

# KIC 007116859

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007116859-01	OBS	7580.01	0.566788	131.820177	43.7	2.958	7.3	7.3	0.94	5766	0.74	5328.24
007116859-02	OBS	No	64.659758	140.494949	3686.0	3.500	14.7	-1.0	0.94	5766	5.67	9.63
007116859-03	OBS	No	64.559130	140.864791	2891.5	2.268	13.2	8.4	0.94	5766	5.04	9.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007116859-01	OBS	FP	0.00	1	0	0	1	LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH
007116859-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
007116859-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

**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.

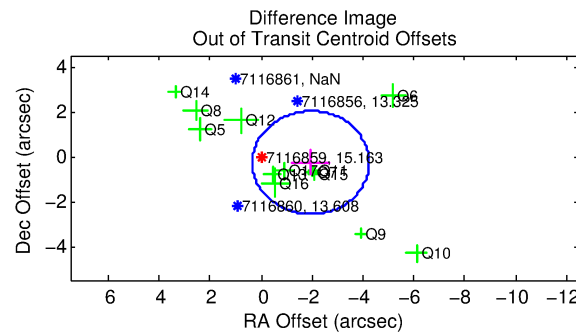
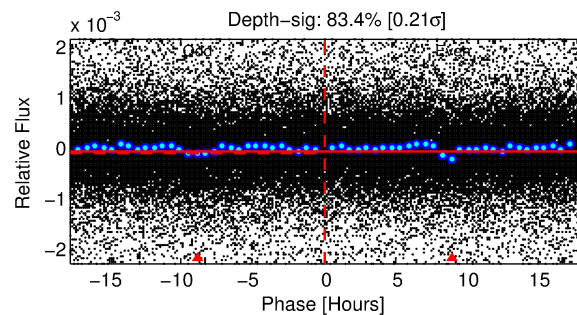
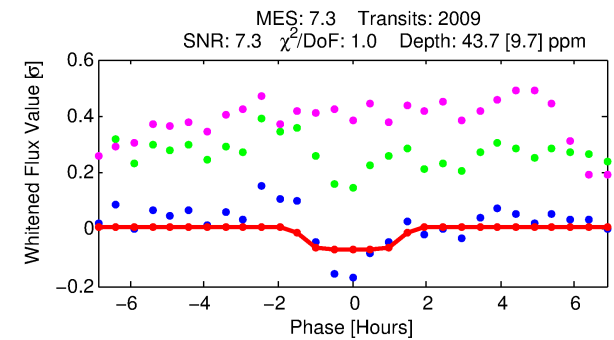
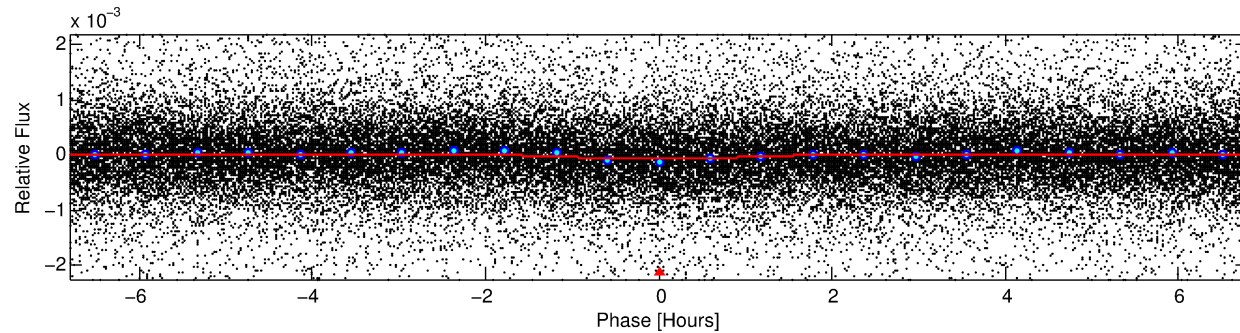
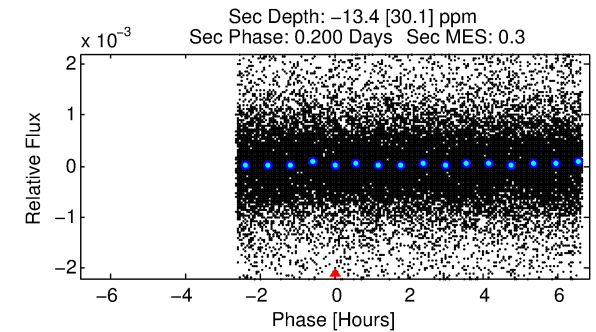
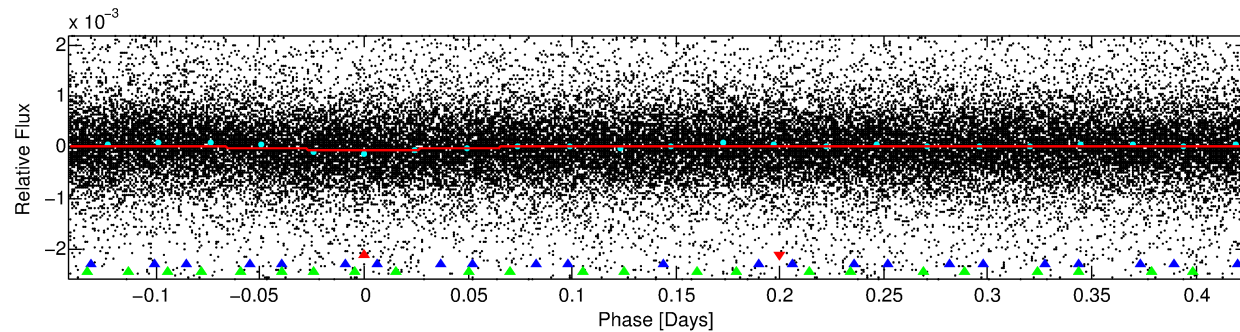
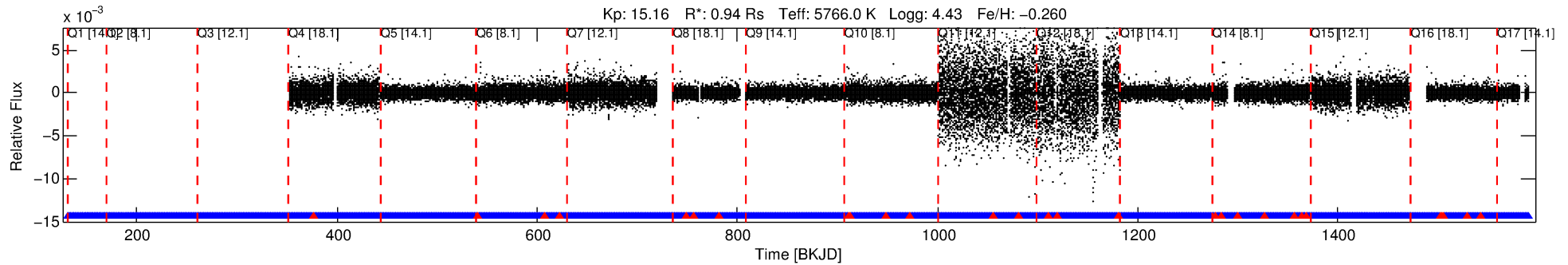
## Ephemeris Match Information For 007116859-01

TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $\mu$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
007116859-01	7116859	RR-Lyr-pri	7198959	1:1	691.3	174	-8	7.86	15.16	14166.00	Direct-PRF	0	1.96	19.46

**Notes:** P<sub>1</sub>:P<sub>2</sub> is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column. m<sub>2</sub> and m<sub>1</sub> are the magnitudes of the parent and child. D<sub>2</sub>/D<sub>1</sub> is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 7116859 Candidate: 1 of 3 Period: 0.567 d  
KOI: K07580.01 Corr: 0.774



## DV Fit Results:

Period = 0.56679 [0.00002] d  
Epoch = 131.8202 [0.0054] BKJD  
Rp/R\* = 0.0072 [0.0086]  
a/R\* = 1.15 [1.67]  
b = 0.90 [1.29]  
Seff = 5328.24 [1952.03]  
Teff = 2179 [200] K  
Rp = 0.74 [0.91] Re  
a = 0.0128 [0.0030] AU  
Ag = N/A  
Teffp = N/A

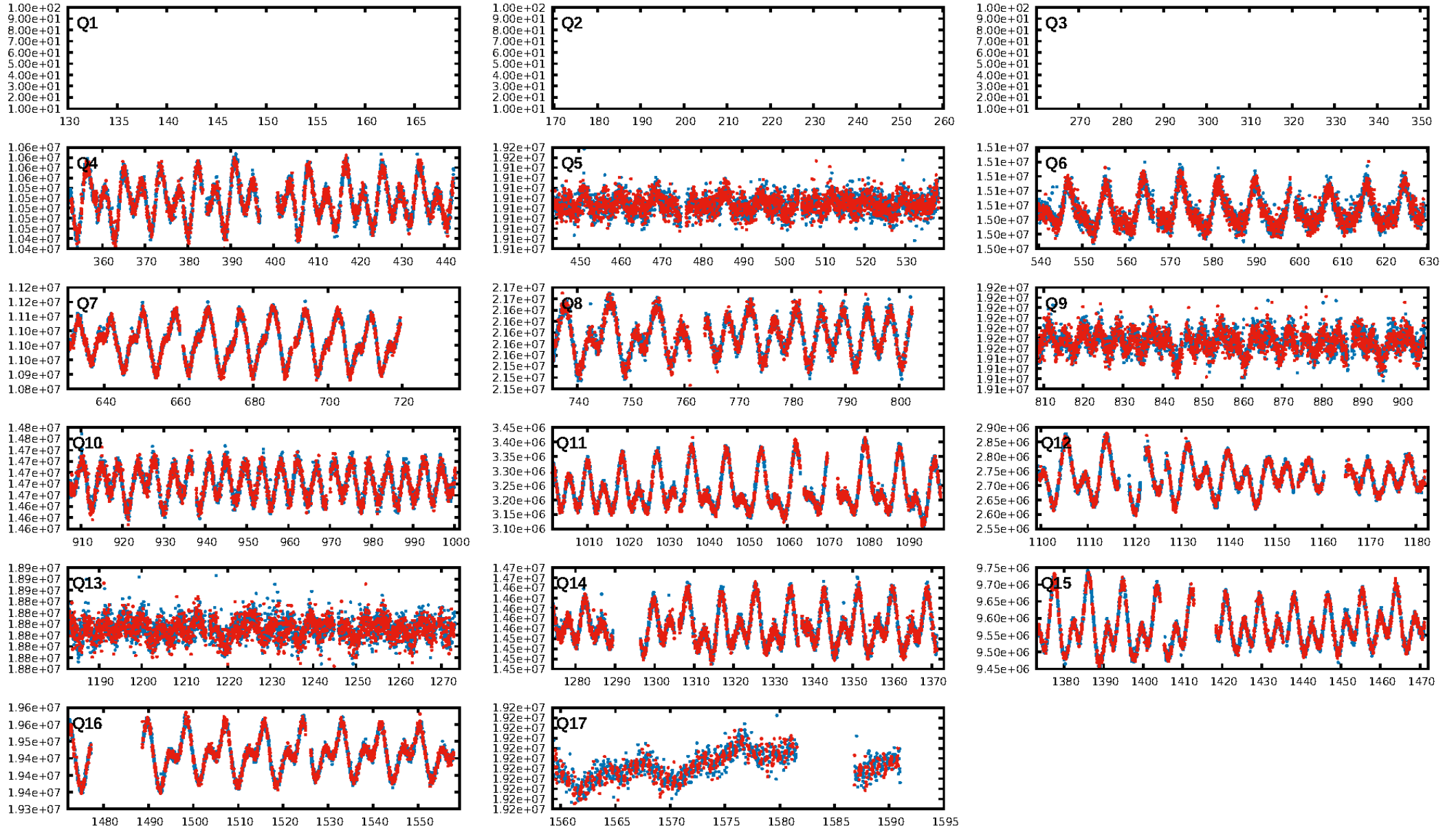
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [412.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 3.79e-10**  
RollingBand-fgt: 0.99 [1934/1962]  
**GhostDiagnostic-chr: 0.2629**  
Centroid-sig: 56.5%  
Centroid-so: 1.575 arcsec [1.22σ]  
OotOffset-rm: 1.968 arcsec [2.57σ]  
KicOffset-rm: 2.073 arcsec [2.44σ]  
OotOffset-st: 3/3/3/4 [13]  
KicOffset-st: 3/3/3/4 [13]  
DiffImageQuality-fgm: 0.08 [1/13]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:58:04 Z

