

# KIC 010879656

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010879656-01	OBS	1642.01	0.729716	132.071007	92.7	1.608	13.4	14.5	0.64	5220	0.74	1482.73
010879656-02	OBS	No	0.729714	131.707438	71.7	1.415	11.3	10.7	0.64	5220	0.65	1482.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010879656-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
010879656-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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 010879656-01

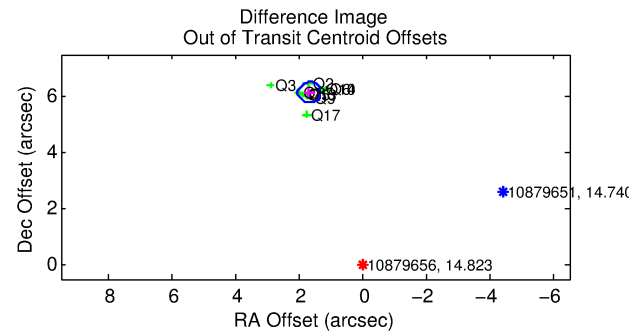
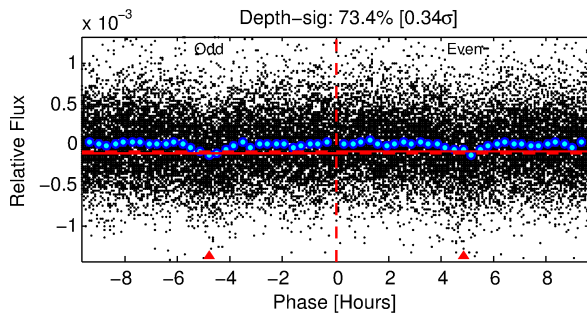
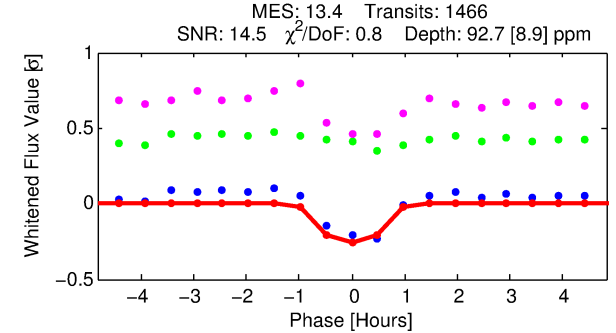
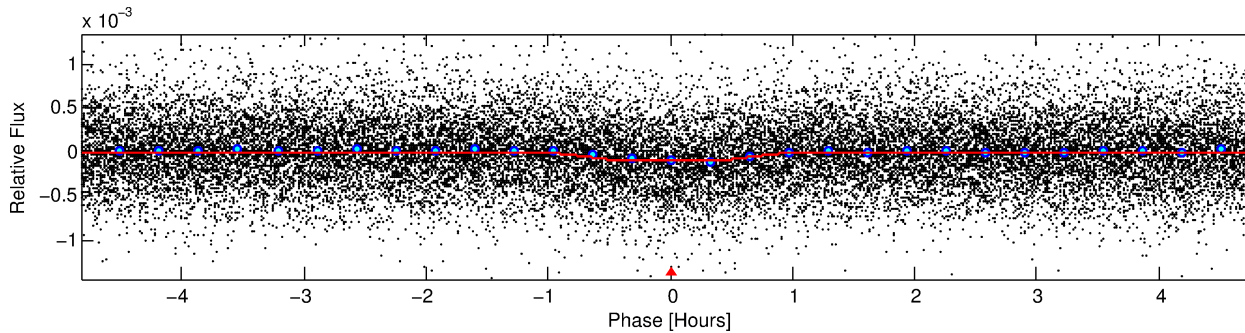
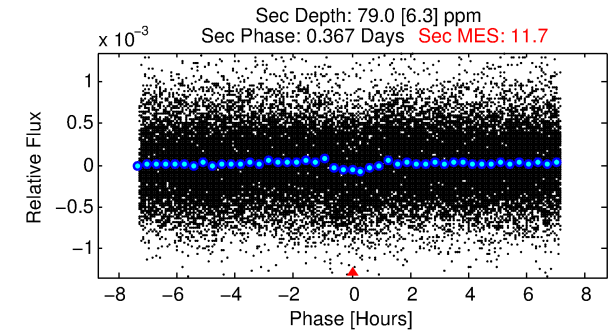
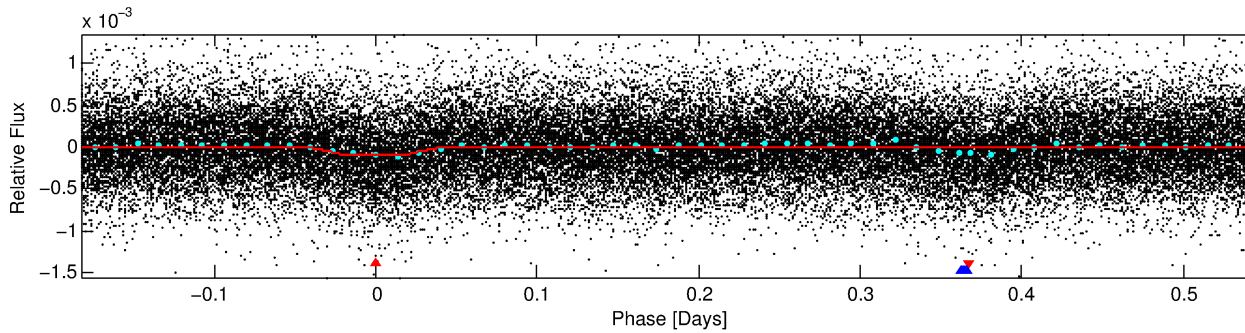
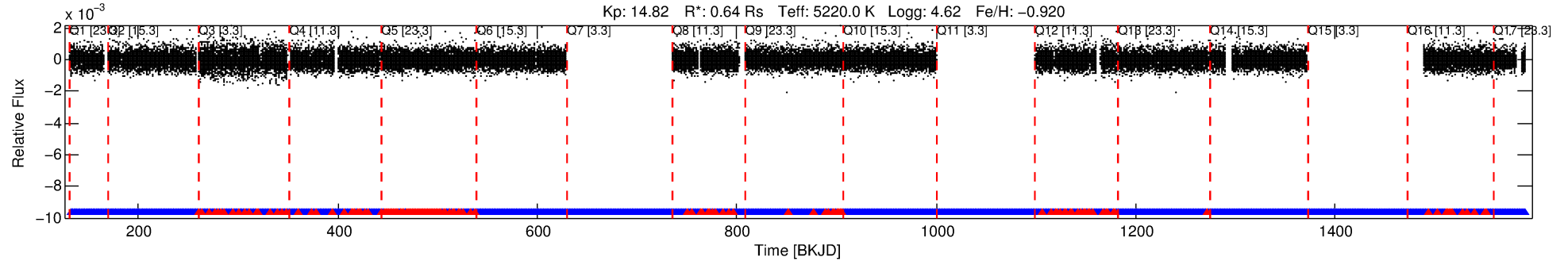
No Significant Match Found

# DV One-Page Summary

KIC: 10879656 Candidate: 1 of 2 Period: 0.730 d

KOI: K01642 Corr: No Ephemeris Match

Kp: 14.82 R\*: 0.64 Rs Teff: 5220.0 K Logg: 4.62 Fe/H: -0.920



## DV Fit Results:

Period = 0.72972 [0.00001] d  
Epoch = 132.0710 [0.0016] BKJD  
Rp/R\* = 0.0106 [0.0053]  
a/R\* = 1.83 [2.97]  
b = 0.90 [0.48]  
Seff = 1482.73 [257.12]  
Teff = 1582 [69] K  
Rp = 0.74 [0.38] Re  
a = 0.0136 [0.0011] AU  
Ag = 14.62 [14.77] [0.92σ]  
Teffp = 4784 [1208] K [2.65σ]

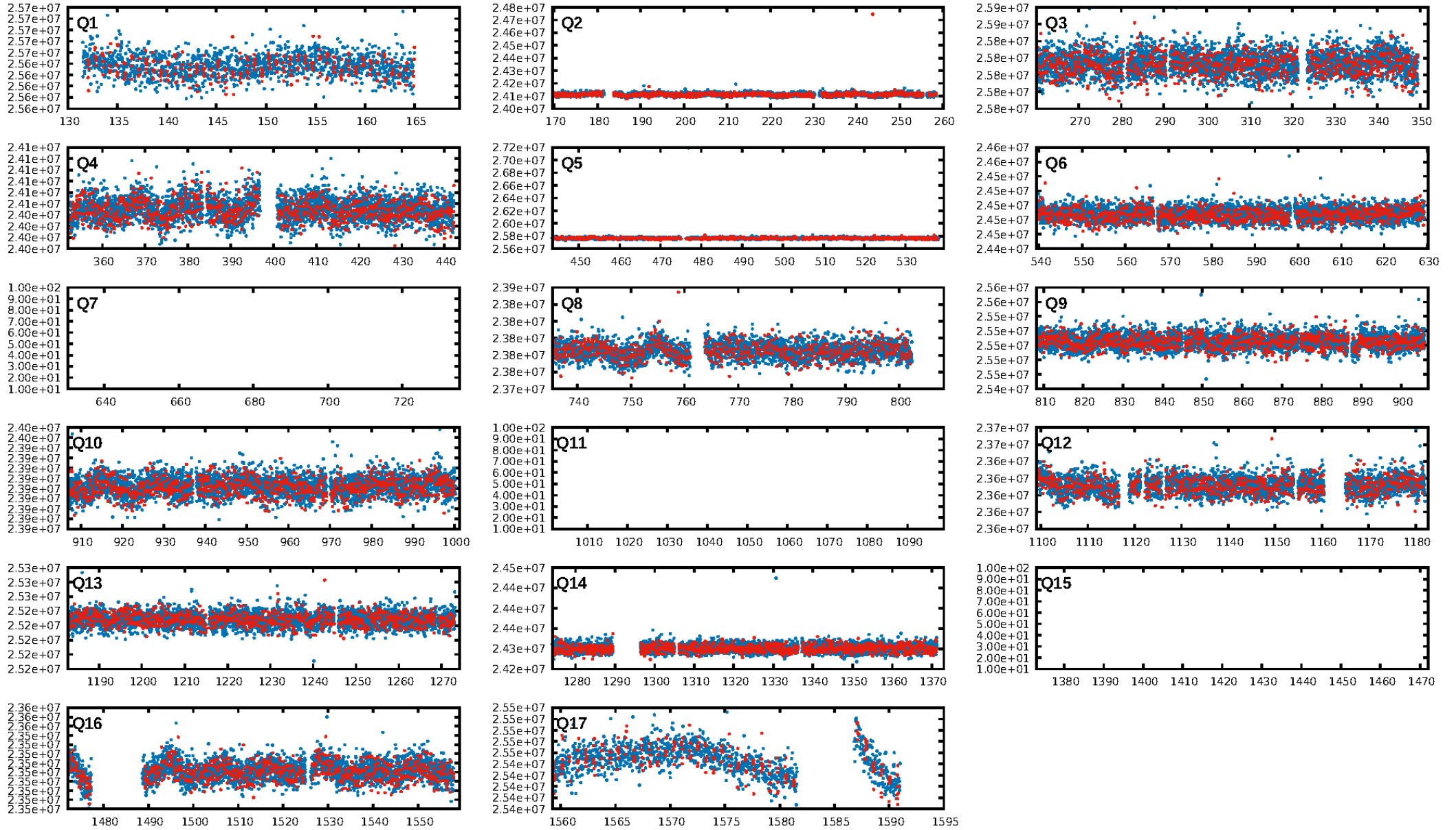
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.40e-44  
RollingBand-fgt: 0.88 [1212/1383]  
GhostDiagnostic-chr: -1.399  
Centroid-sig: 0.0%  
Centroid-so: 7.745 arcsec [7.39σ]  
OotOffset-rm: 6.375 arcsec [52.62σ]  
KicOffset-rm: 6.602 arcsec [61.40σ]  
OotOffset-st: 4/1/0/5 [10]  
KicOffset-st: 4/1/0/5 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 1.00 [14/14]

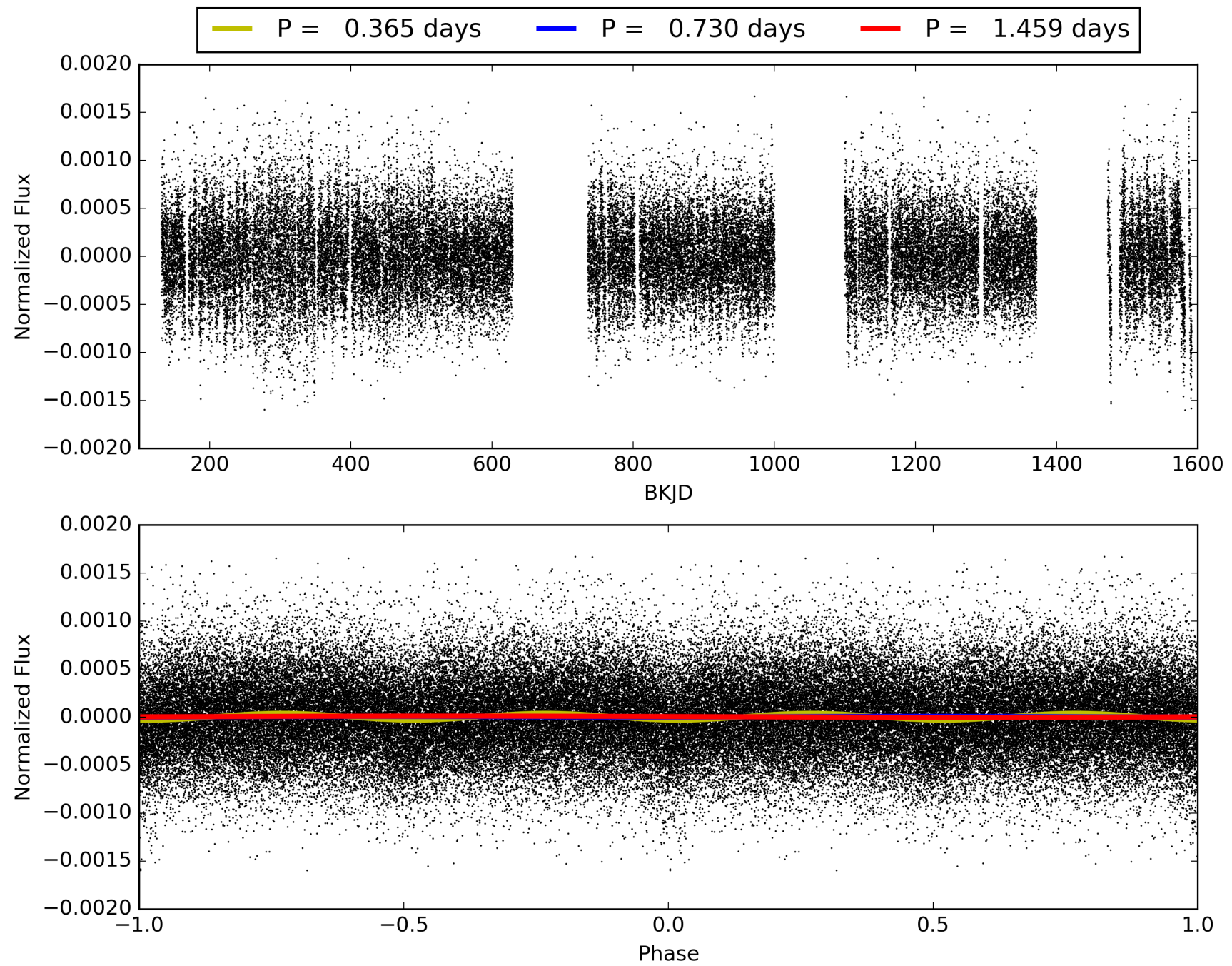
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:59:10 Z

