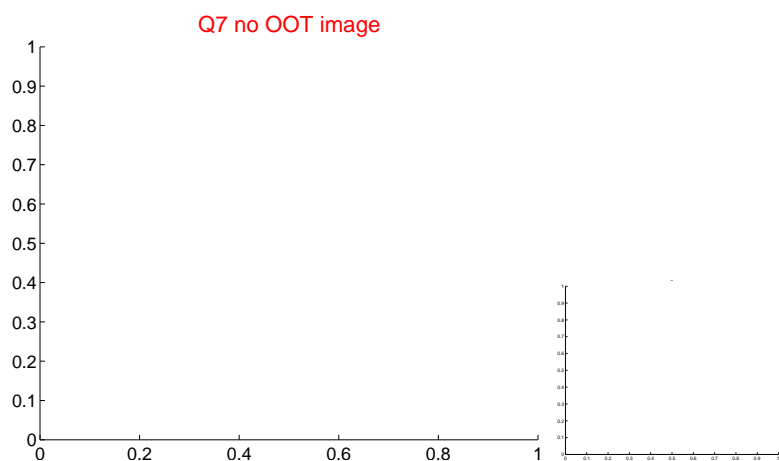
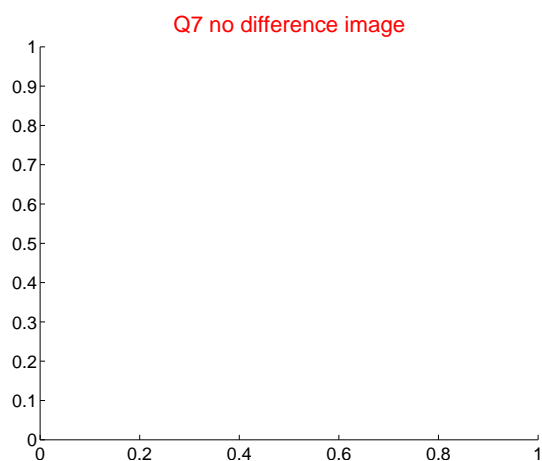
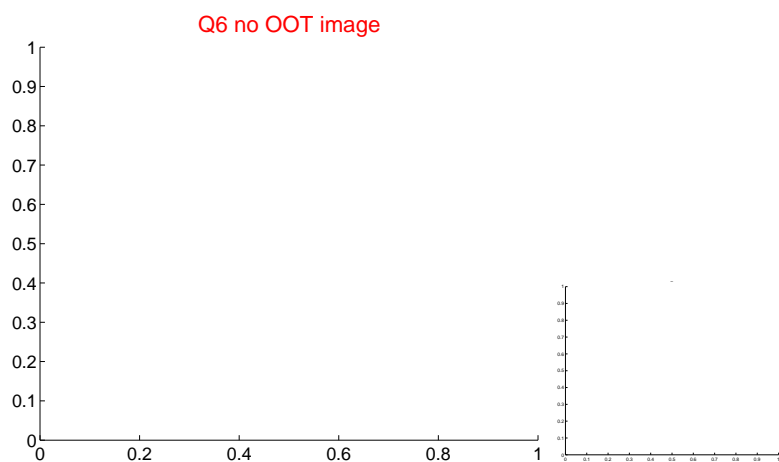