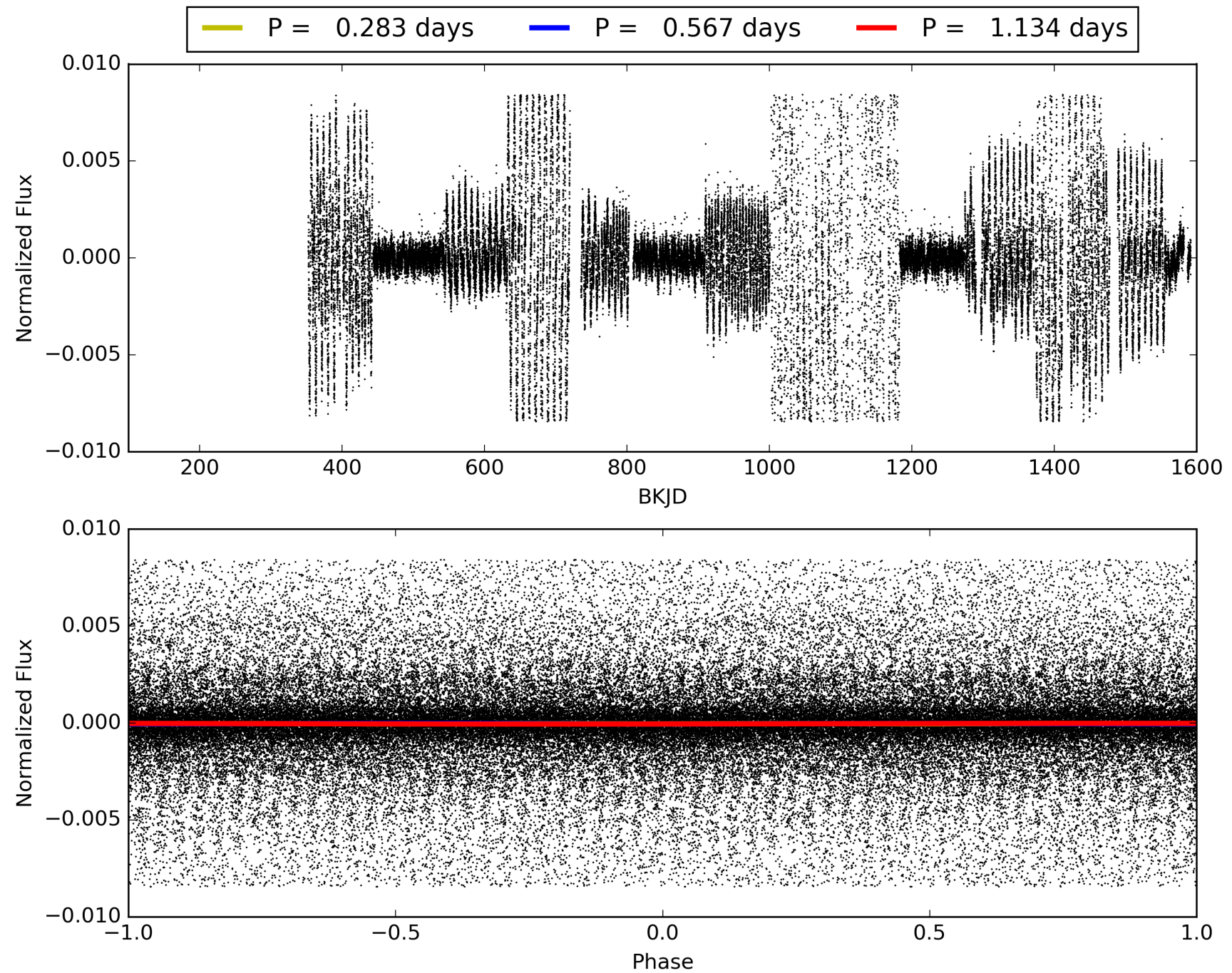
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007116859-01, PDC Light Curves