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

# TCE 010879656-01, PDC Light Curves

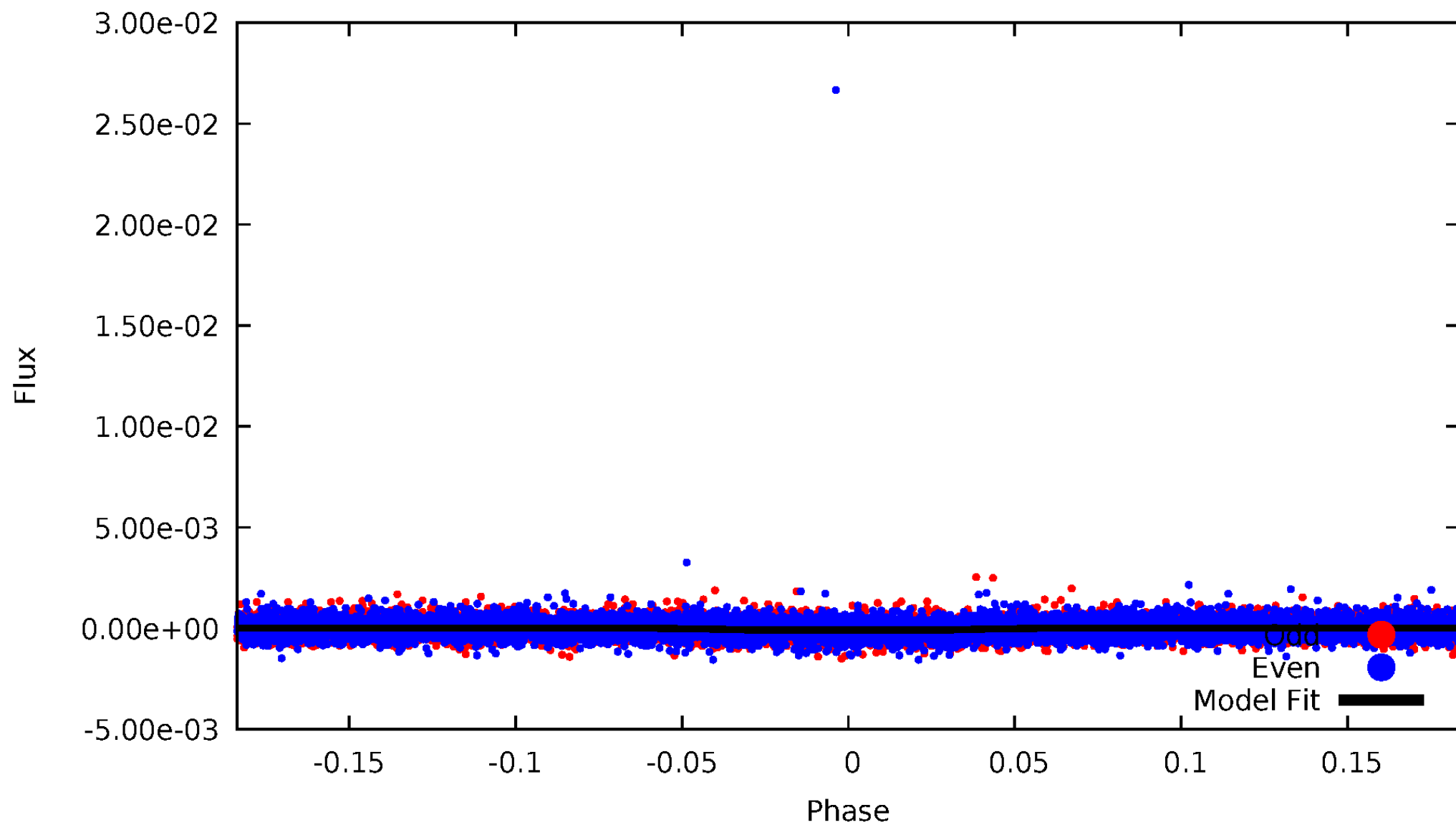


TCE 010879656-01



# DV Odd/Even

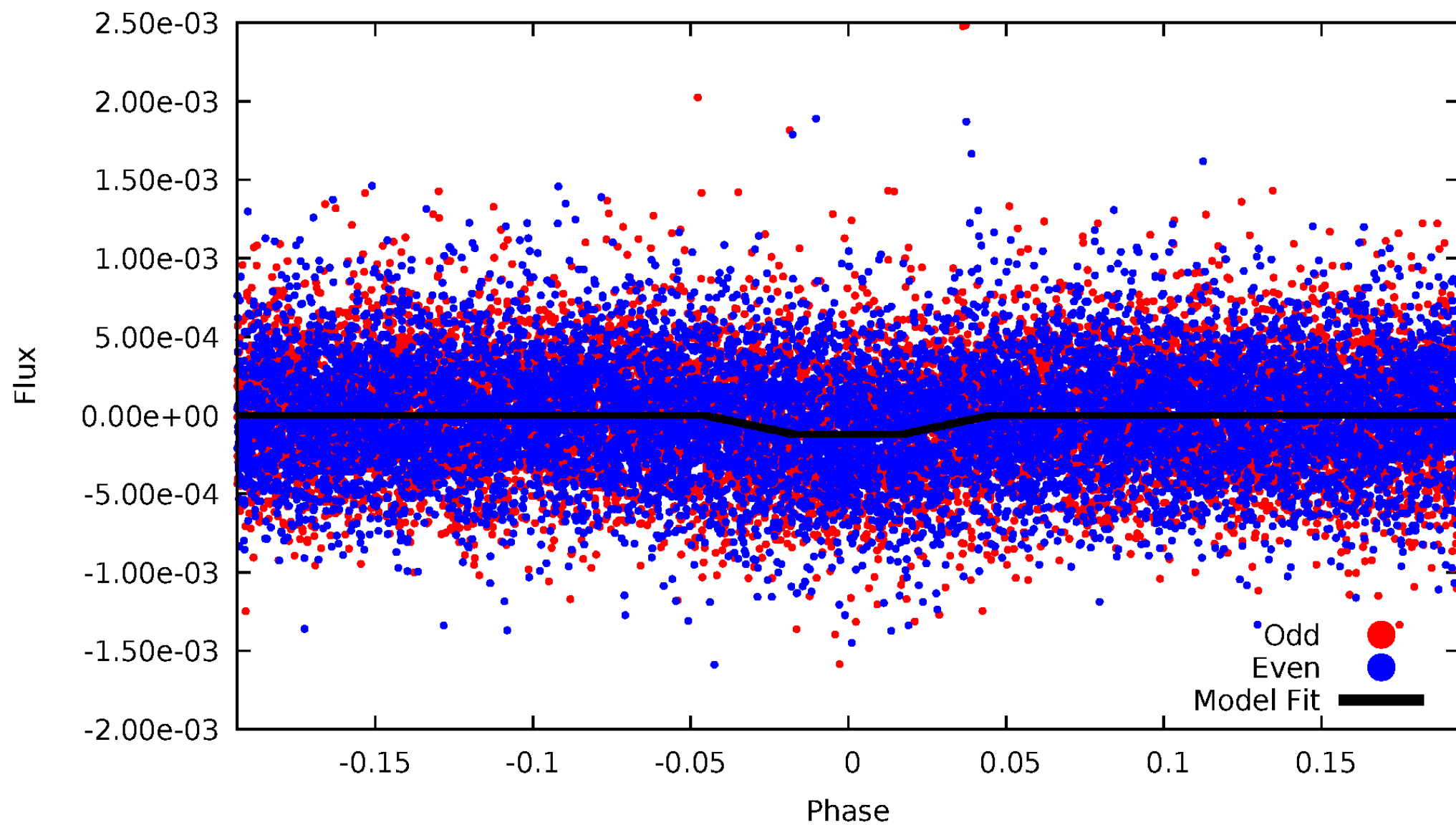
TCE 010879656-01





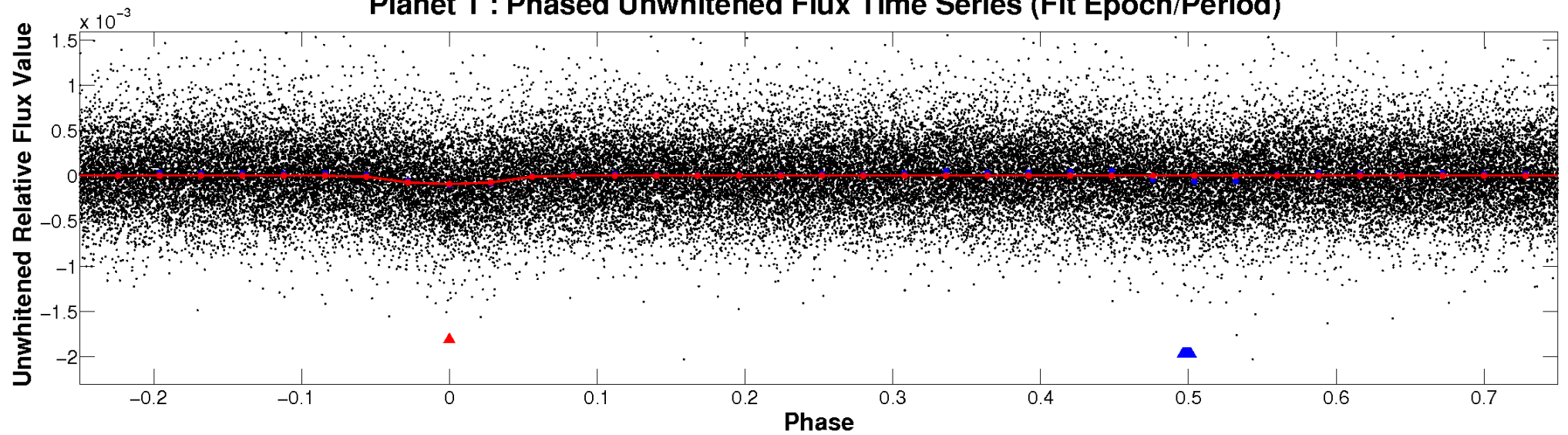
# ALT Odd/Even

TCE 010879656-01

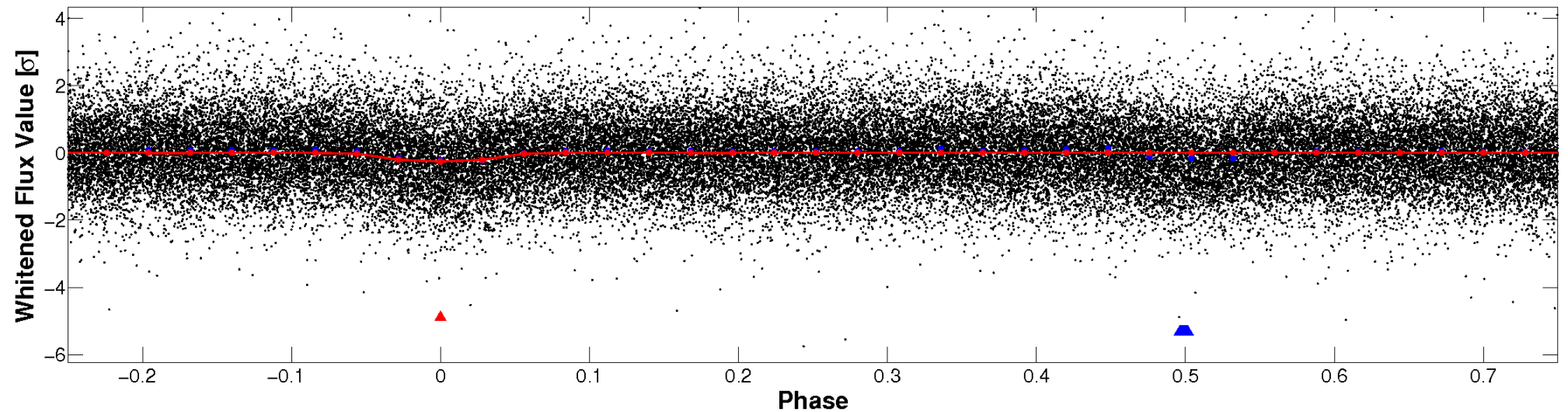


# Non-Whitened Vs. Whitened Light Curve

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

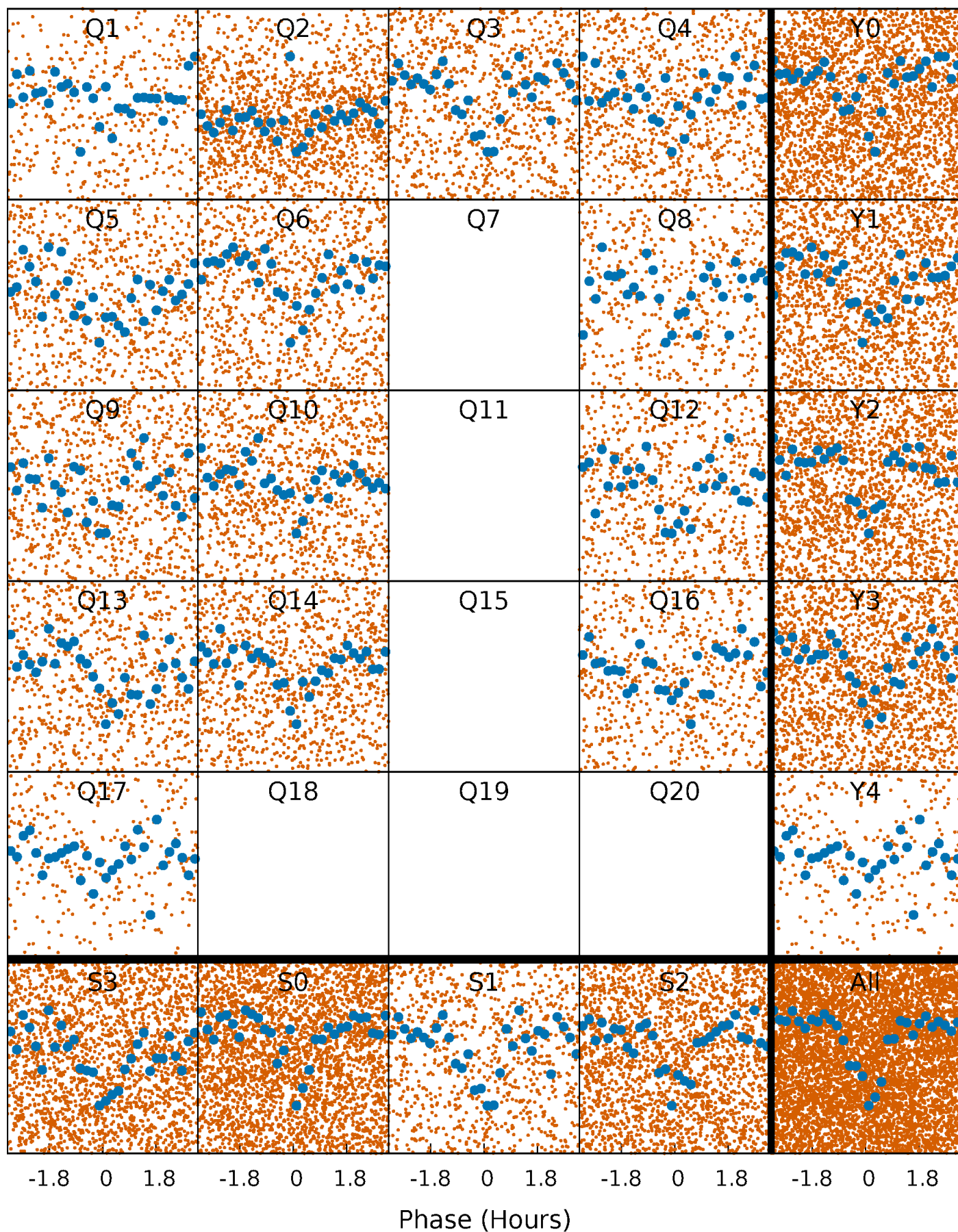


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

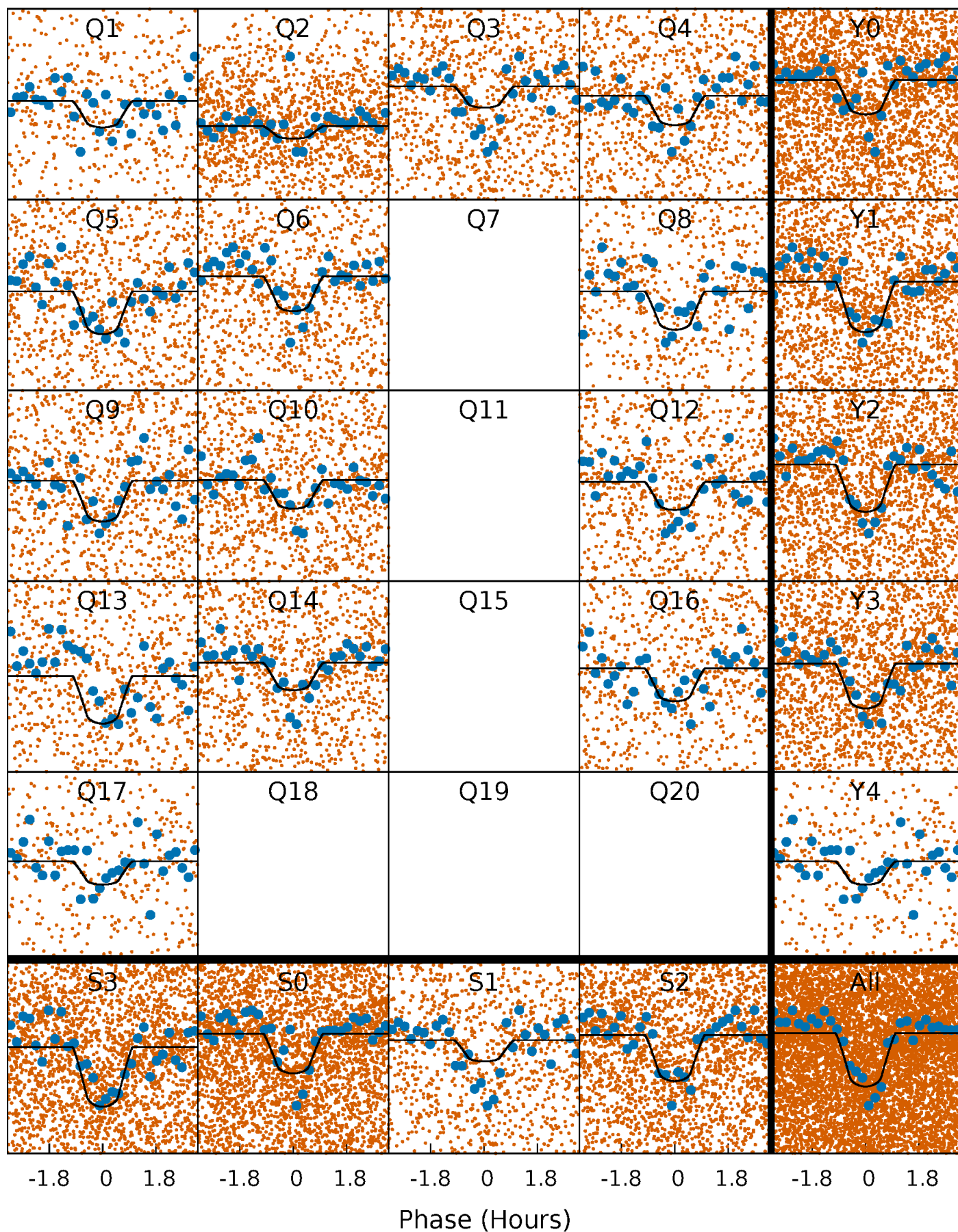
TCE 010879656-01 P= 0.729716 Days  $T_0=132.071007$  (BKJD)





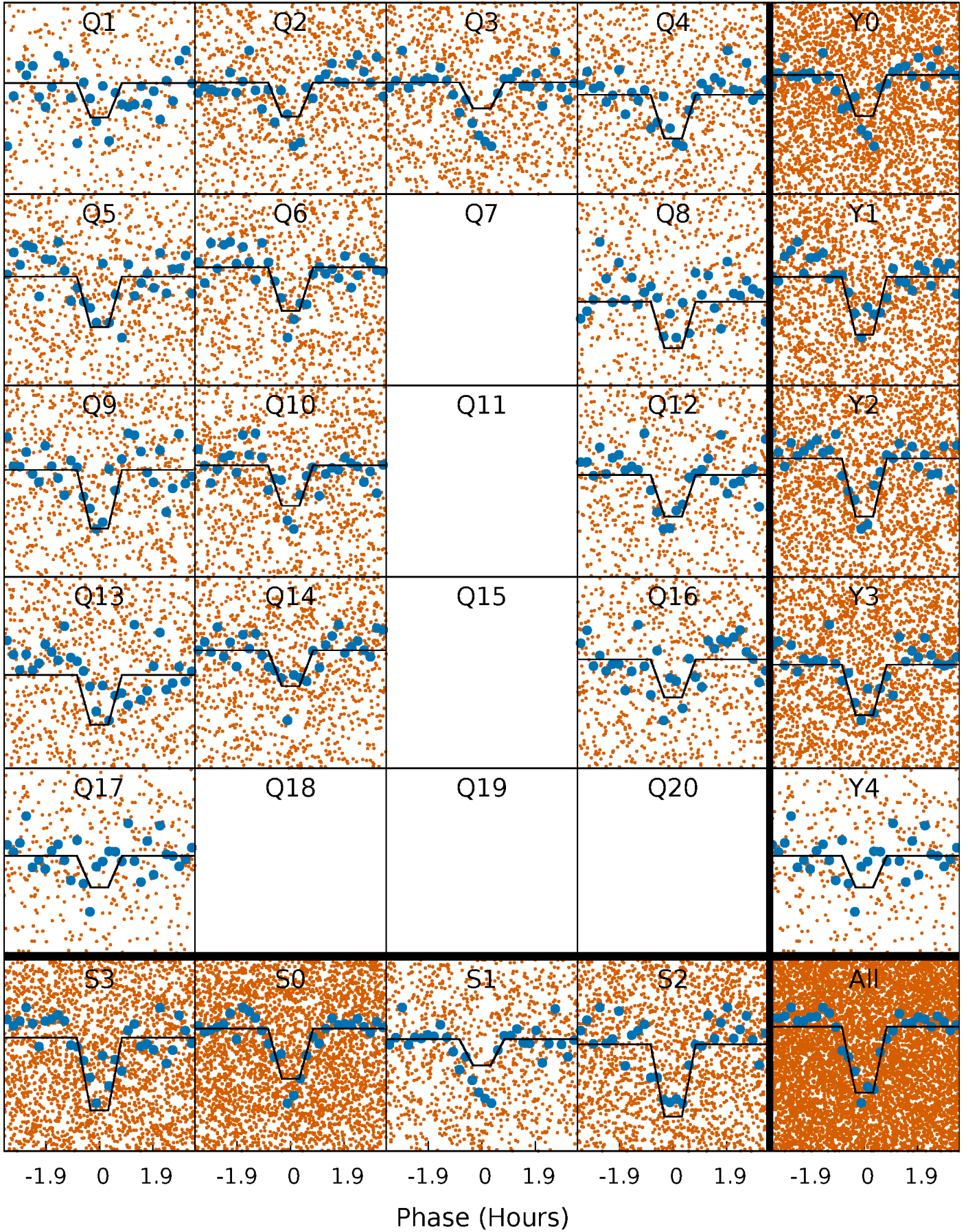
# DV Quarter-Phased Transit Curves

TCE 010879656-01 P= 0.729716 Days  $T_0=132.071007$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

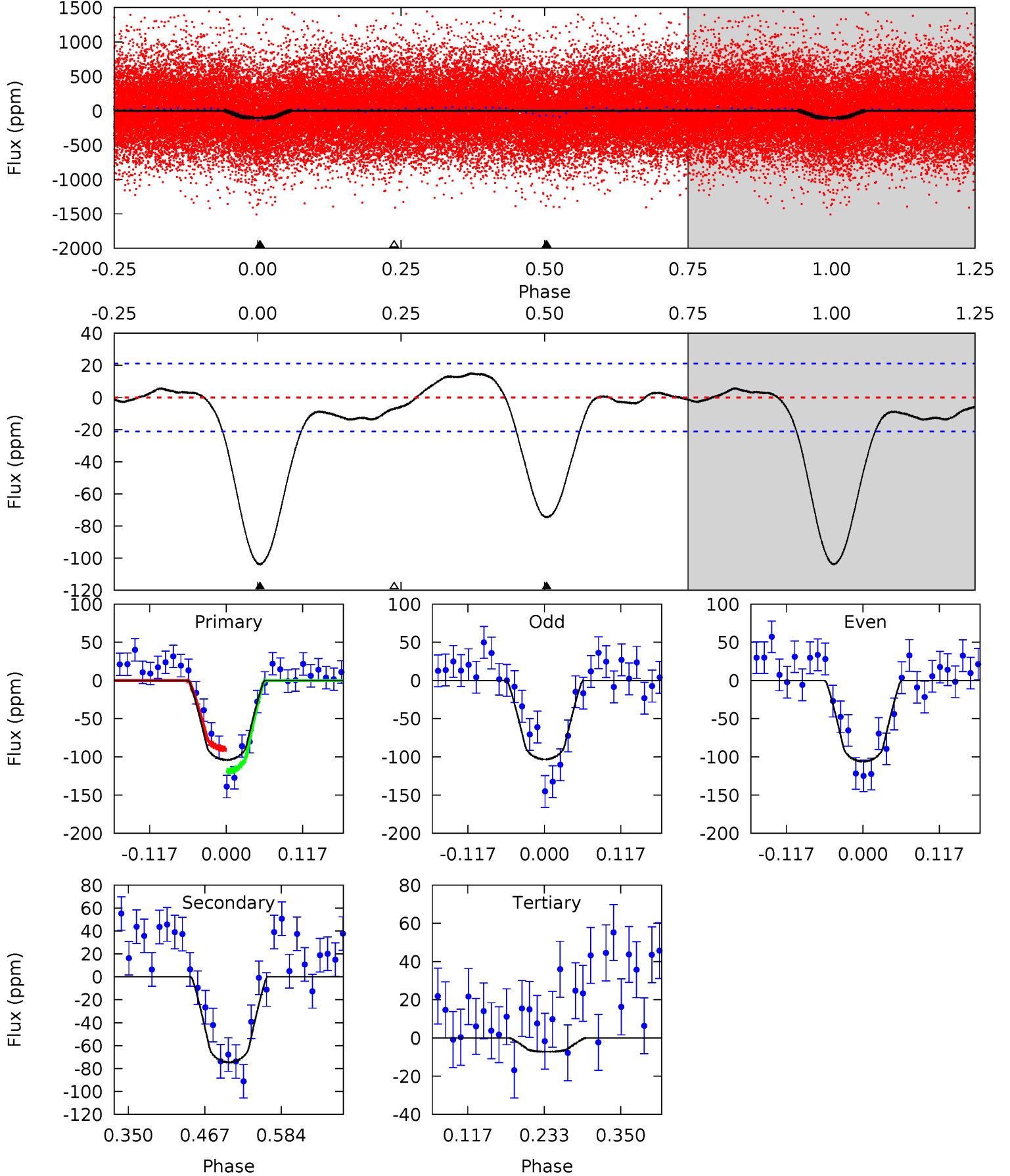
TCE 010879656-01 P= 0.729720 Days  $T_0=132.071637$  (BKJD)



# DV Model-Shift Uniqueness Test

010879656-01, P = 0.729716 Days, E = 131.341291 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.3	16.0	1.54	0	4.53	1.57	1.70	20.7	22.3	14.4	16.0	0.30	0.89	0.13	3.15

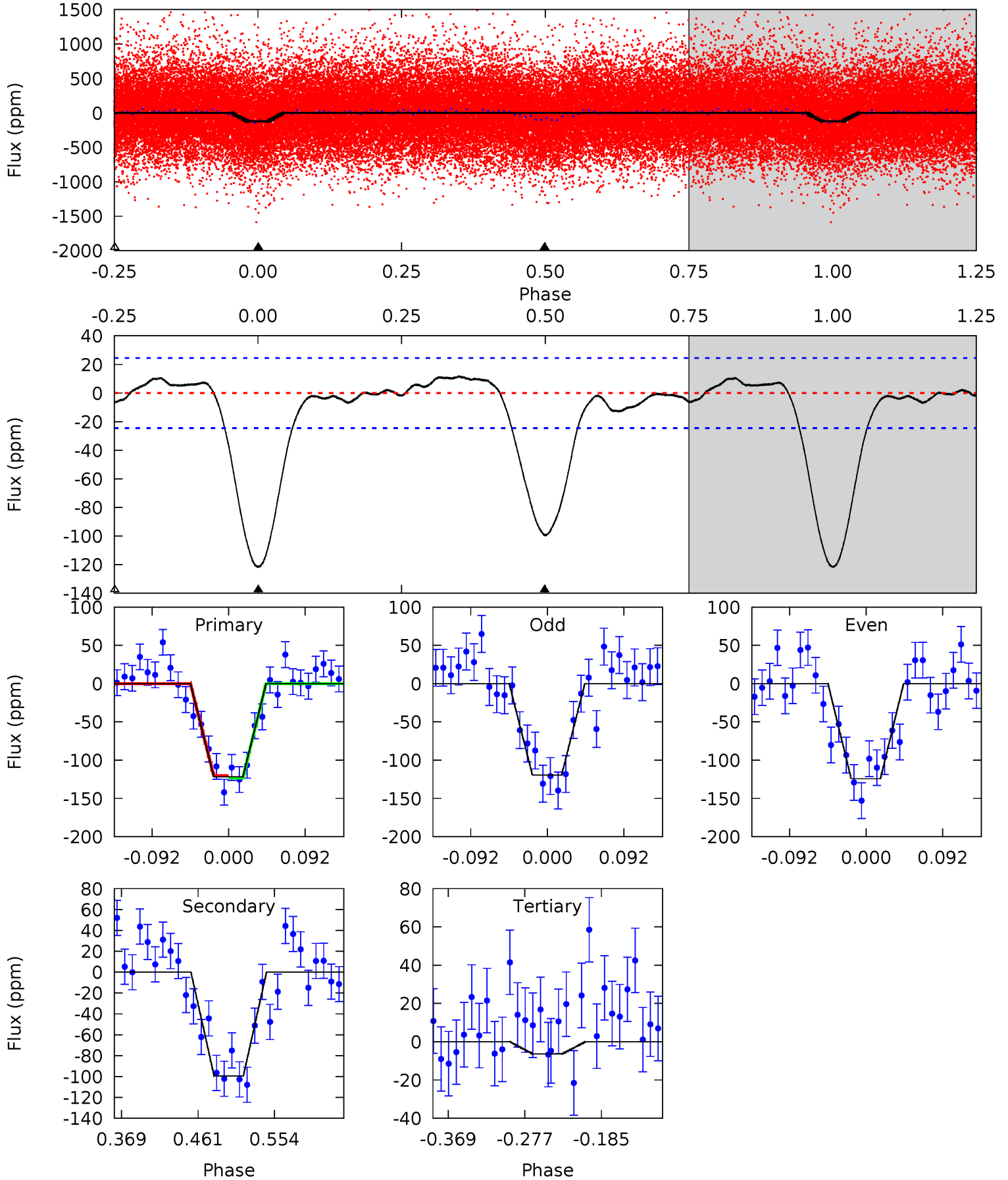




# Alt Model-Shift Uniqueness Test

010879656-01, P = 0.729720 Days, E = 131.341917 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.7	18.6	1.20	0	4.58	1.68	1.21	21.5	22.7	17.4	18.6	0.45	0.98	0.09	0.31