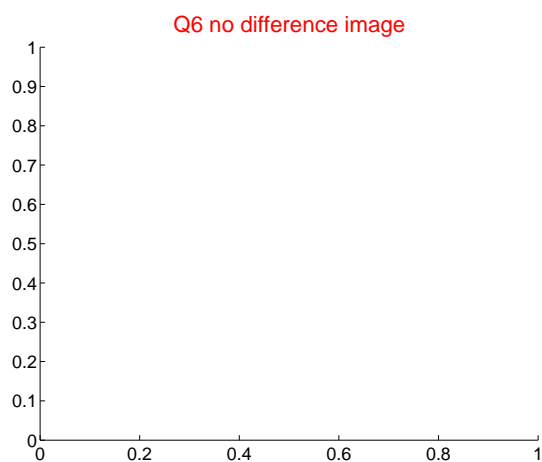
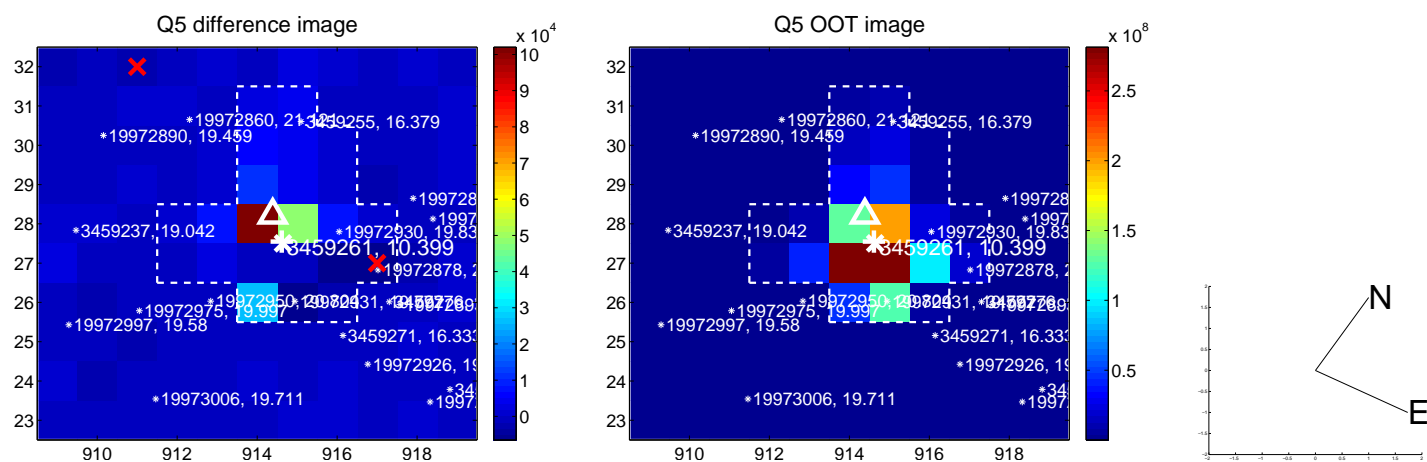
Q4 no difference image