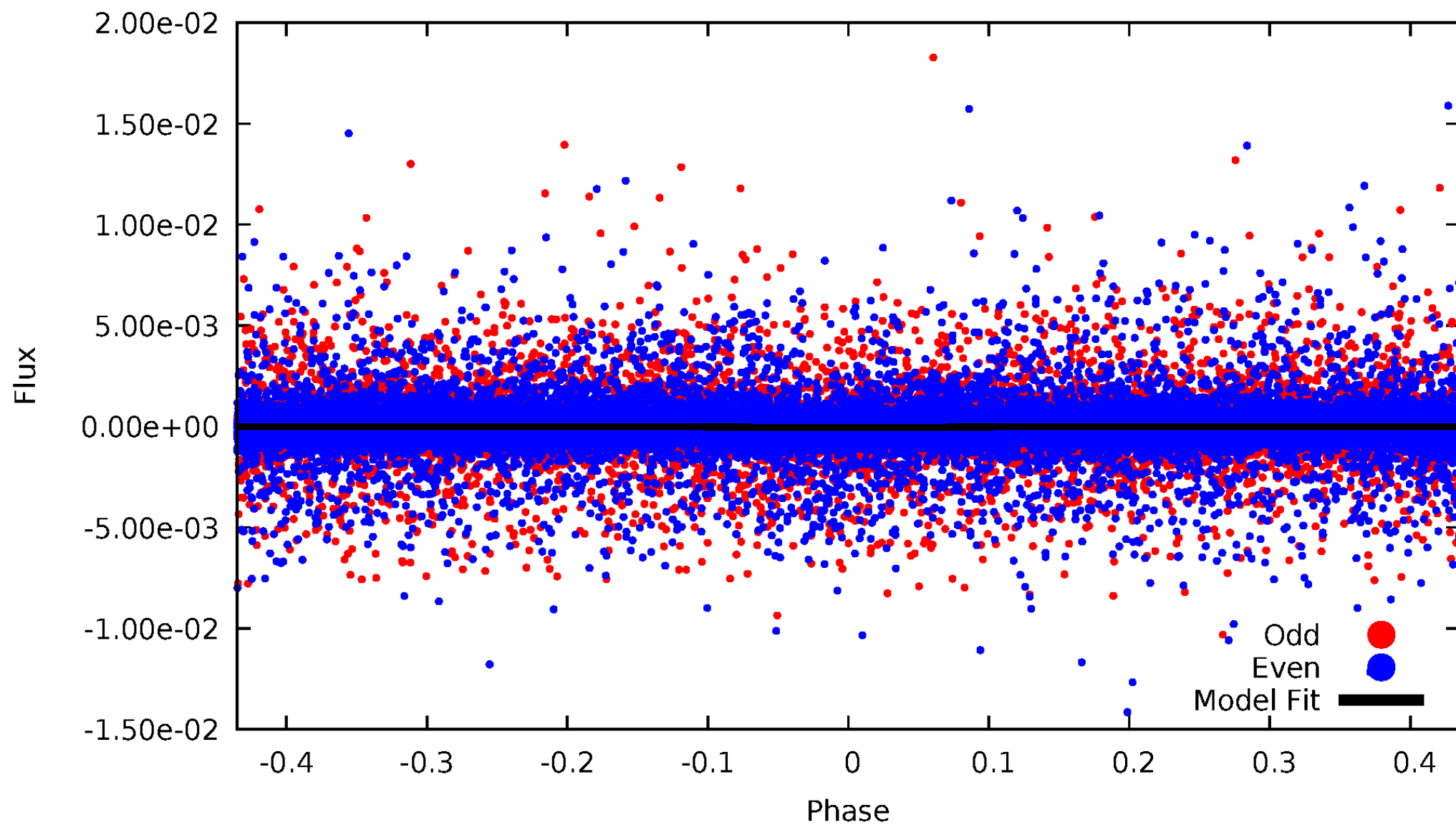


# TCE 007116859-01



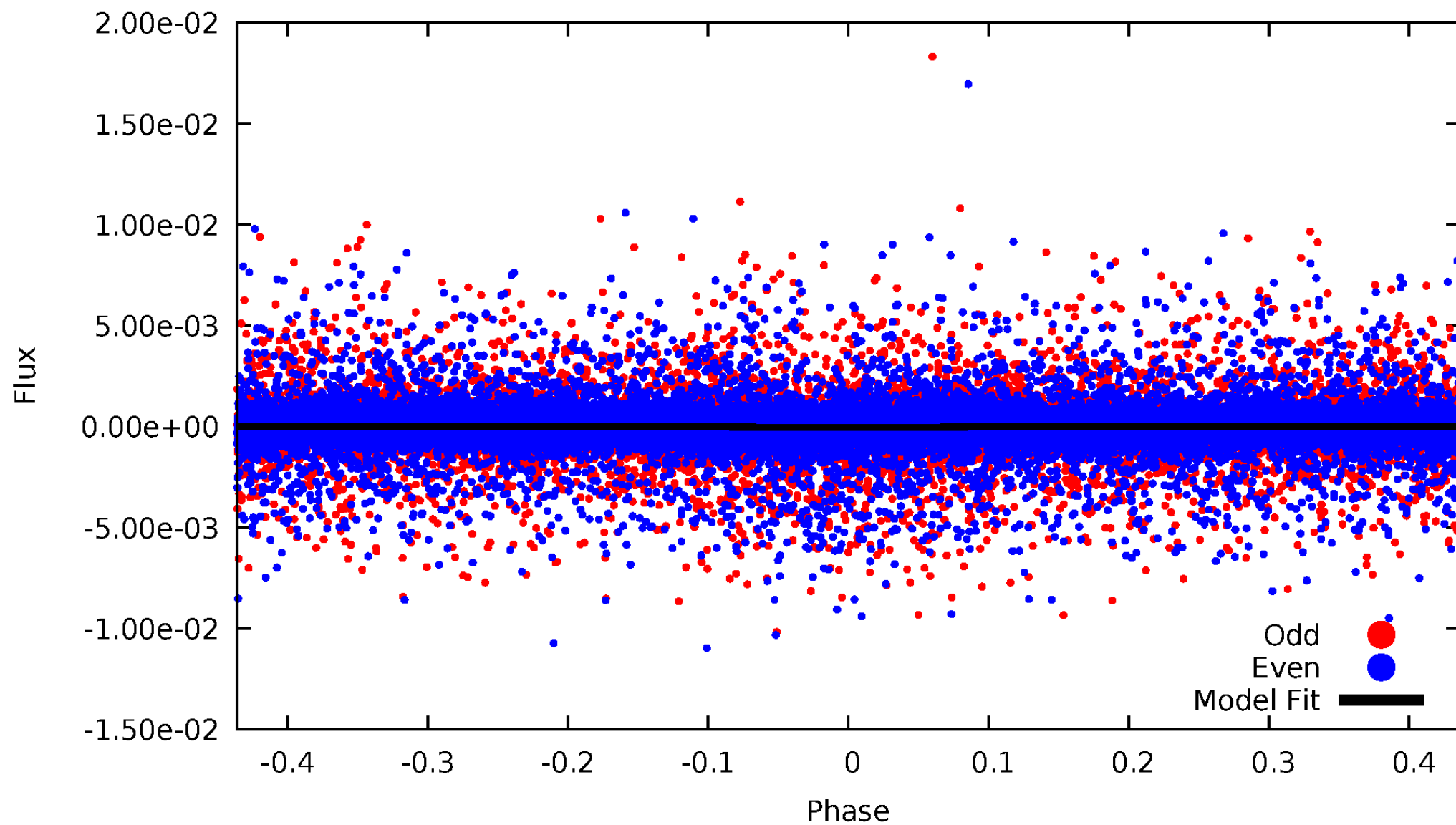
# DV Odd/Even

TCE 007116859-01



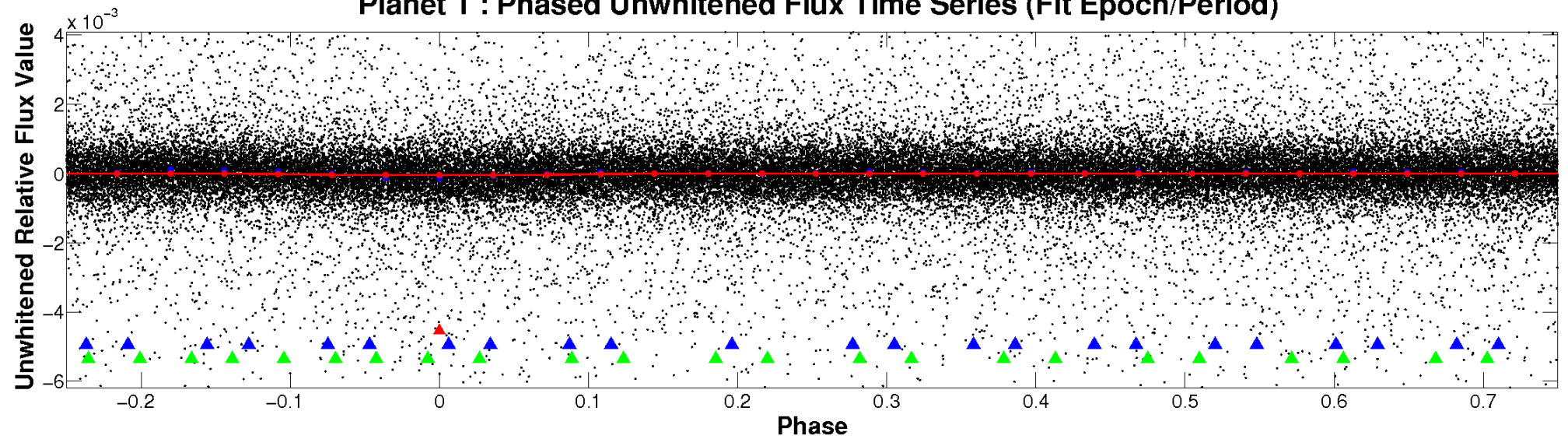
# ALT Odd/Even

TCE 007116859-01