### Stellar Parameters For KIC 010879656

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5220^{+157}_{-157}$	$4.622^{+0.072}_{-0.044}$	$-0.920^{+0.300}_{-0.300}$	$0.642^{+0.056}_{-0.056}$	$0.630^{+0.059}_{-0.024}$	$3.348^{+0.907}_{-0.535}$
	+3%/-3%	+2%/-1%	+33%/-33%	+9%/-9%	+9%/-4%	+27%/-16%
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 010879656-01 / KOI 1642.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-75 \pm 5$	$0.75^{+0.36}_{-0.36}$	$2196^{+82}_{-80}$	$4722^{+1622}_{-655}$	$13^{+34}_{-7}$
Alt.	$-99 \pm 5$	$0.79^{+0.36}_{-0.34}$	$2206^{+81}_{-87}$	$4967^{+1450}_{-740}$	$17^{+34}_{-9}$

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

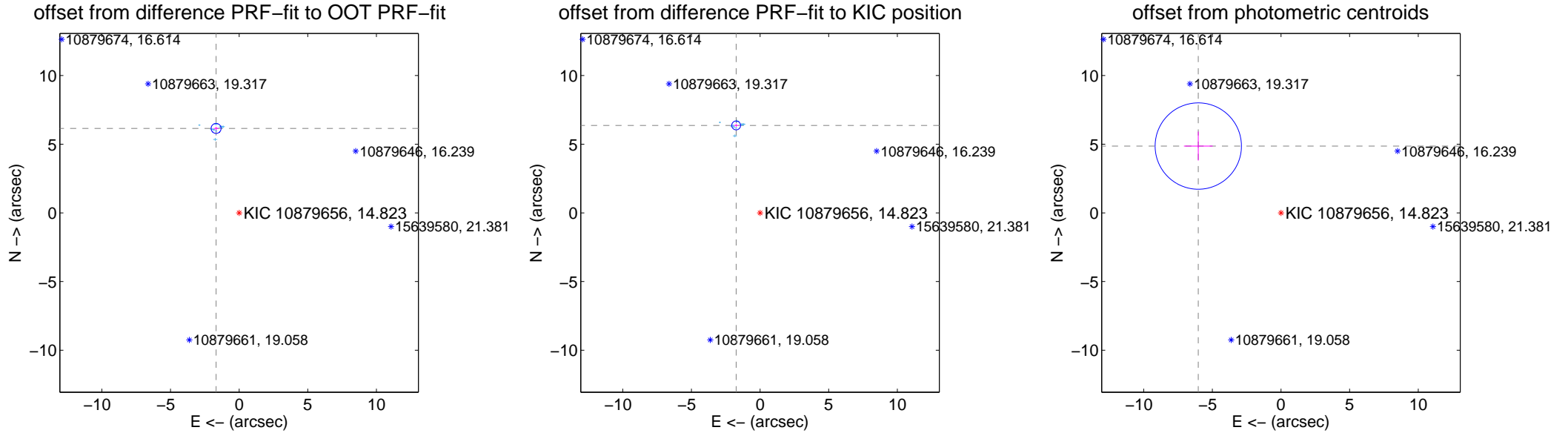
## DV Centroid Data

Supplemental centroid analysis for 010879656-01. Kepler magnitude: 14.82. Transit SNR 14.51

There are 10 quarters with good PRF difference image offsets

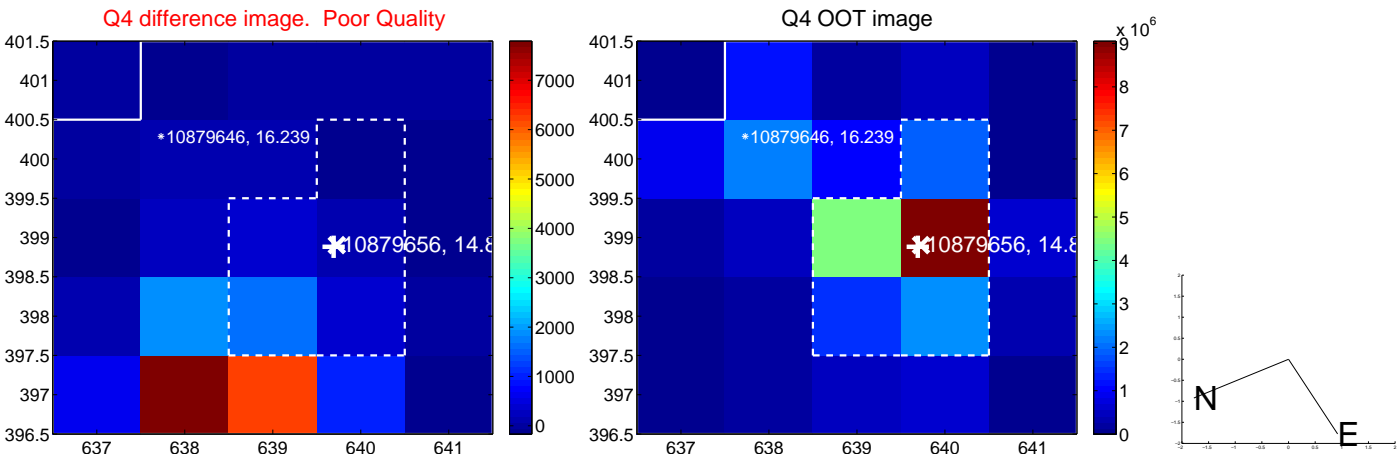
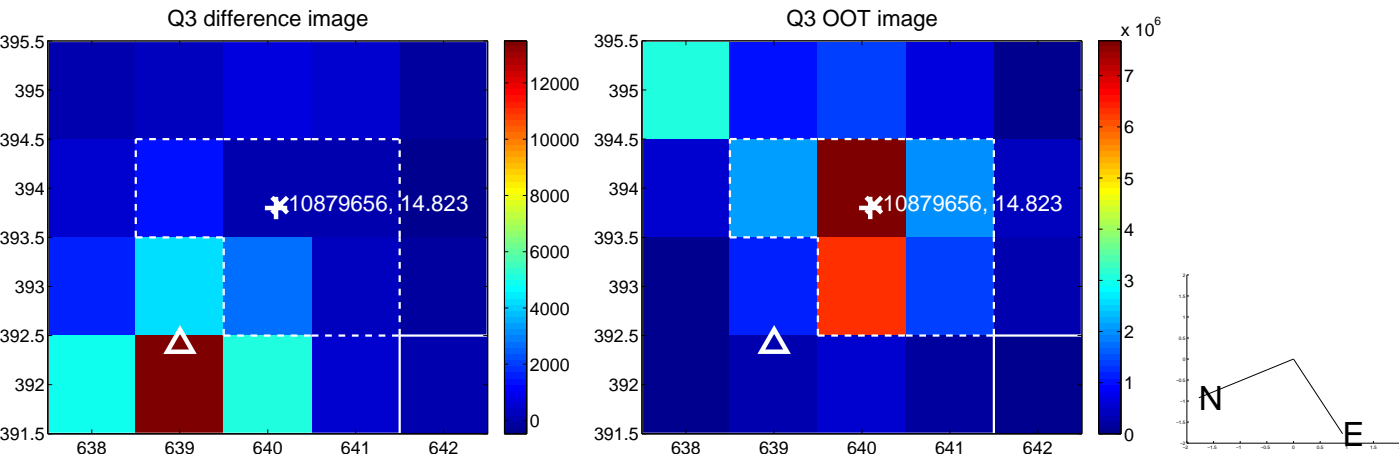
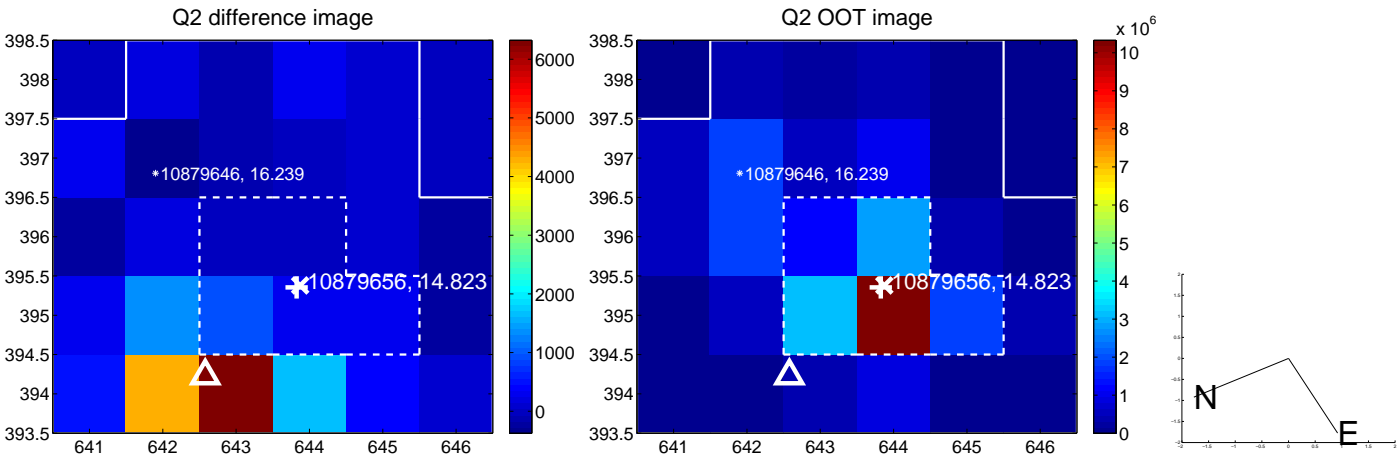
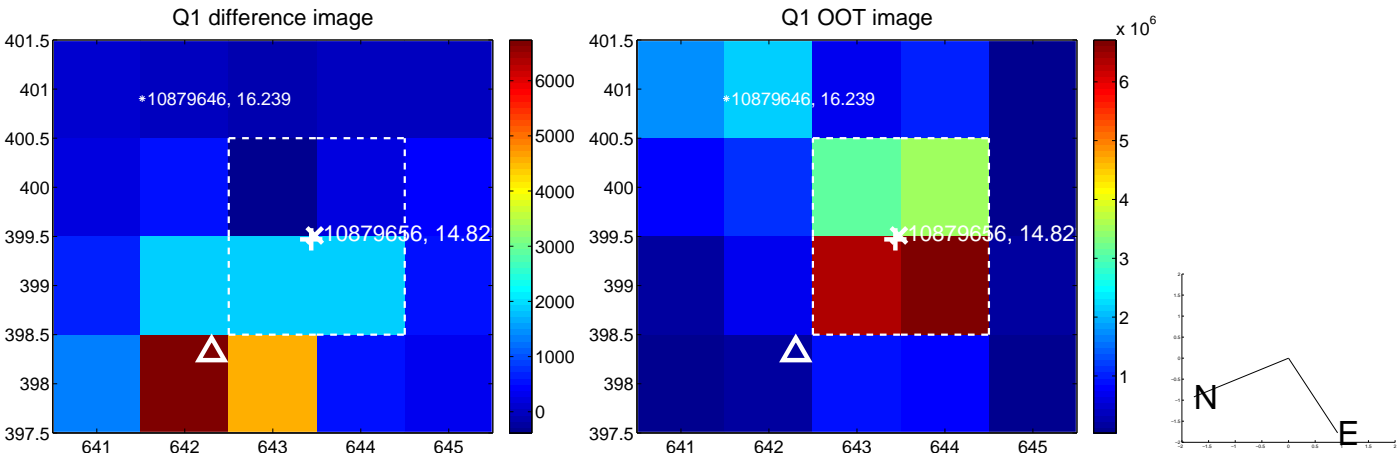
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.375 <math>\pm</math> 0.121</b>	<b>52.62</b>	1.679 $\pm$ 0.173	6.150 $\pm$ 0.118
PRF-fit source offset from KIC position	<b>6.602 <math>\pm</math> 0.108</b>	<b>61.40</b>	1.742 $\pm$ 0.156	6.368 $\pm$ 0.105
photometric centroid source offset	<b>7.74 <math>\pm</math> 1.05</b>	<b>7.39</b>	6.03 $\pm$ 1.04	4.87 $\pm$ 1.05

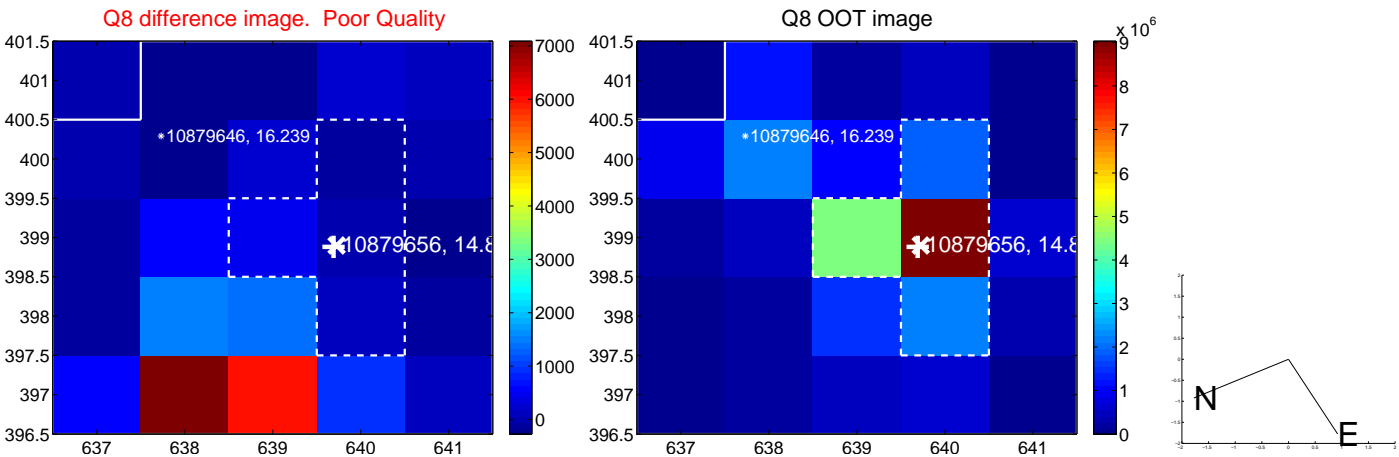
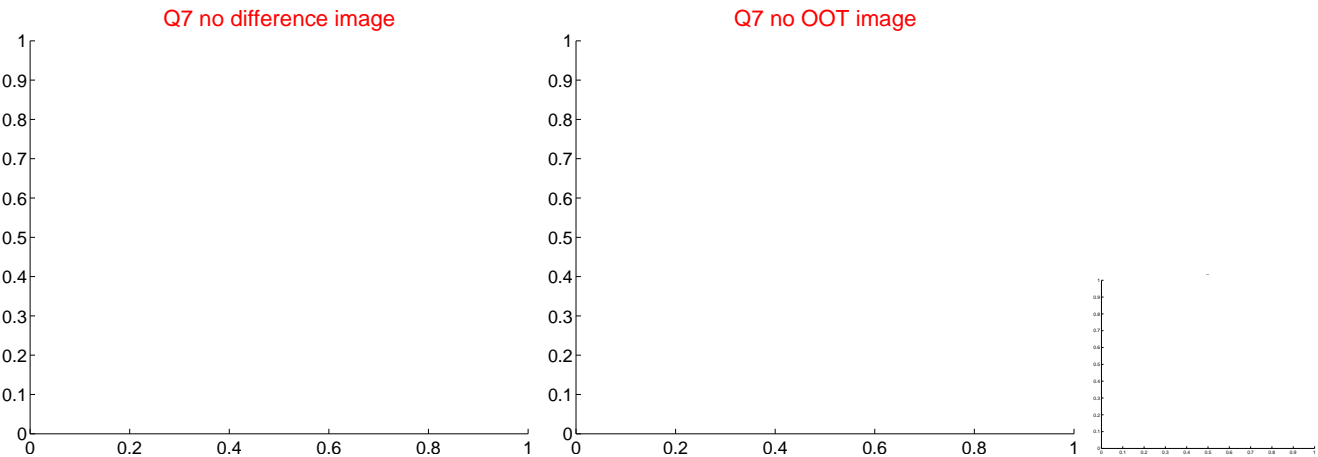
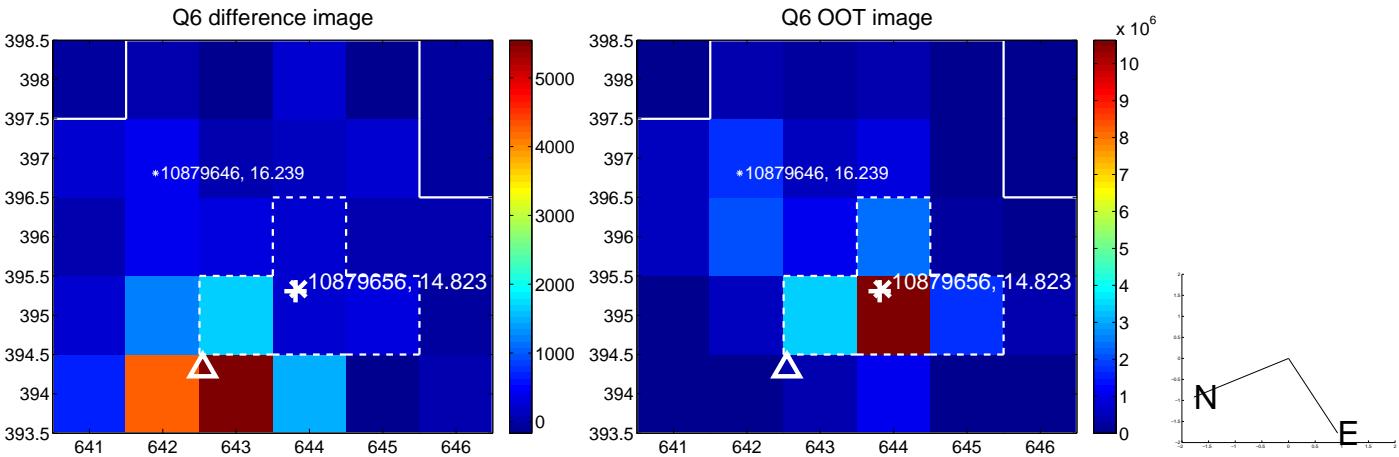
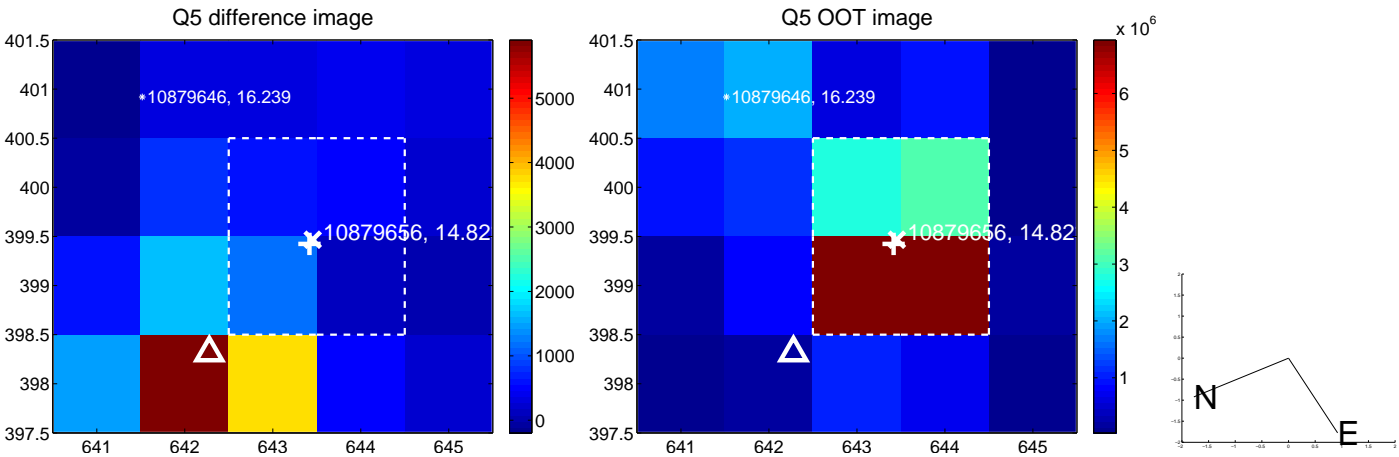