Q4 no OOT image



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



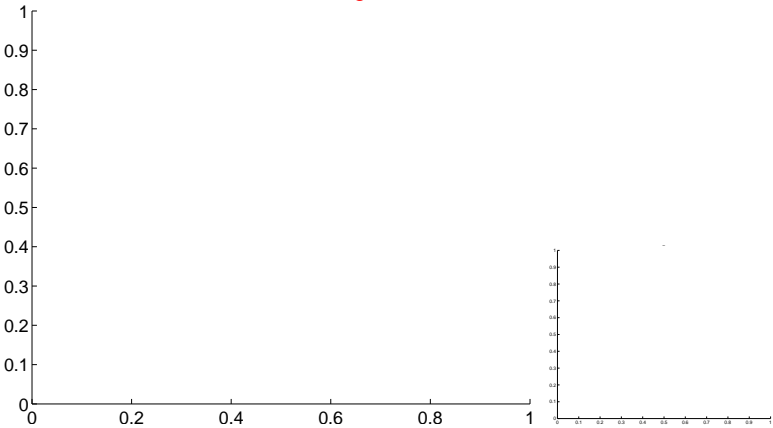


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image



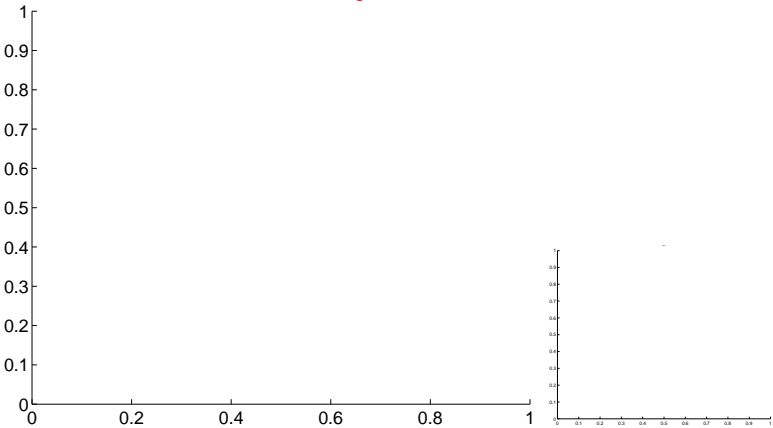
Q13 no OOT image



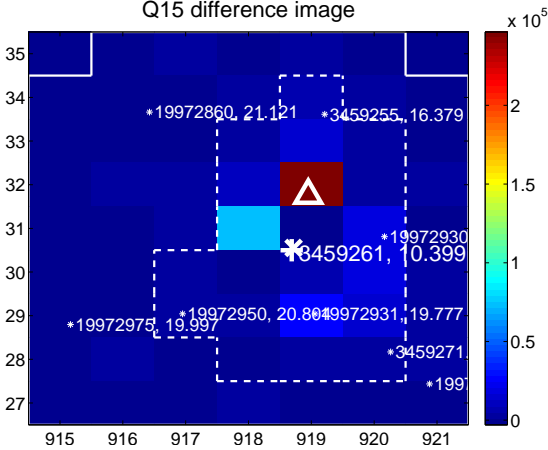
Q14 no difference image



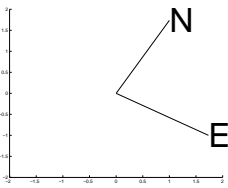
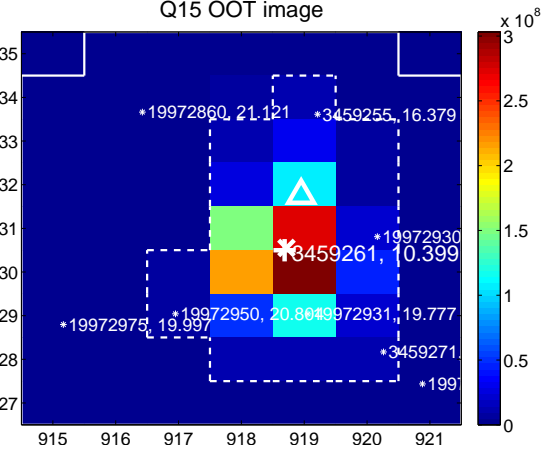
Q14 no OOT image