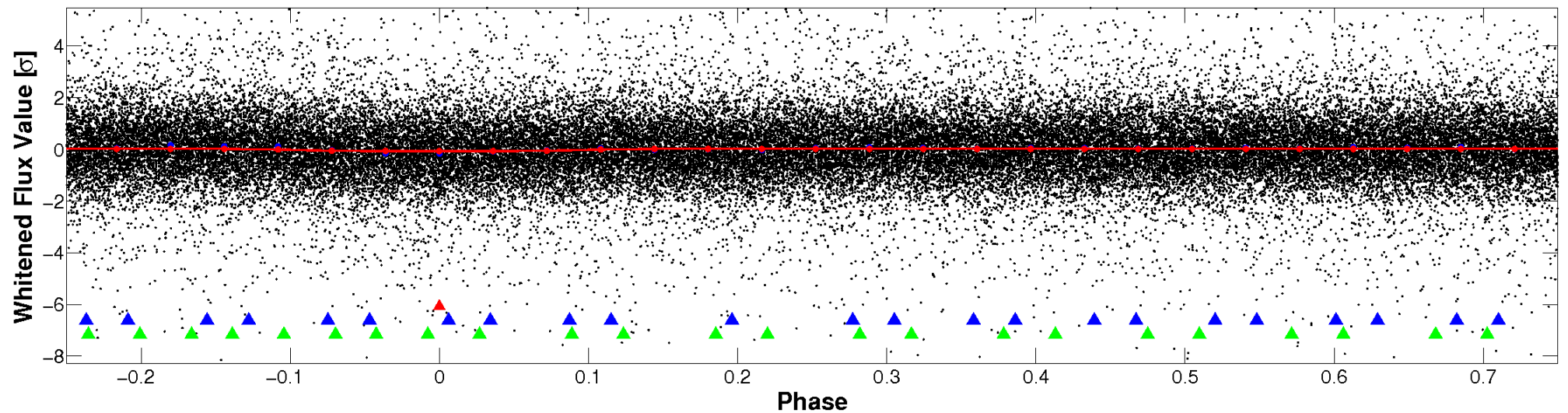


# Non-Whitened Vs. Whitened Light Curve

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



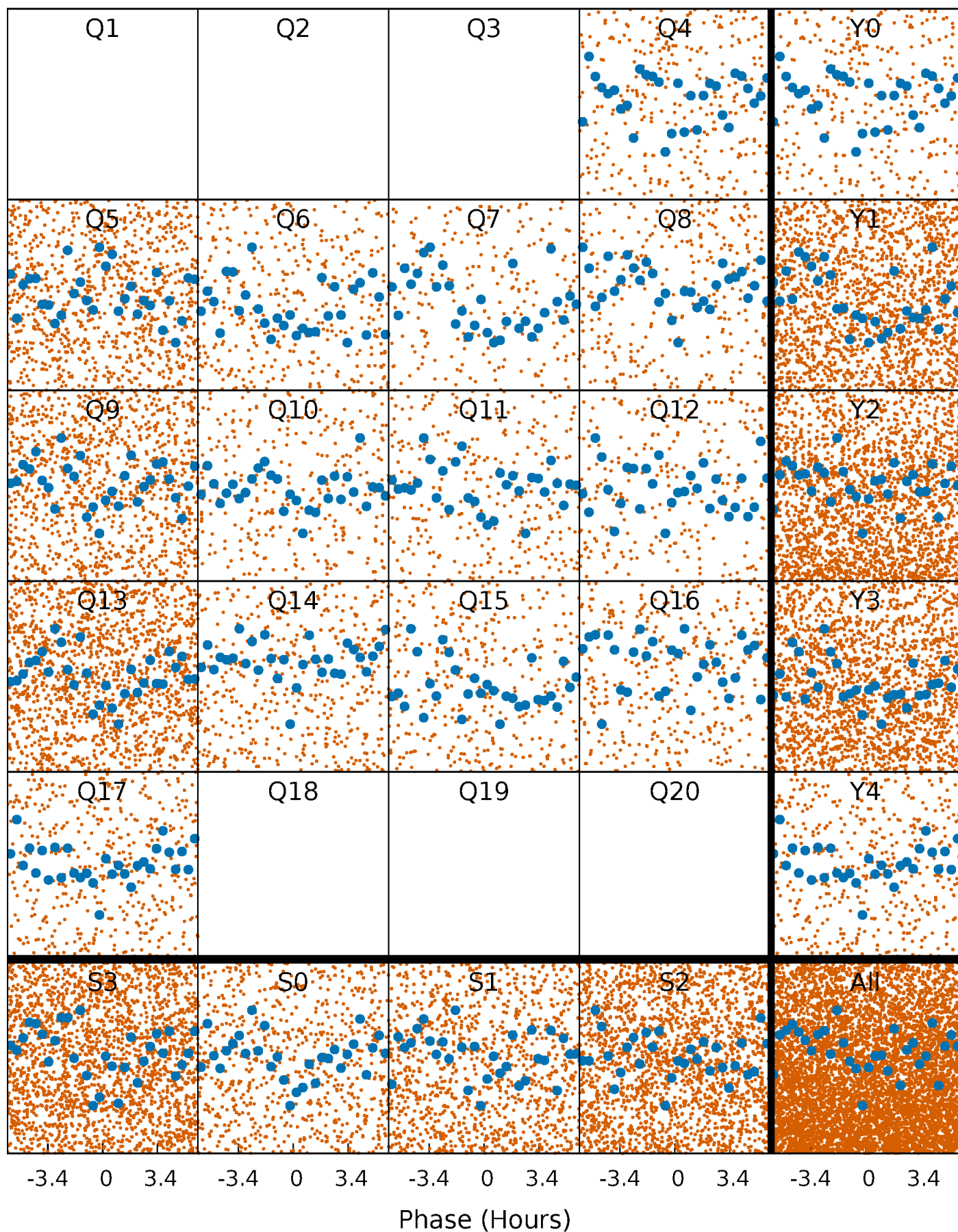
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