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

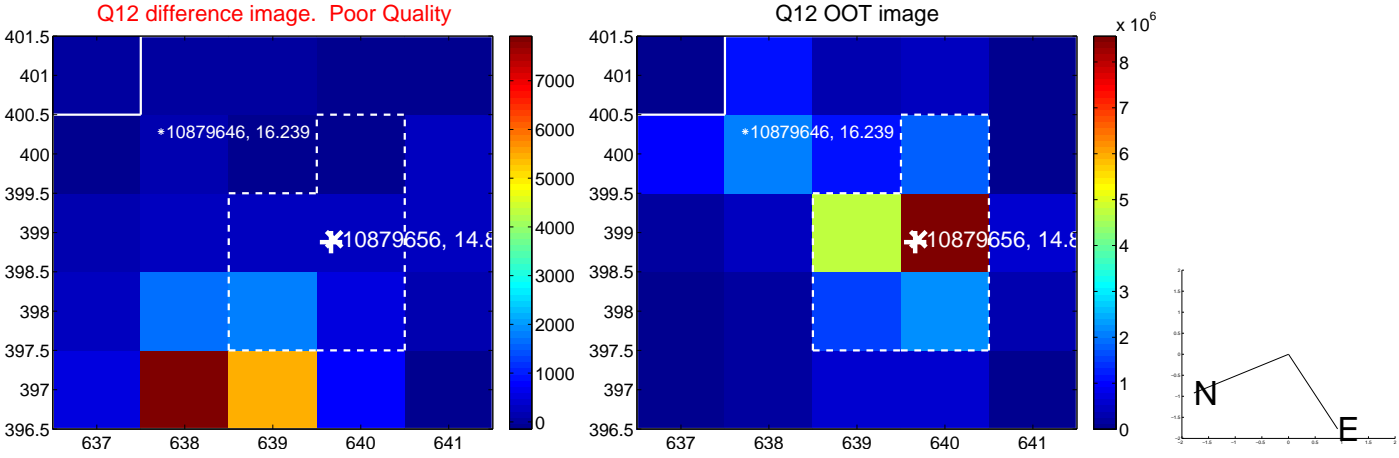
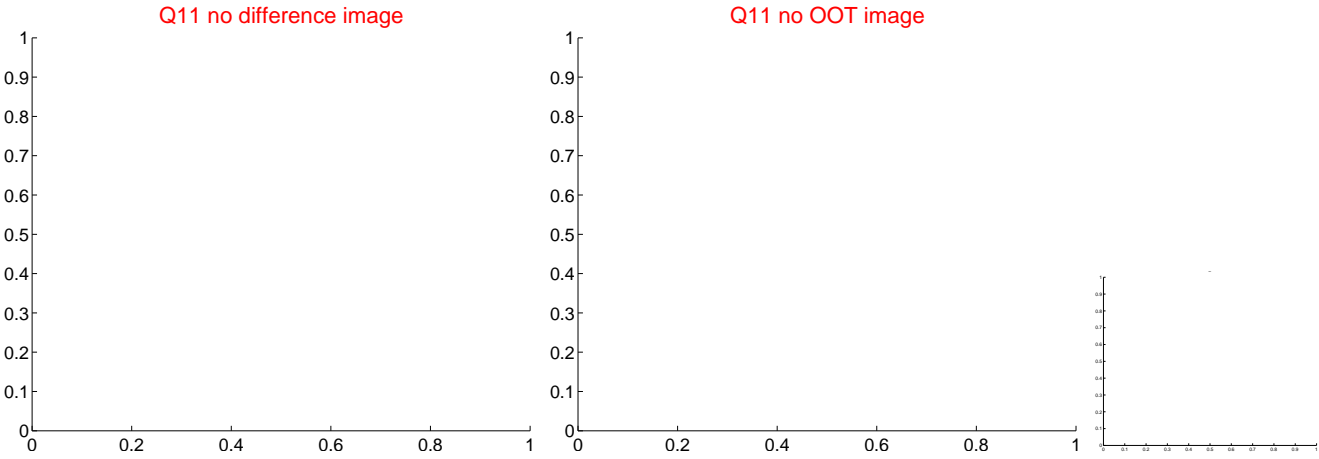
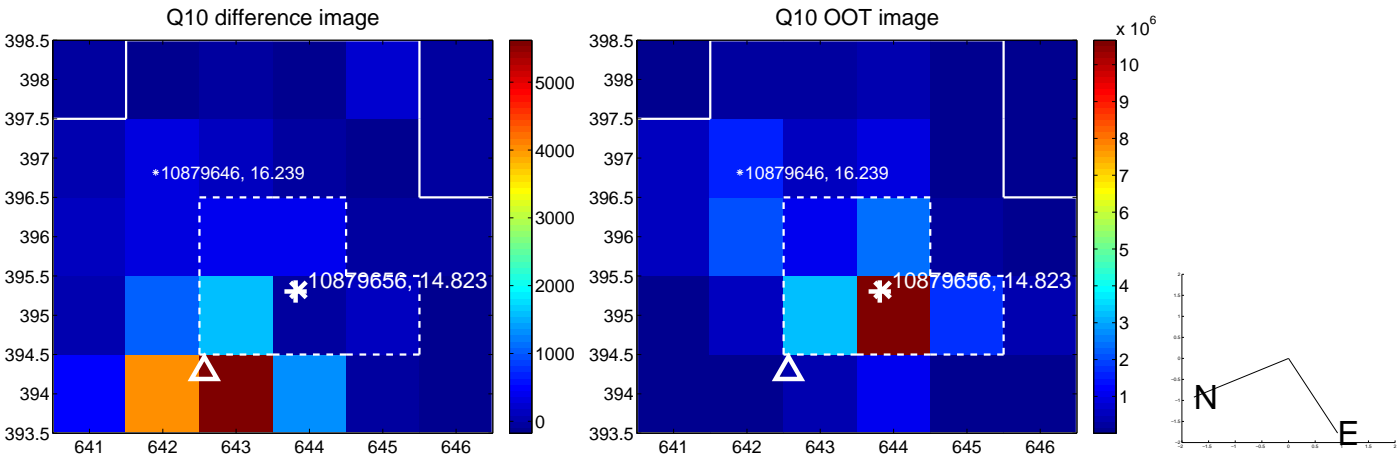
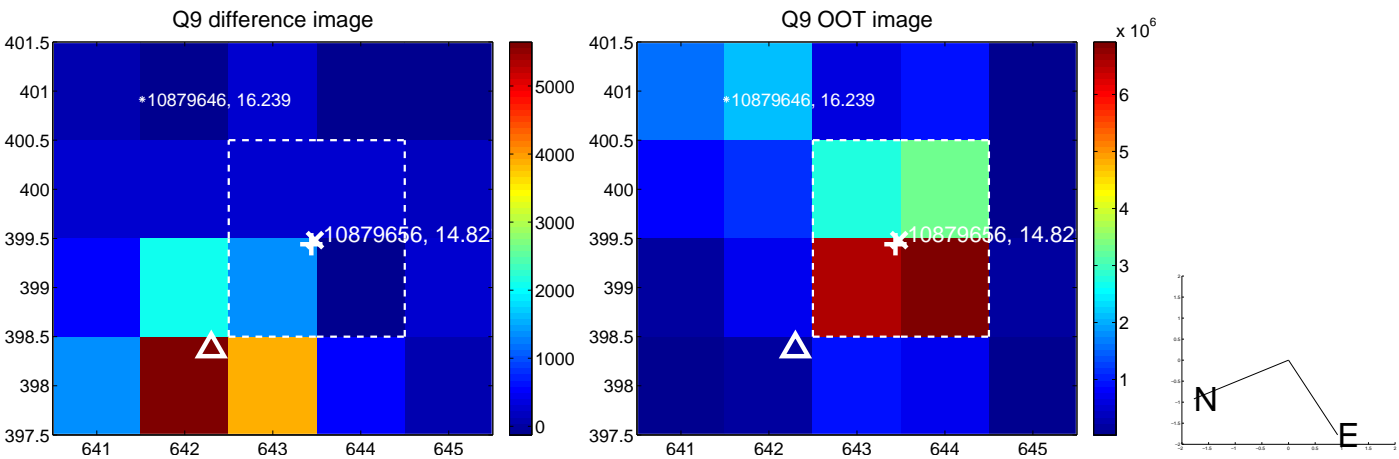


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

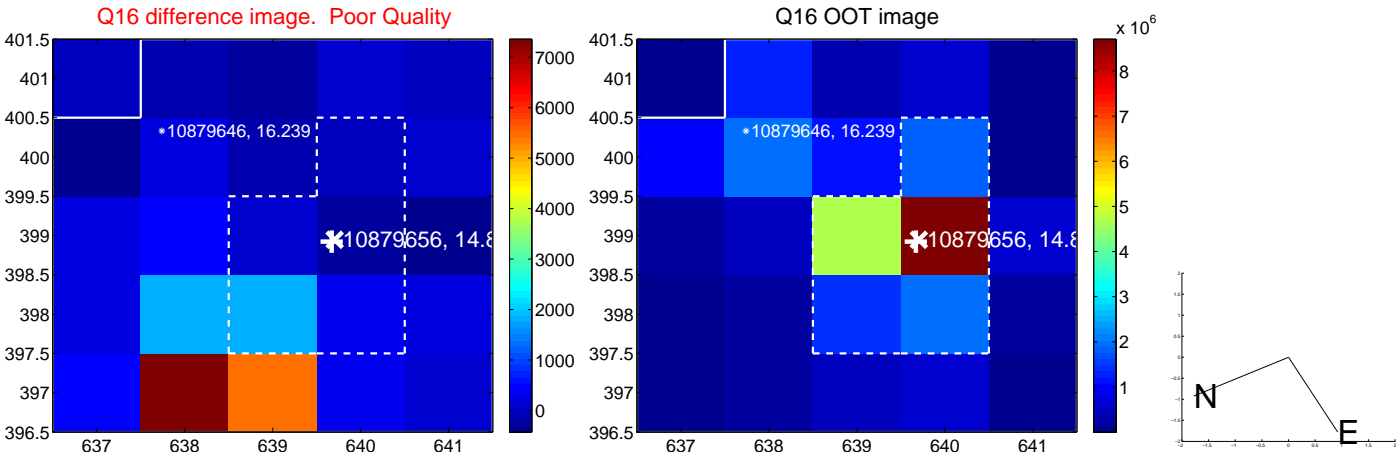
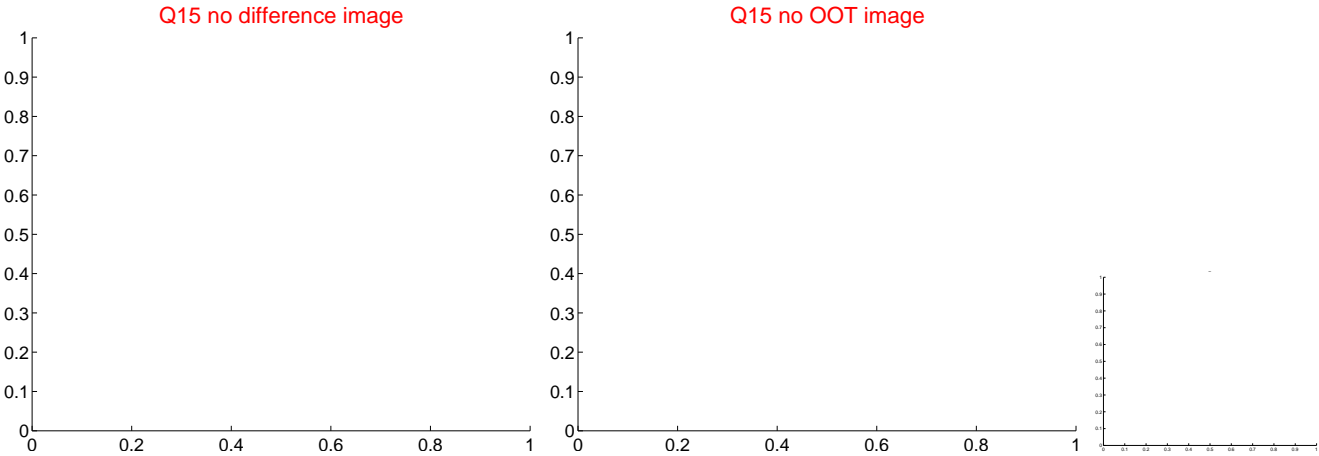
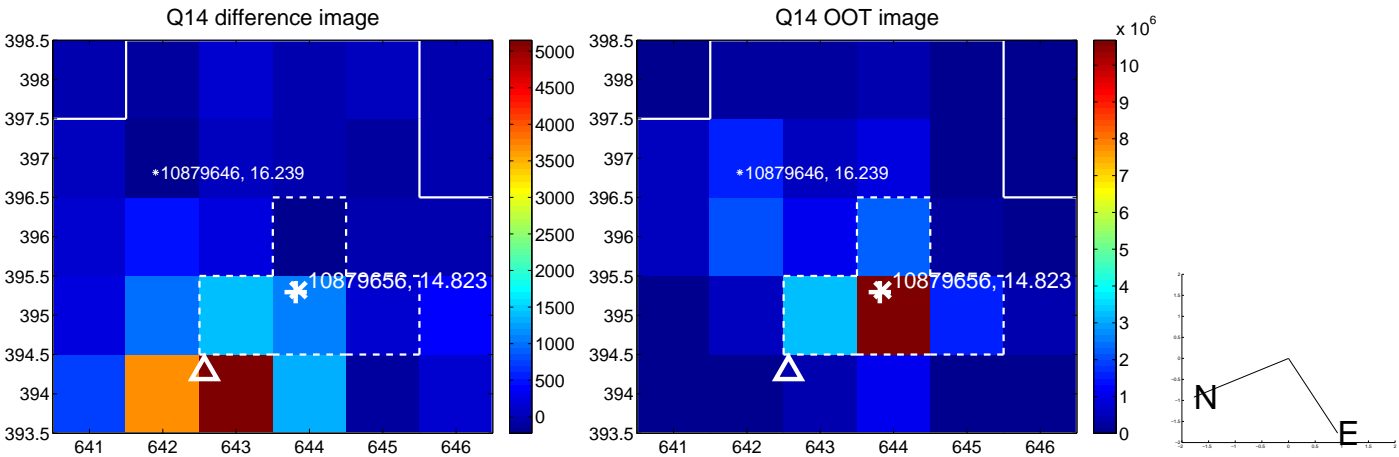
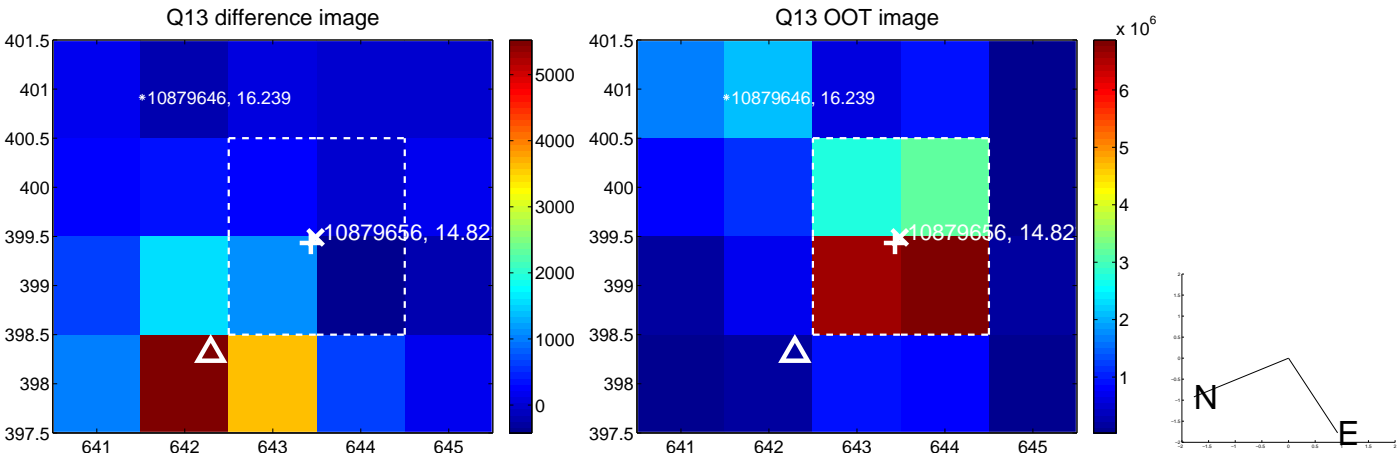




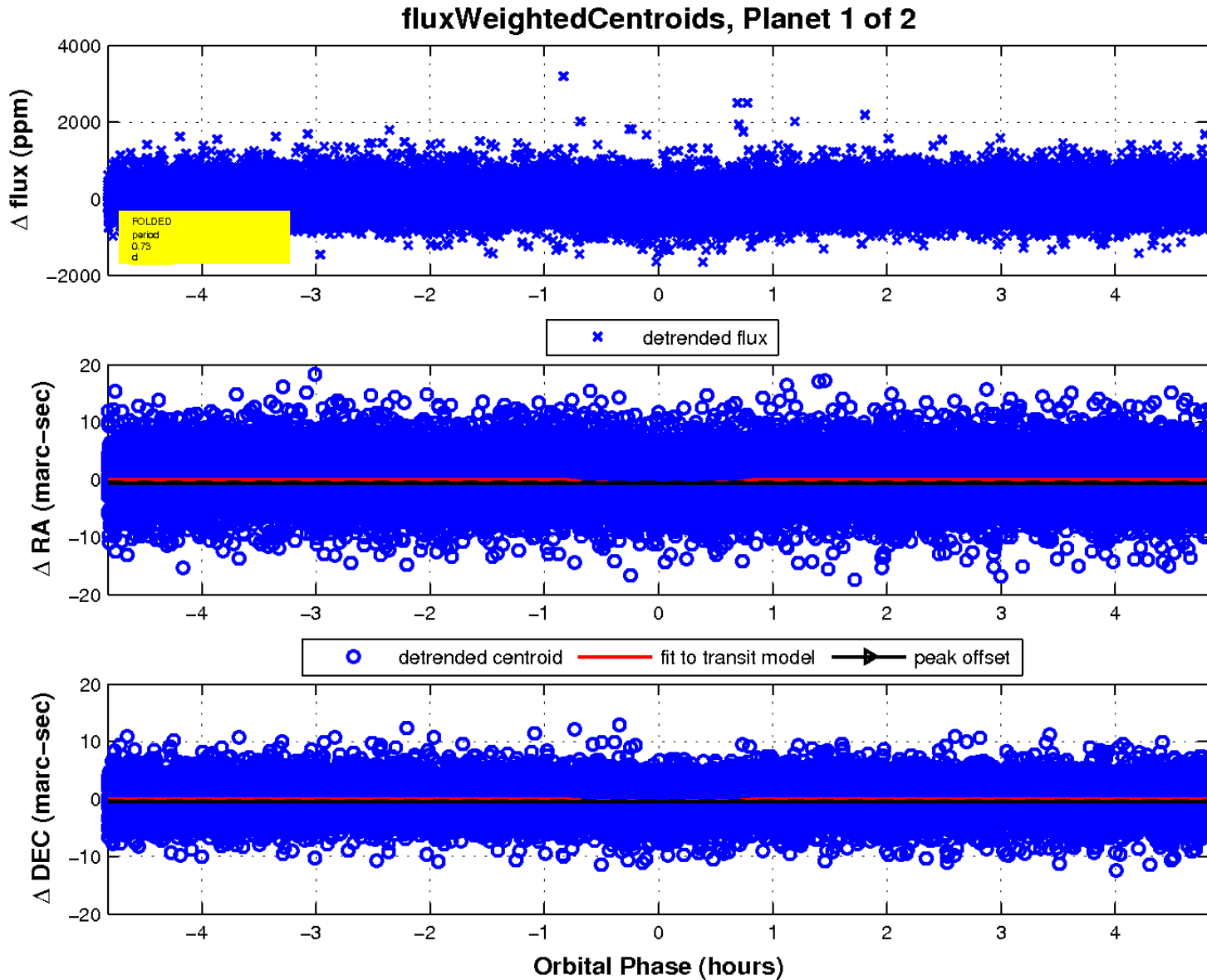
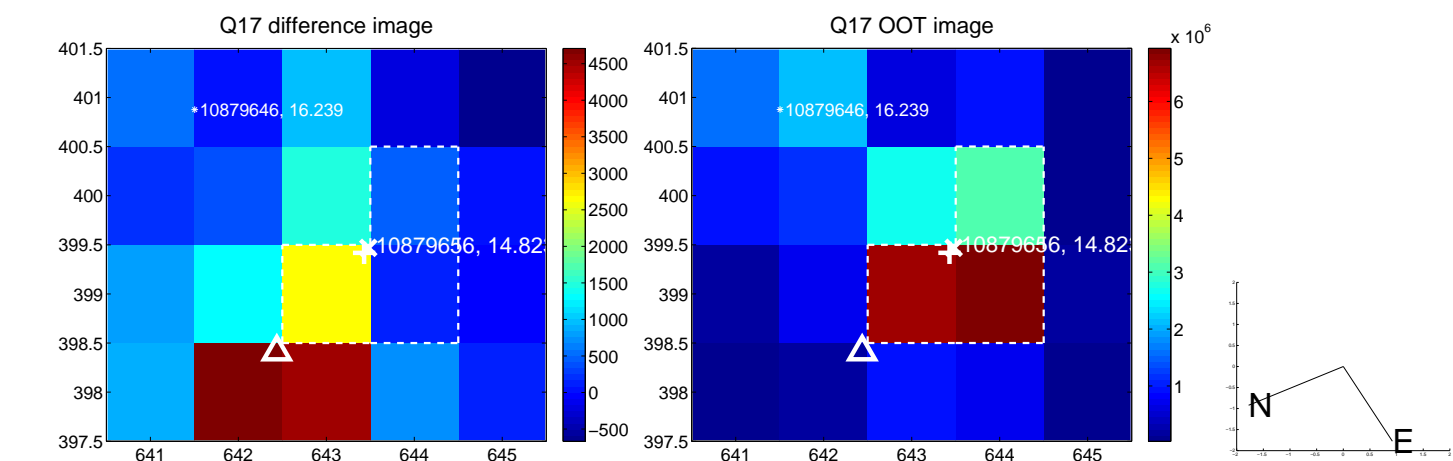
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