Q15 difference image



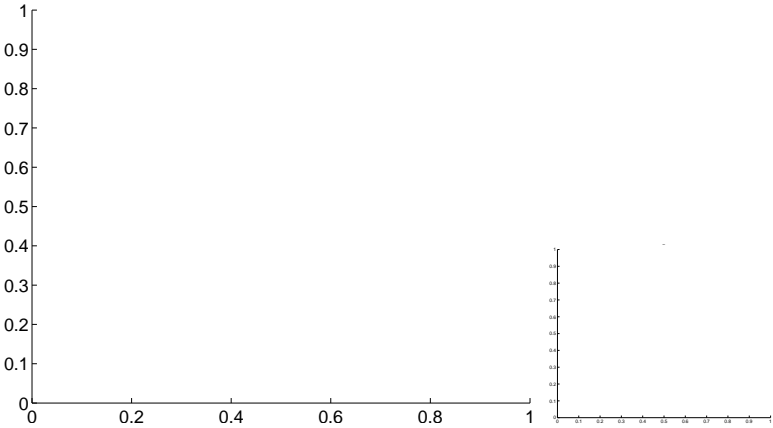
Q15 OOT image



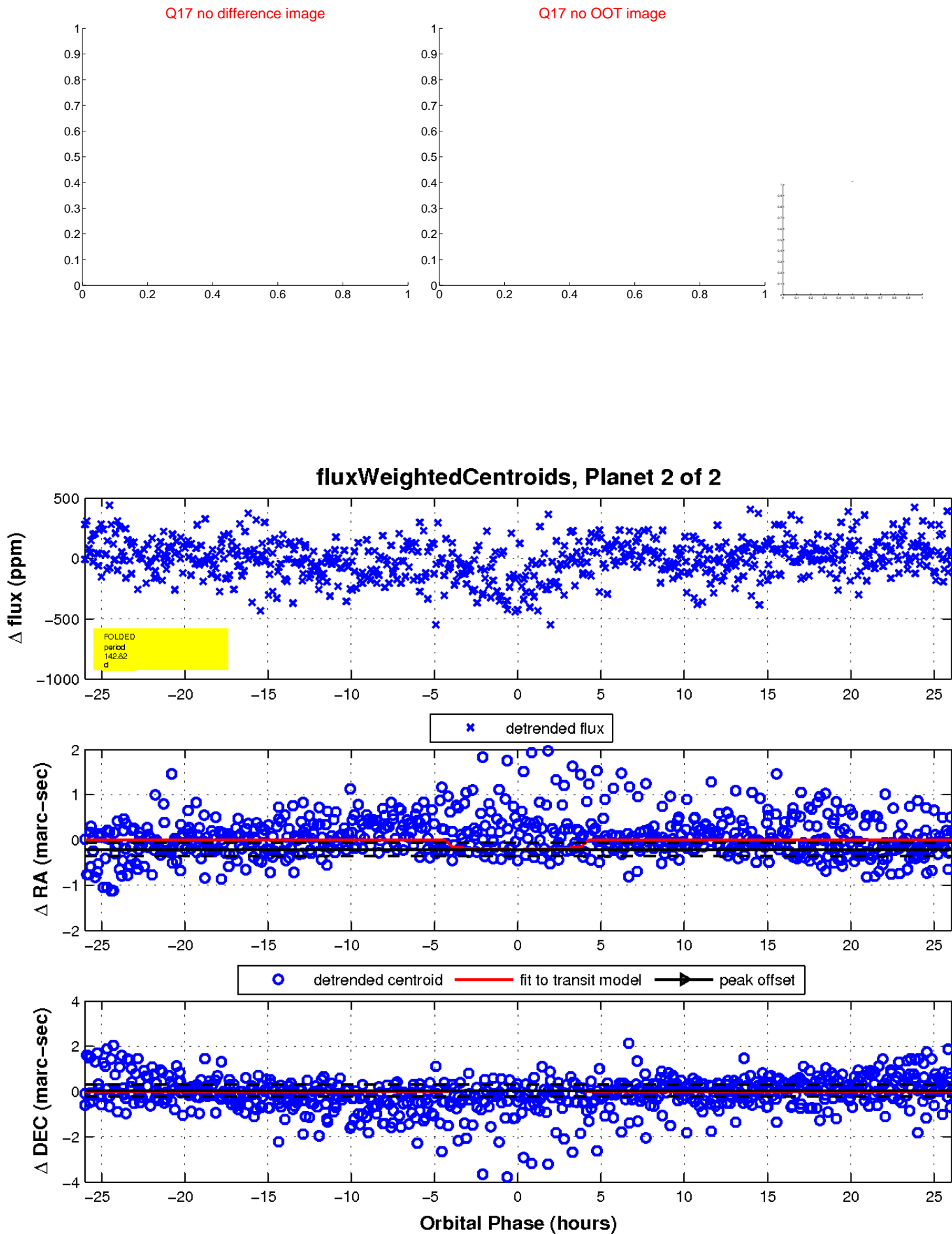
Q16 no difference image



Q16 no OOT image



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





UKIRT Image

Declination

