

# KIC 009967129

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009967129-01	OBS	No	5.149819	131.970263	68.8	9.544	11.5	11.1	1.14	6703	1.09	622.06
009967129-02	OBS	No	5.150835	136.118163	54.9	6.058	8.5	8.7	1.14	6703	0.90	621.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009967129-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
009967129-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

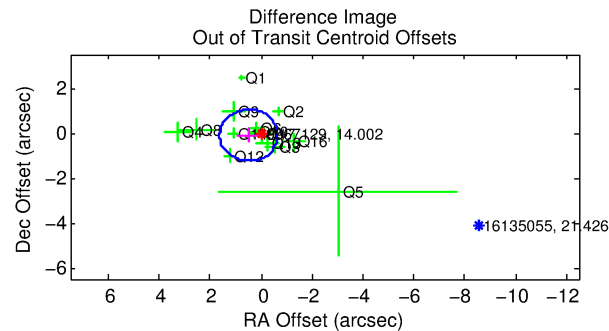
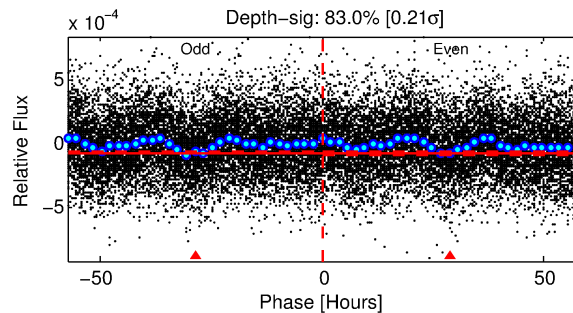
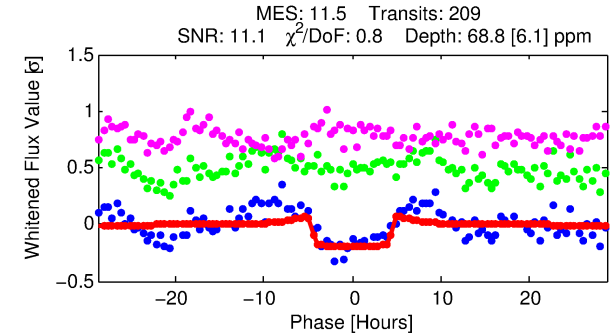
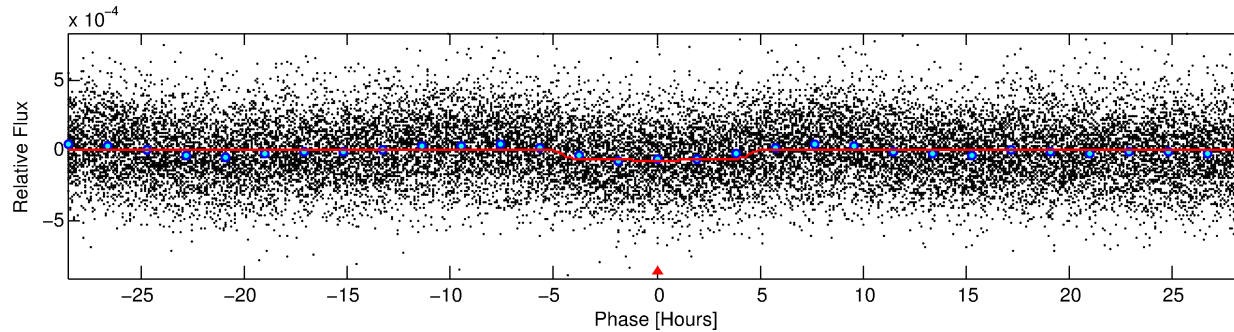
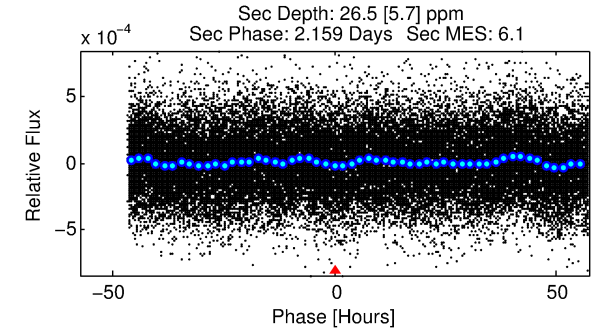
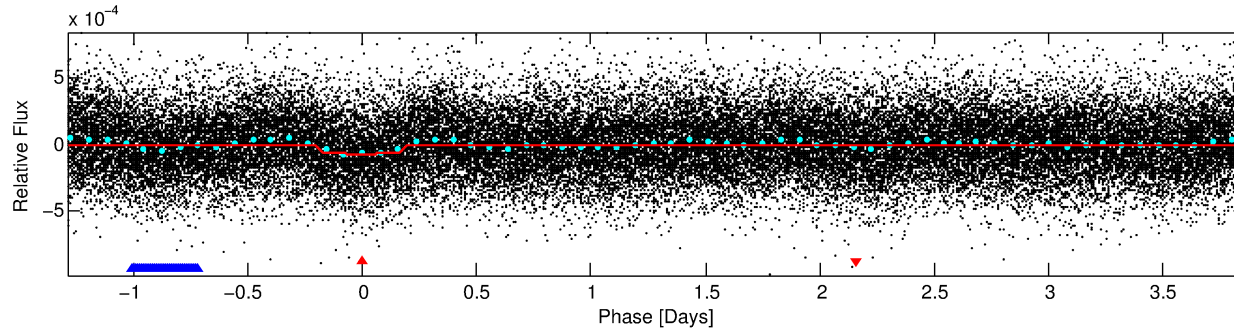
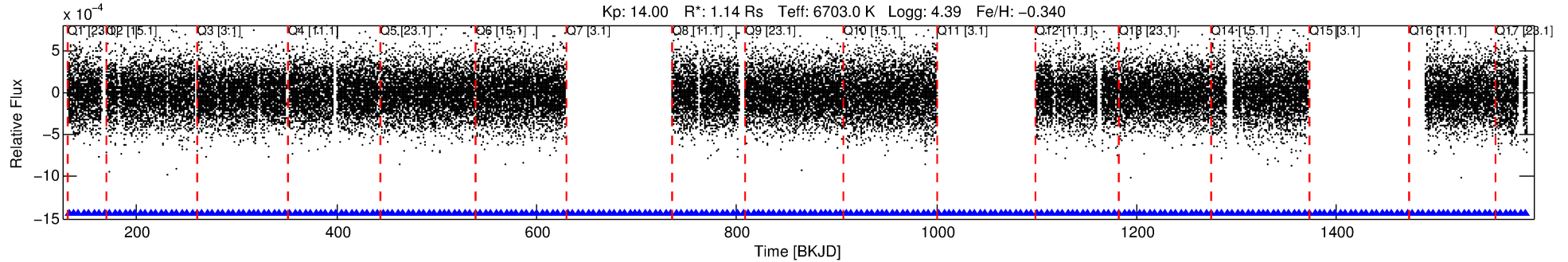
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009967129-01

No Significant Match Found

# DV One-Page Summary

KIC: 9967129 Candidate: 1 of 2 Period: 5.150 d



## DV Fit Results:

Period = 5.14982 [0.00006] d  
Epoch = 131.9703 [0.0072] BKJD  
Rp/R\* = 0.0088 [0.0014]  
a/R\* = 2.19 [1.54]  
b = 0.89 [0.22]  
Seff = 622.06 [223.19]  
Teq = 1273 [114] K  
Rp = 1.09 [0.35] Re  
a = 0.0613 [0.0142] AU  
Ag = 46.34 [23.42] [1.94σ]  
Teffp = 5137 [517] K [7.30σ]

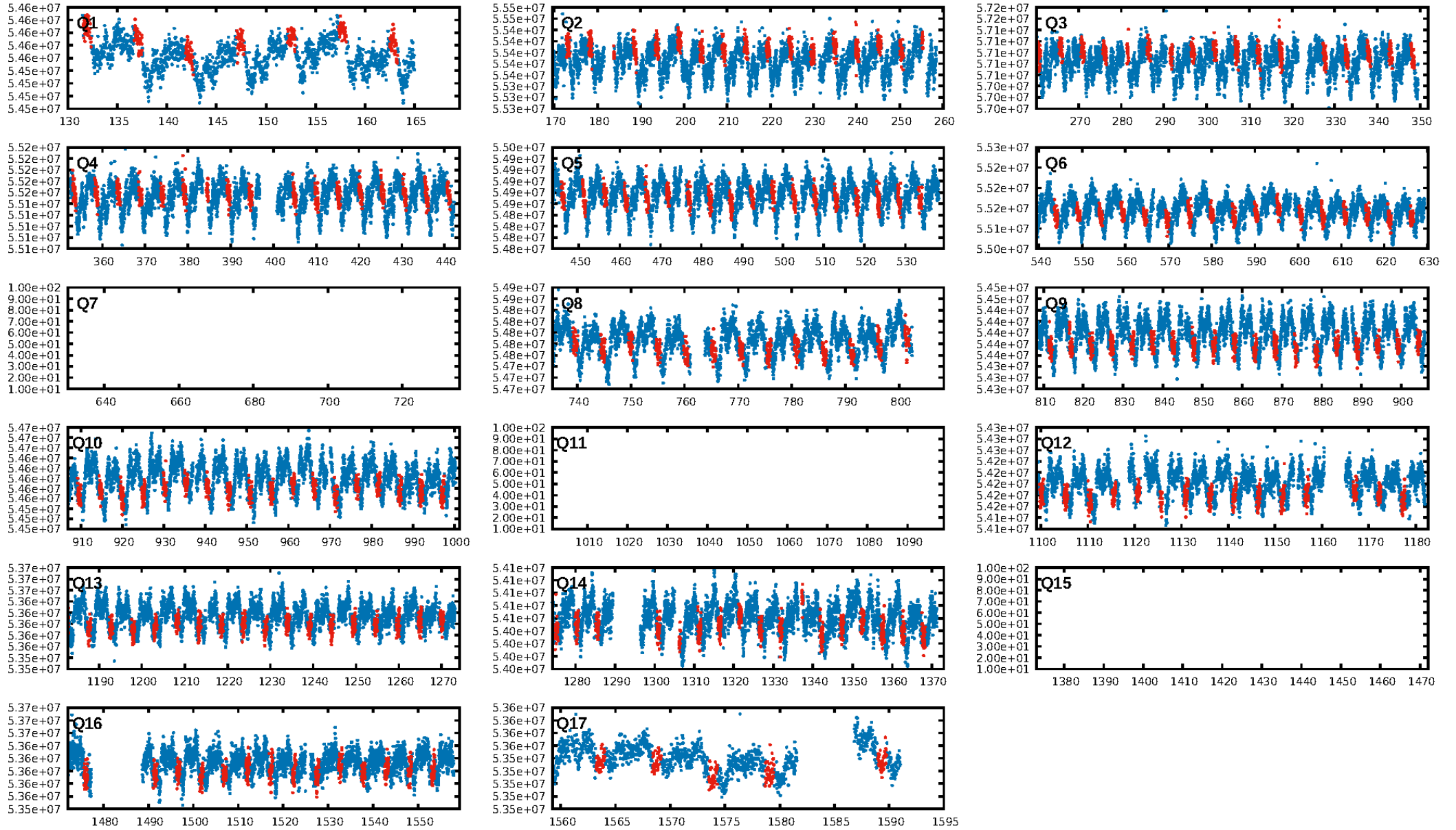
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 3.69e-24  
RollingBand-fgt: 1.00 [197/197]  
GhostDiagnostic-chr: 0.9945  
Centroid-sig: 3.8%  
Centroid-so: 0.988 arcsec [1.18σ]  
OotOffset-rm: 0.495 arcsec [1.30σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-rm: 0.461 arcsec [1.26σ]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 0.57 [8/14]

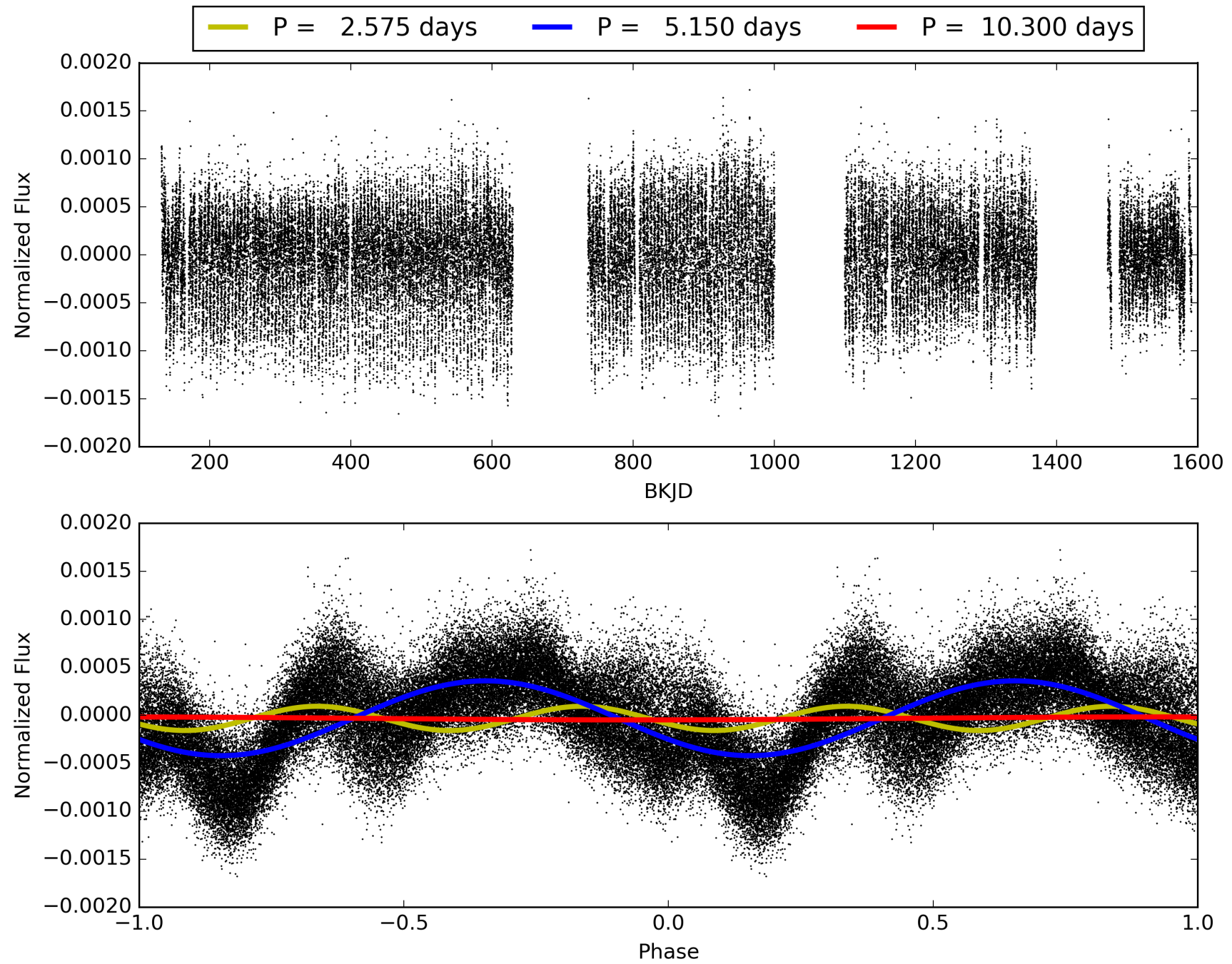
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:11:33 Z