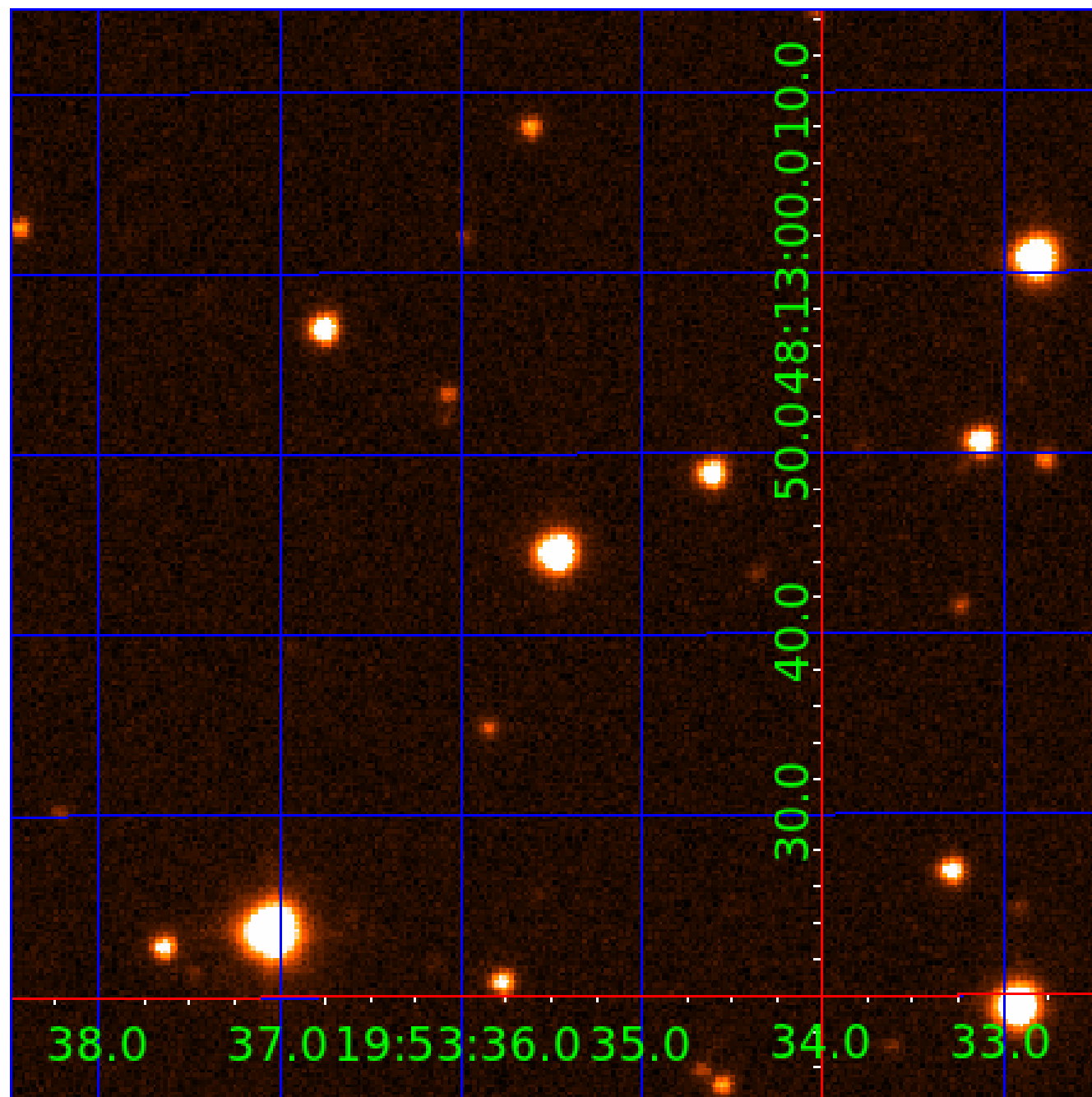


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 010879656

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010879656-01	OBS	1642.01	0.729716	132.071007	92.7	1.608	13.4	14.5	0.64	5220	0.74	1482.73
010879656-02	OBS	No	0.729714	131.707438	71.7	1.415	11.3	10.7	0.64	5220	0.65	1482.73

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010879656-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
010879656-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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 010879656-02

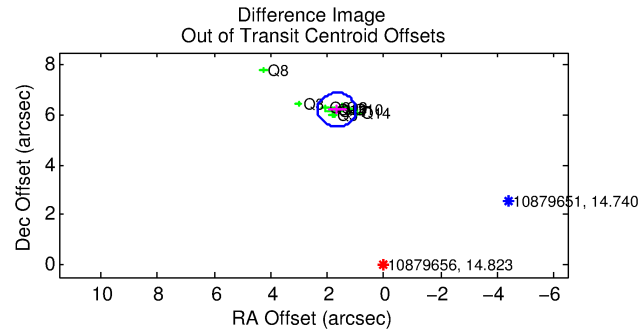
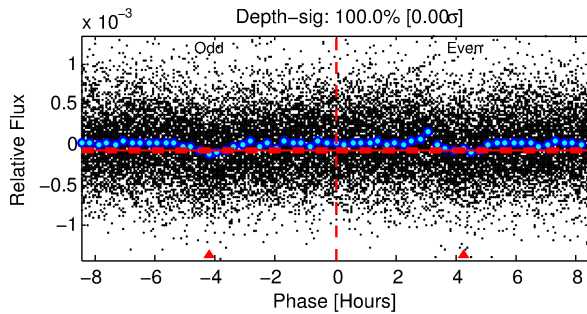
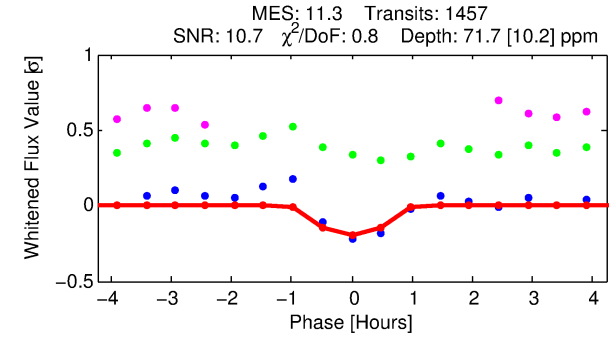
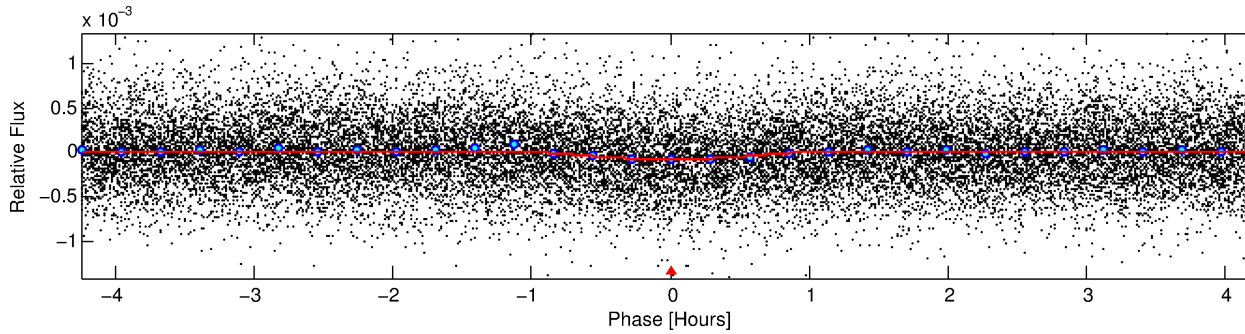
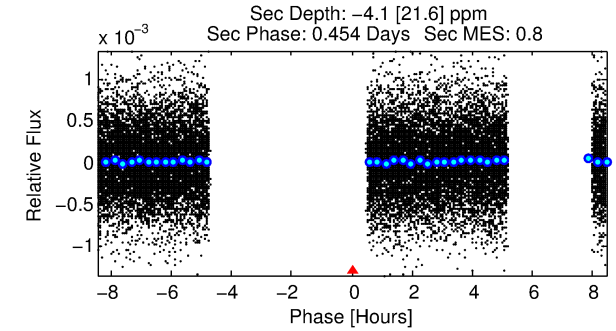
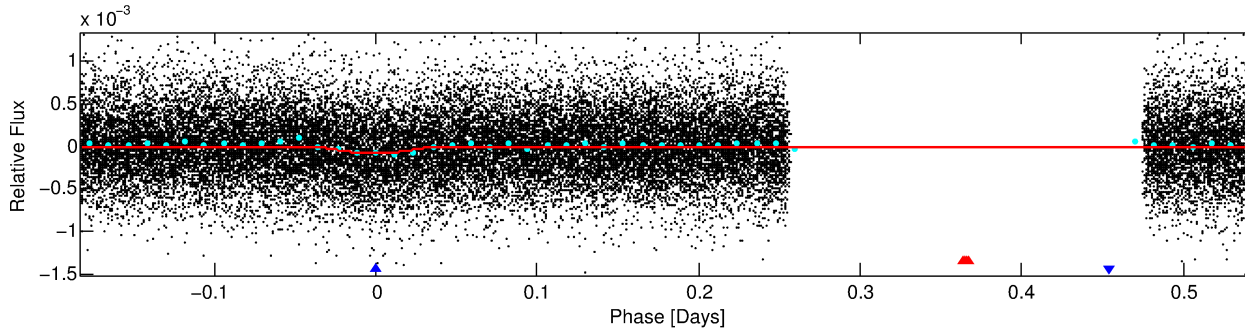
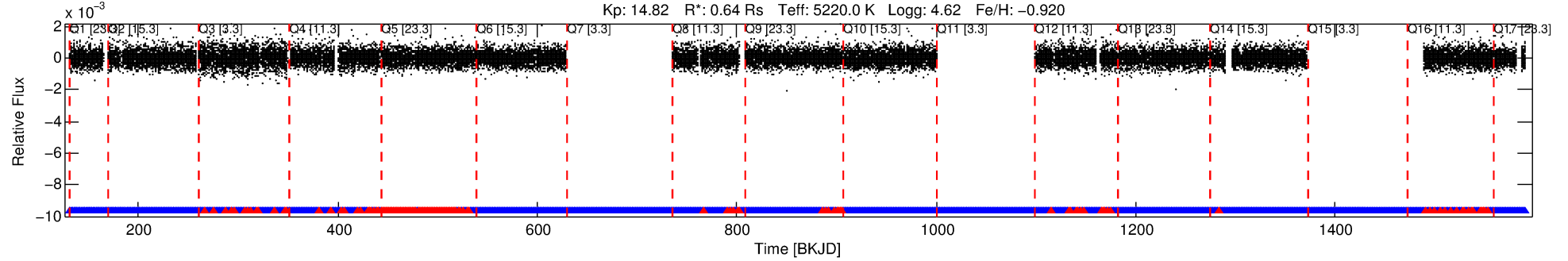
No Significant Match Found

# DV One-Page Summary

KIC: 10879656 Candidate: 2 of 2 Period: 0.730 d

KOI: K01642 Corr: No Ephemeris Match

Kp: 14.82 R\*: 0.64 Rs Teff: 5220.0 K Logg: 4.62 Fe/H: -0.920



## DV Fit Results:

Period = 0.72971 [0.00001] d  
Epoch = 131.7074 [0.0022] BKJD  
Rp/R\* = 0.0093 [0.0080]  
a/R\* = 2.03 [6.08]  
b = 0.90 [0.86]  
Seff = 1482.73 [257.12]  
Teq = 1582 [69] K  
Rp = 0.65 [0.56] Re  
a = 0.0136 [0.0011] AU  
Ag = N/A  
Teffp = N/A

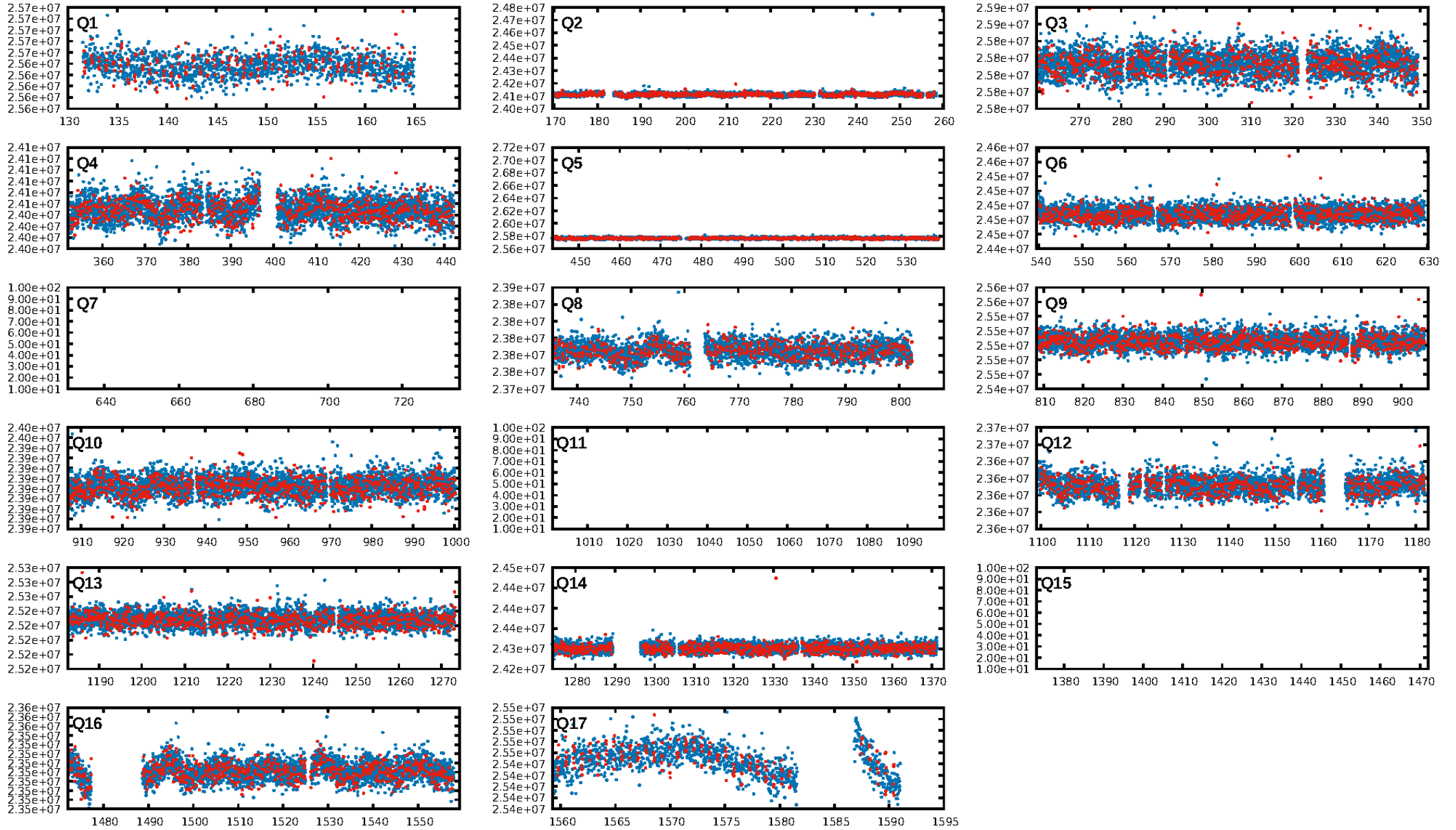
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.60e-33  
RollingBand-fgt: 0.88 [1216/1376]  
GhostDiagnostic-chr: -23.33  
Centroid-sig: 3.1%  
Centroid-so: 2.656 arcsec [1.86σ]  
OotOffset-rm: 6.421 arcsec [28.65σ]  
KicOffset-rm: 6.674 arcsec [31.46σ]  
OotOffset-st: 4/1/1/4 [10]  
KicOffset-st: 4/1/1/4 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 1.00 [14/14]

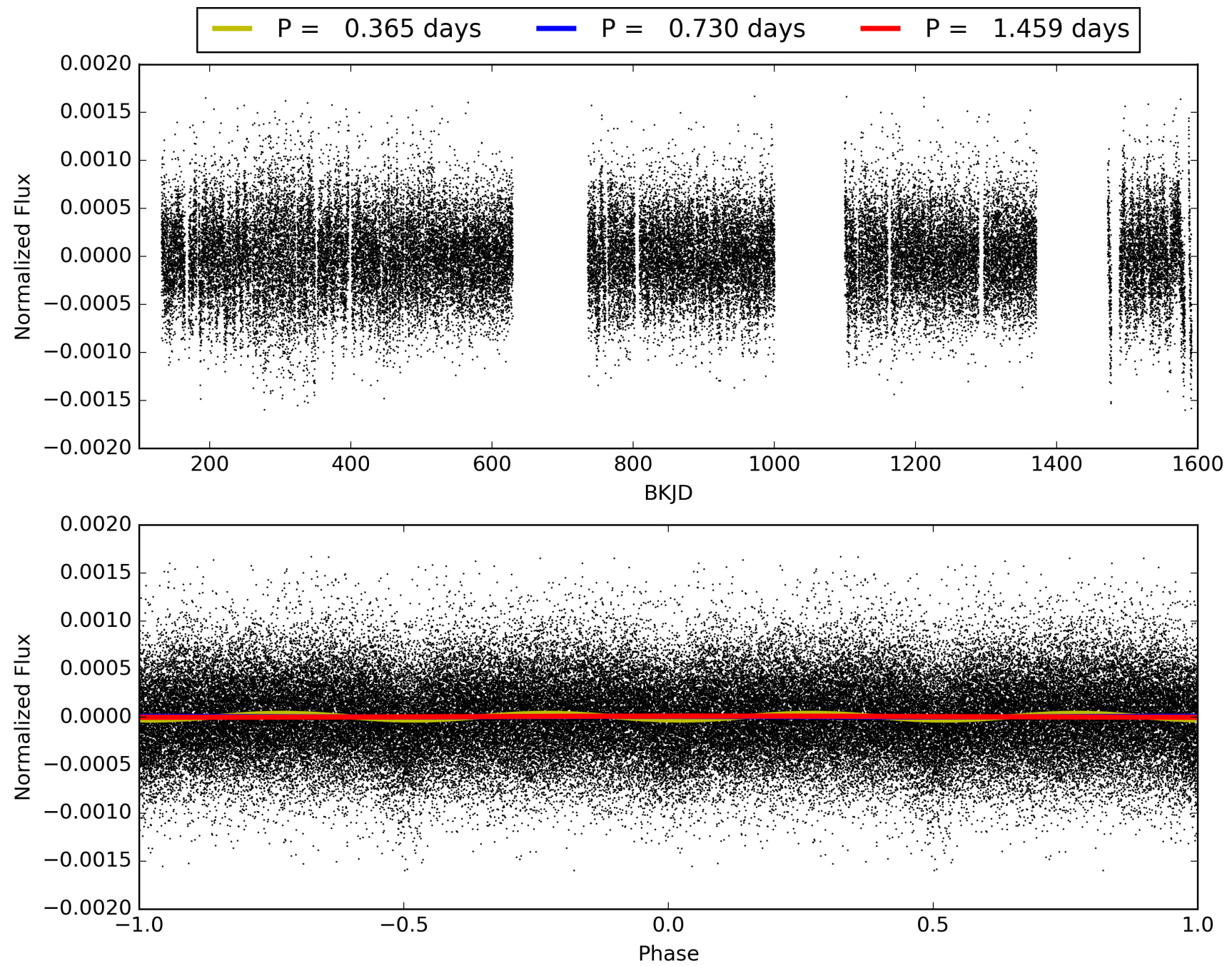
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:59:20 Z