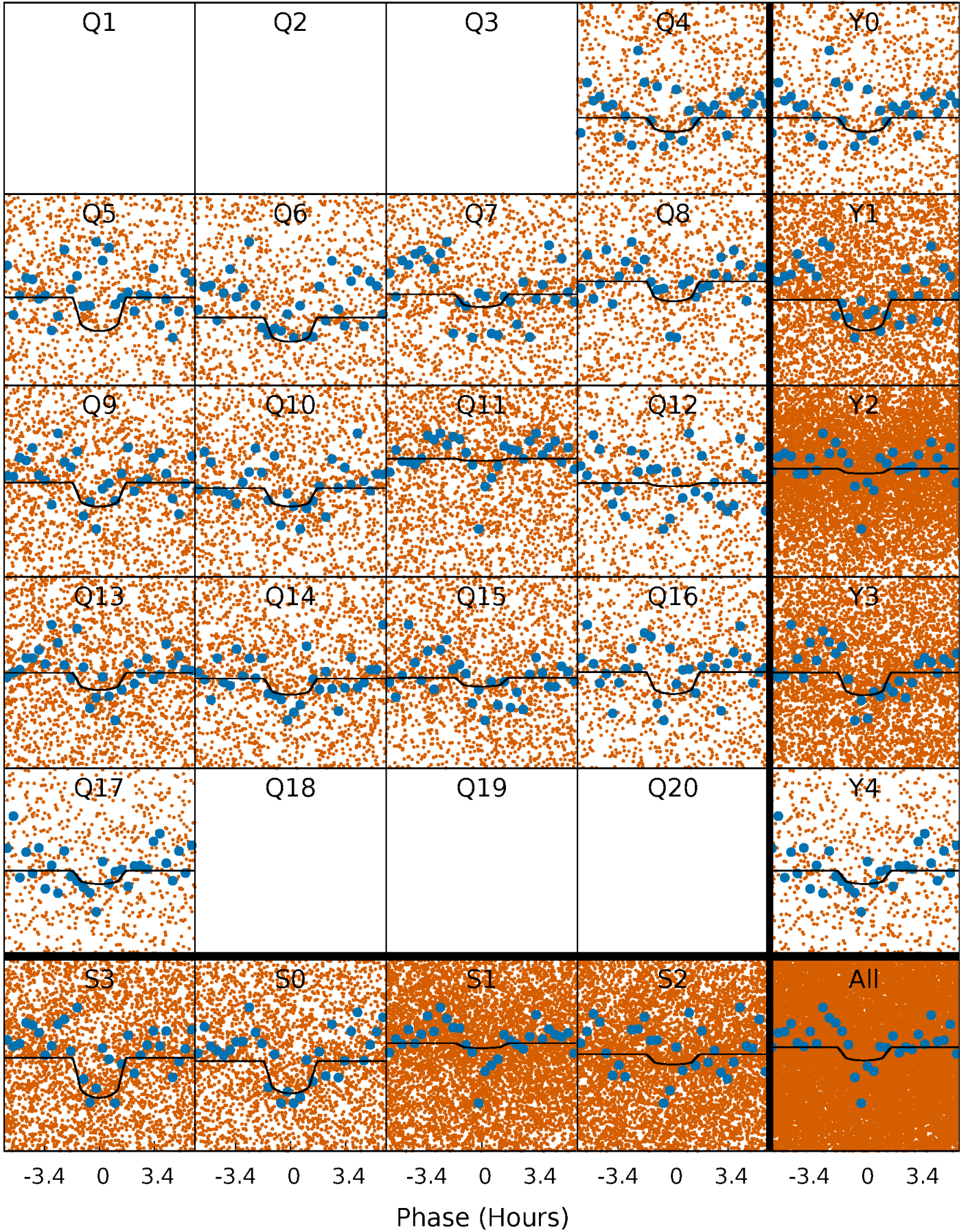
TCE 007116859-01 P= 0.566788 Days  $T_0=131.820177$  (BKJD)