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

# TCE 009967129-01, PDC Light Curves

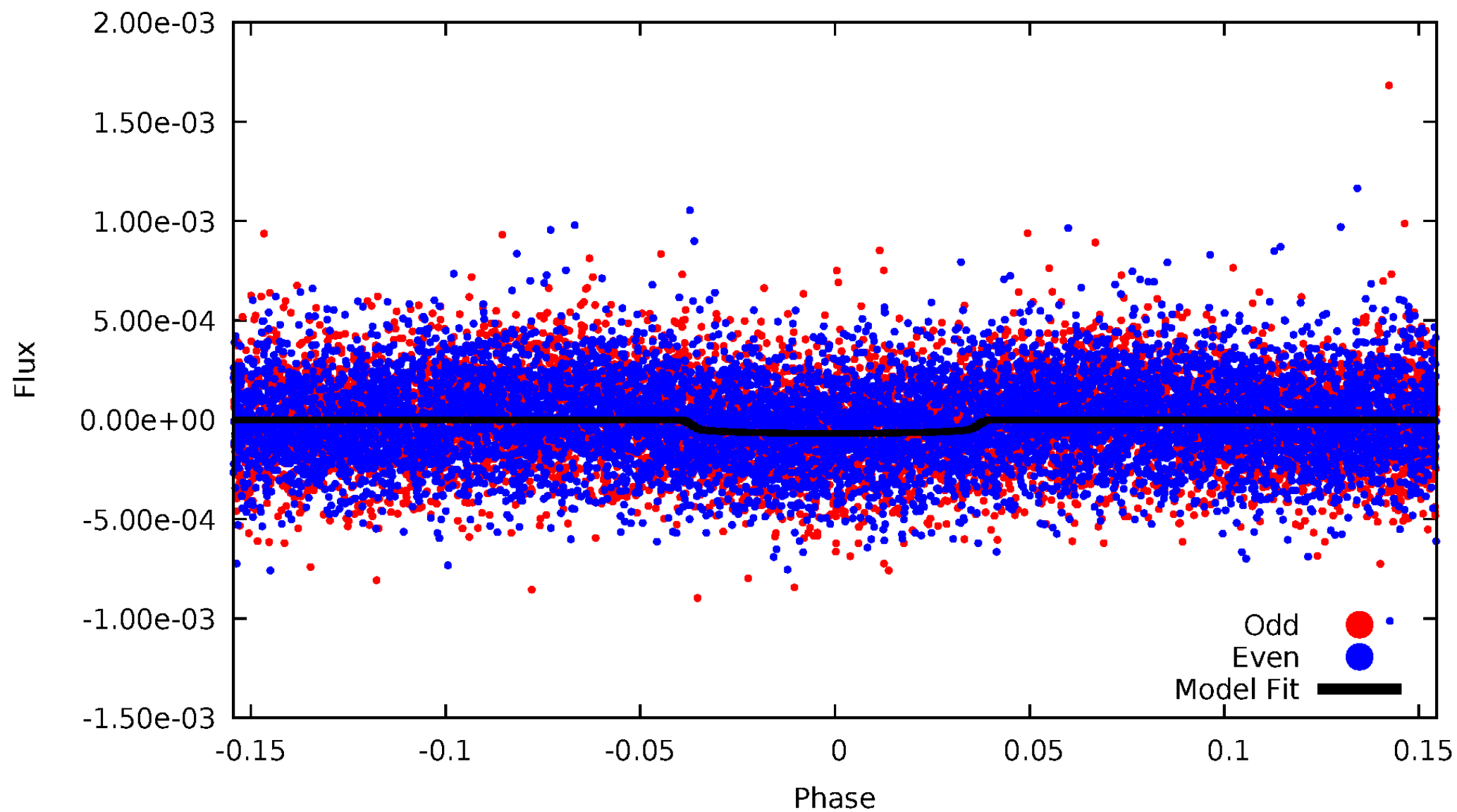


TCE 009967129-01



# DV Odd/Even

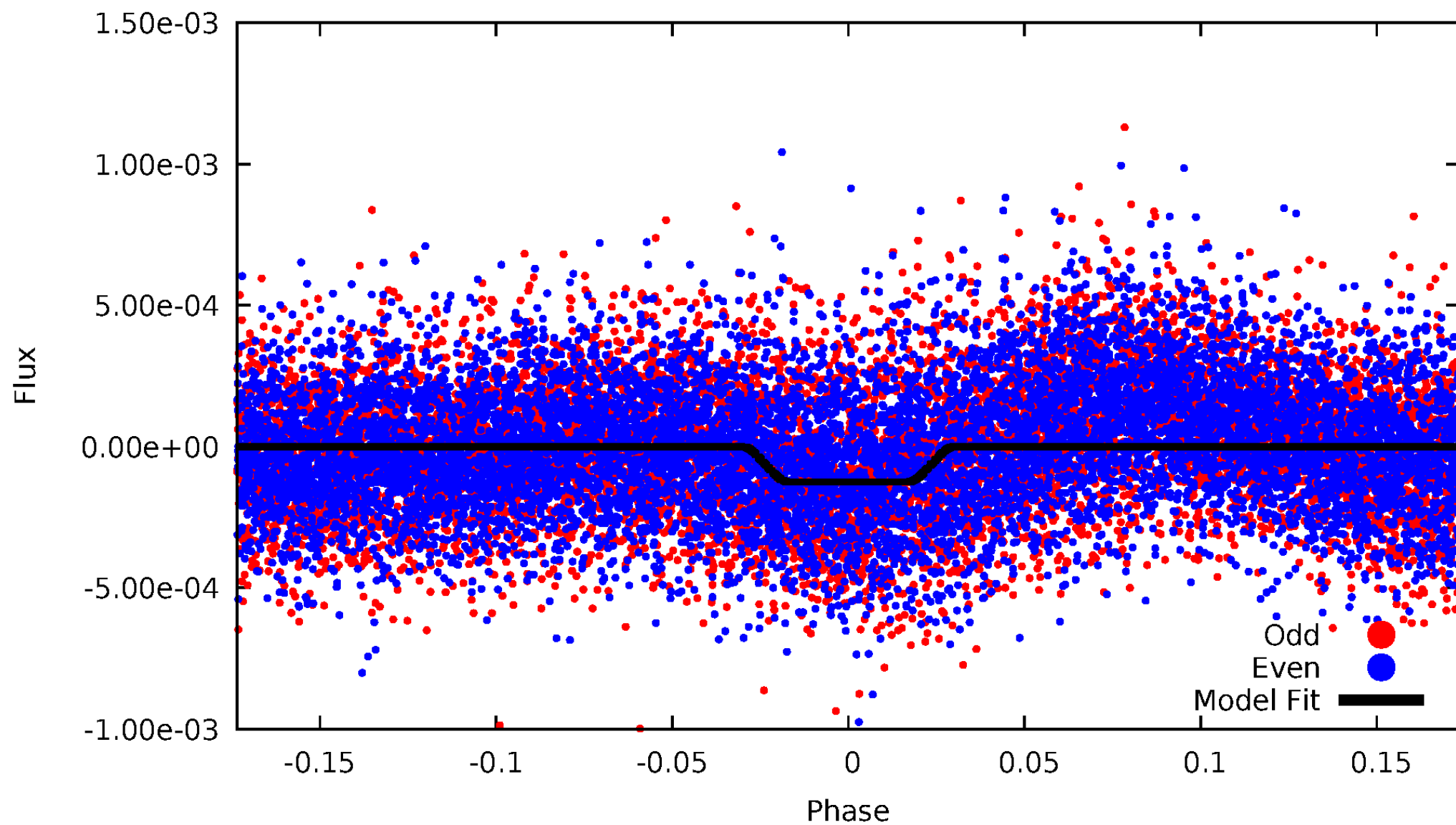
TCE 009967129-01



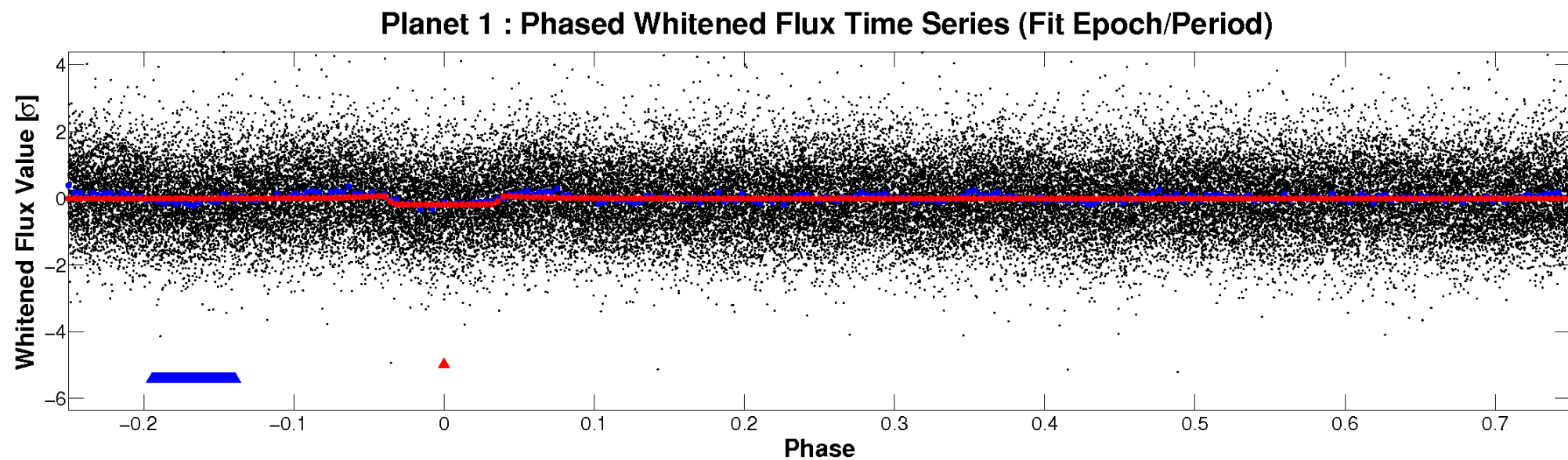
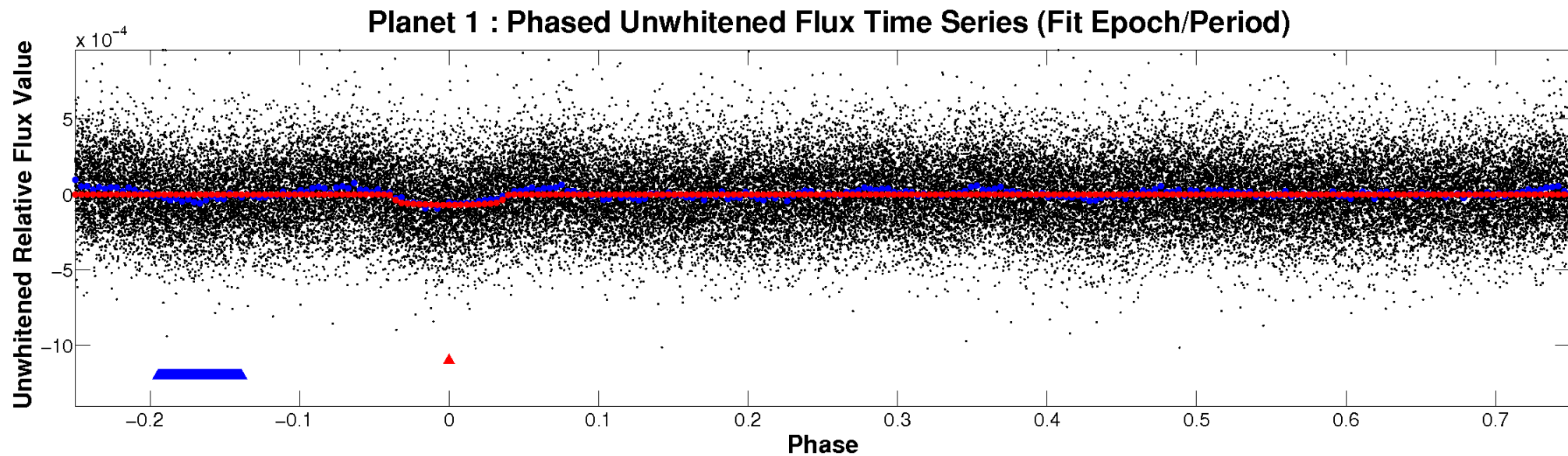


# ALT Odd/Even

TCE 009967129-01

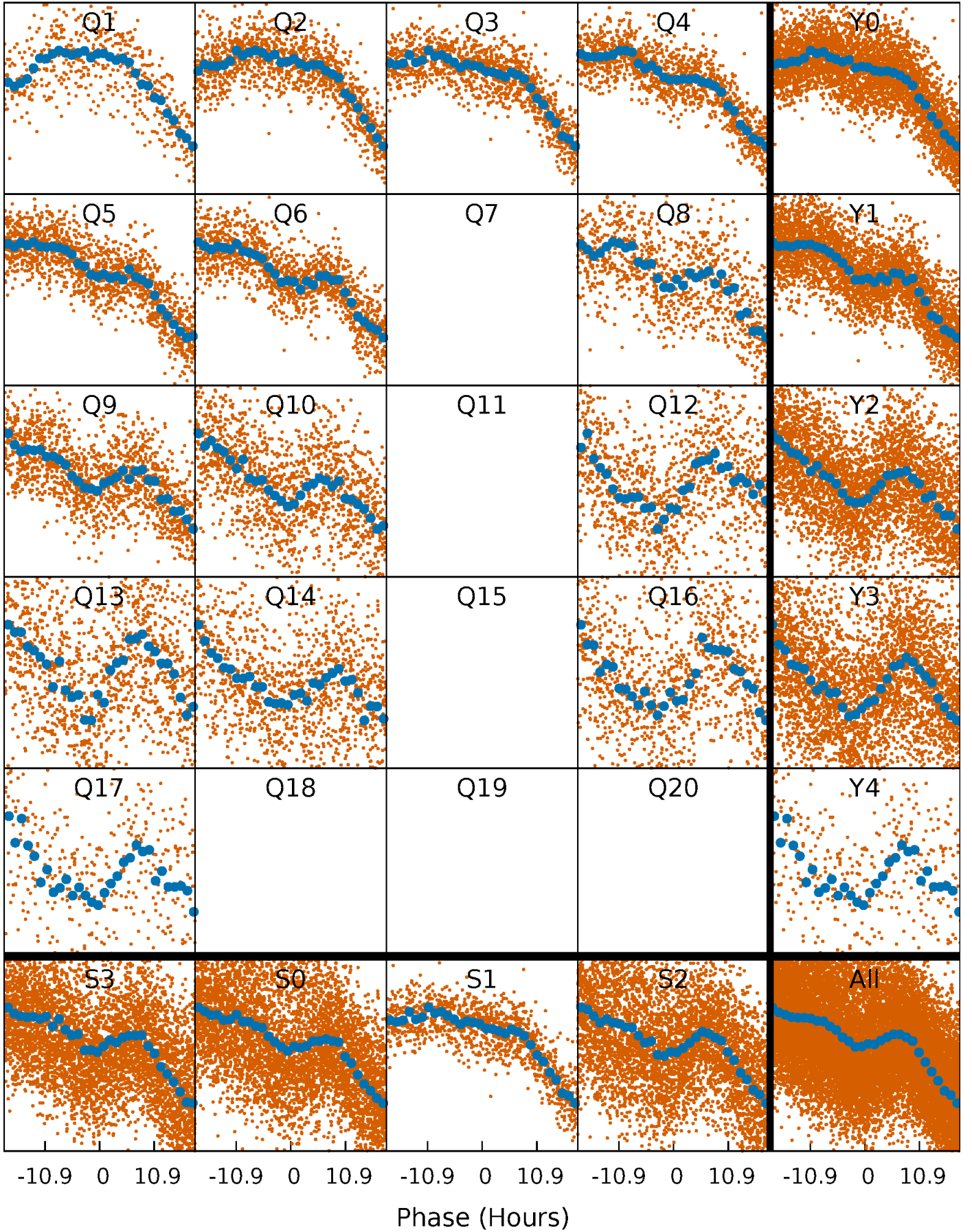


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

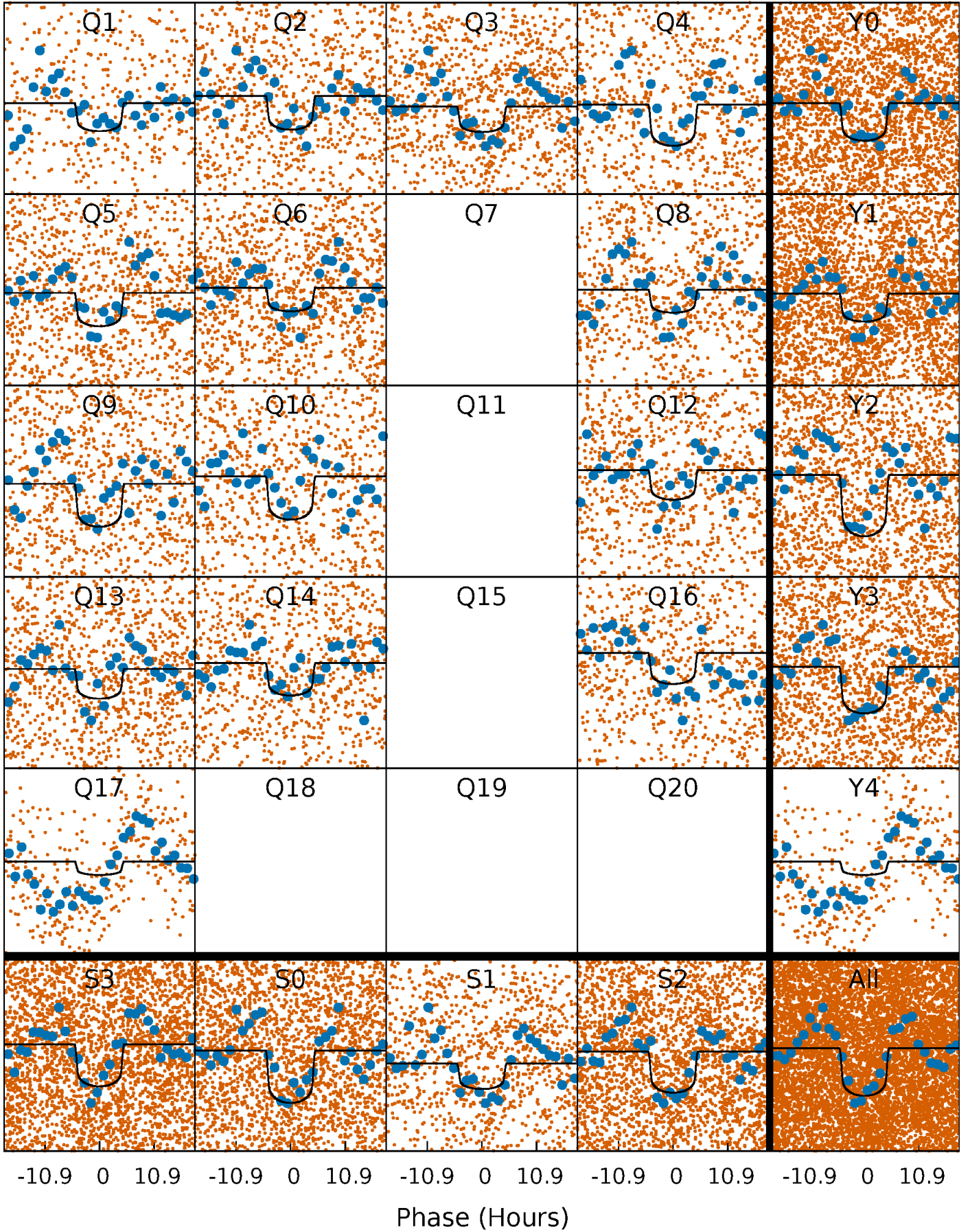
TCE 009967129-01   P= 5.149819 Days    $T_0=131.970263$  (BKJD)





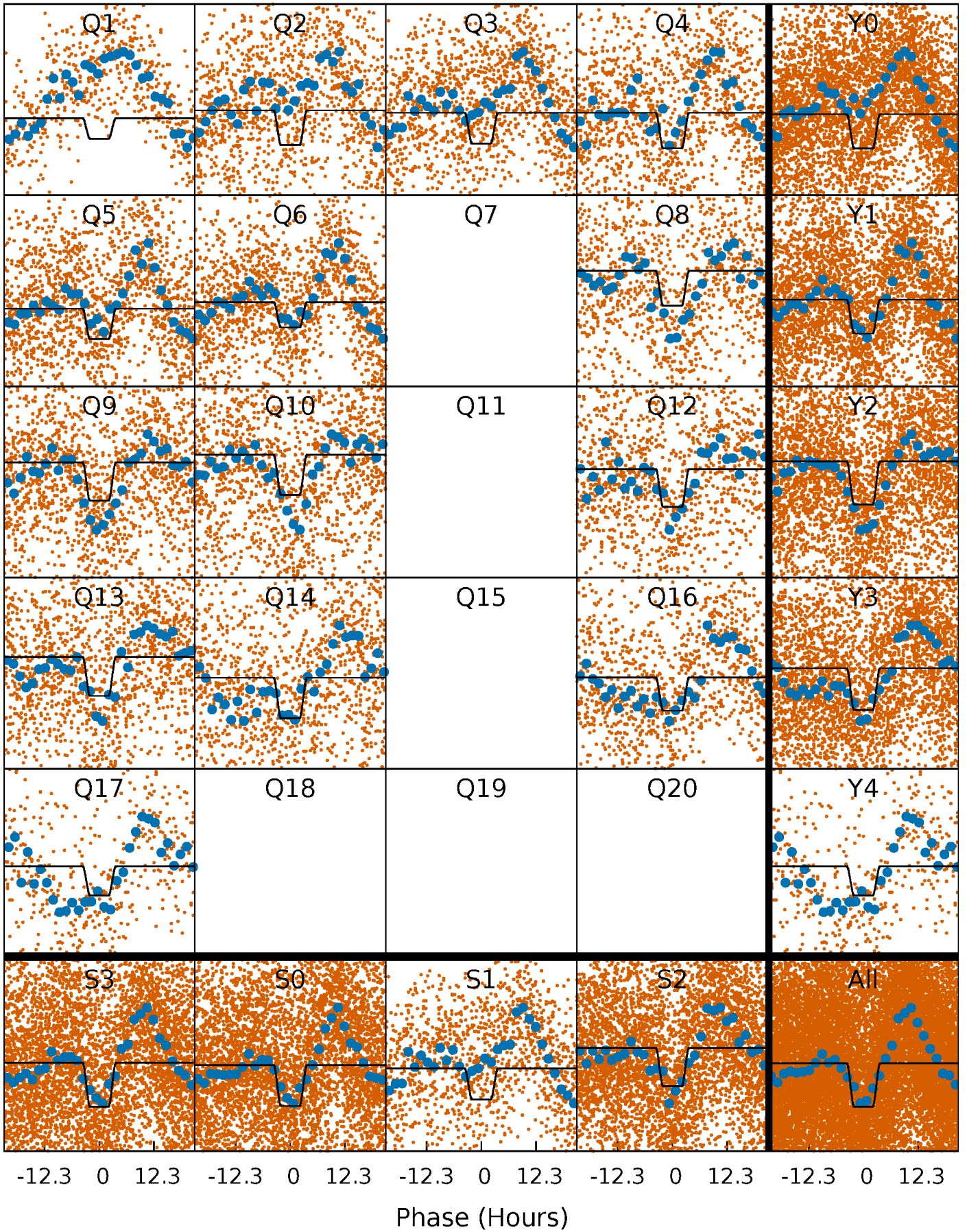
# DV Quarter-Phased Transit Curves

TCE 009967129-01 P= 5.149819 Days  $T_0=131.970263$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

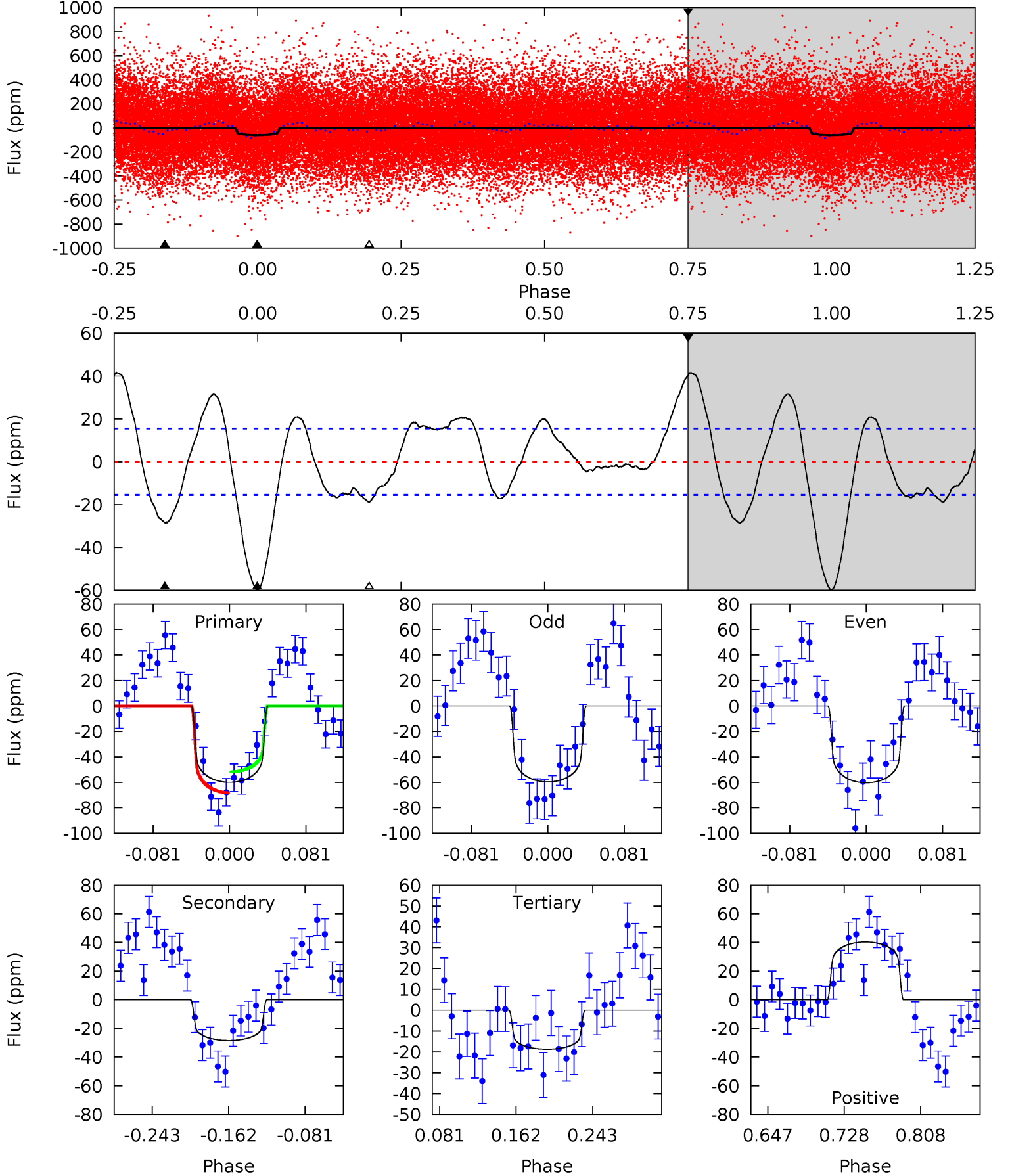
TCE 009967129-01 P= 5.149639 Days  $T_0=131.915793$  (BKJD)



# DV Model-Shift Uniqueness Test

009967129-01, P = 5.149819 Days, E = 126.820444 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
17.8	8.44	5.57	12.0	4.61	1.75	4.15	12.2	5.84	2.88	-3.52	0.10	0.97	0.41	2.45

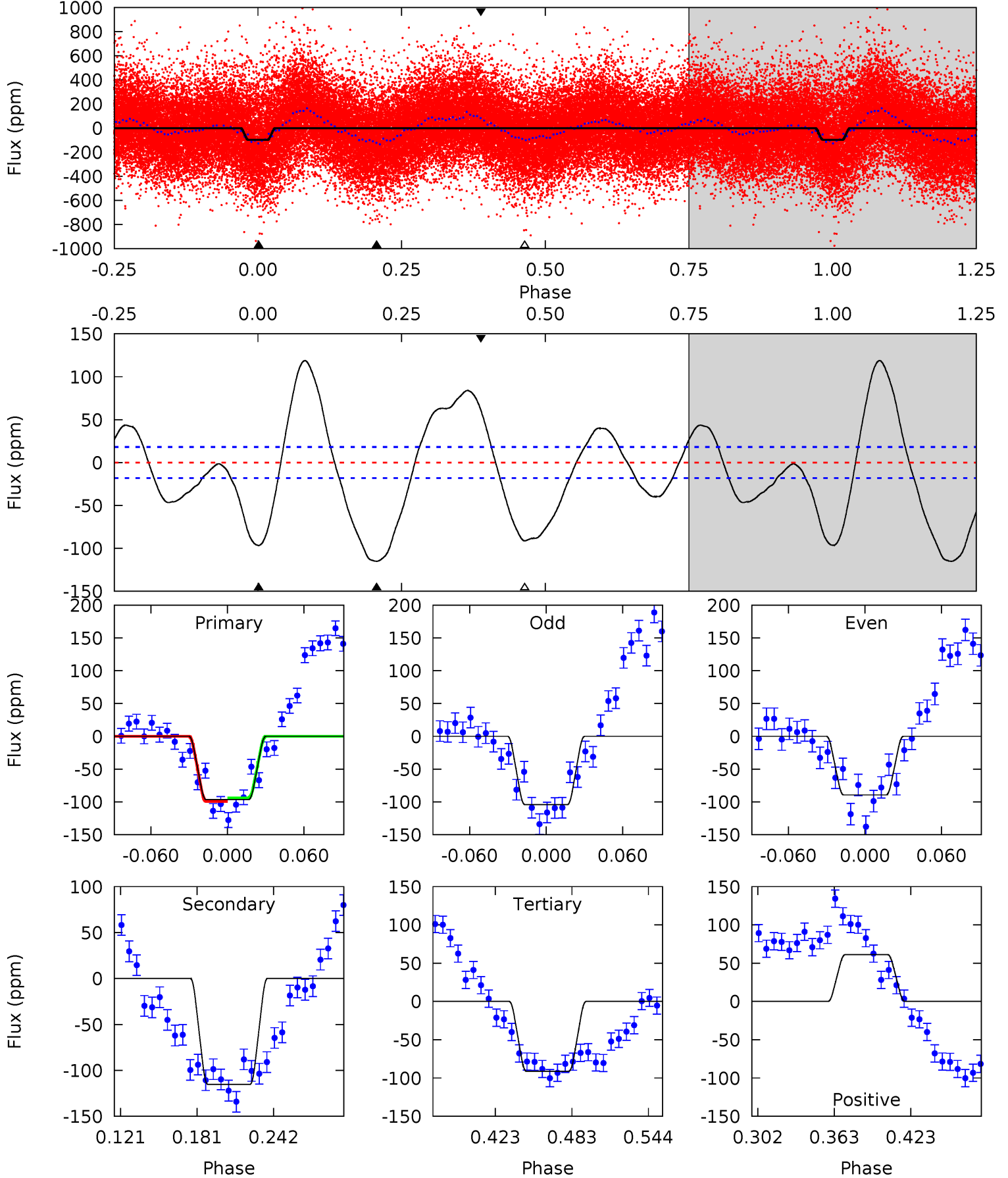




# Alt Model-Shift Uniqueness Test

009967129-01, P = 5.149639 Days, E = 126.766154 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
24.9	29.7	23.6	15.8	4.67	1.88	13.1	1.34	9.12	6.17	13.9	1.91	0.86	0.51	0.68