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

# TCE 010879656-02, PDC Light Curves



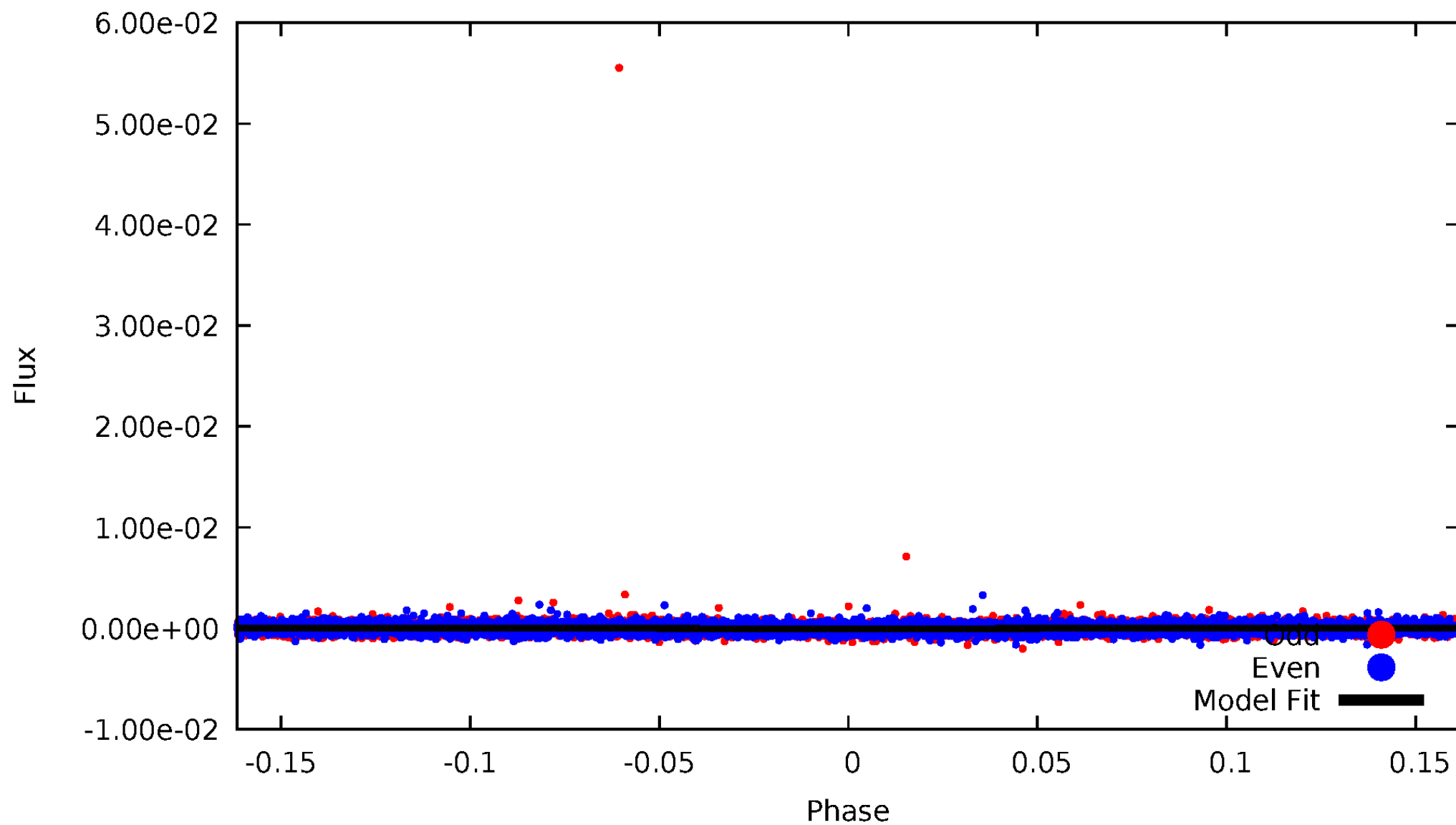
TCE 010879656-02





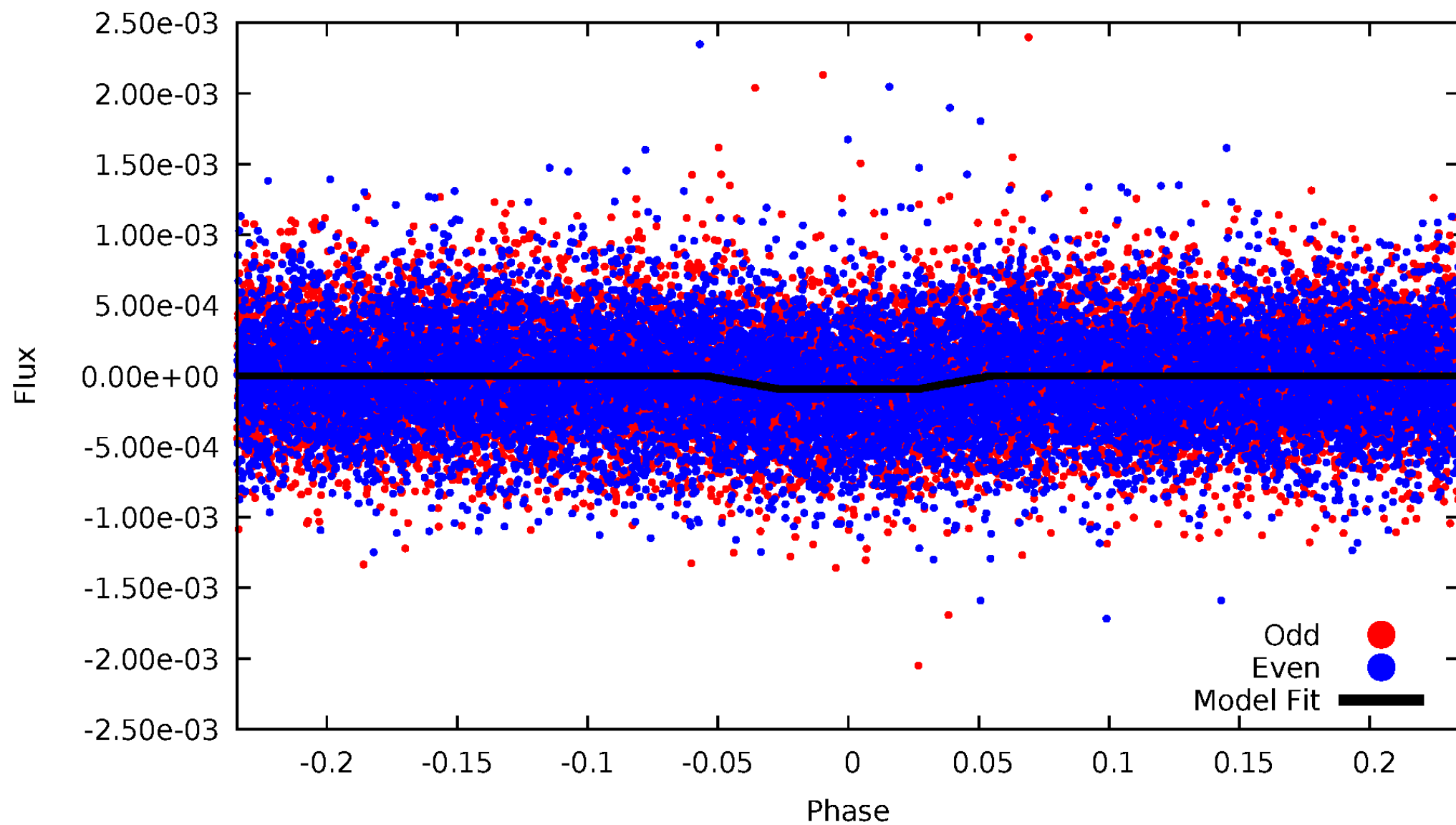
# DV Odd/Even

TCE 010879656-02



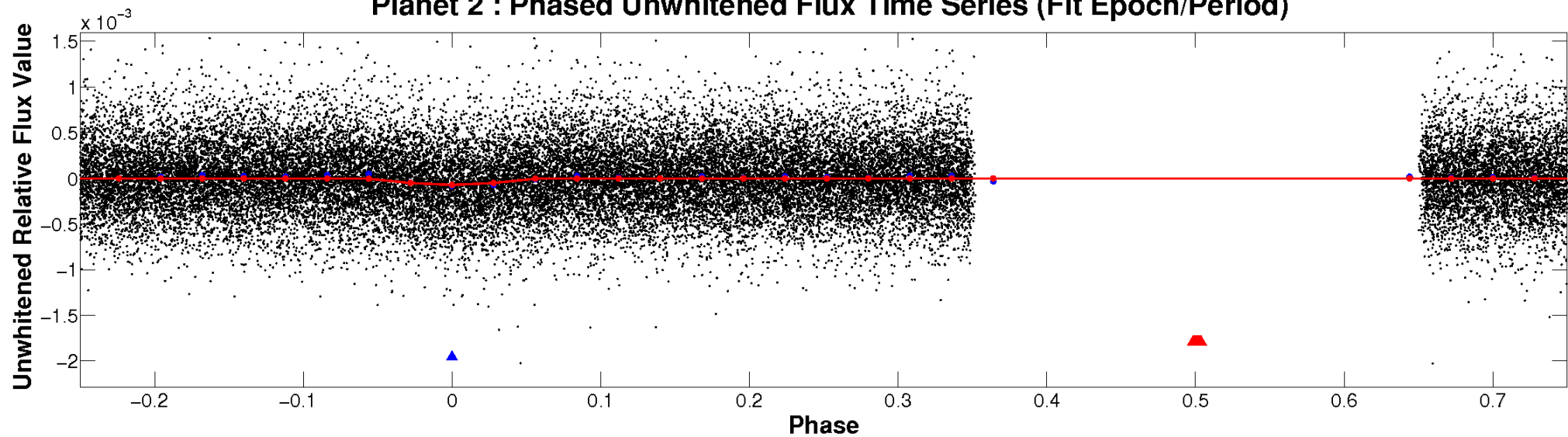
# ALT Odd/Even

TCE 010879656-02

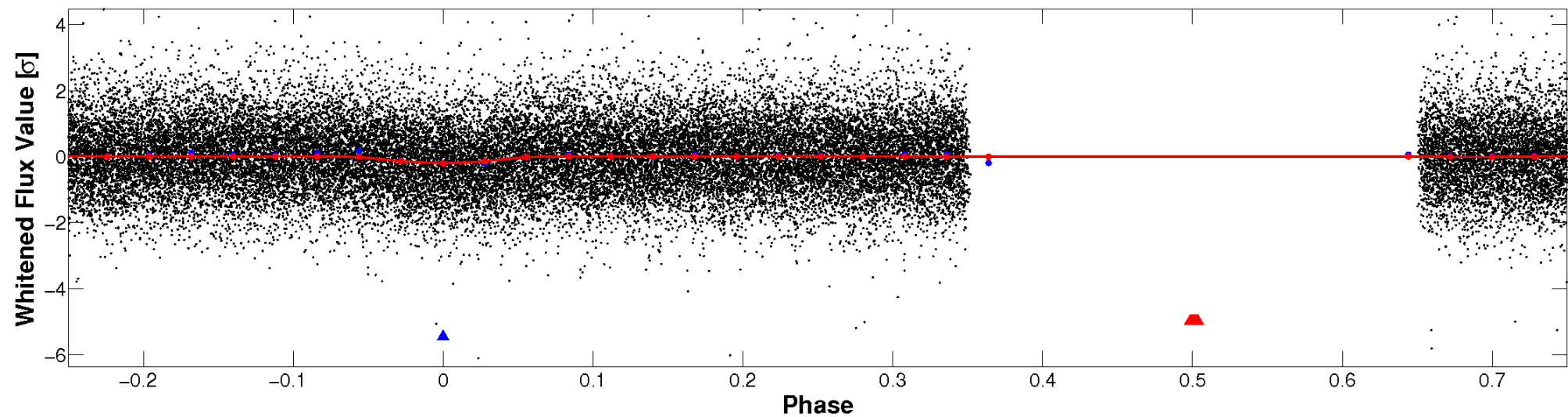


# Non-Whitened Vs. Whitened Light Curve

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

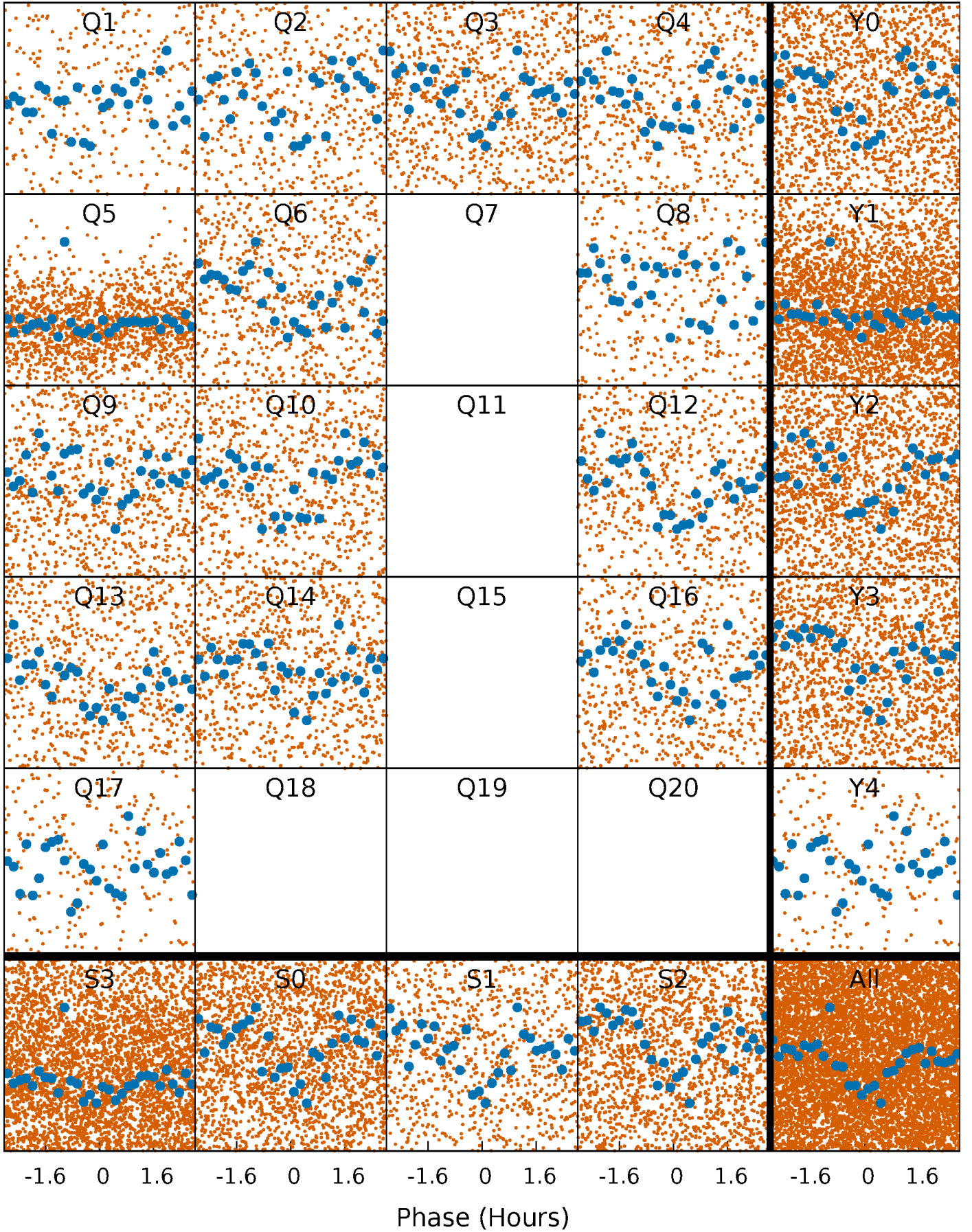


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

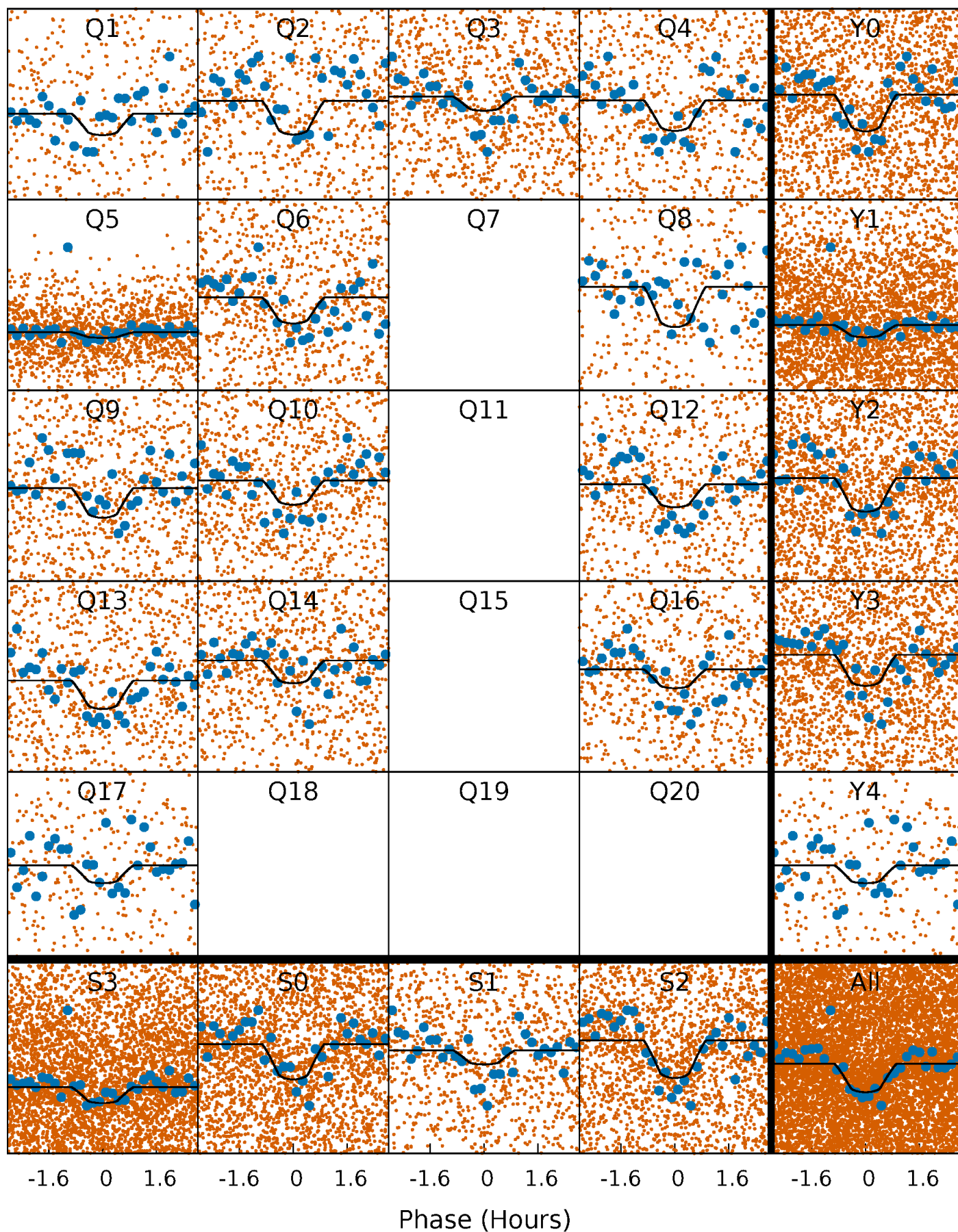
TCE 010879656-02     $P = 0.729714$  Days     $T_0 = 131.707438$  (BKJD)





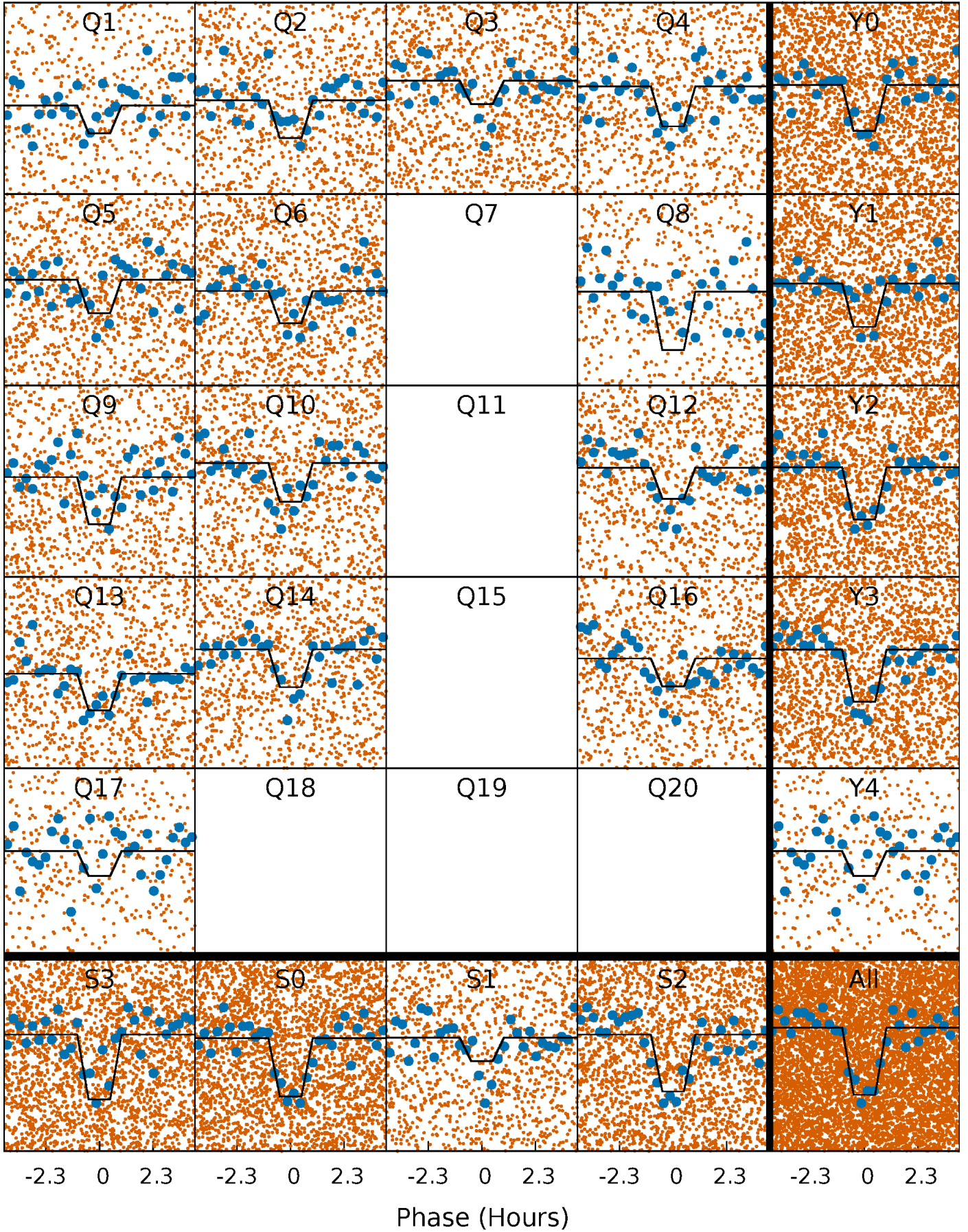
# DV Quarter-Phased Transit Curves

TCE 010879656-02     $P = 0.729714$  Days     $T_0 = 131.707438$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

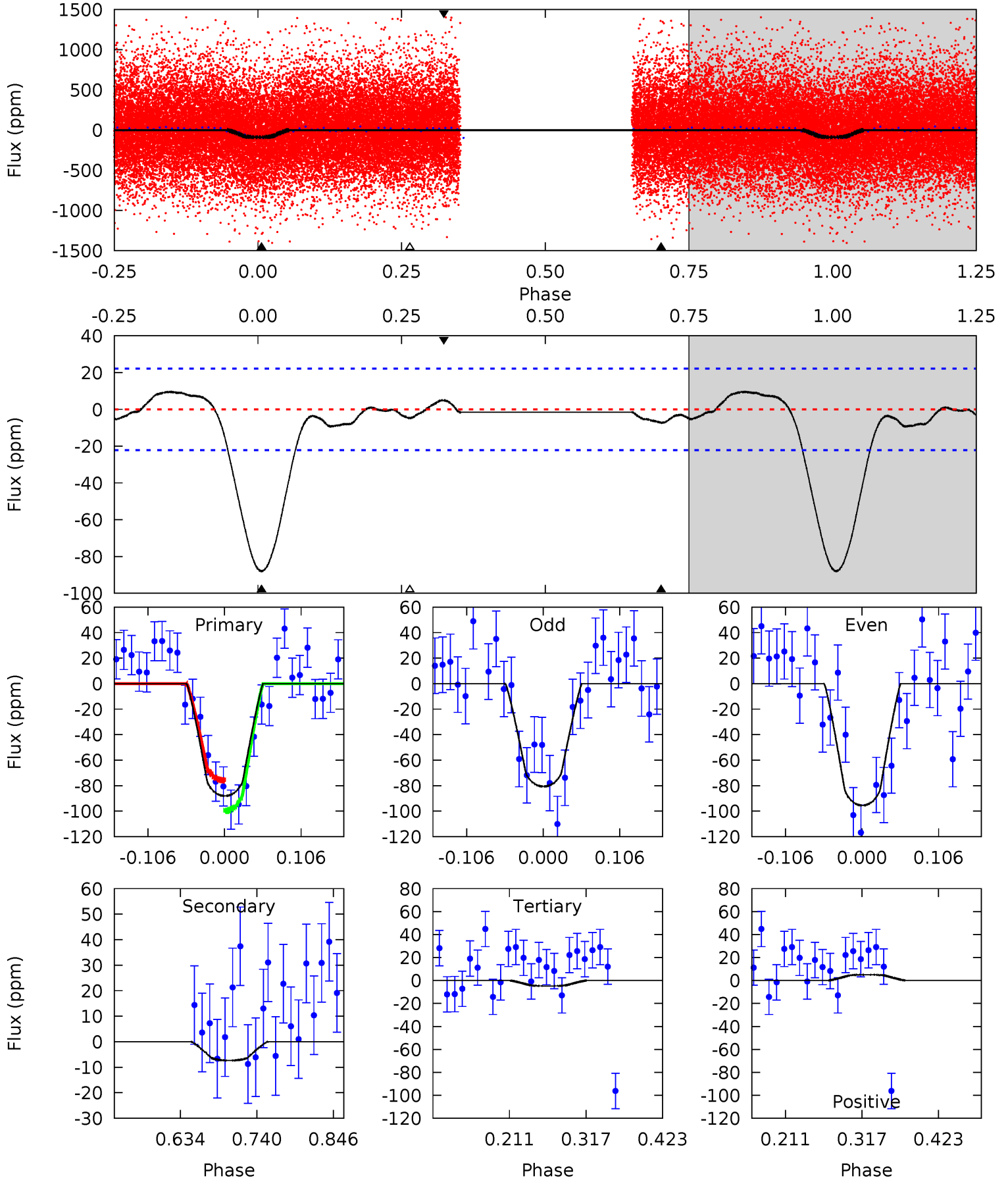
TCE 010879656-02   P= 0.729729 Days    $T_0=131.698850$  (BKJD)



# DV Model-Shift Uniqueness Test

010879656-02, P = 0.729714 Days, E = 130.977724 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
18.1	1.51	0.99	1.03	4.55	1.62	1.19	17.1	17.0	0.52	0.48	1.52	0.95	0.10	2.46