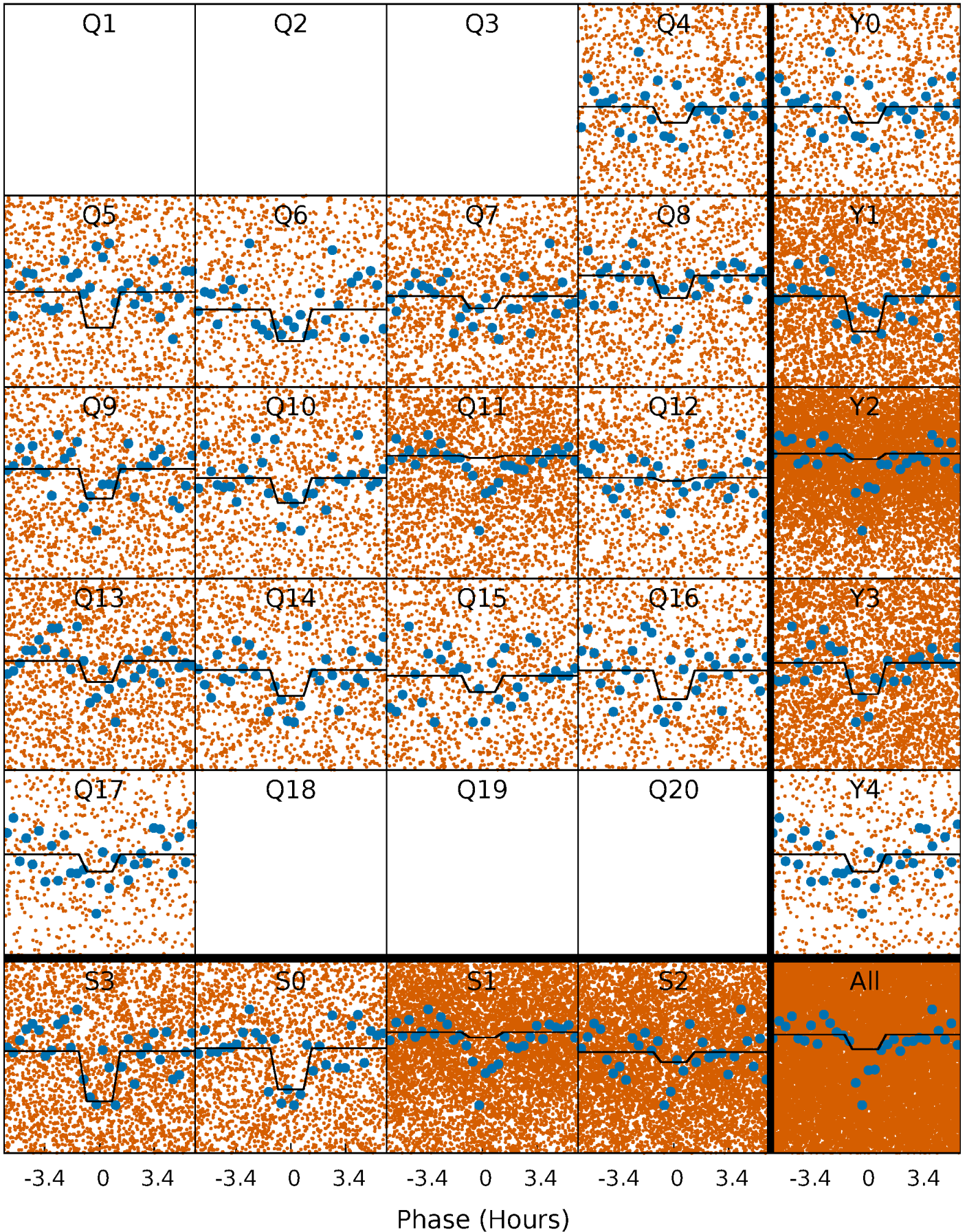
# DV Quarter-Phased Transit Curves

TCE 007116859-01   P= 0.566788 Days    $T_0=131.820177$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007116859-01 P= 0.566788 Days  $T_0=131.820183$  (BKJD)