### Stellar Parameters For KIC 009967129

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6703^{+161}_{-222}$	$4.390^{+0.060}_{-0.180}$	$-0.340^{+0.250}_{-0.350}$	$1.136^{+0.318}_{-0.136}$	$1.158^{+0.153}_{-0.153}$	$1.114^{+0.356}_{-0.526}$
	+2%/-3%	+1%/-4%	+74%/-103%	+28%/-12%	+13%/-13%	+32%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009967129-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-28 \pm 3$	$1.12^{+0.26}_{-0.20}$	$1809^{+115}_{-87}$	$5223^{+469}_{-331}$	$45^{+23}_{-15}$
Alt.	$-115 \pm 4$	$1.41^{+0.25}_{-0.20}$	$1803^{+120}_{-81}$	$6551^{+499}_{-419}$	$115^{+41}_{-31}$

$T_{\text{max}}$  = 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

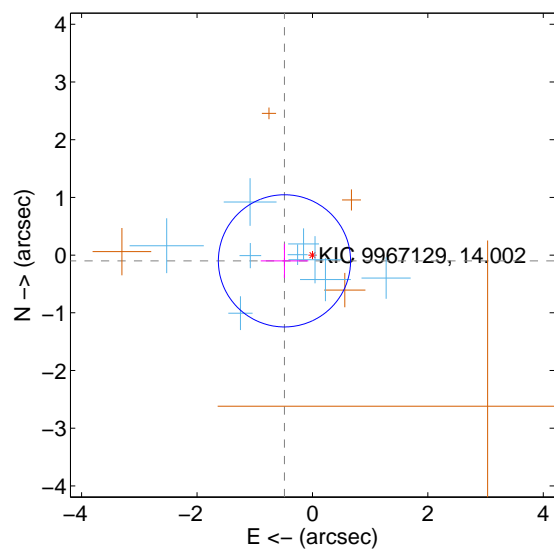
Supplemental centroid analysis for 009967129-01. Kepler magnitude: 14.00. Transit SNR 11.08

There are 9 quarters with good PRF difference image offsets

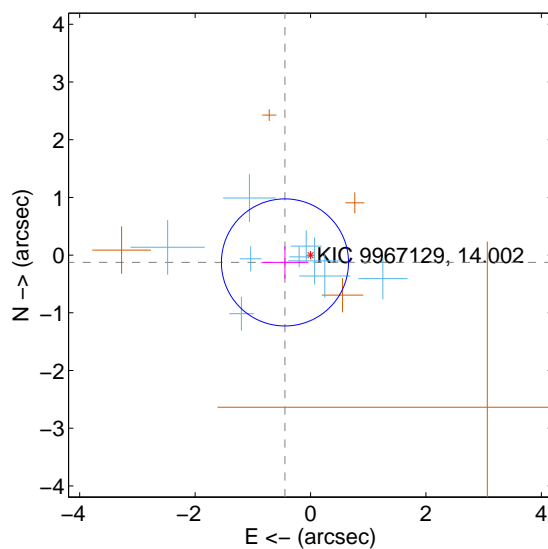
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.495 \pm 0.382$	1.30	$0.485 \pm 0.412$	$-0.100 \pm 0.296$
PRF-fit source offset from KIC position	$0.461 \pm 0.367$	1.26	$0.443 \pm 0.406$	$-0.127 \pm 0.282$
photometric centroid source offset	$0.99 \pm 0.84$	1.18	$0.52 \pm 0.81$	$0.84 \pm 0.85$

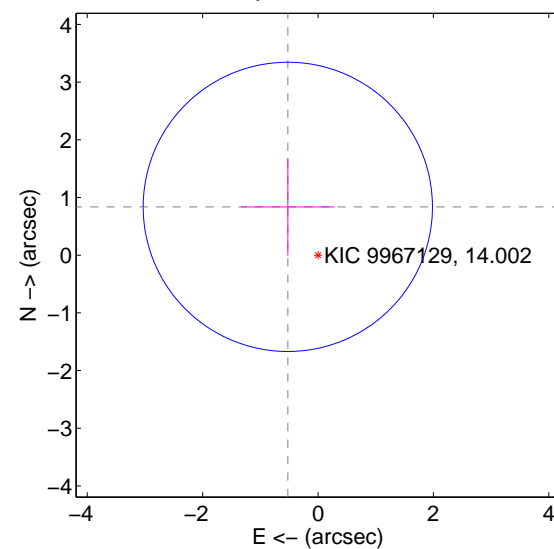
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

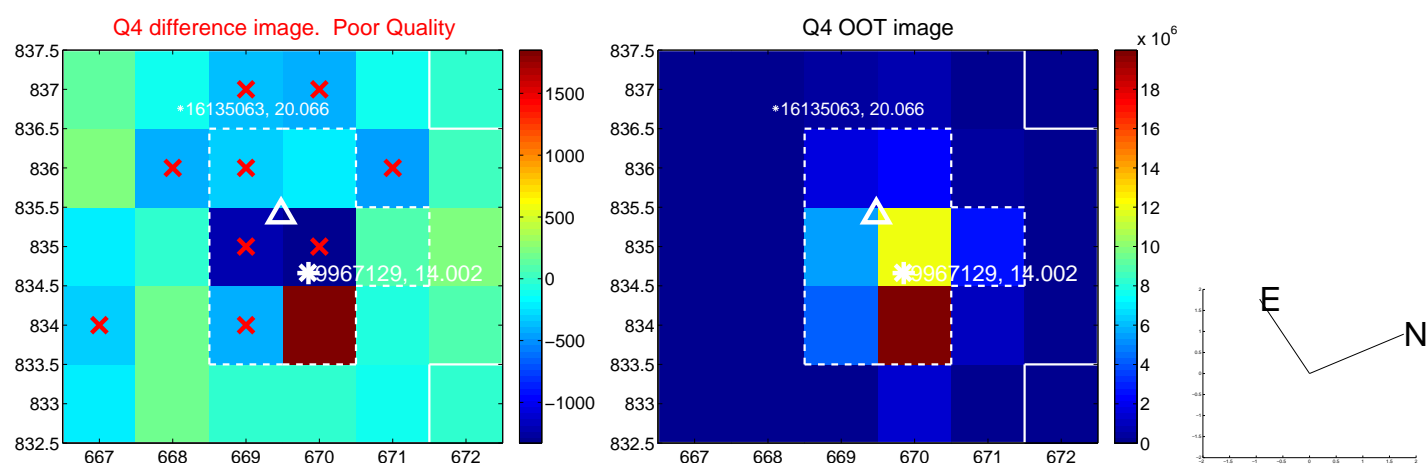
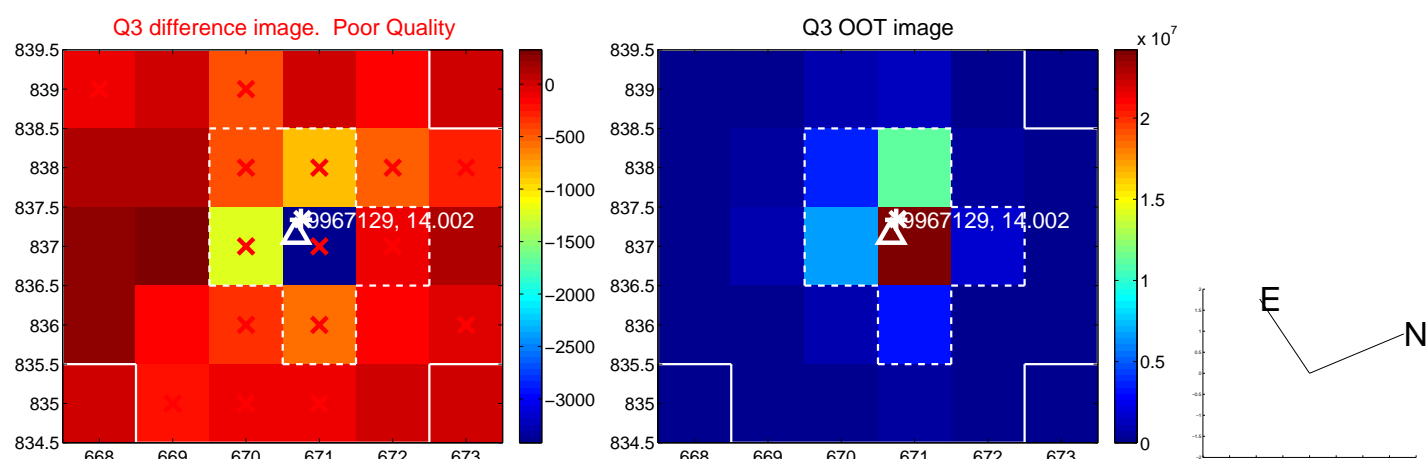
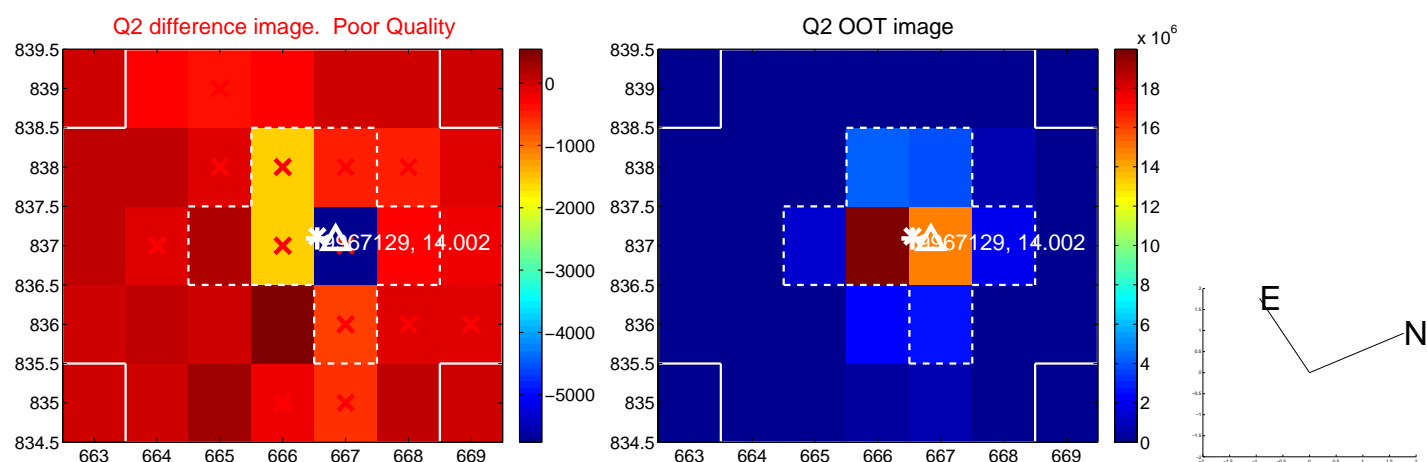
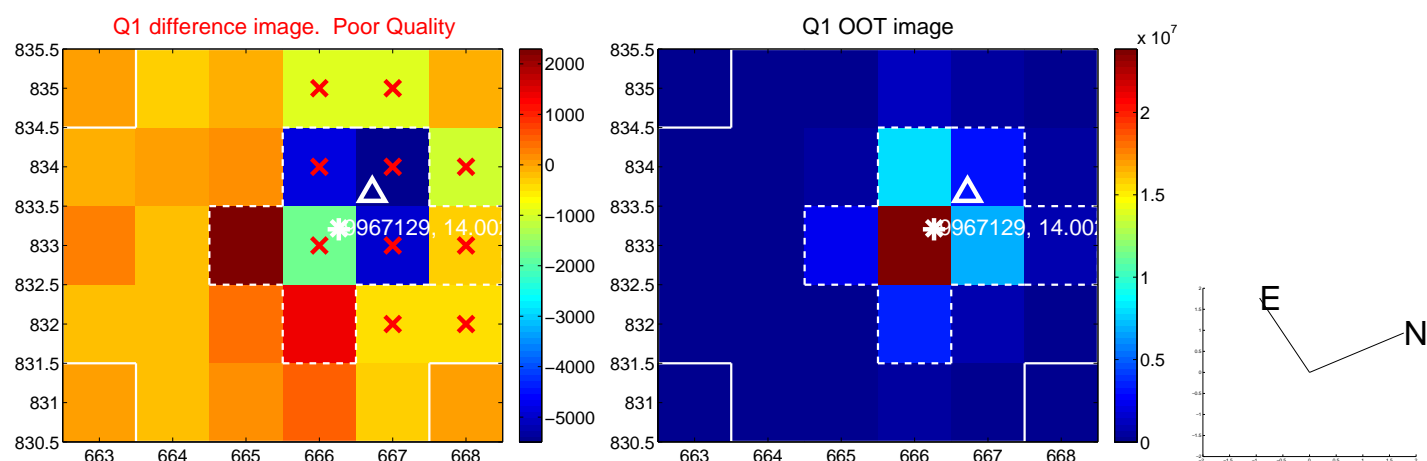


offset from photometric centroids

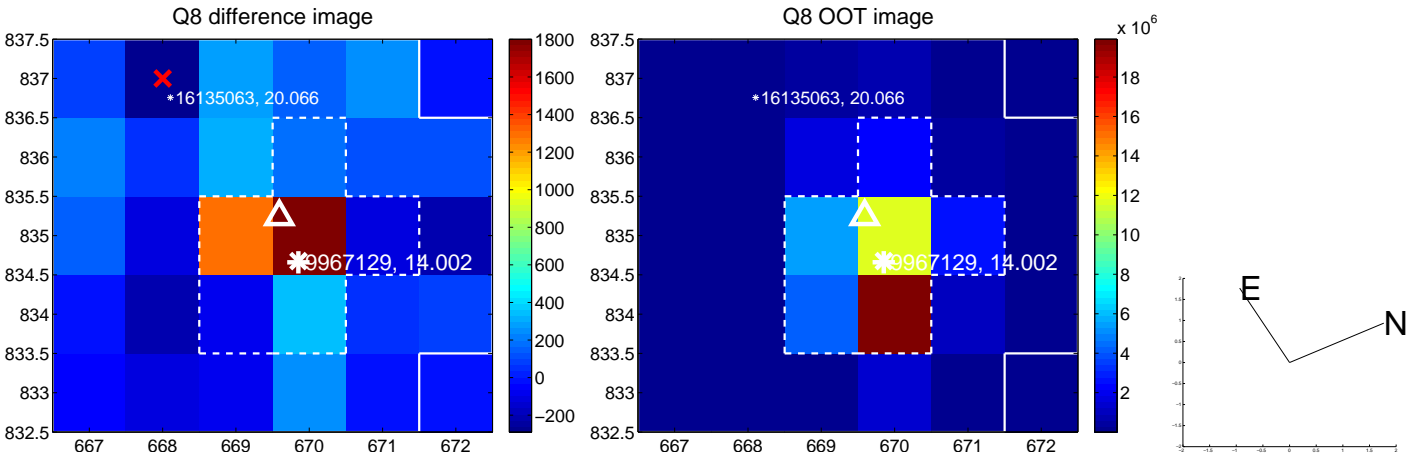
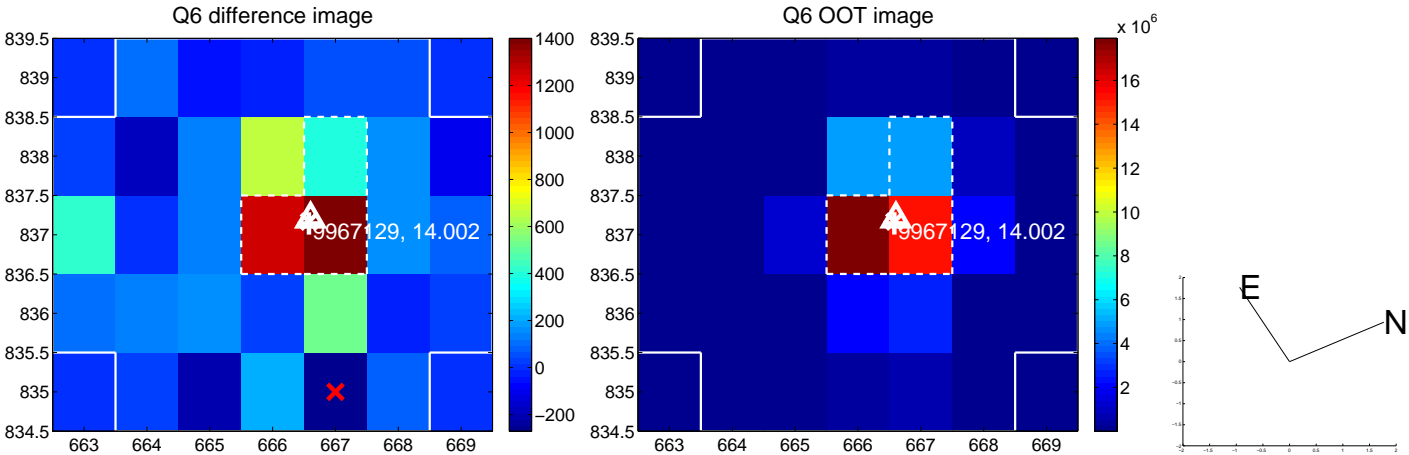
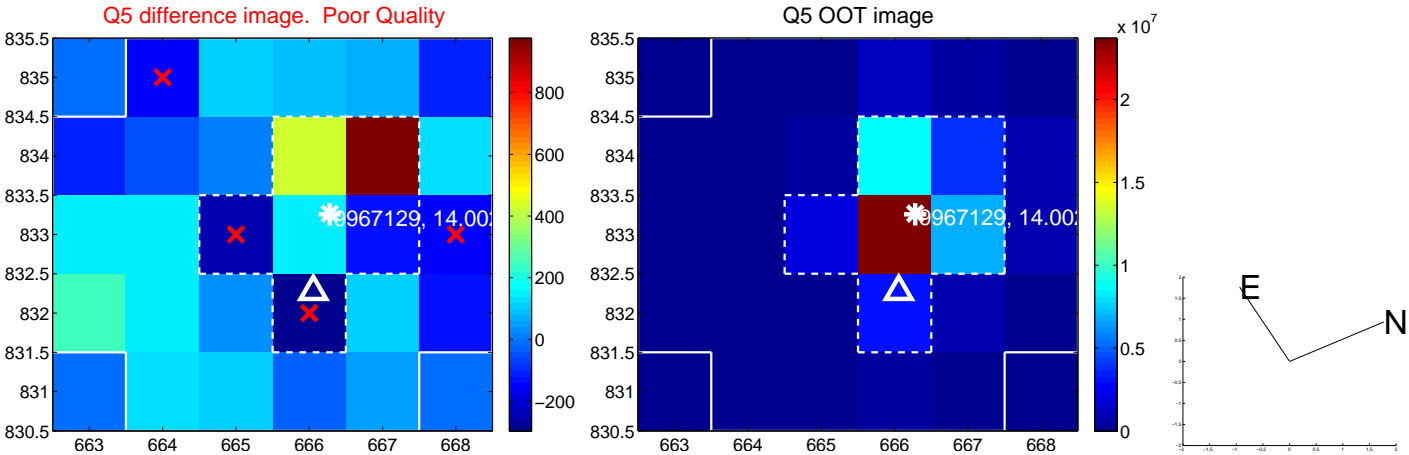