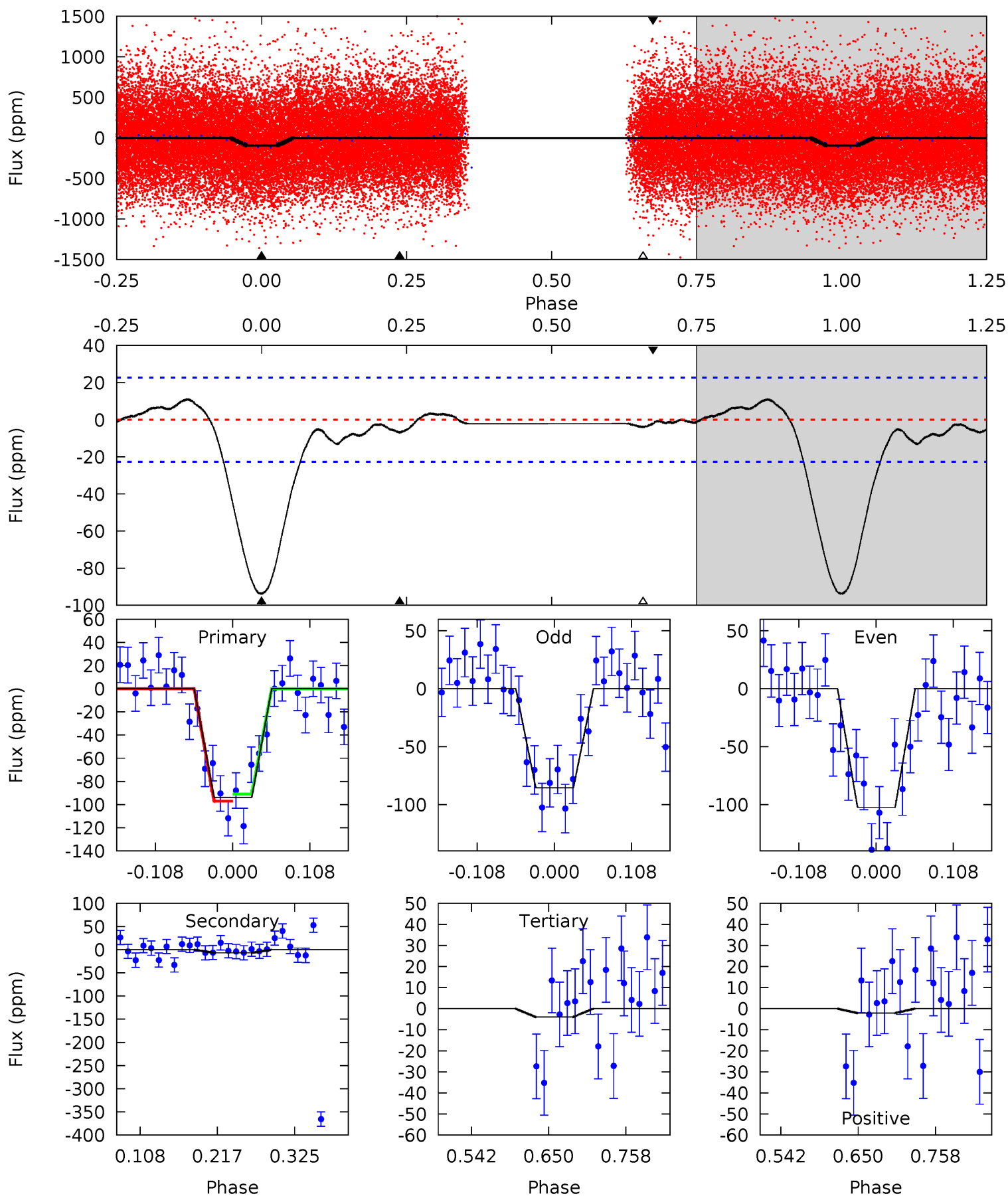




# Alt Model-Shift Uniqueness Test

010879656-02, P = 0.729729 Days, E = 130.969121 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
18.8	1.38	0.80	-0.42	4.55	1.61	1.11	18.0	19.2	0.59	1.80	1.71	0.98	0.10	0.62



### Stellar Parameters For KIC 010879656

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5220^{+157}_{-157}$	$4.622^{+0.072}_{-0.044}$	$-0.920^{+0.300}_{-0.300}$	$0.642^{+0.056}_{-0.056}$	$0.630^{+0.059}_{-0.024}$	$3.348^{+0.907}_{-0.535}$
	+3%/-3%	+2%/-1%	+33%/-33%	+9%/-9%	+9%/-4%	+27%/-16%
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 010879656-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-7 \pm 5$	$0.73^{+0.50}_{-0.45}$	$2200^{+79}_{-78}$	$3013^{+1211}_{-5104}$	$1.199^{+6.953}_{-0.942}$
Alt.	$-7 \pm 5$	$0.75^{+0.52}_{-0.44}$	$2203^{+83}_{-86}$	$2968^{+1206}_{-5310}$	$1.106^{+6.029}_{-0.921}$

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

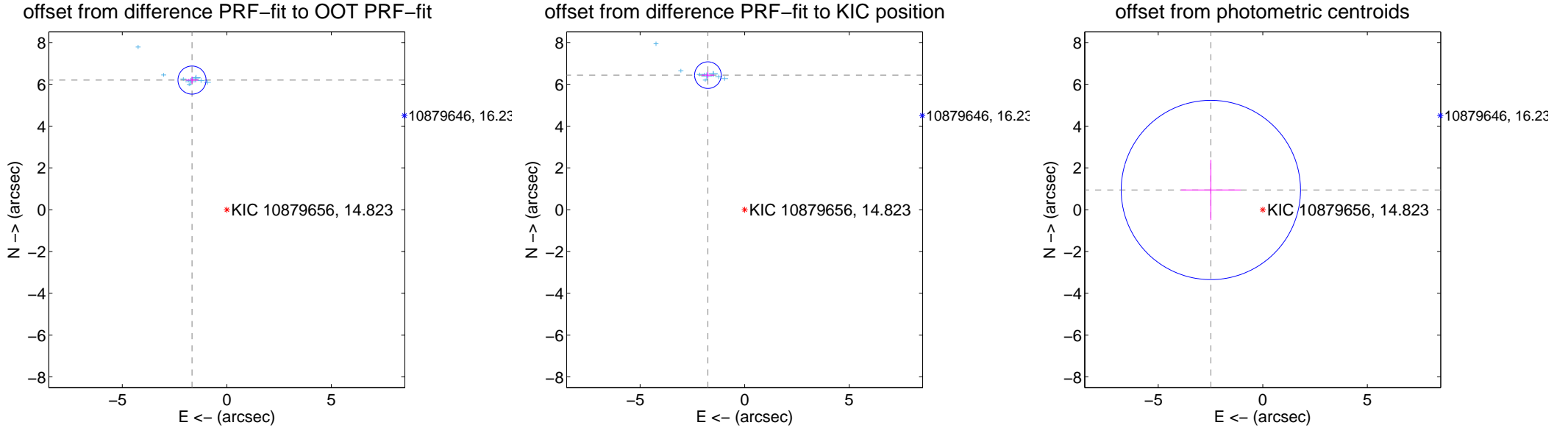
## DV Centroid Data

Supplemental centroid analysis for 010879656-02. Kepler magnitude: 14.82. Transit SNR 10.67

There are 10 quarters with good PRF difference image offsets

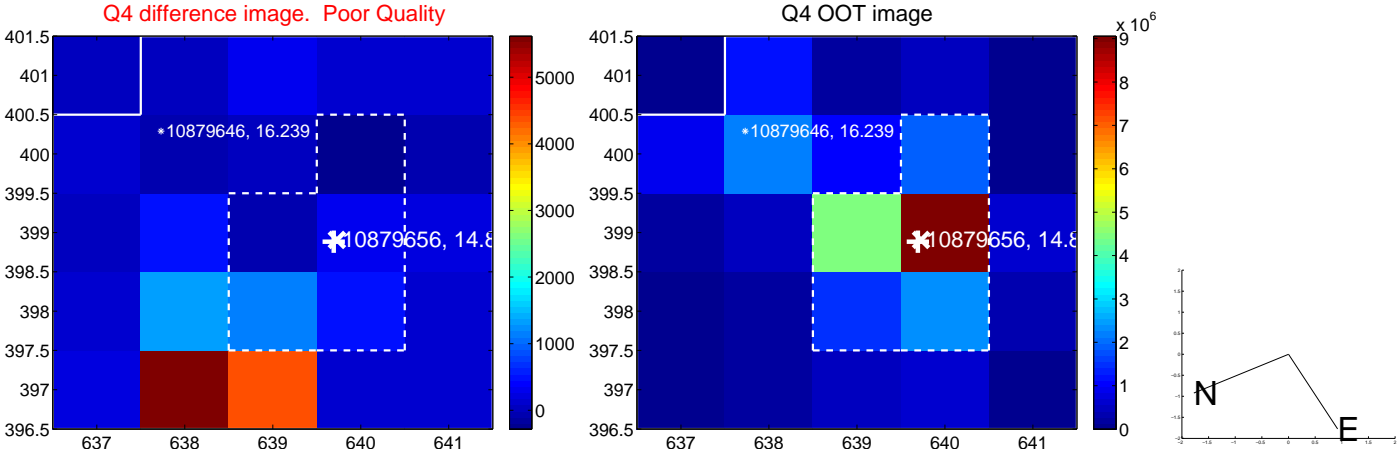
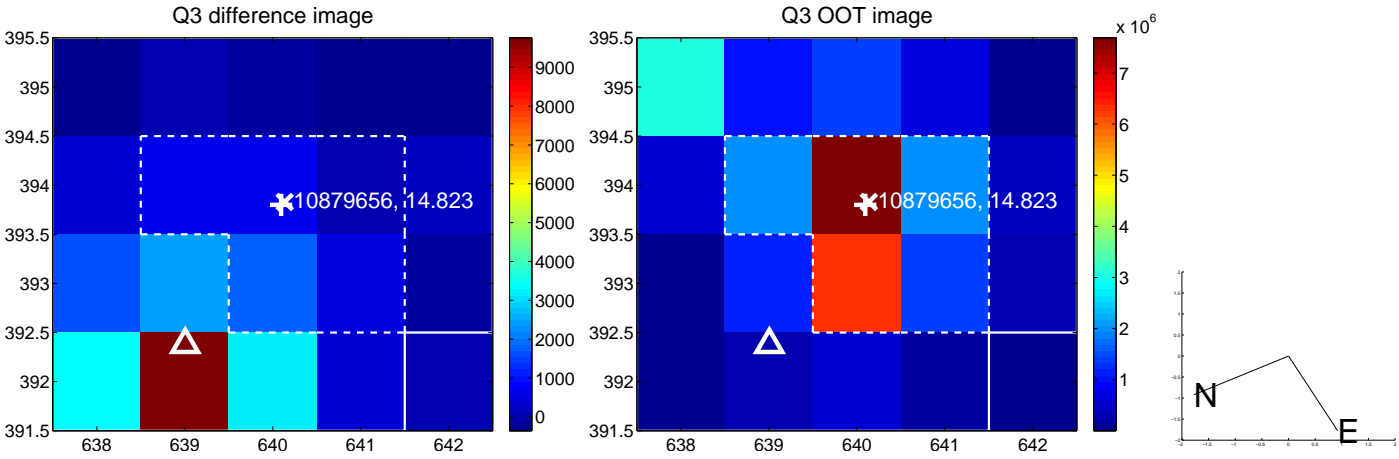
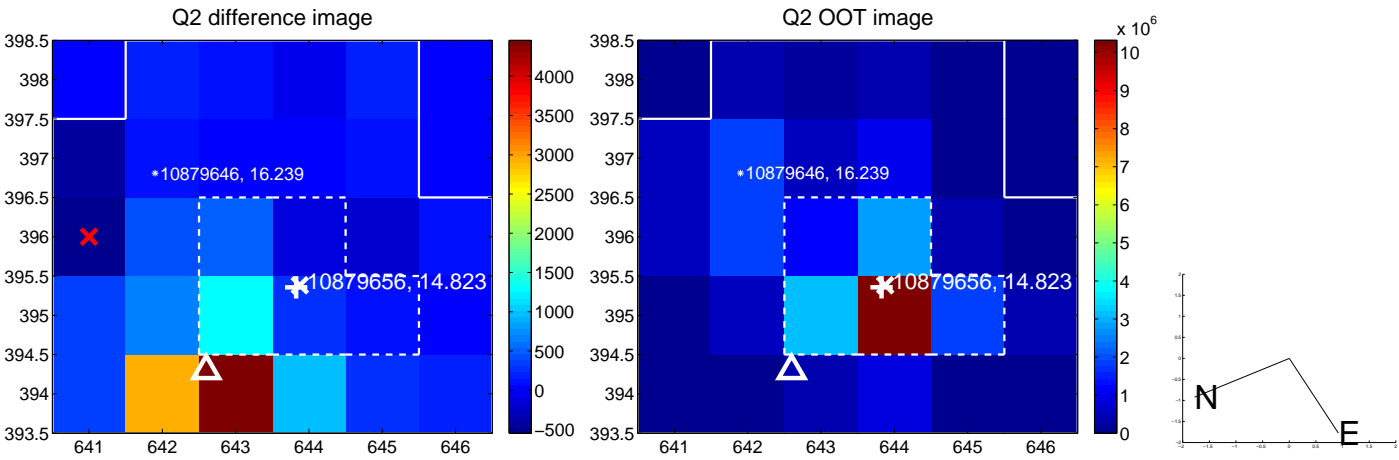
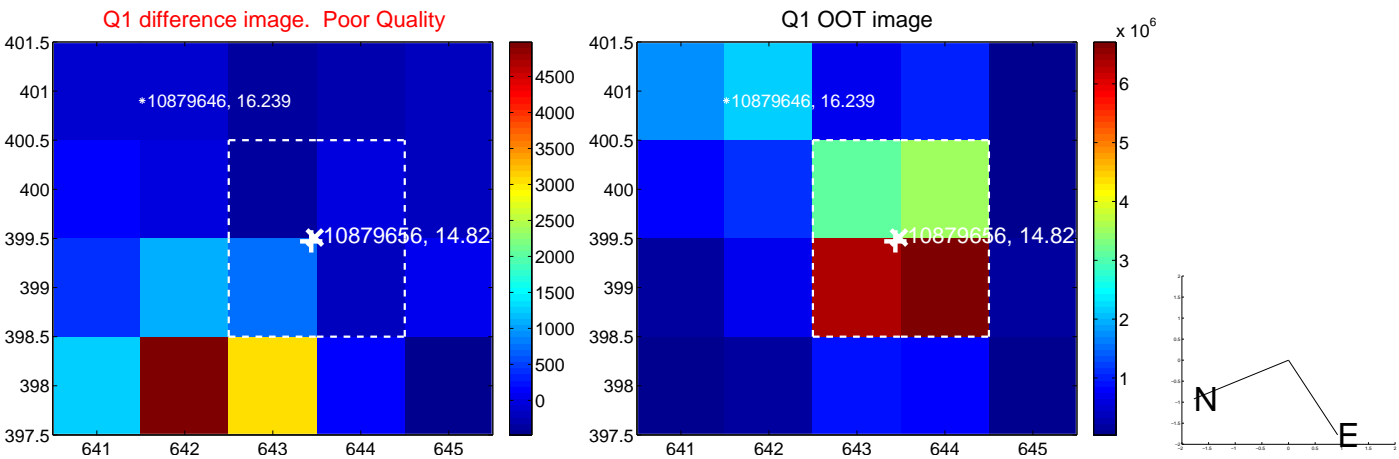
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.421 \pm 0.224$	28.65	$1.667 \pm 0.294$	$6.201 \pm 0.166$
PRF-fit source offset from KIC position	$6.674 \pm 0.212$	31.46	$1.759 \pm 0.297$	$6.438 \pm 0.151$
photometric centroid source offset	$2.66 \pm 1.43$	1.86	$2.48 \pm 1.43$	$0.94 \pm 1.44$

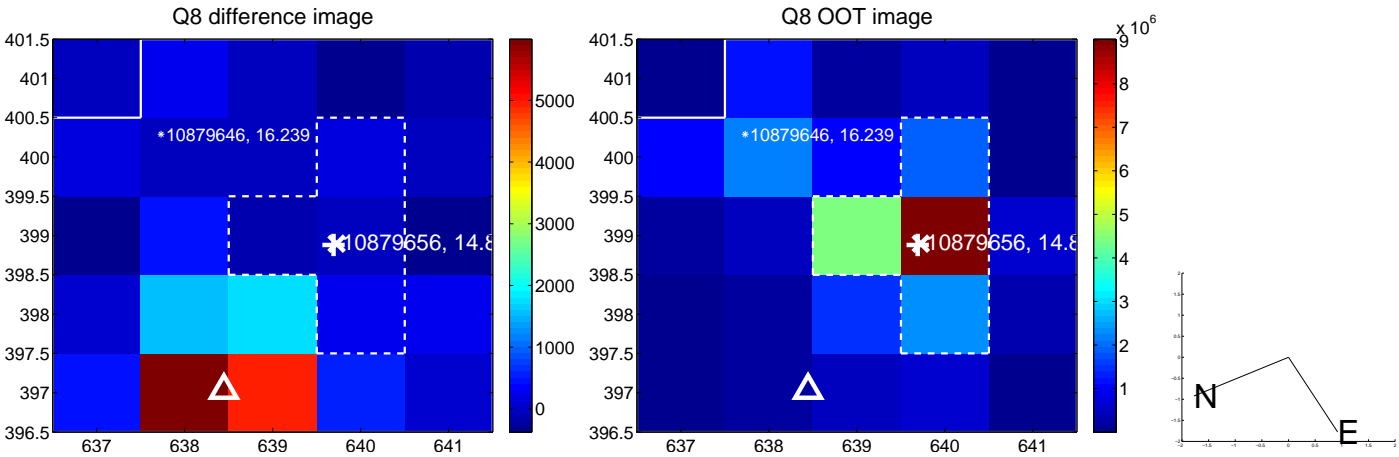
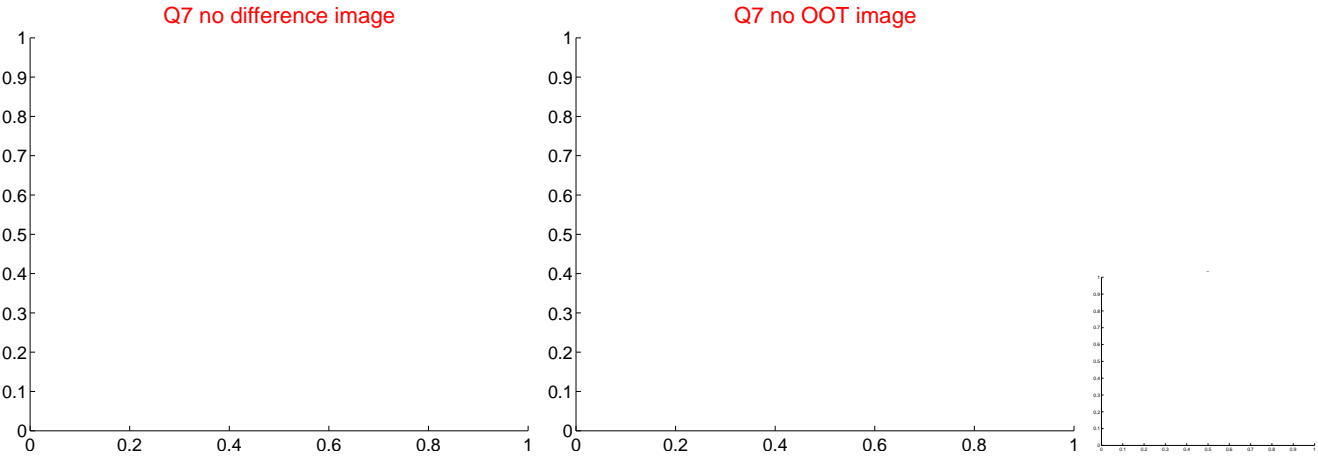
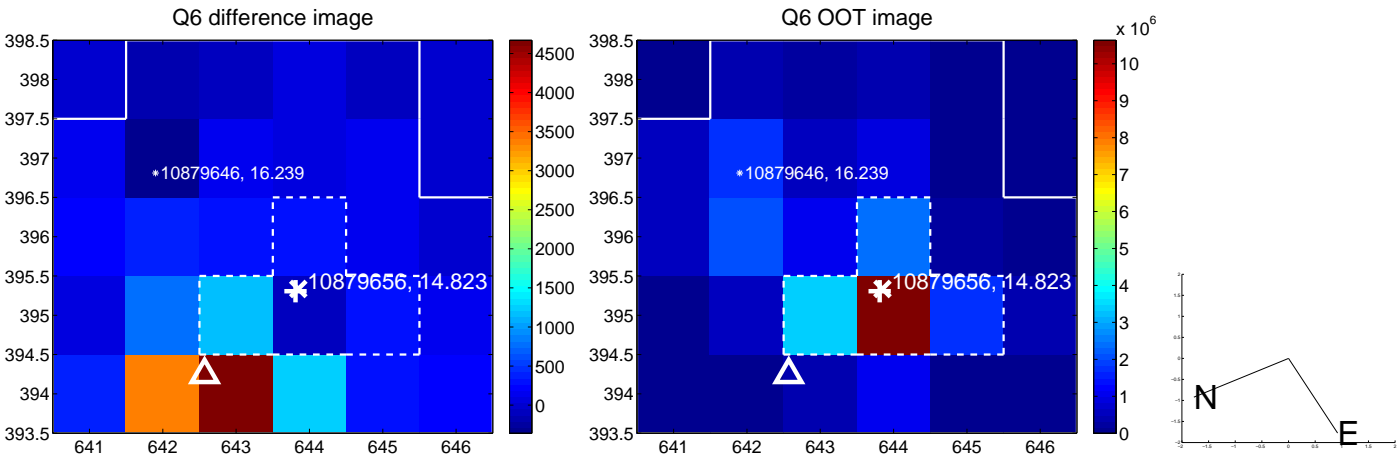
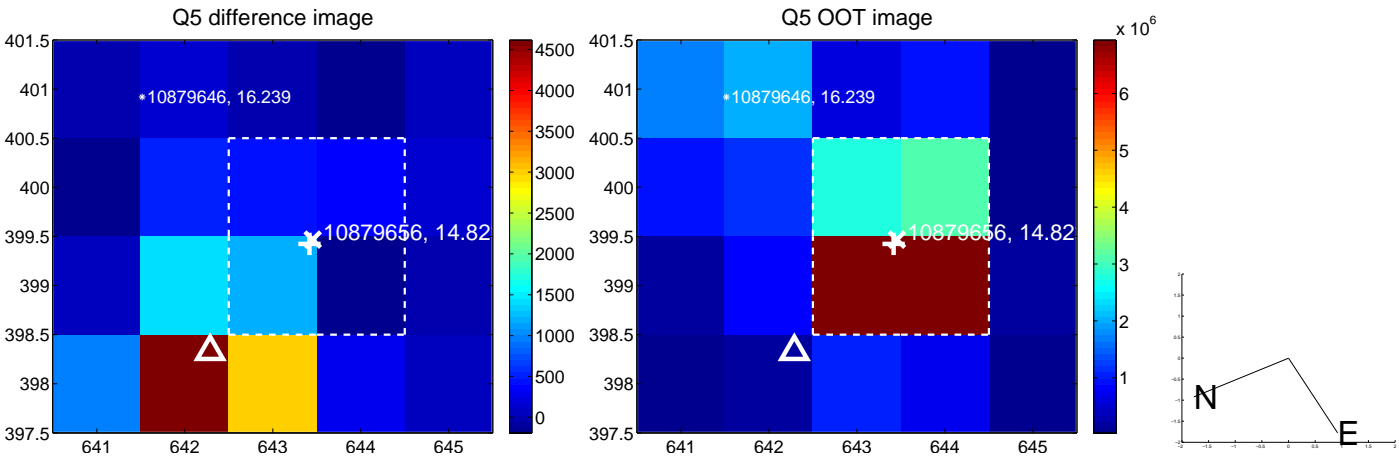