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

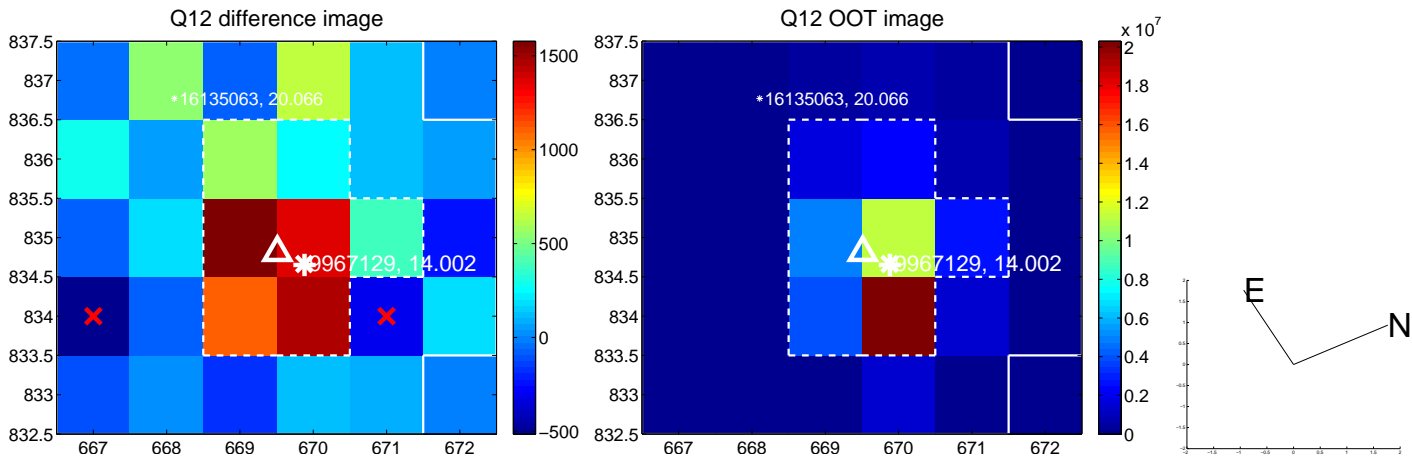
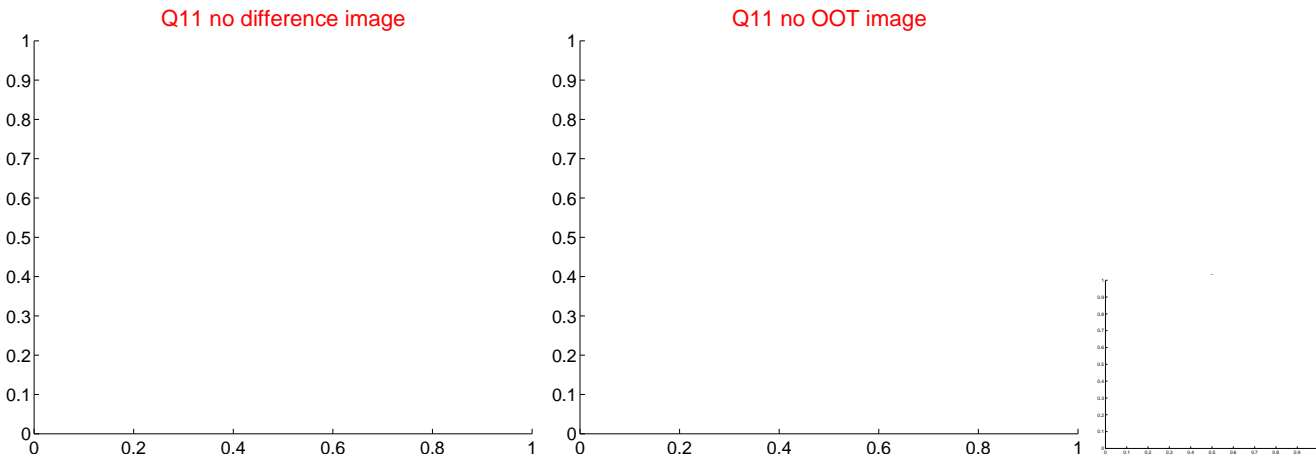
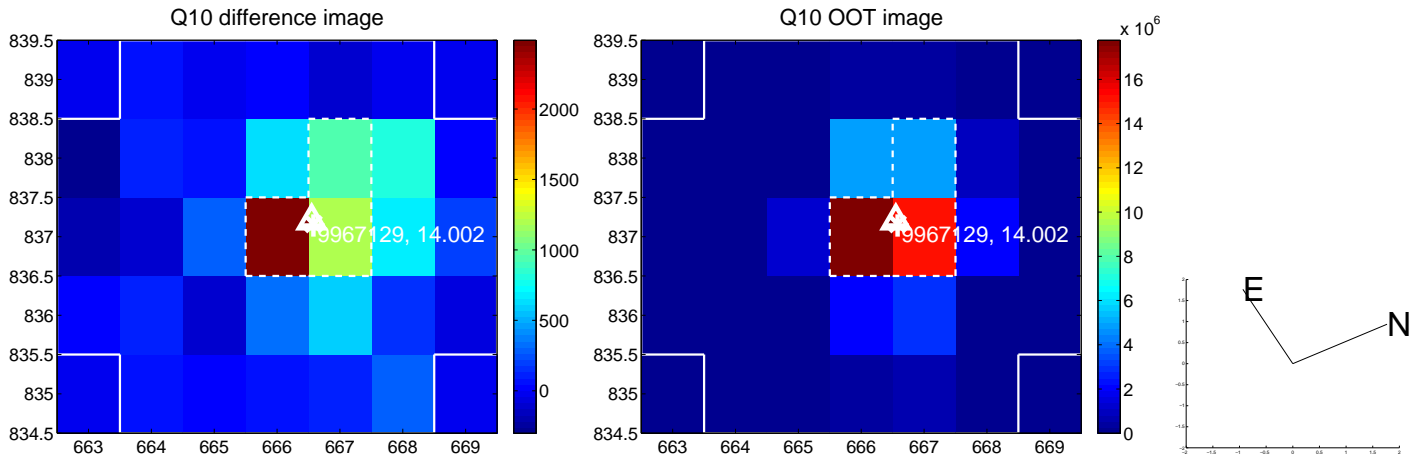
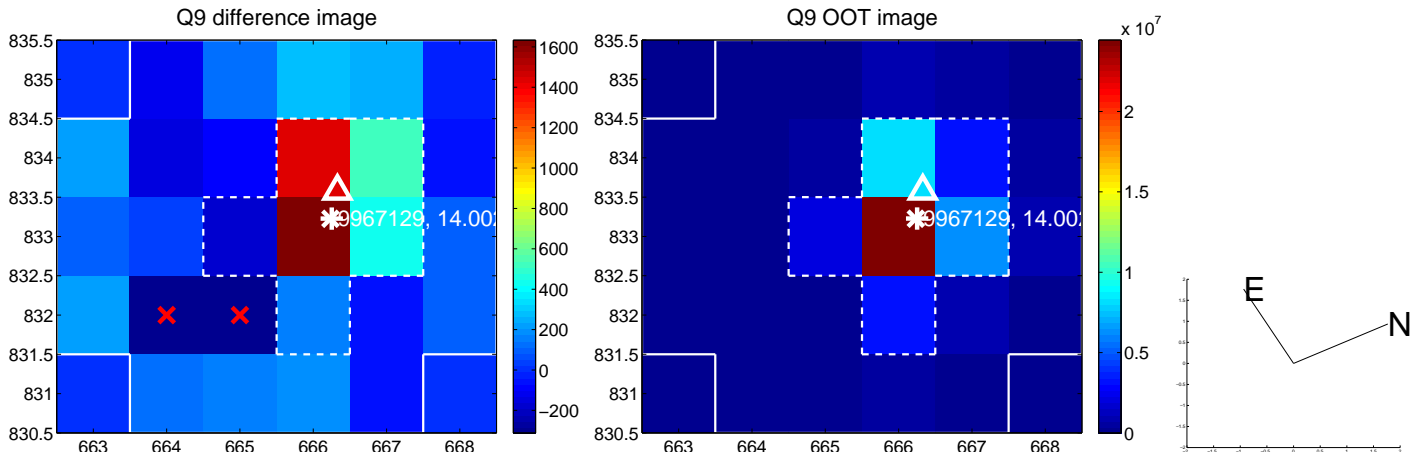


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

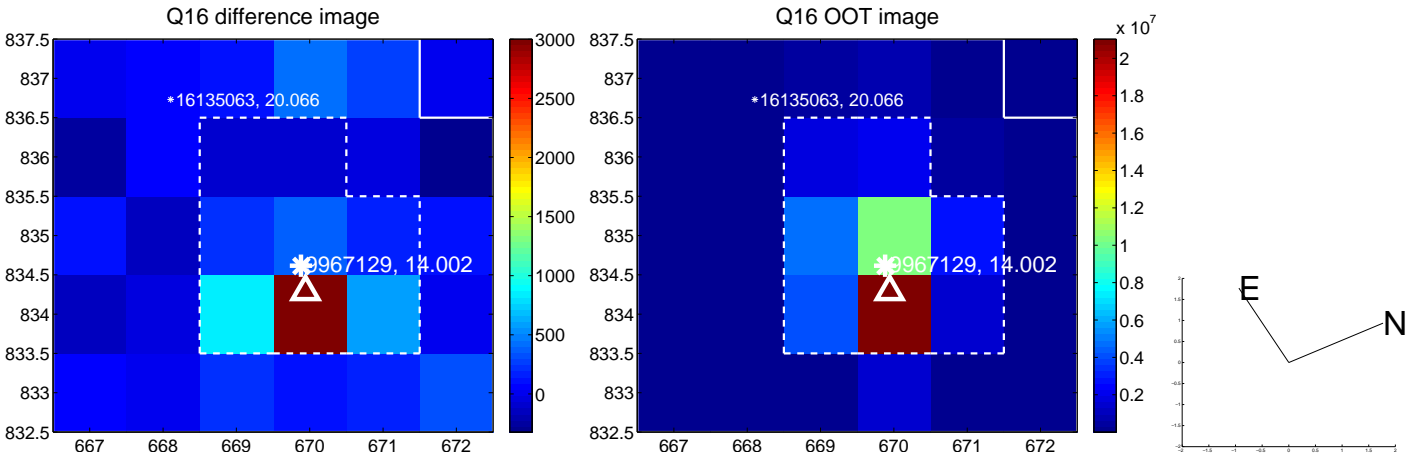
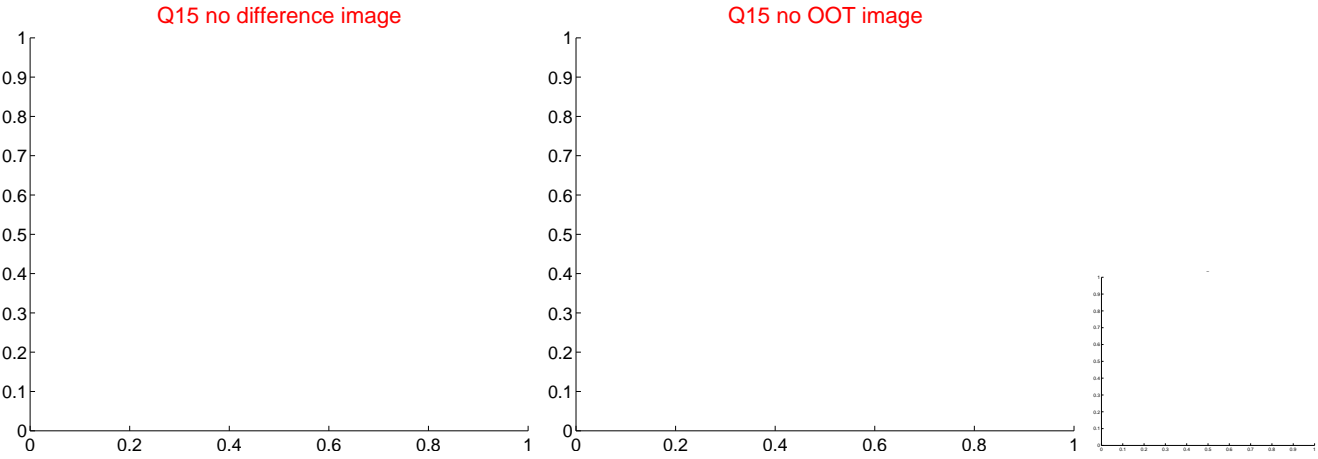
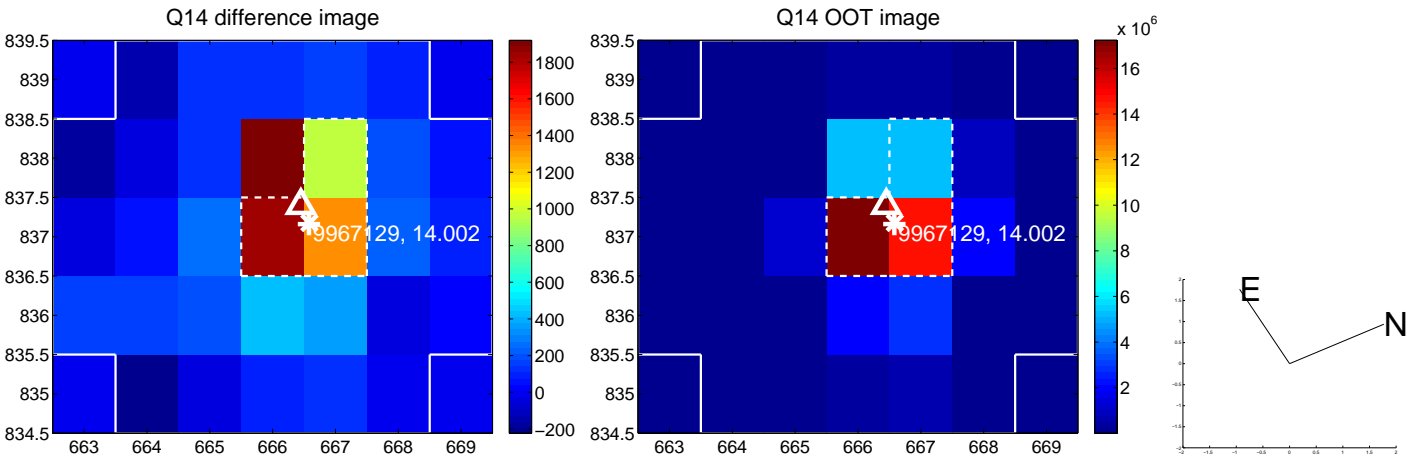
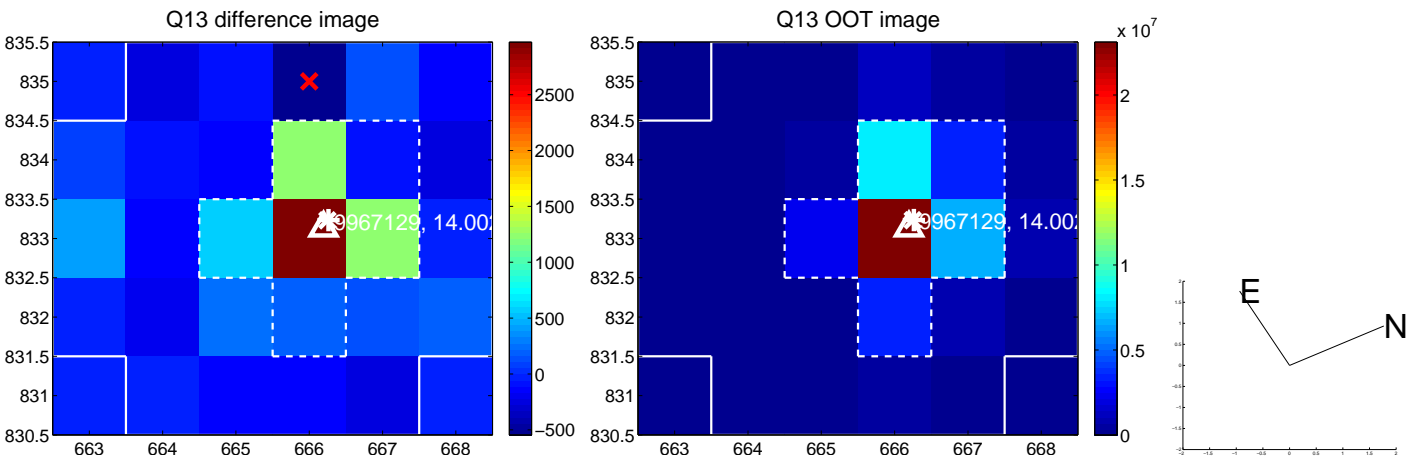




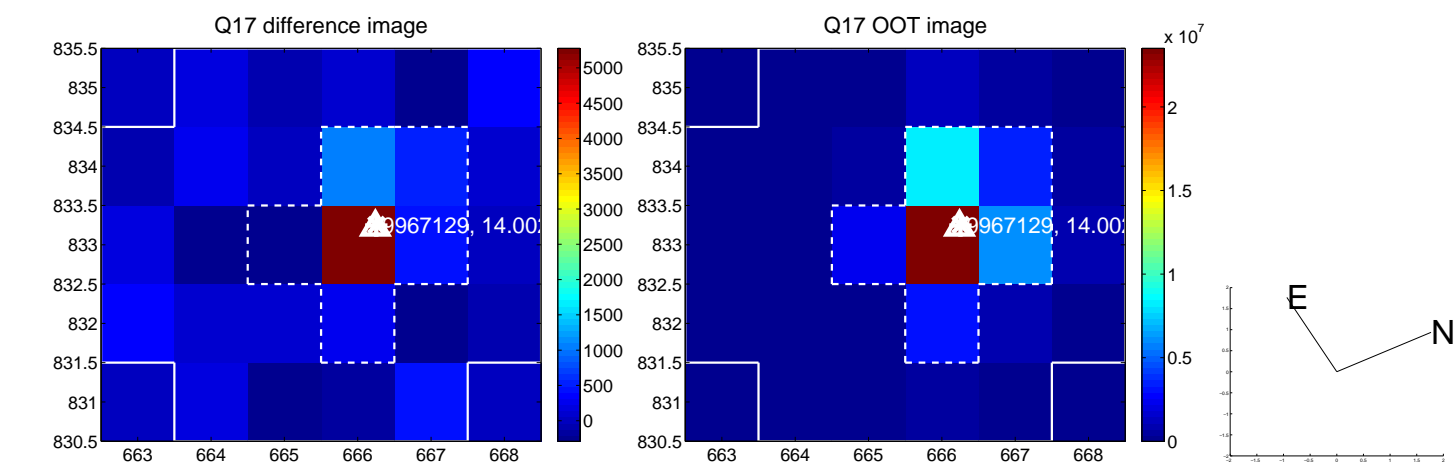
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



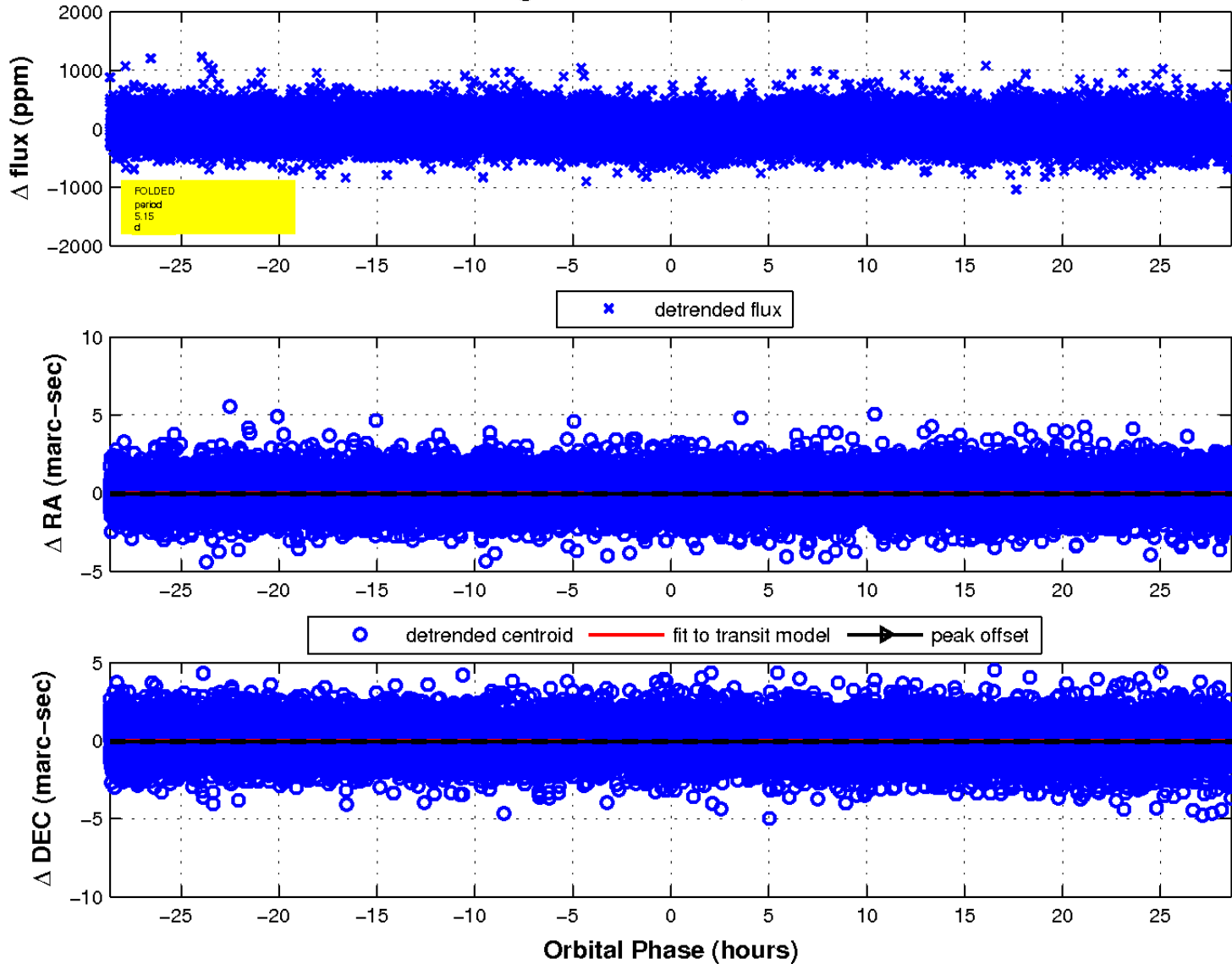
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

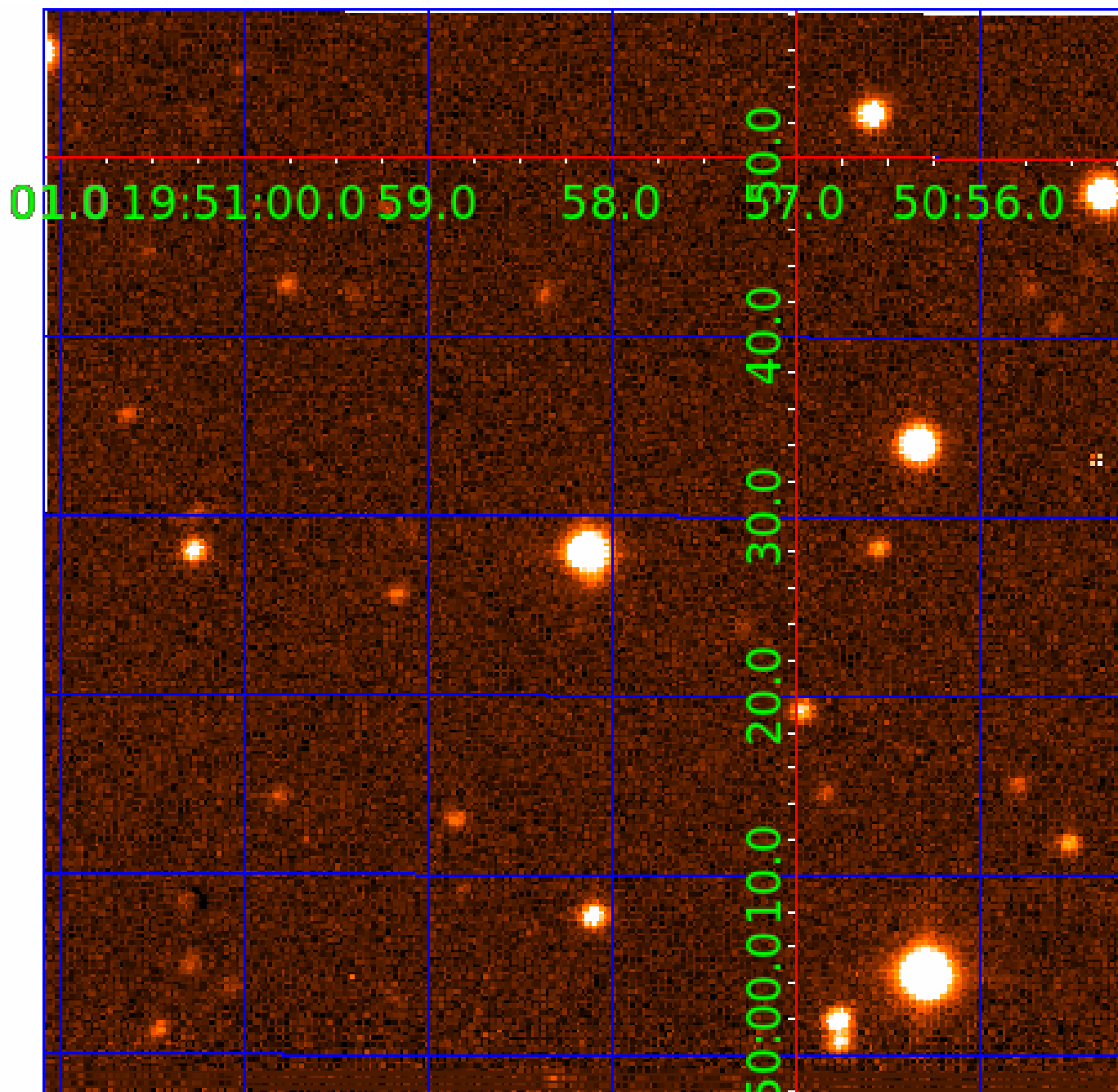


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 009967129

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009967129-01	OBS	No	5.149819	131.970263	68.8	9.544	11.5	11.1	1.14	6703	1.09	622.06
009967129-02	OBS	No	5.150835	136.118163	54.9	6.058	8.5	8.7	1.14	6703	0.90	621.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009967129-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
009967129-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

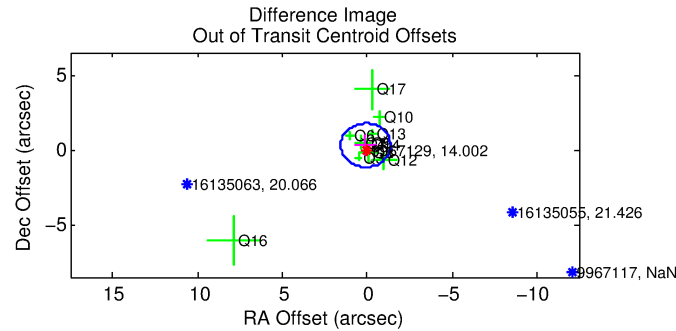
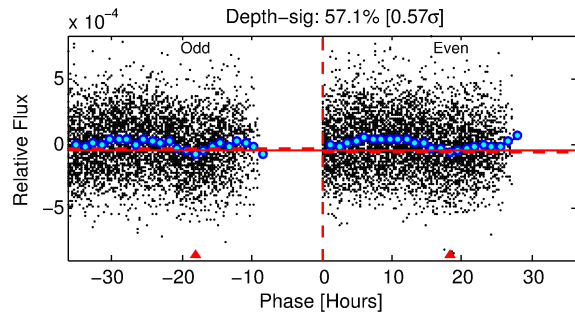
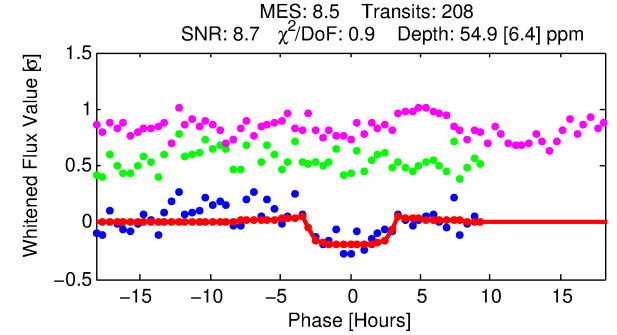
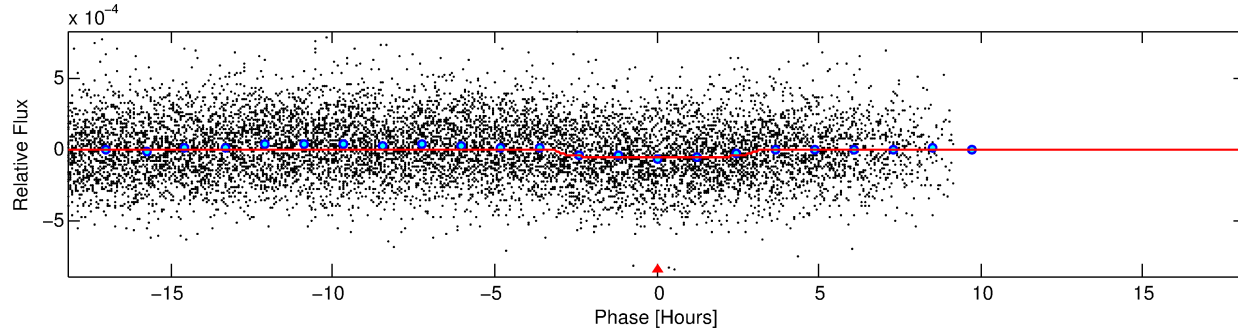
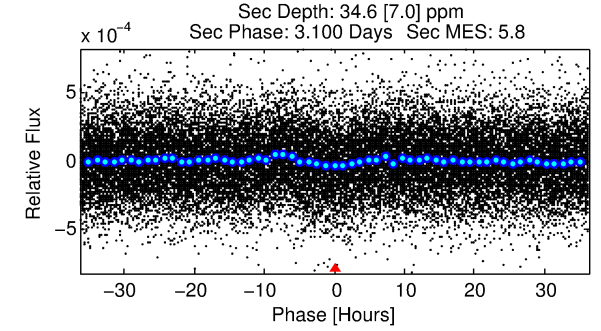
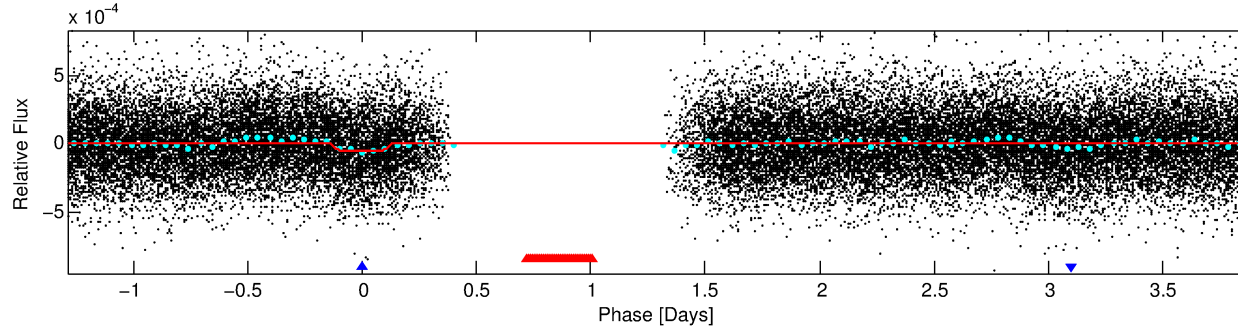
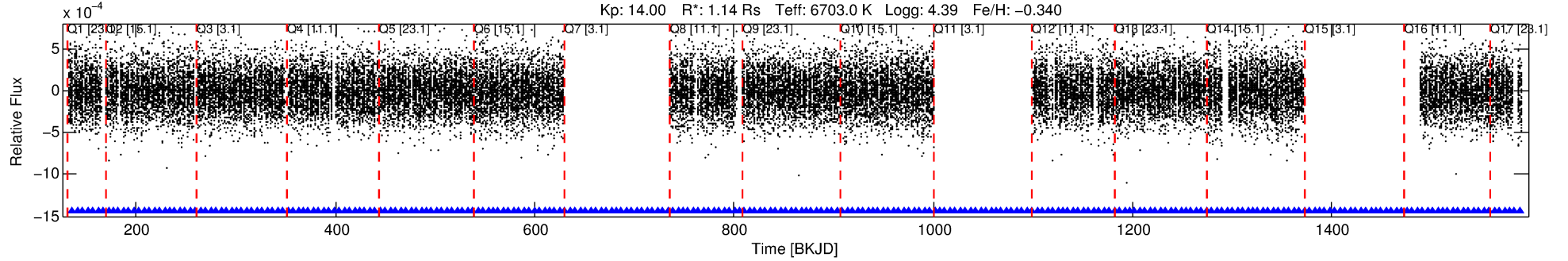
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009967129-02

No Significant Match Found

# DV One-Page Summary

KIC: 9967129 Candidate: 2 of 2 Period: 5.151 d



## DV Fit Results:

Period = 5.15083 [0.00006] d  
Epoch = 136.1182 [0.0079] BKJD  
Rp/R\* = 0.0073 [0.0025]  
a/R\* = 4.74 [8.72]  
b = 0.71 [1.38]  
Seff = 621.90 [223.13]  
Teq = 1273 [114] K  
Rp = 0.90 [0.40] Re  
a = 0.0613 [0.0142] AU  
Ag = 87.64 [68.55] [1.26σ]  
Teffp = 6024 [1084] K [4.36σ]

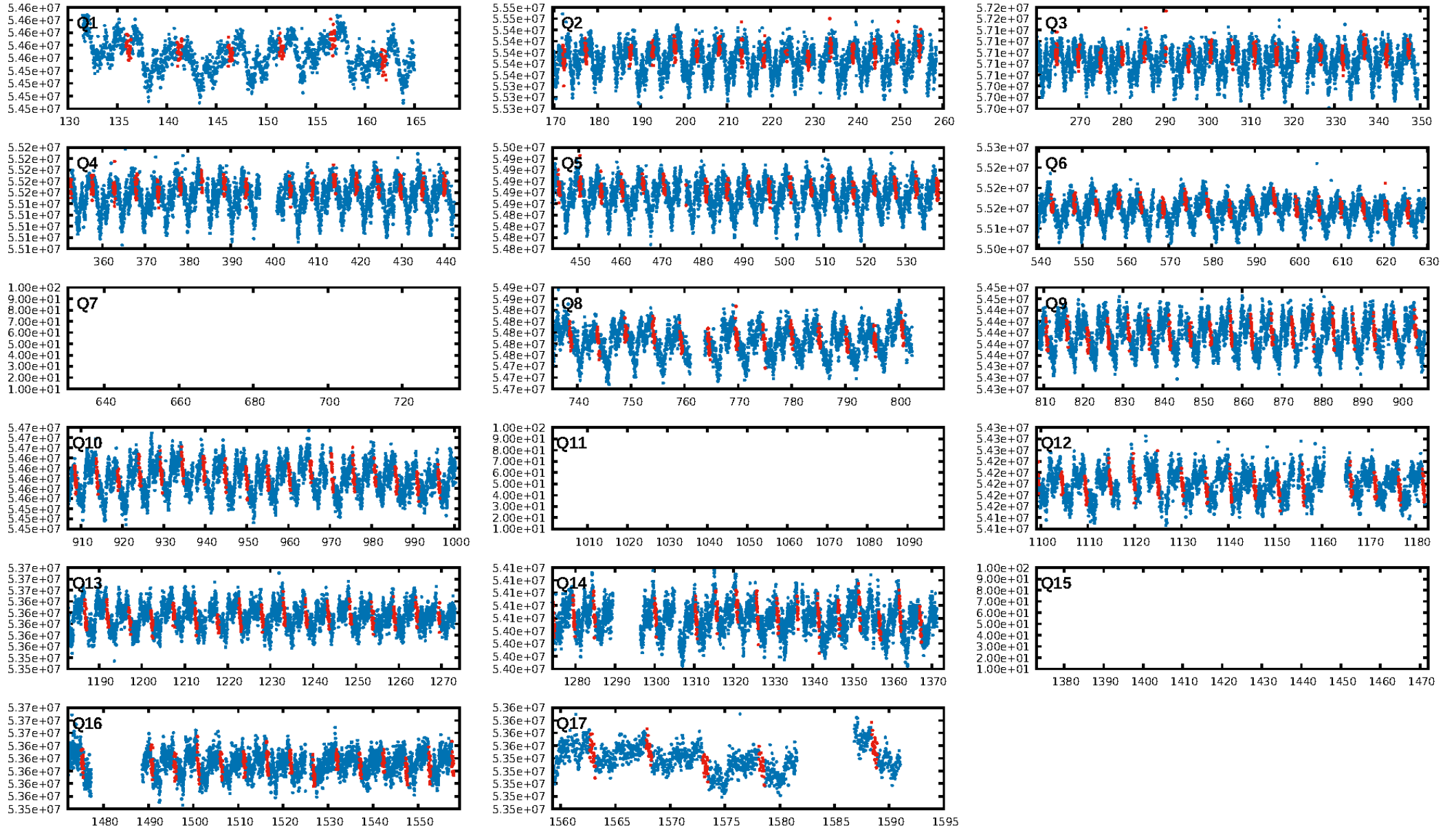
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.60e-15  
RollingBand-fgt: 1.00 [197/197]  
GhostDiagnostic-chr: 2.945  
Centroid-sig: 19.6%  
Centroid-so: 1.003 arcsec [0.79σ]  
OotOffset-rm: 0.307 arcsec [0.63σ]  
KicOffset-rm: 0.286 arcsec [0.52σ]  
OotOffset-st: 4/1/4/3 [12]  
KicOffset-st: 4/1/4/3 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 1.00 [14/14]

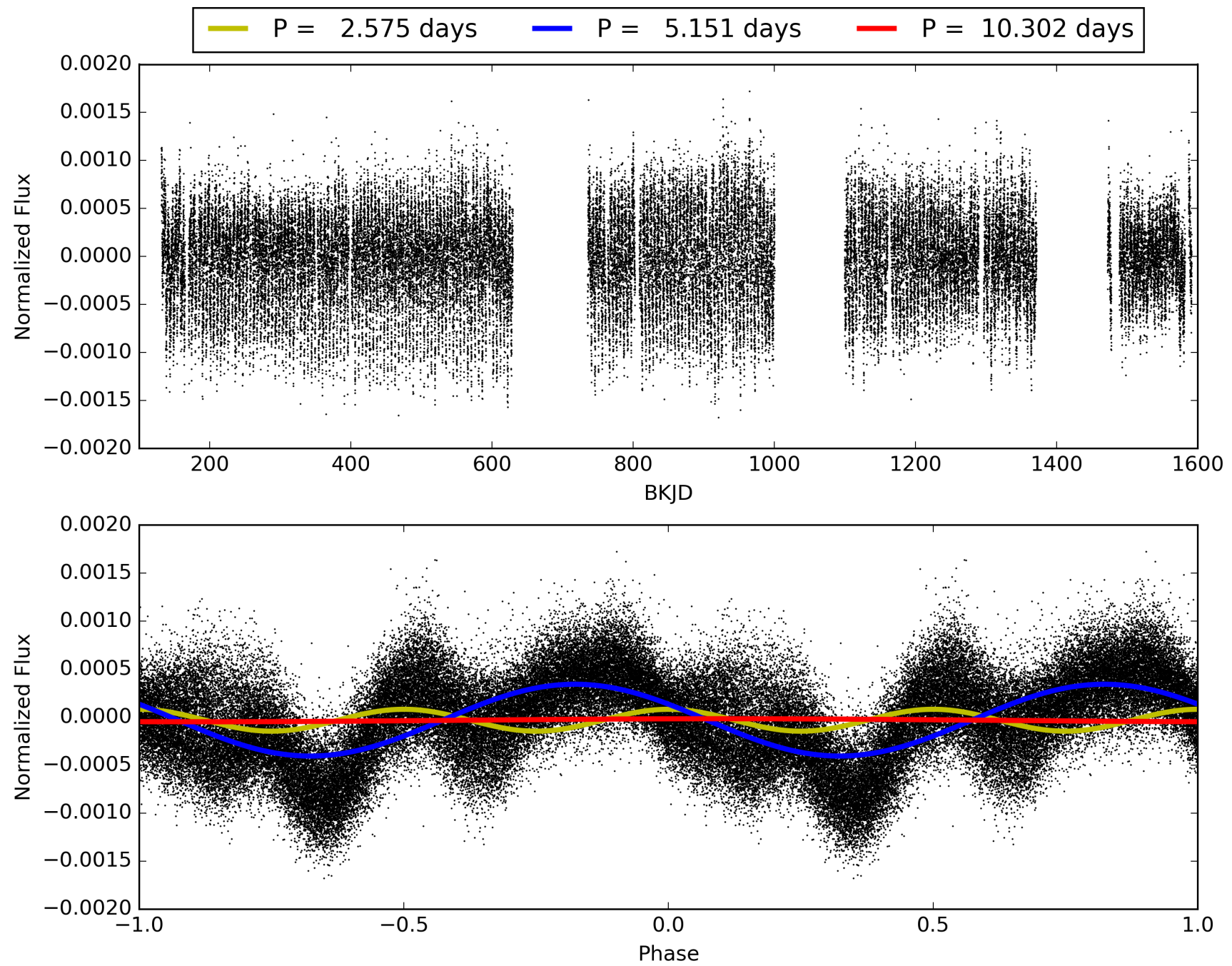
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:11:42 Z