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

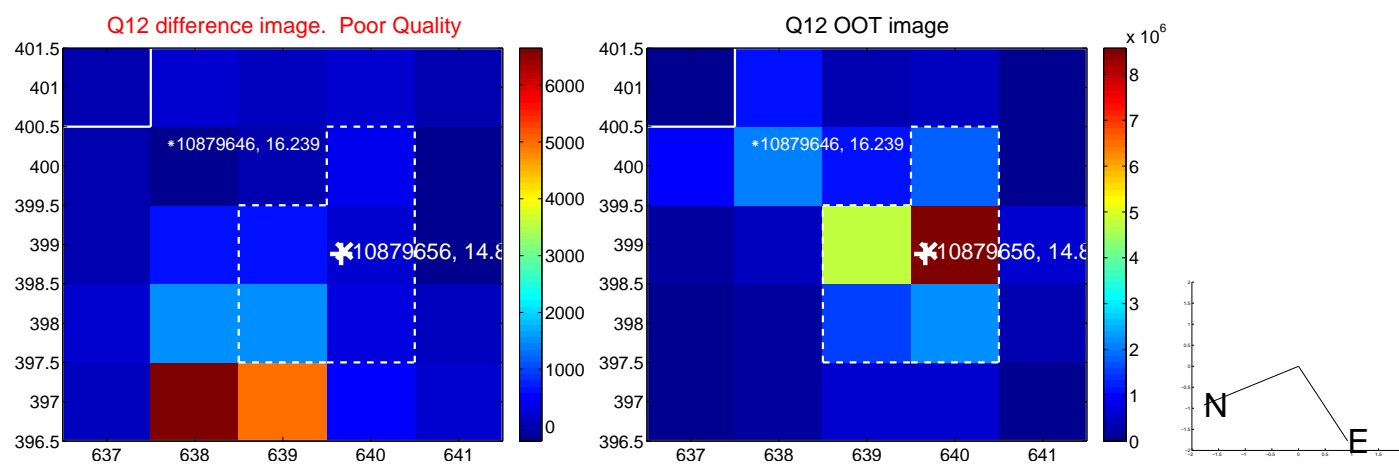
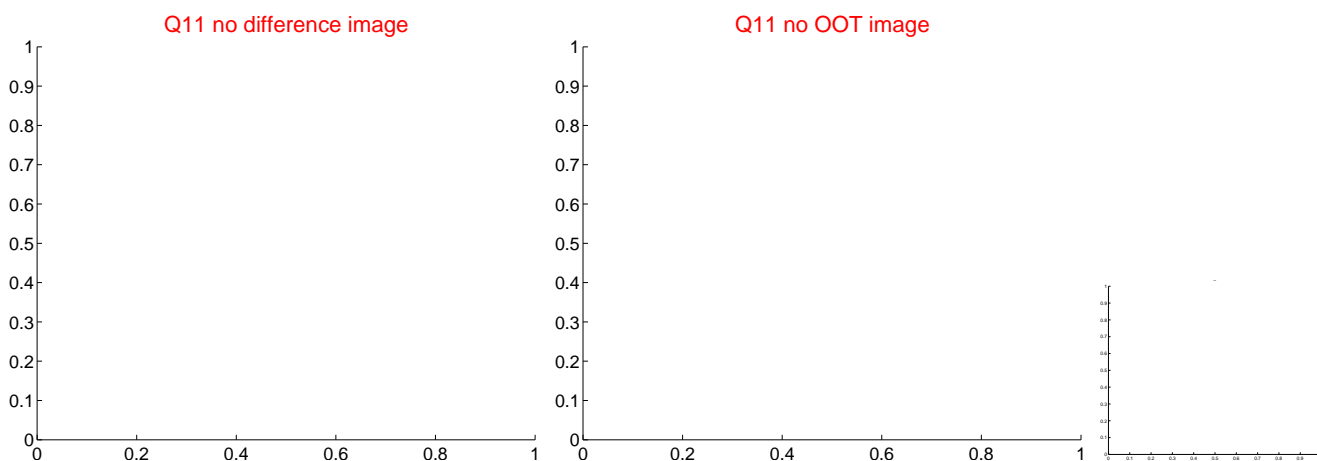
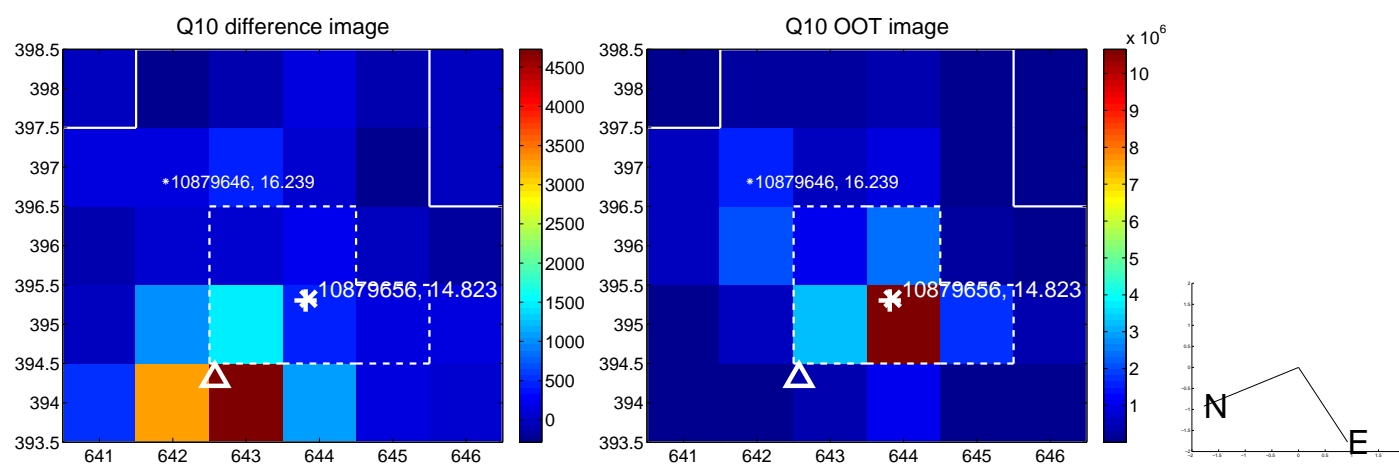
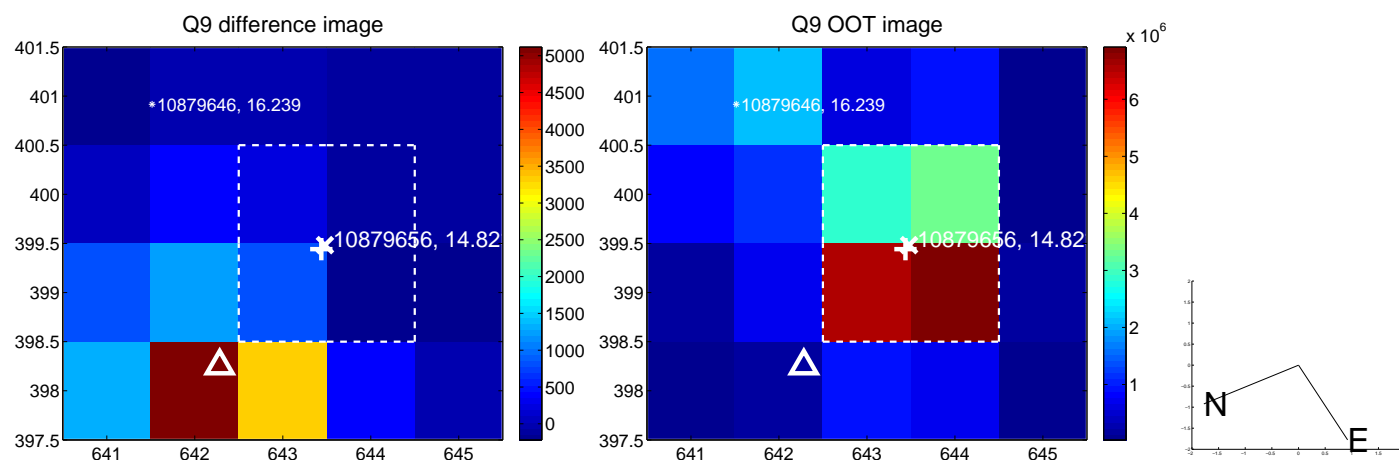
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



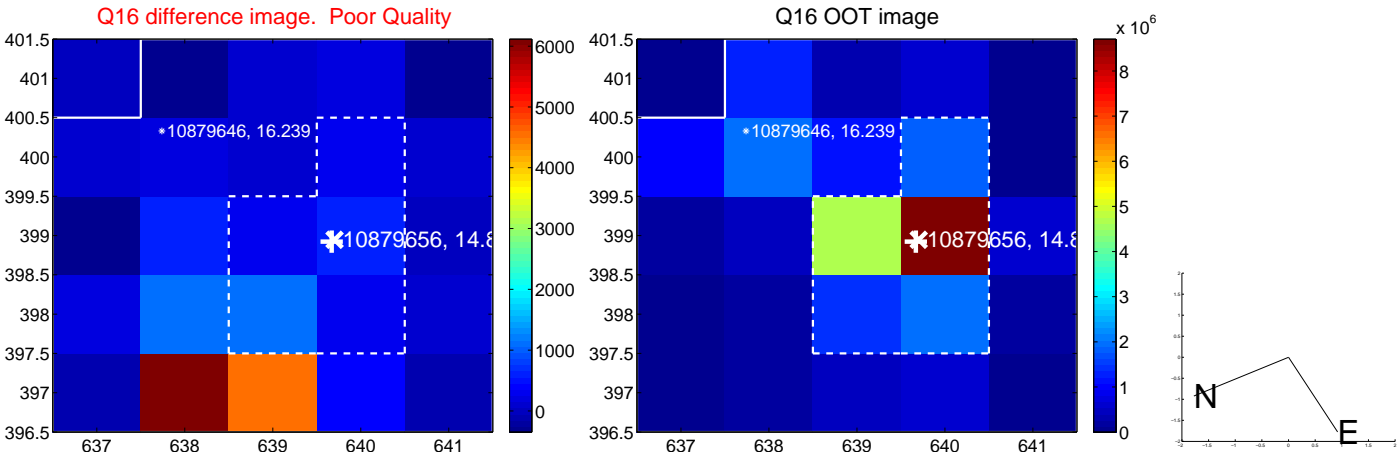
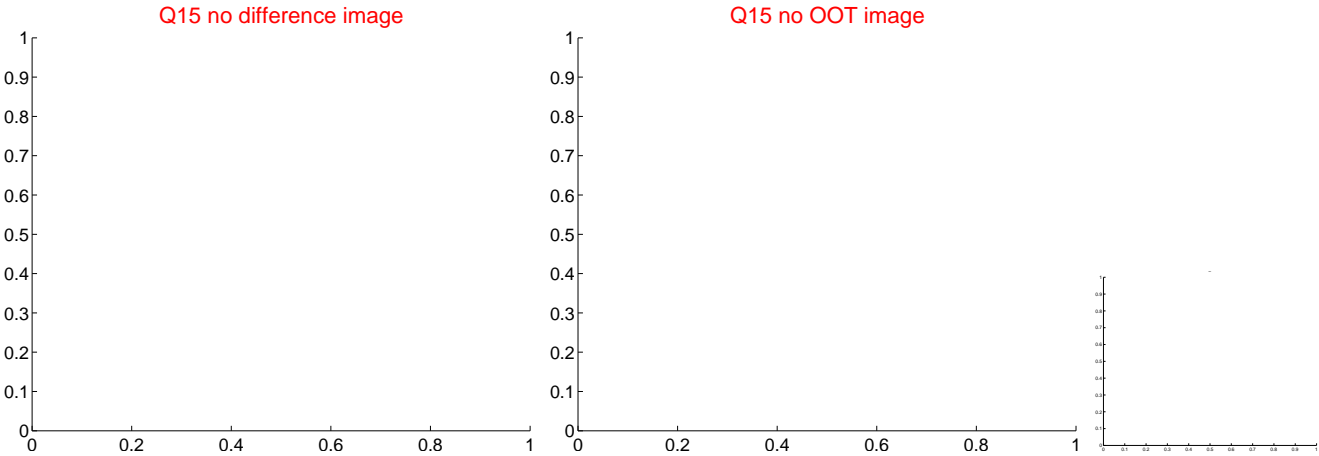
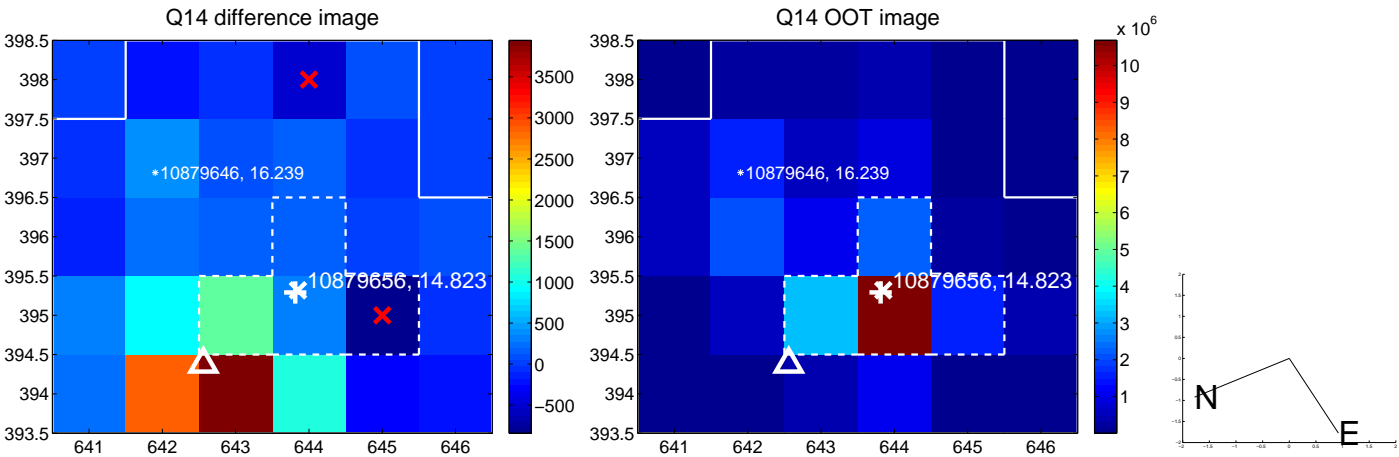
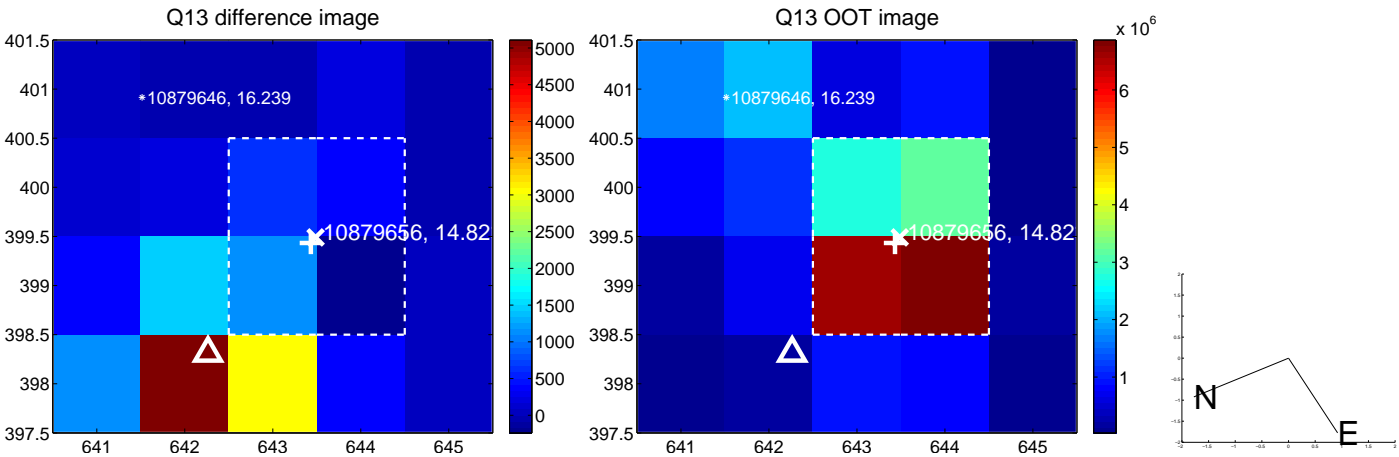
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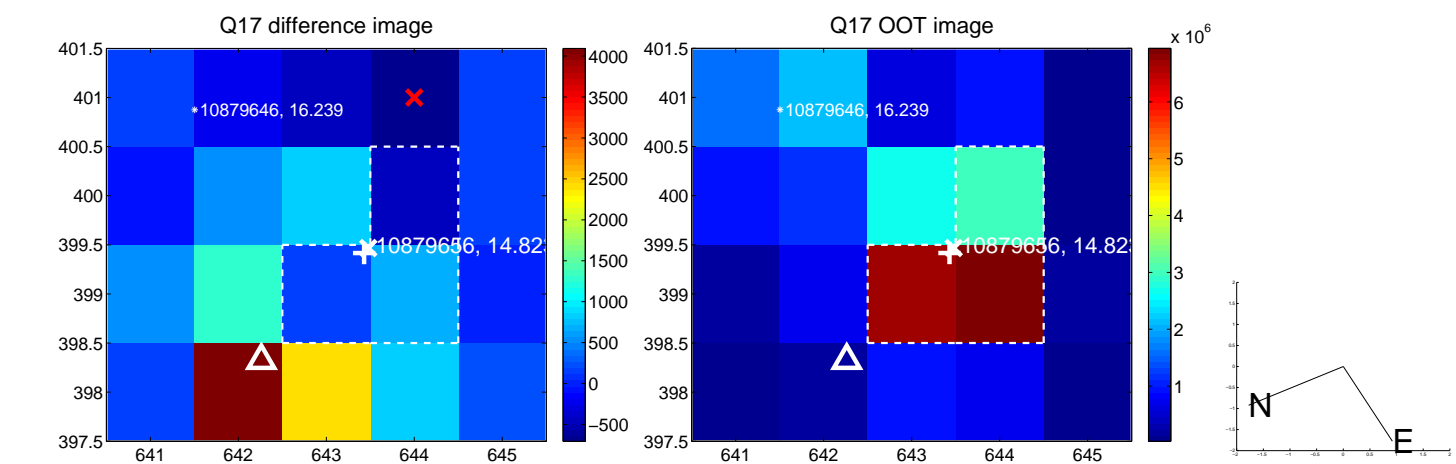


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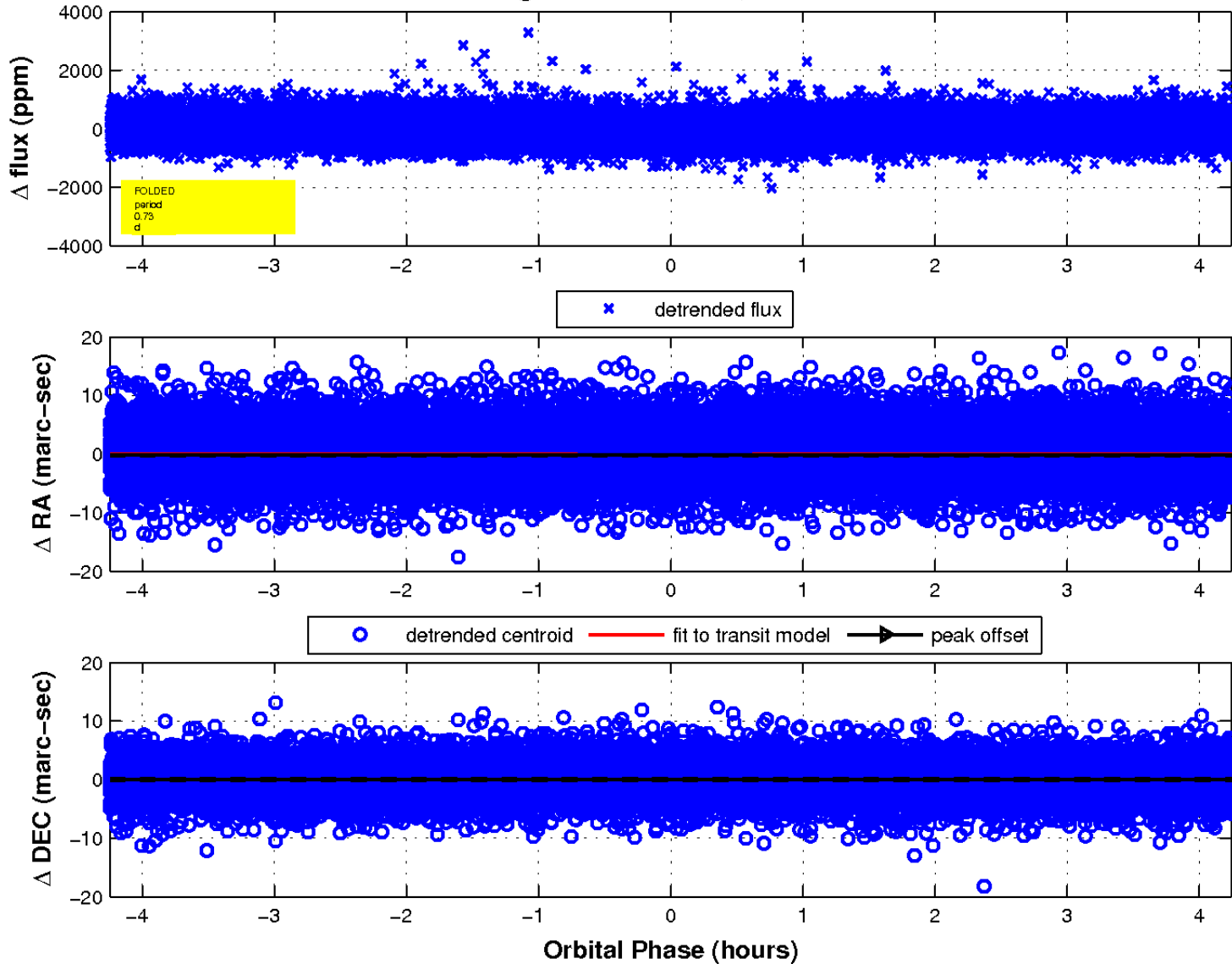




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