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

# TCE 009967129-02, PDC Light Curves



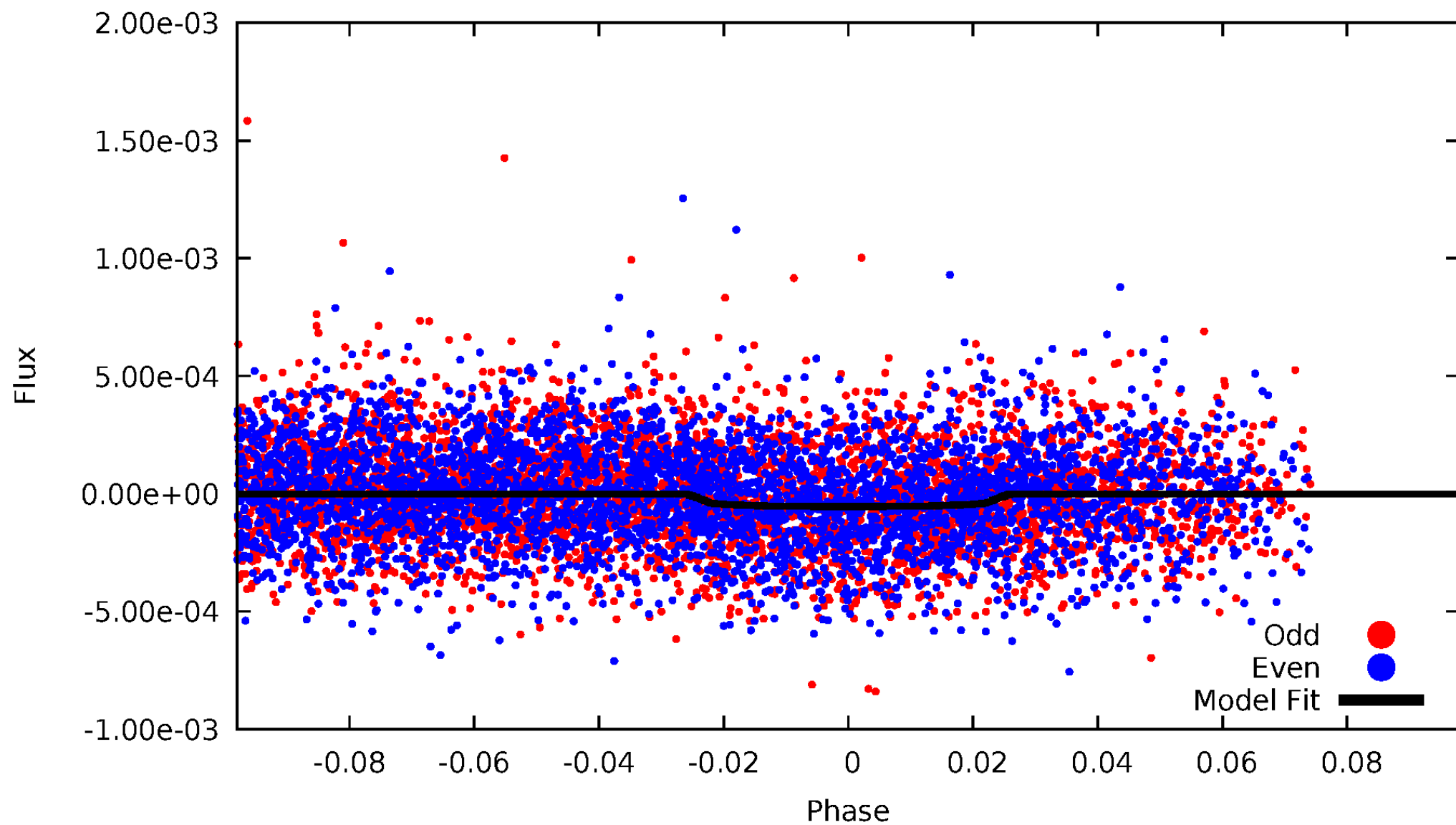
TCE 009967129-02





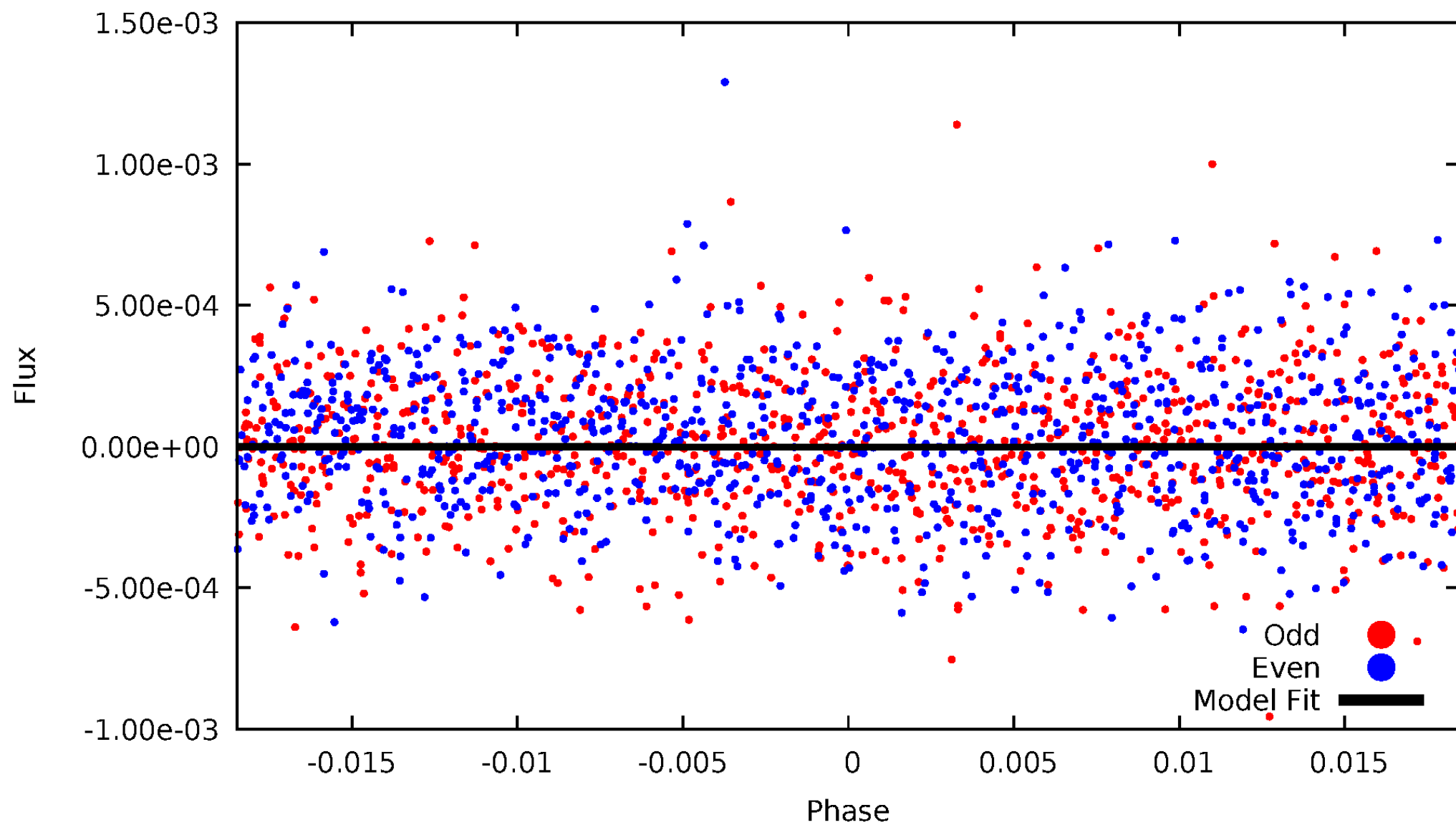
# DV Odd/Even

TCE 009967129-02



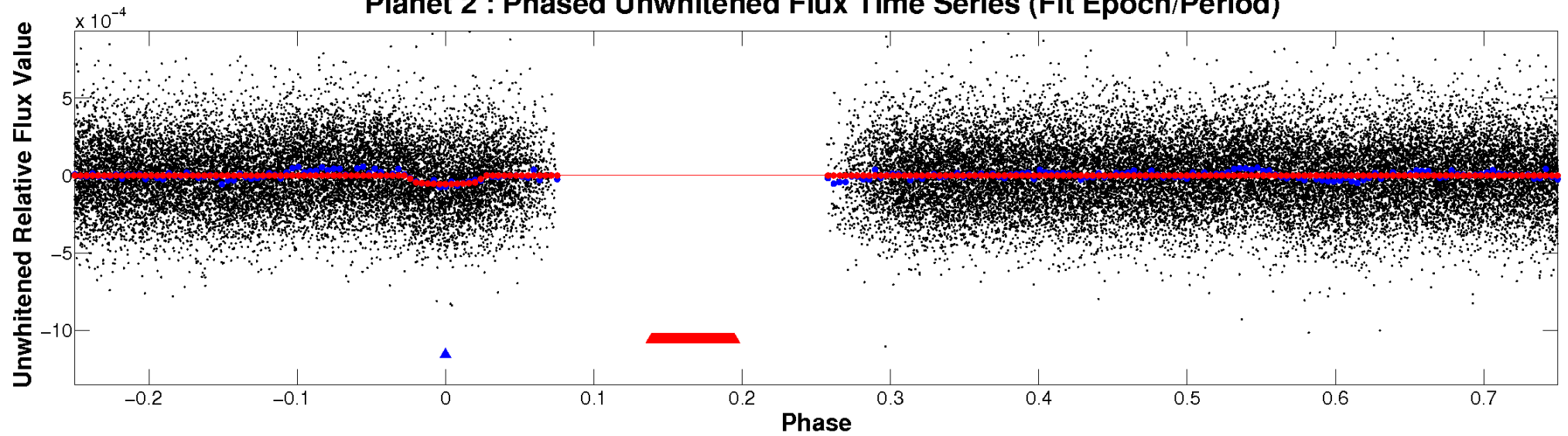
# ALT Odd/Even

TCE 009967129-02

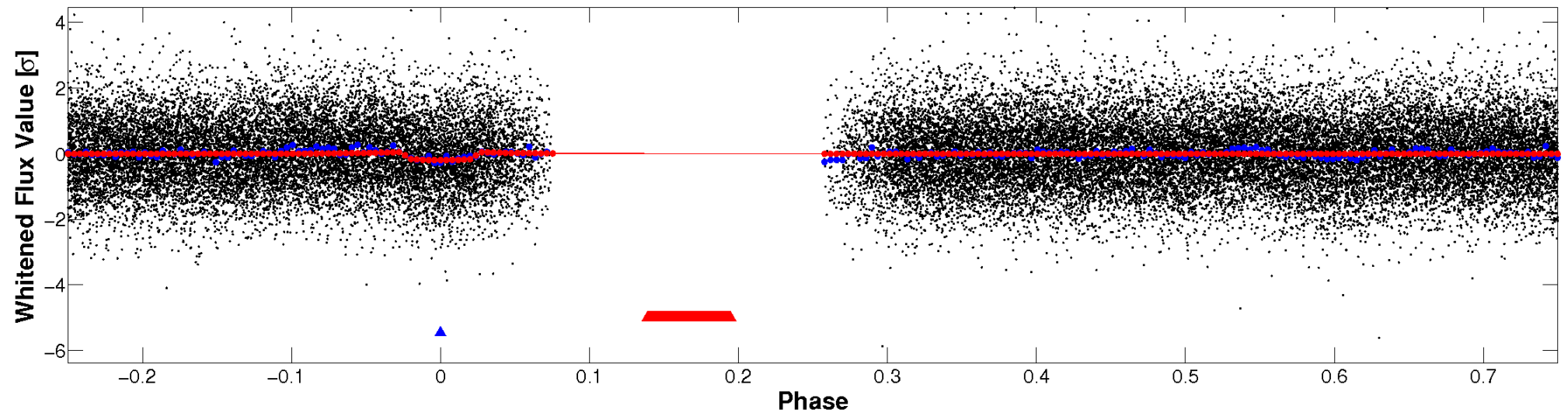


# Non-Whitened Vs. Whitened Light Curve

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

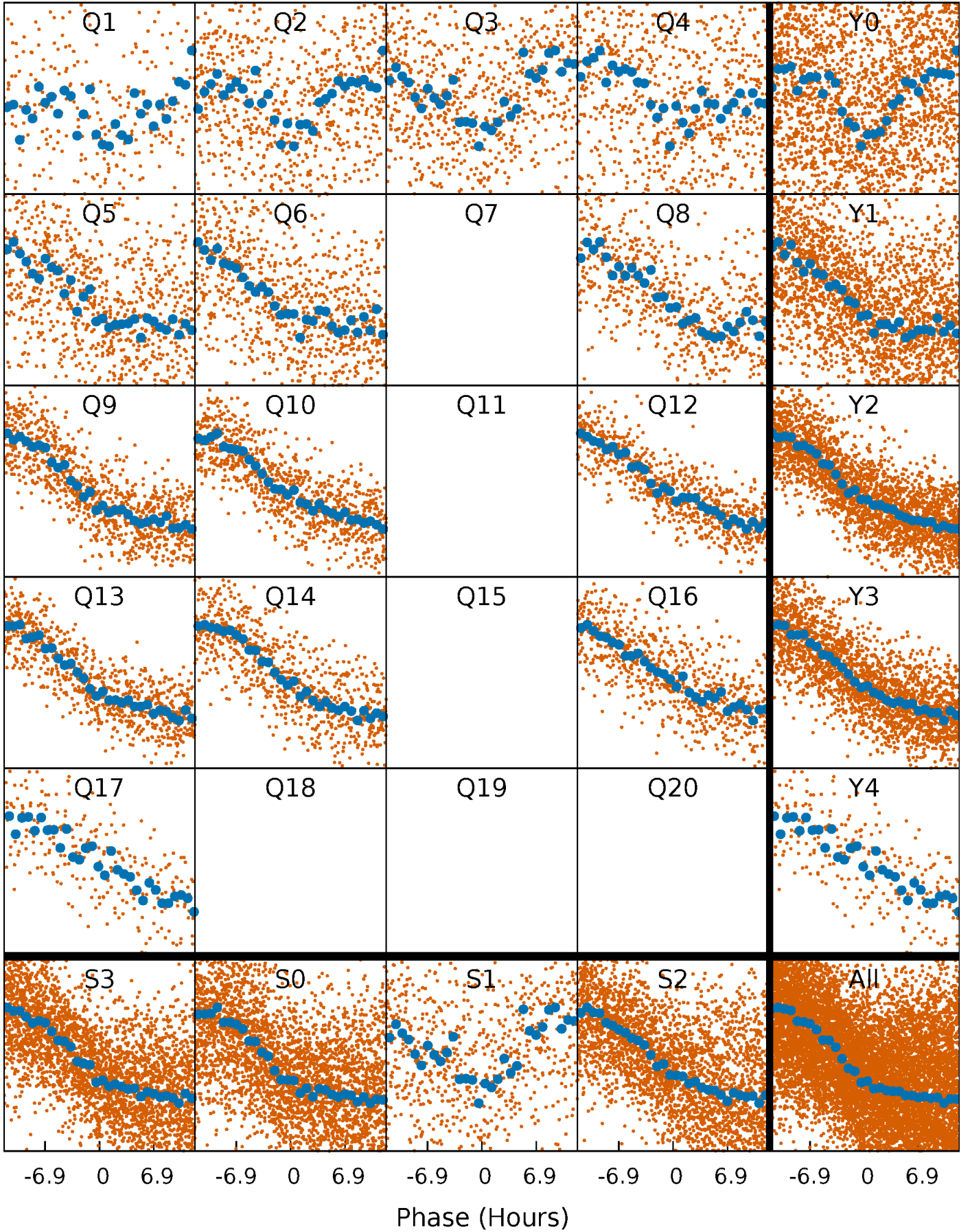


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



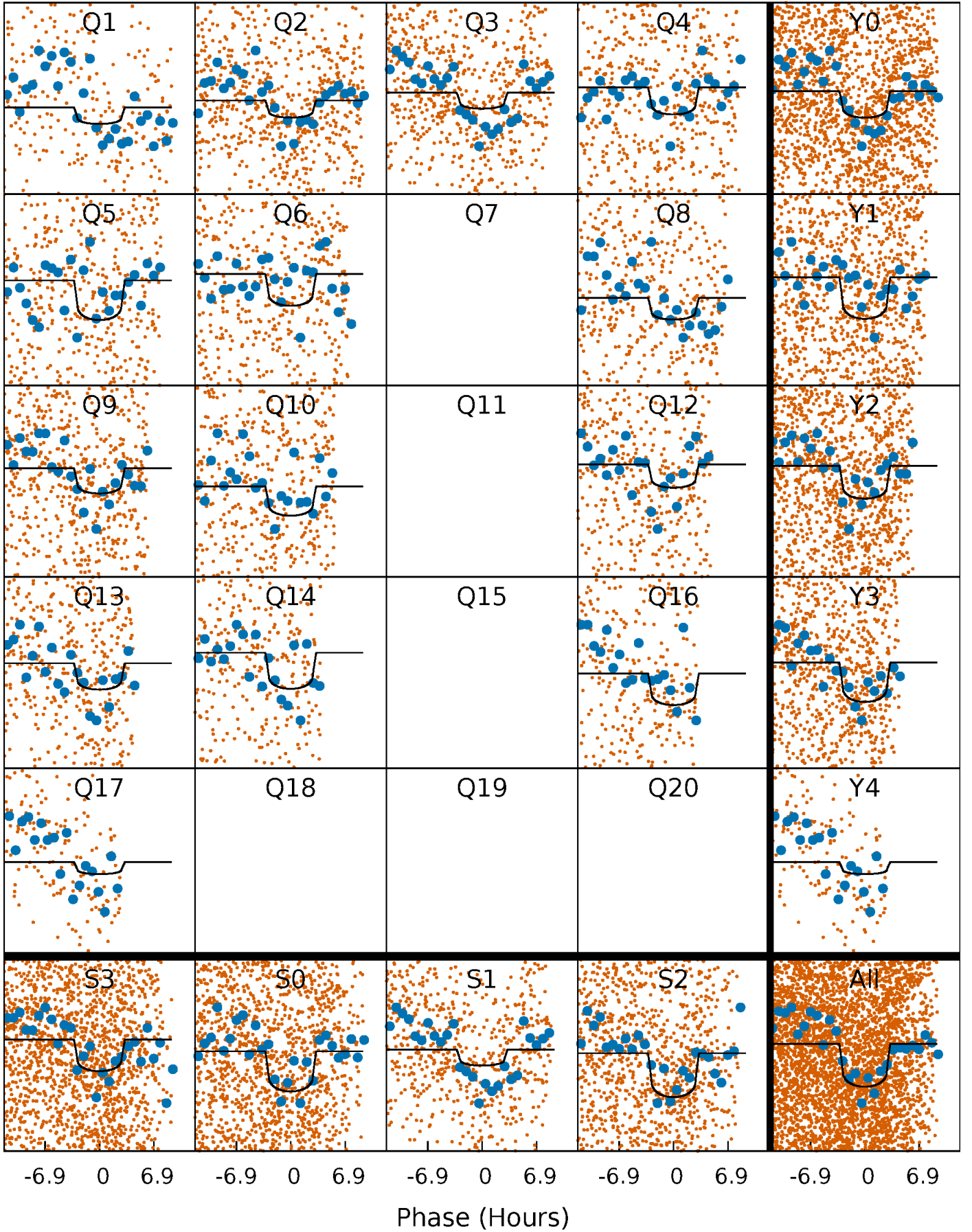
# PDC Quarter-Phased Transit Curves

TCE 009967129-02   P= 5.150835 Days    $T_0=136.118163$  (BKJD)



# DV Quarter-Phased Transit Curves

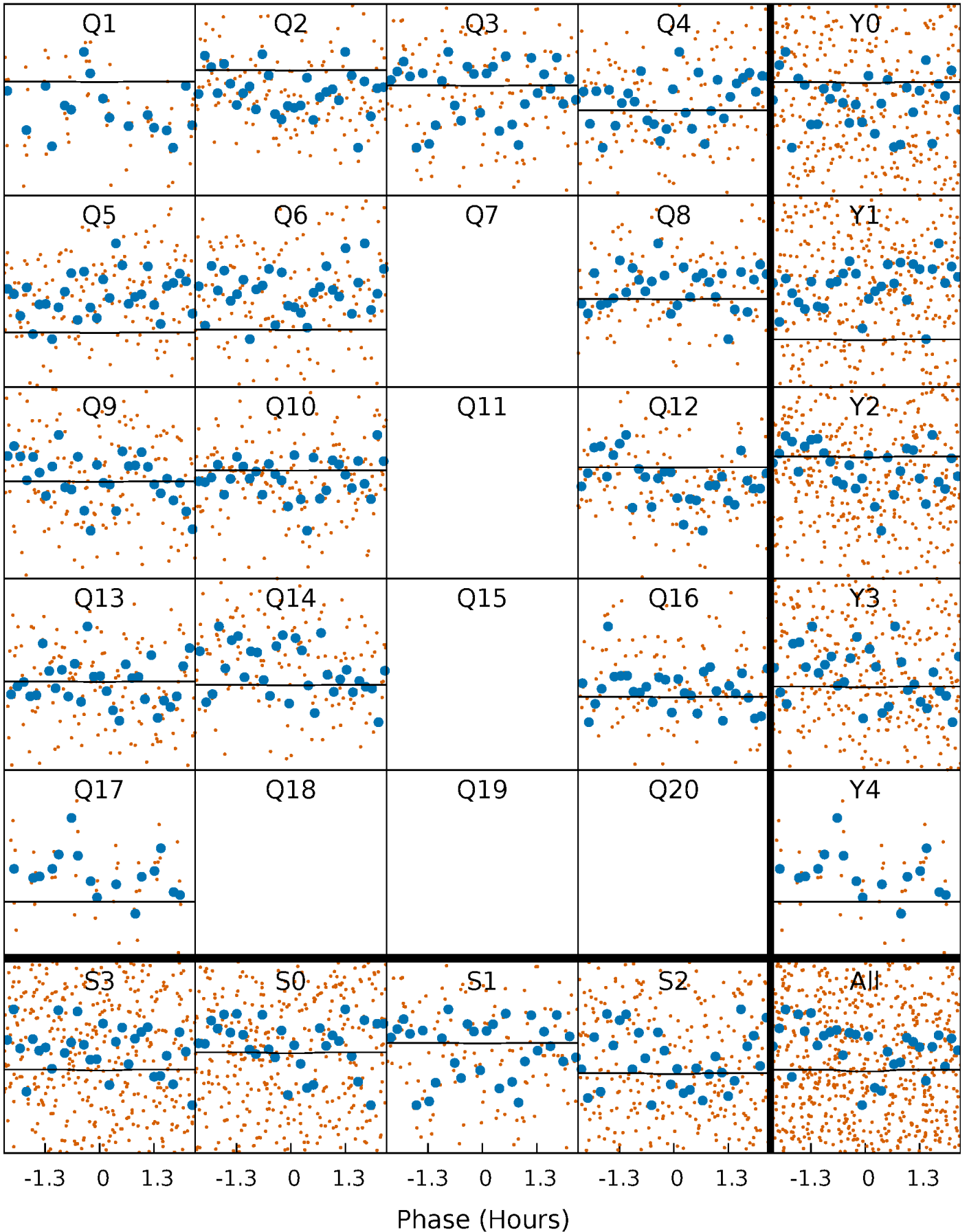
TCE 009967129-02 P= 5.150835 Days  $T_0=136.118163$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

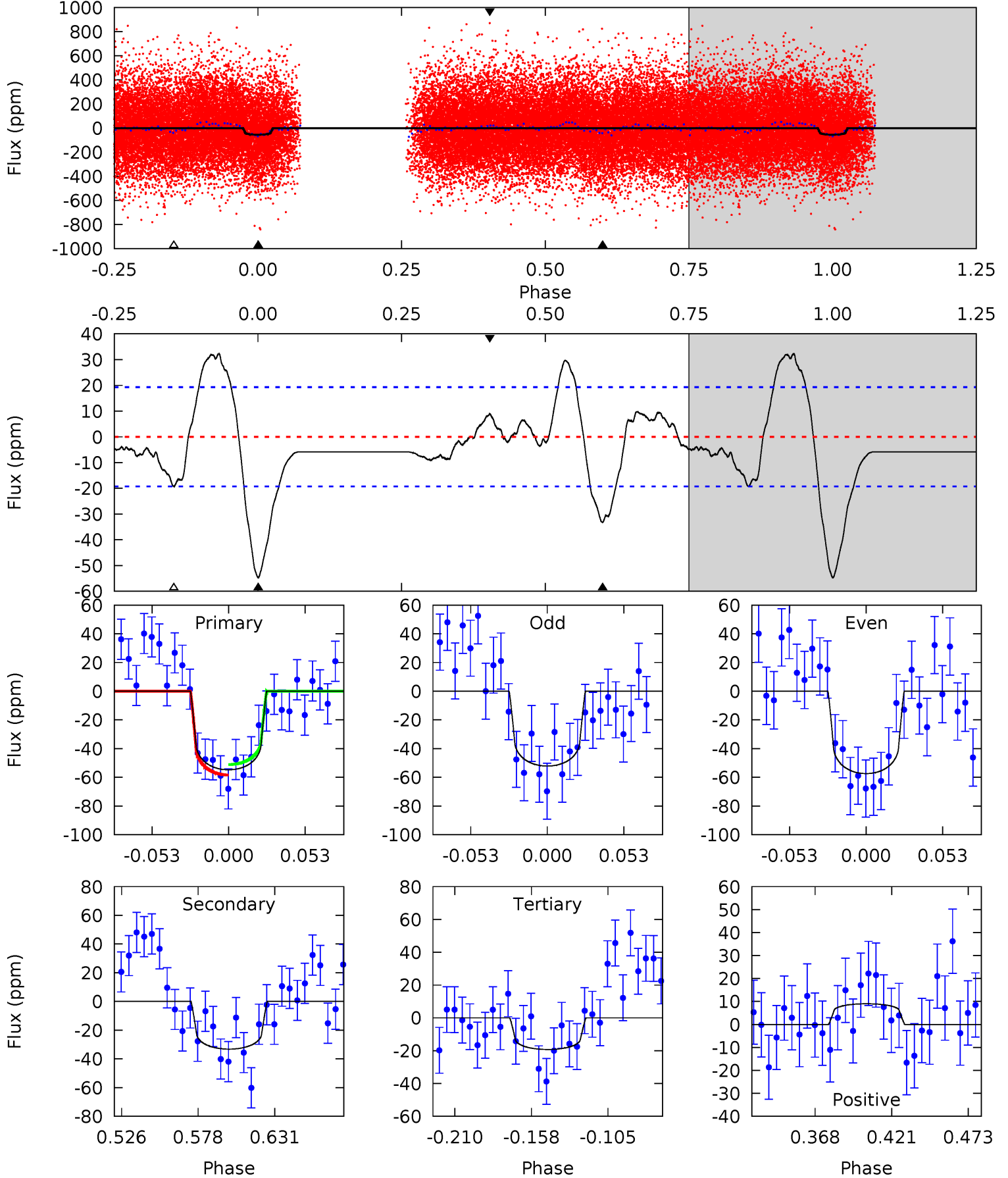
TCE 009967129-02 P= 5.150484 Days  $T_0=136.077636$  (BKJD)



# DV Model-Shift Uniqueness Test

009967129-02, P = 5.150835 Days, E = 130.967328 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
13.3	8.09	4.69	2.19	4.70	1.94	2.97	8.64	11.1	3.39	5.90	0.64	0.95	0.37	0.88

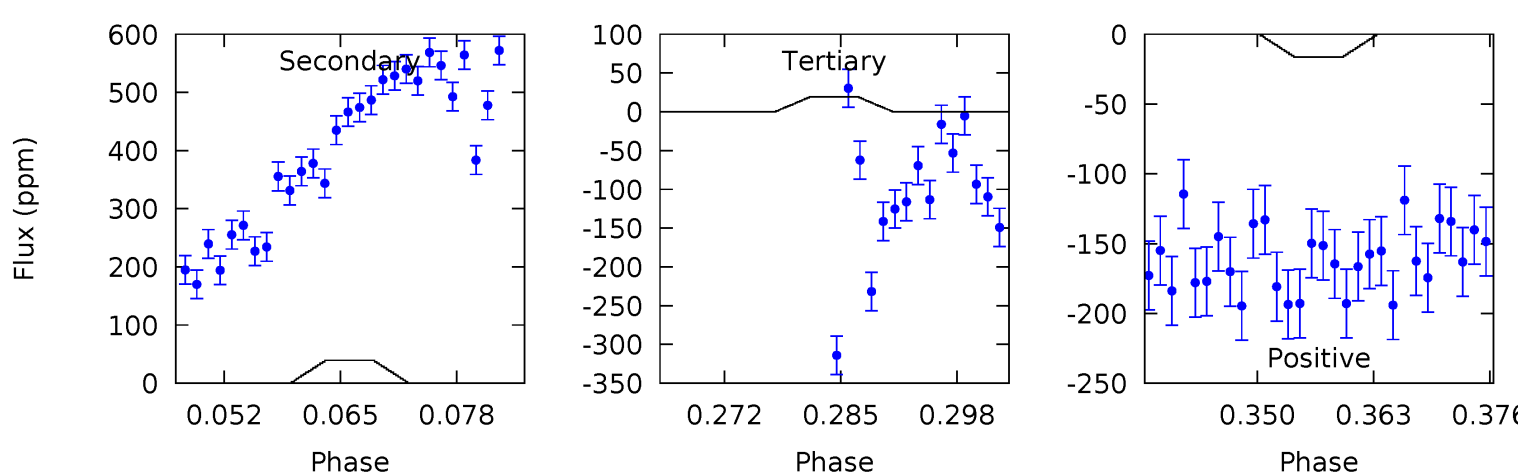
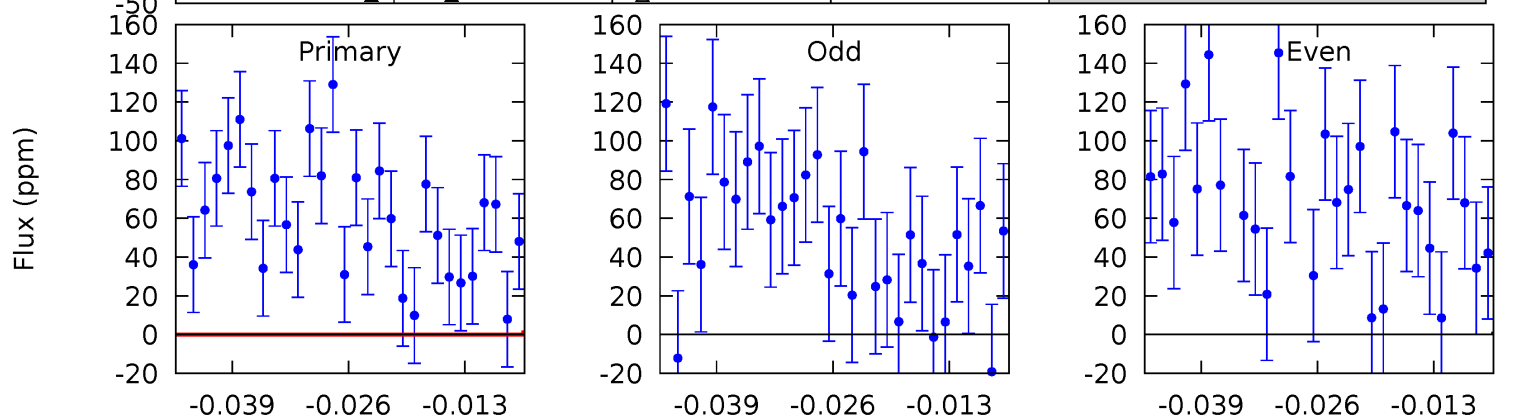
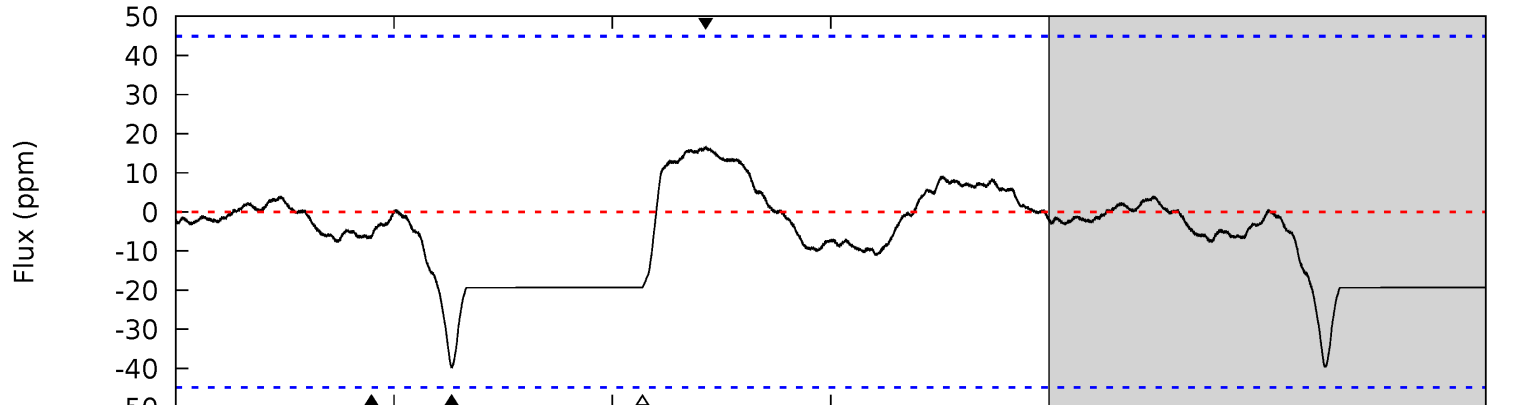
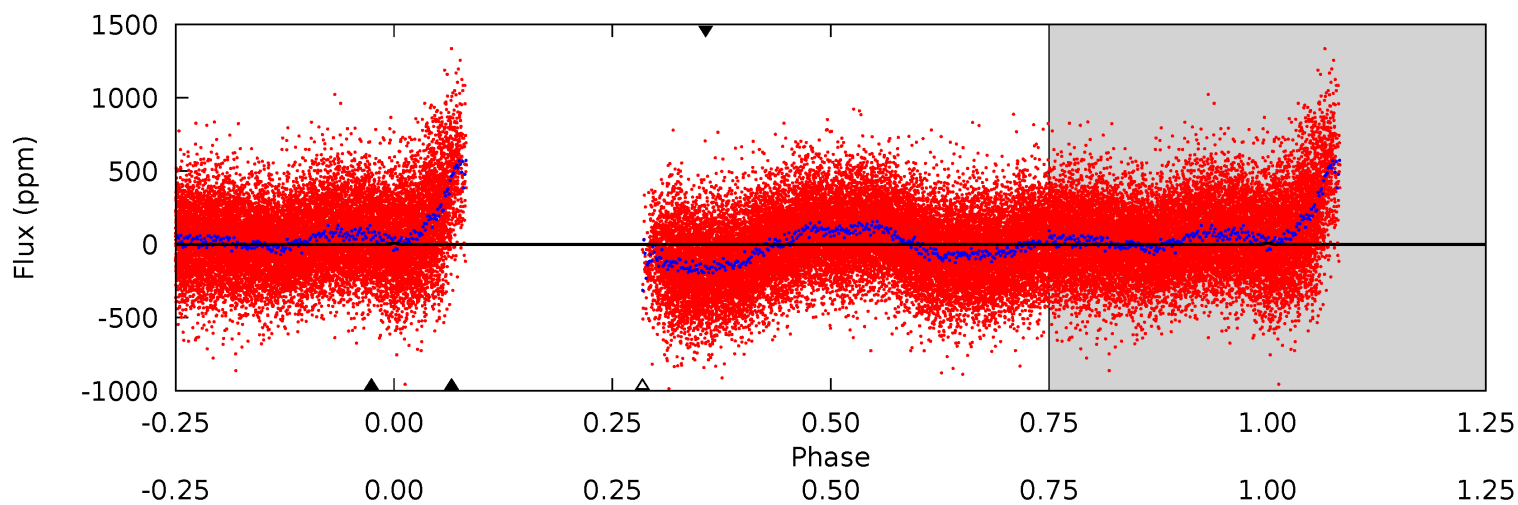




# Alt Model-Shift Uniqueness Test

009967129-02, P = 5.150484 Days, E = 130.927152 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
0.70	4.39	2.14	1.83	4.98	2.48	0.84	-1.44	-1.13	2.25	2.56	0.70	1.05	0.29	0.65



### Stellar Parameters For KIC 009967129

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6703^{+161}_{-222}$	$4.390^{+0.060}_{-0.180}$	$-0.340^{+0.250}_{-0.350}$	$1.136^{+0.318}_{-0.136}$	$1.158^{+0.153}_{-0.153}$	$1.114^{+0.356}_{-0.526}$
	+2%/-3%	+1%/-4%	+74%/-103%	+28%/-12%	+13%/-13%	+32%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009967129-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-33 \pm 4$	$0.93^{+0.36}_{-0.30}$	$1800^{+118}_{-79}$	$5918^{+1372}_{-845}$	$78^{+95}_{-39}$
Alt.	$-40 \pm 9$	$0.29^{+0.27}_{-0.19}$	$1809^{+116}_{-83}$	$13467^{+37564}_{-5233}$	$915^{+7077}_{-671}$

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

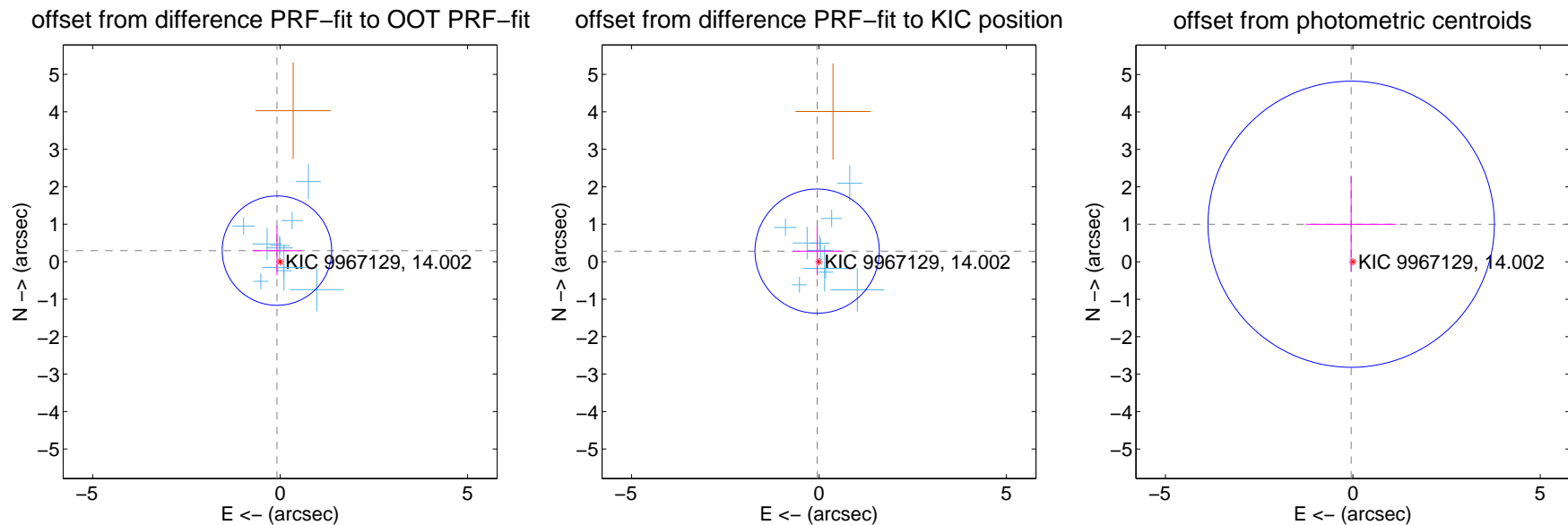
## DV Centroid Data

Supplemental centroid analysis for 009967129-02. Kepler magnitude: 14.00. Transit SNR 8.66

There are 10 quarters with good PRF difference image offsets

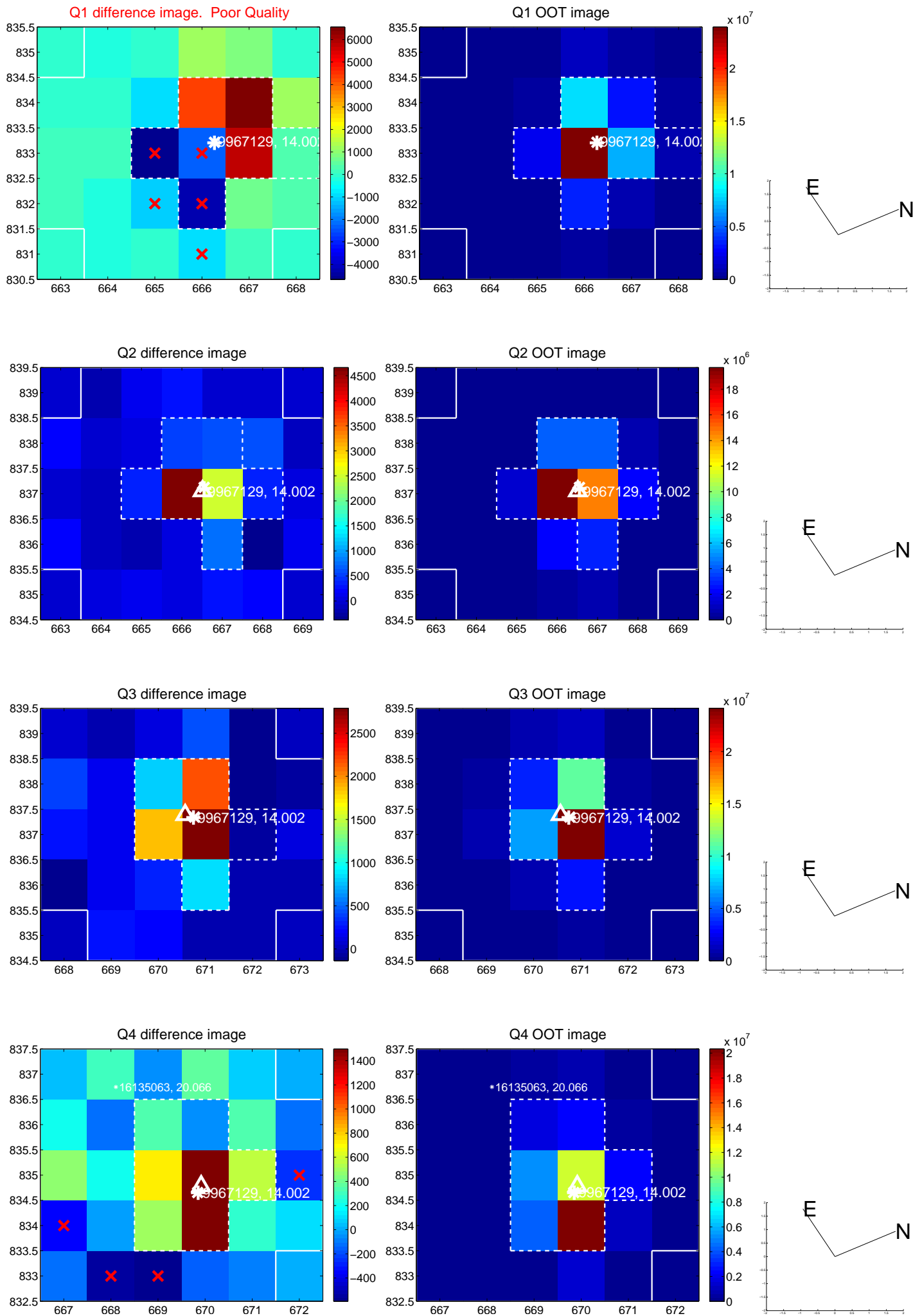
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.307 \pm 0.487$	0.63	$0.085 \pm 0.650$	$0.295 \pm 0.656$
PRF-fit source offset from KIC position	$0.286 \pm 0.552$	0.52	$0.049 \pm 0.652$	$0.282 \pm 0.648$
photometric centroid source offset	$1.00 \pm 1.27$	0.79	$0.04 \pm 1.21$	$1.00 \pm 1.27$

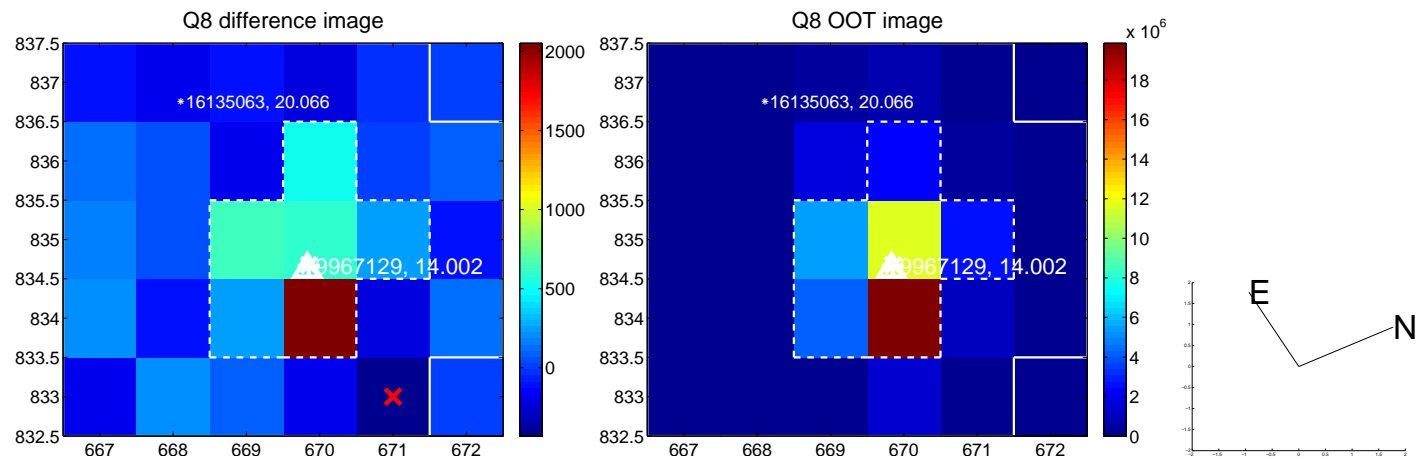
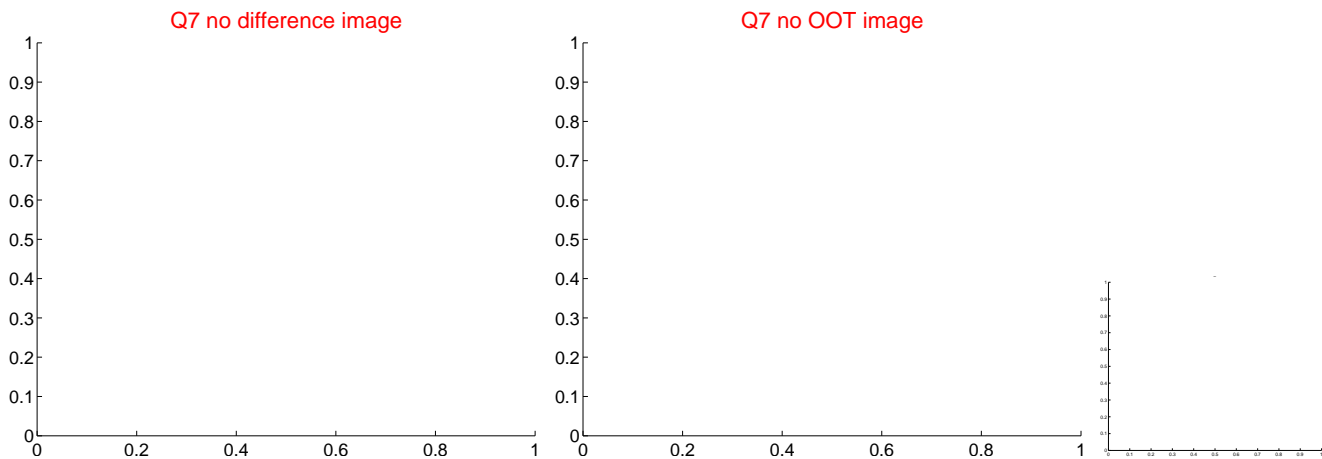
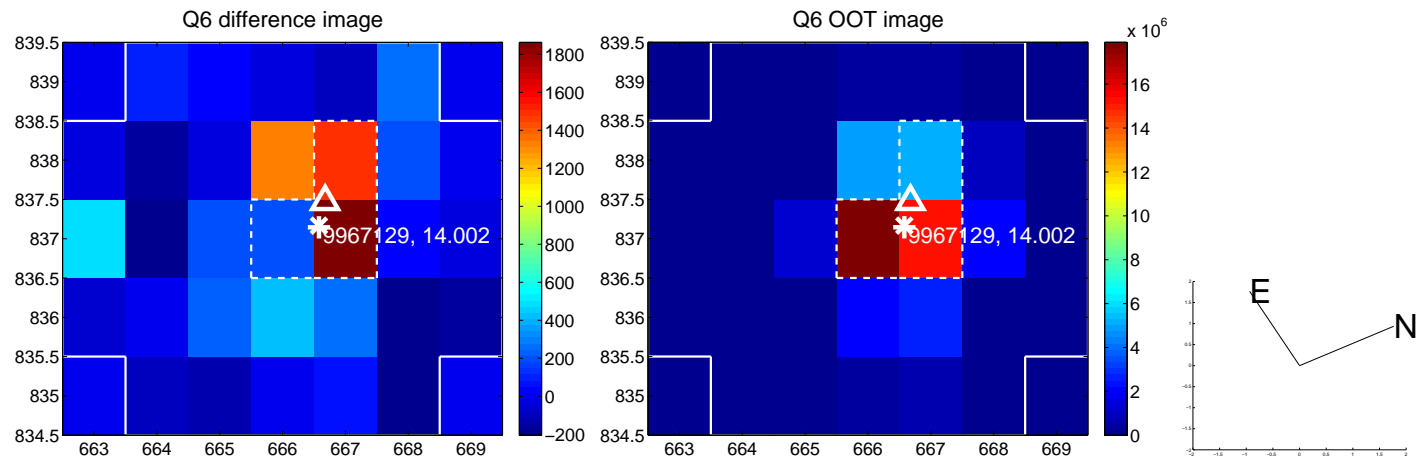
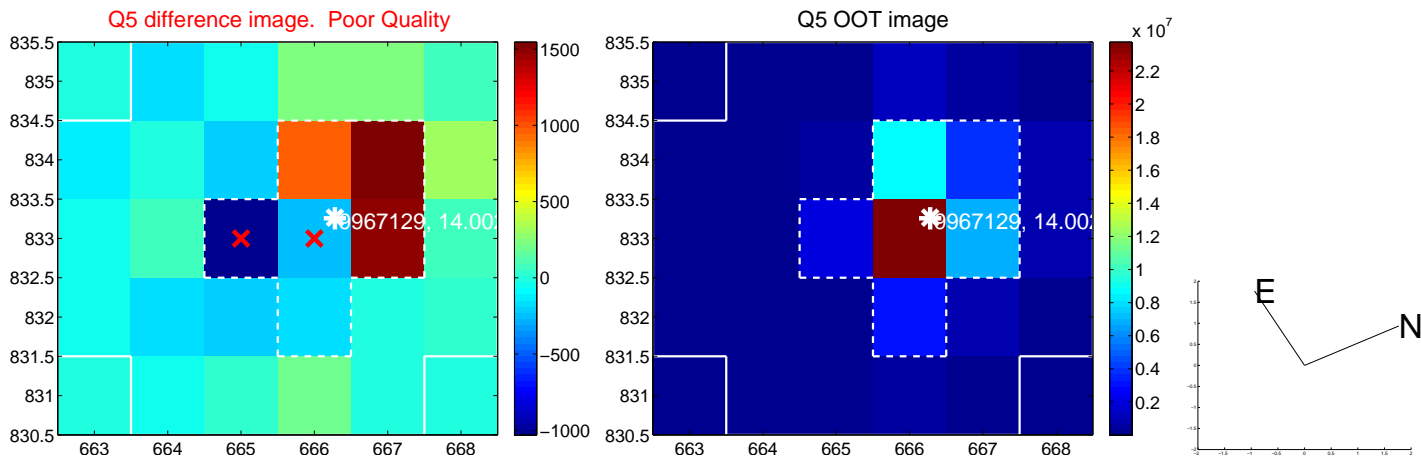


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

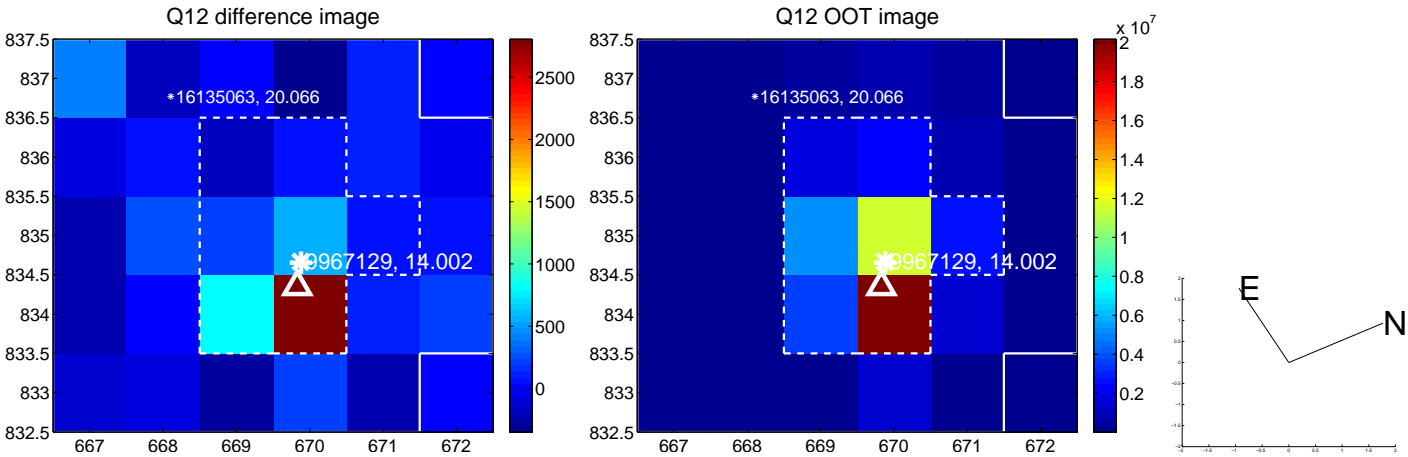
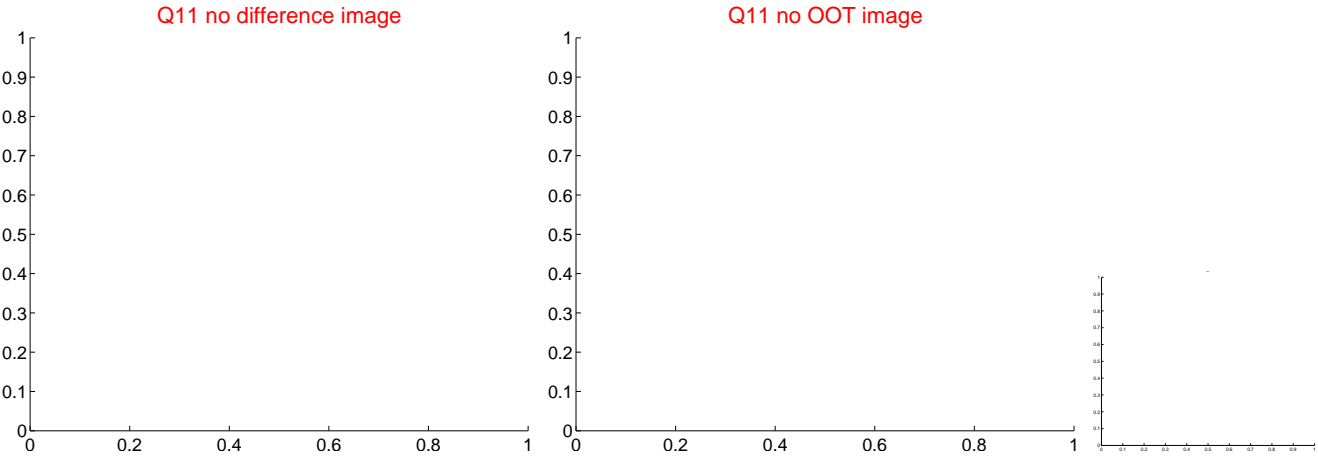
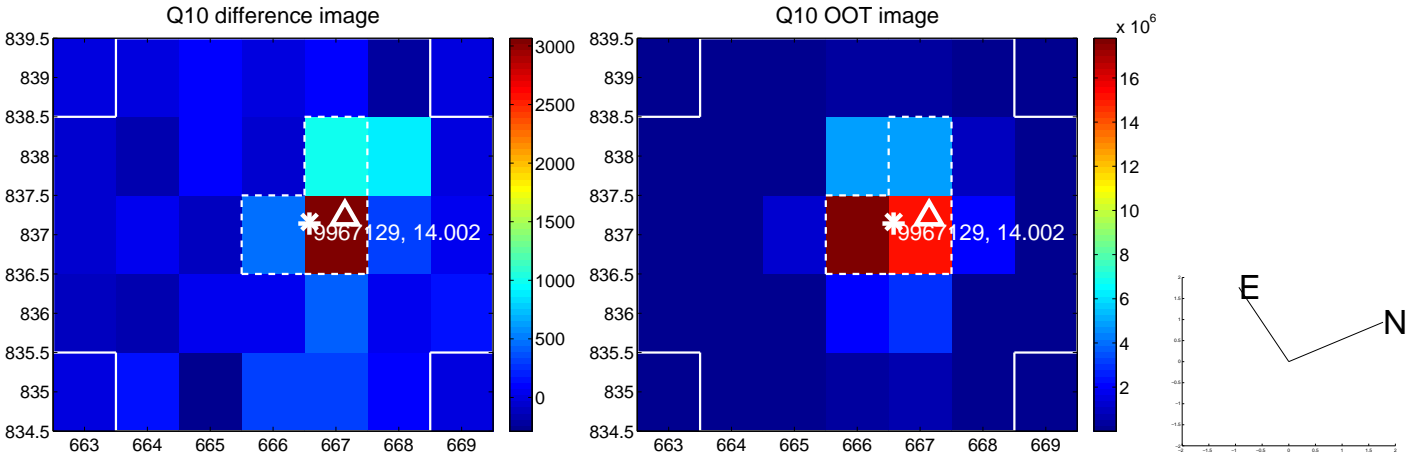
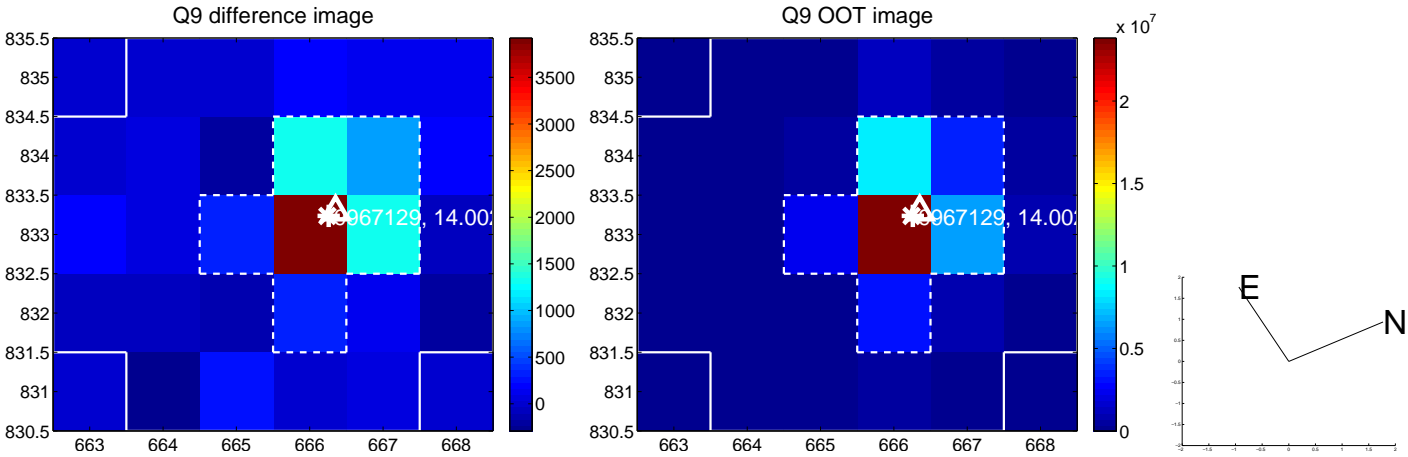
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



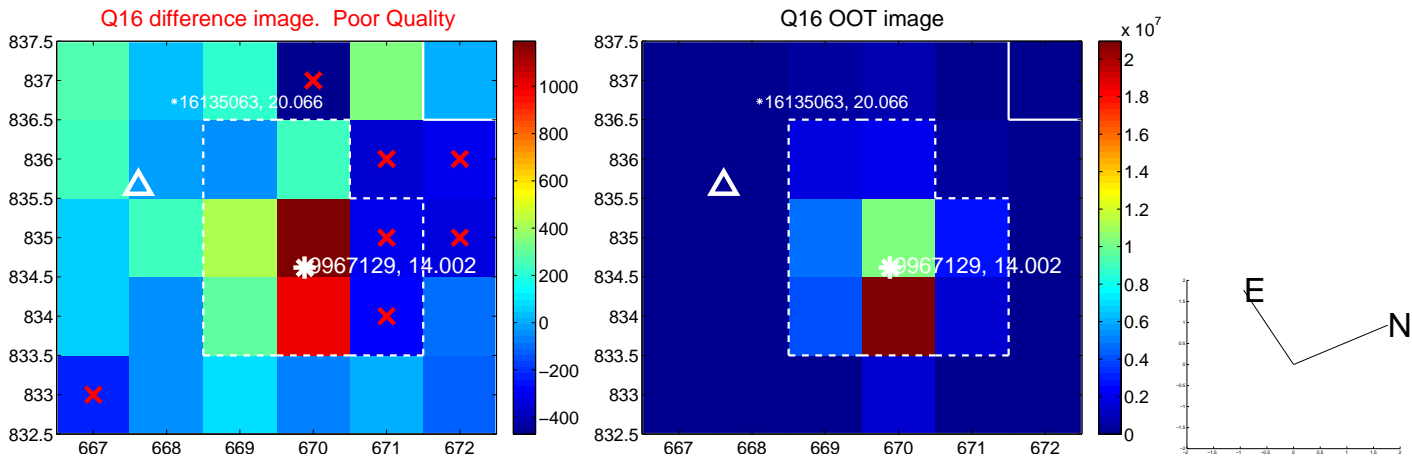
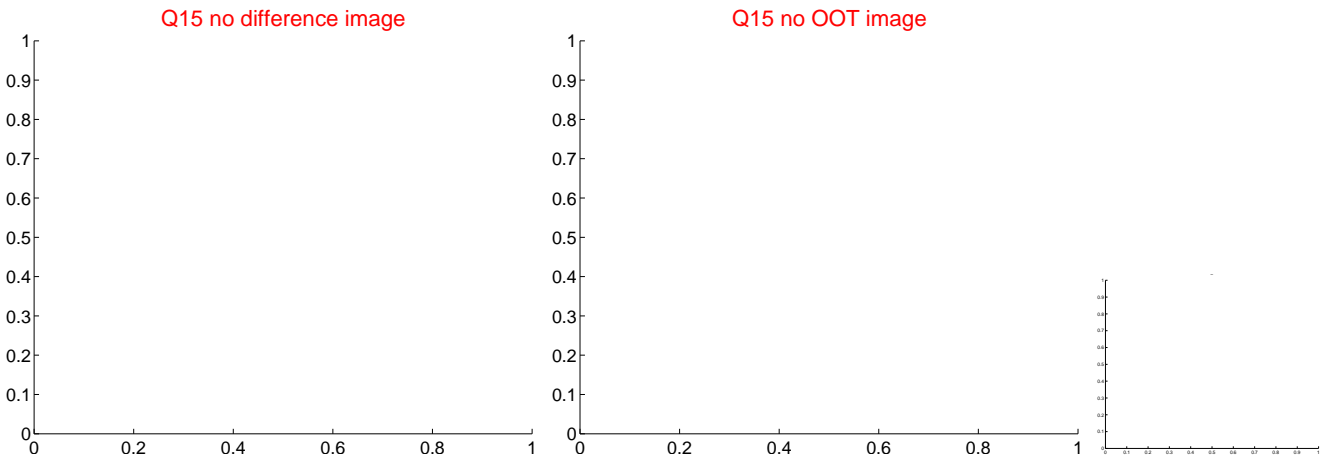
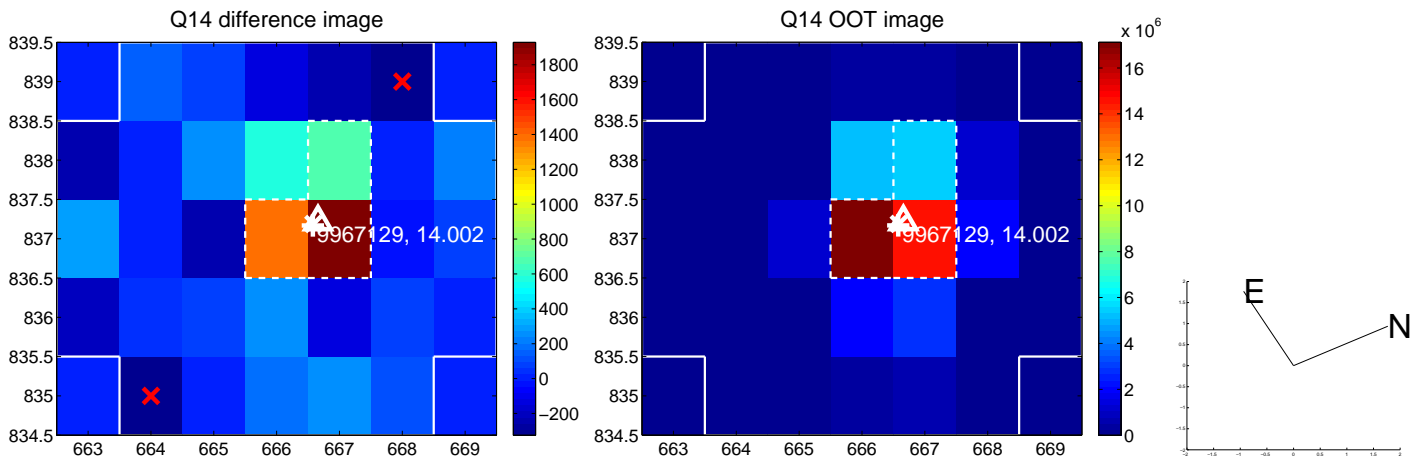
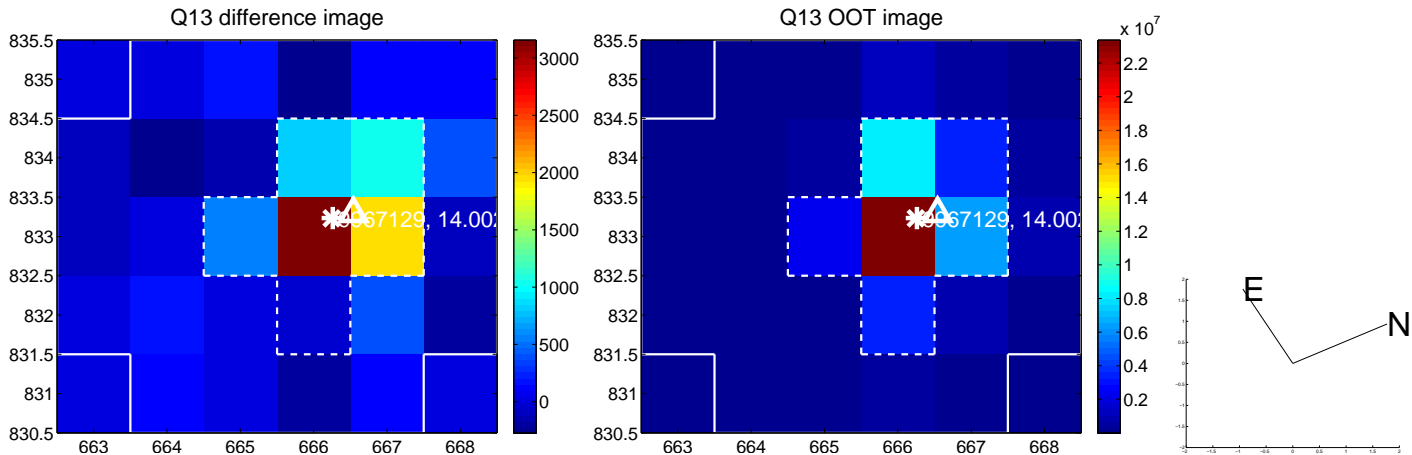
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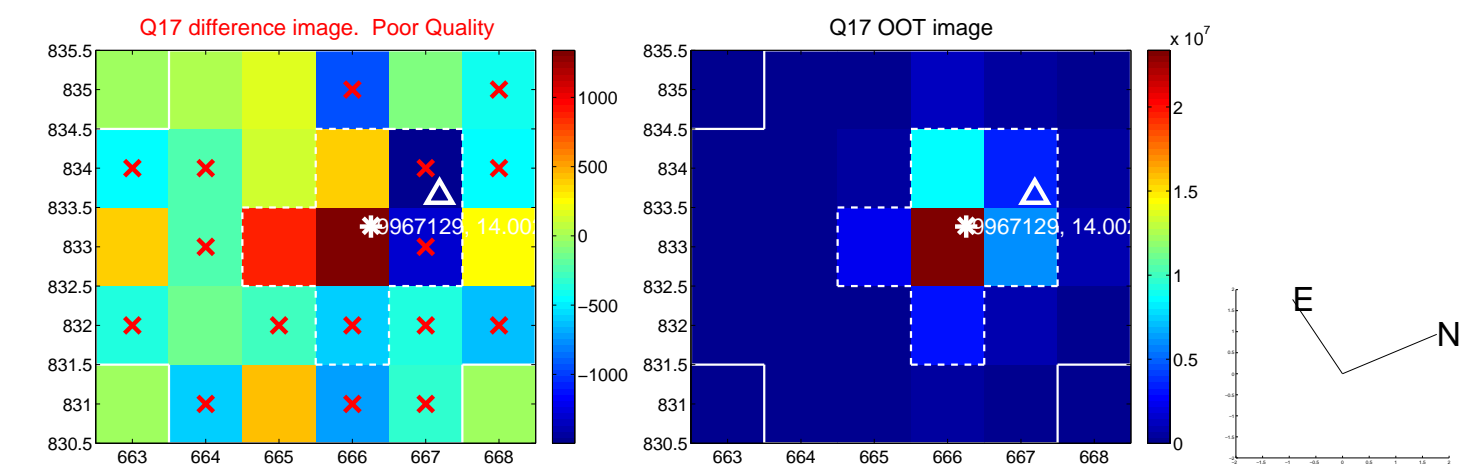


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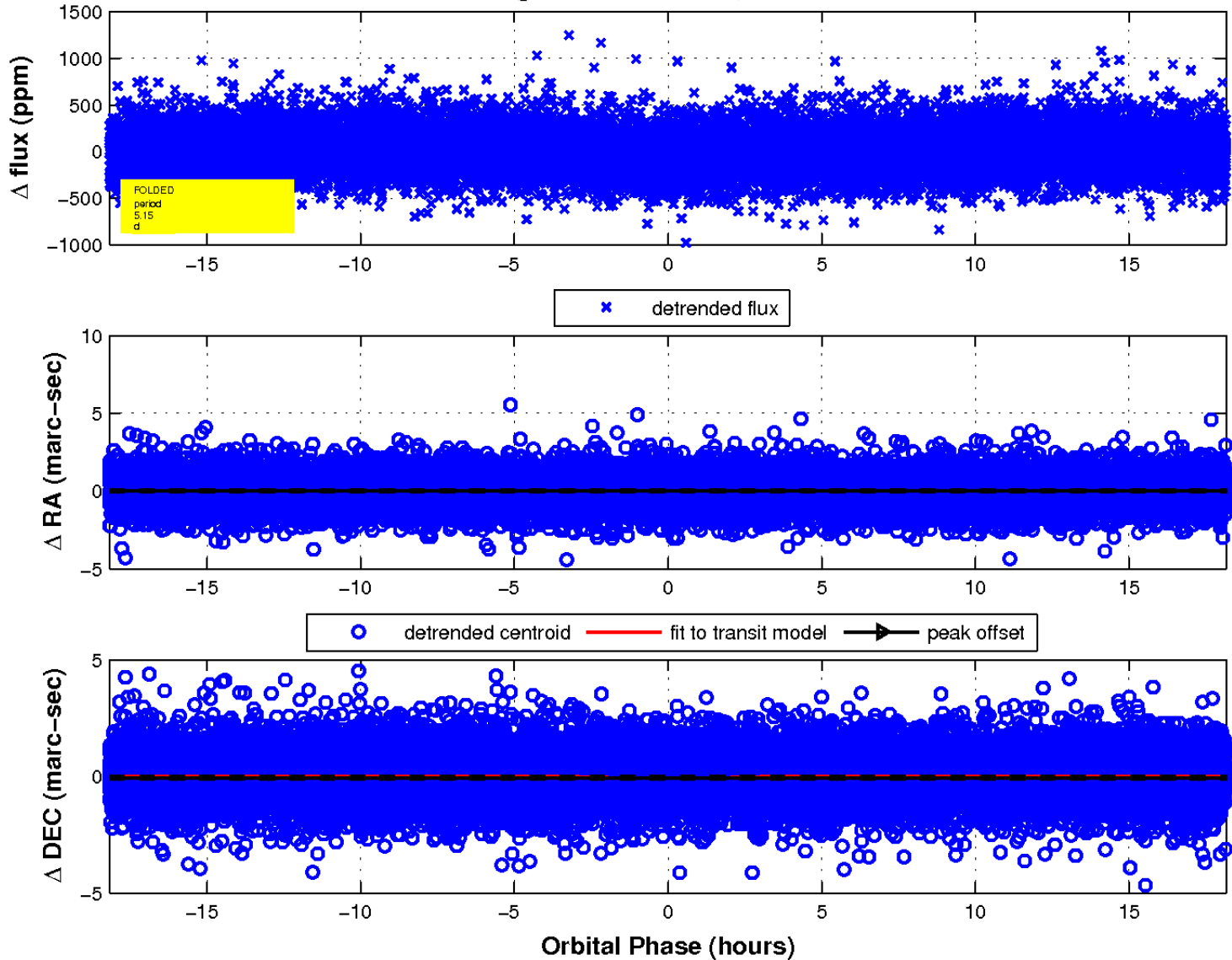




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