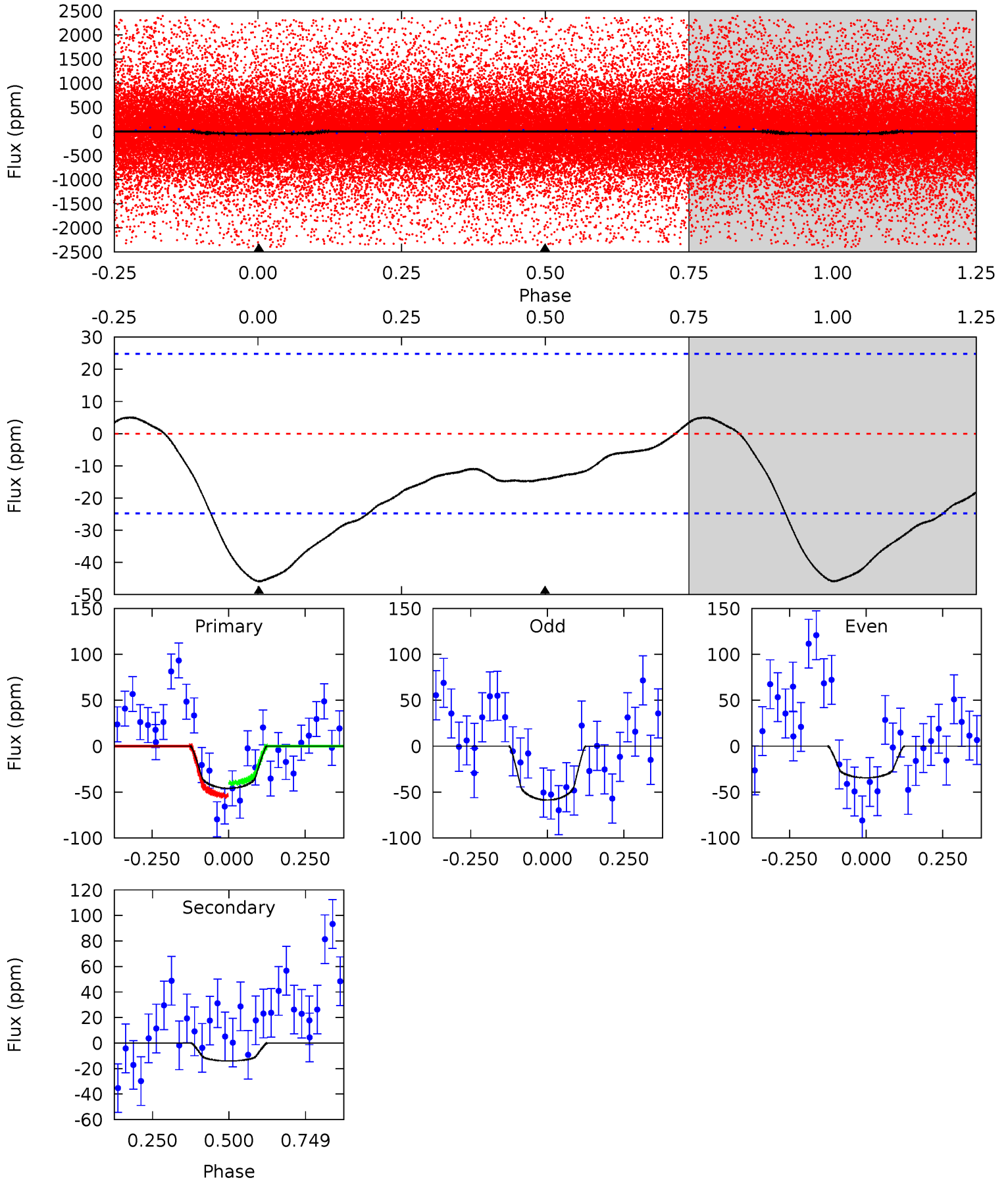




# DV Model-Shift Uniqueness Test

007116859-01, P = 0.566788 Days, E = 131.820177 Days

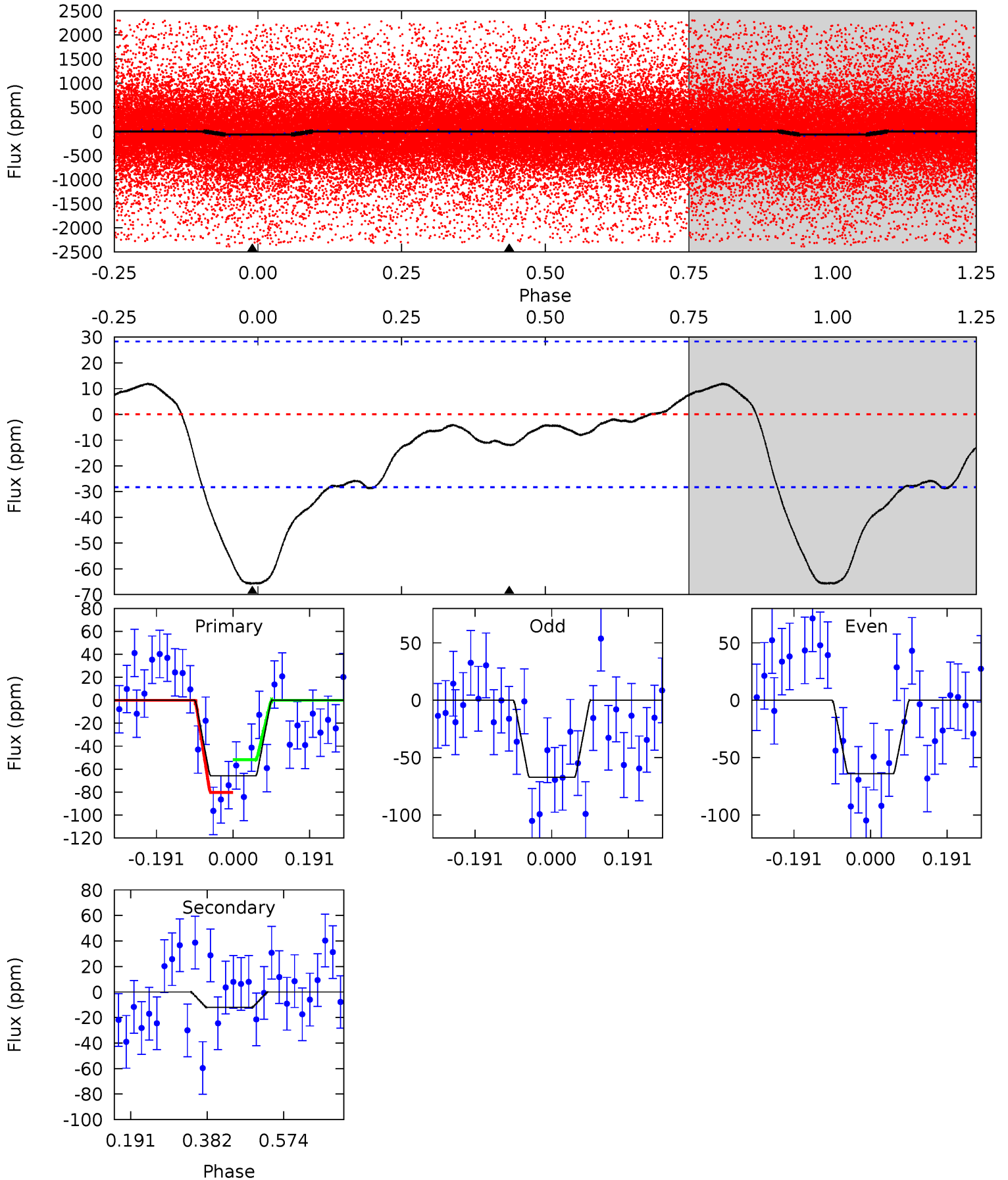
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.09	2.48	0	0	4.37	1.15	1.90	8.09	8.09	2.48	2.48	2.16	1.42	0.10	1.21



# Alt Model-Shift Uniqueness Test

007116859-01, P = 0.566788 Days, E = 131.820183 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	1.87	0	0	4.43	1.31	2.02	10.3	10.3	1.87	1.87	0.26	2.35	0.15	2.29





### Stellar Parameters For KIC 007116859

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5766^{+172}_{-189}$	$4.433^{+0.116}_{-0.188}$	$-0.260^{+0.300}_{-0.300}$	$0.940^{+0.259}_{-0.139}$	$0.874^{+0.120}_{-0.080}$	$1.483^{+0.698}_{-0.724}$
	+3%/-3%	+3%/-4%	+115%/-115%	+28%/-15%	+14%/-9%	+47%/-49%
Source	KIC0	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 007116859-01 / KOI 7580.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-14 \pm 6$	$1.01^{+0.81}_{-0.63}$	$3063^{+235}_{-178}$	$3683^{+2012}_{-1383}$	$1.148^{+7.090}_{-0.826}$
Alt.	$-12 \pm 6$	$0.99^{+0.85}_{-0.63}$	$3063^{+205}_{-178}$	$3555^{+2137}_{-6198}$	$1.036^{+6.840}_{-0.820}$

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

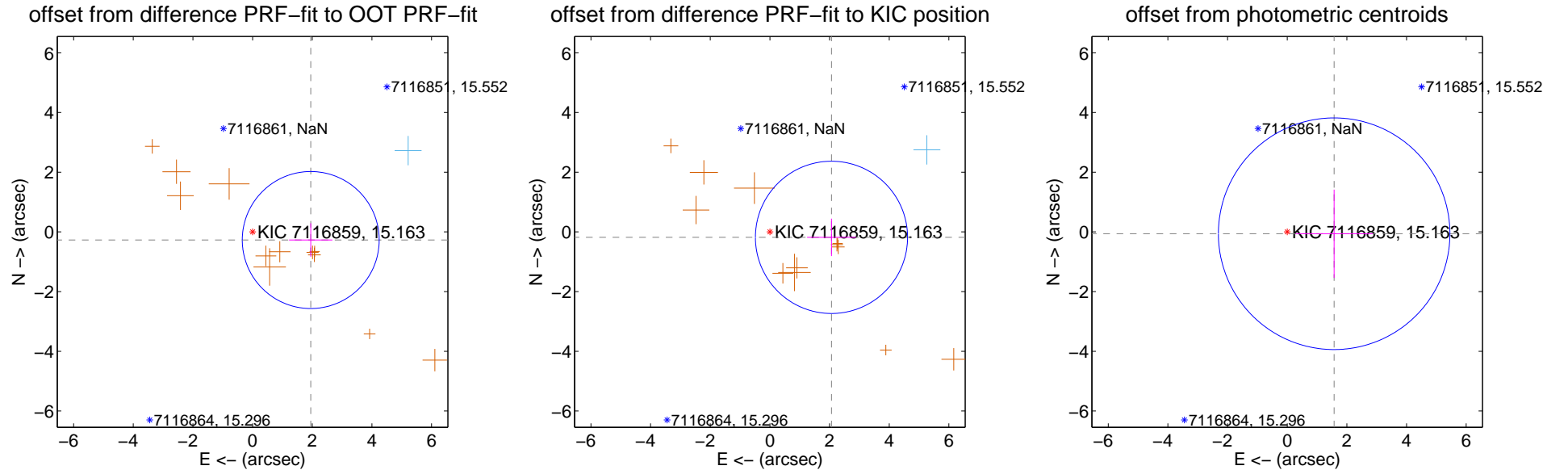
## DV Centroid Data

Supplemental centroid analysis for 007116859-01. Kepler magnitude: 15.16. Transit SNR 7.28

There are 1 quarters with good PRF difference image offsets

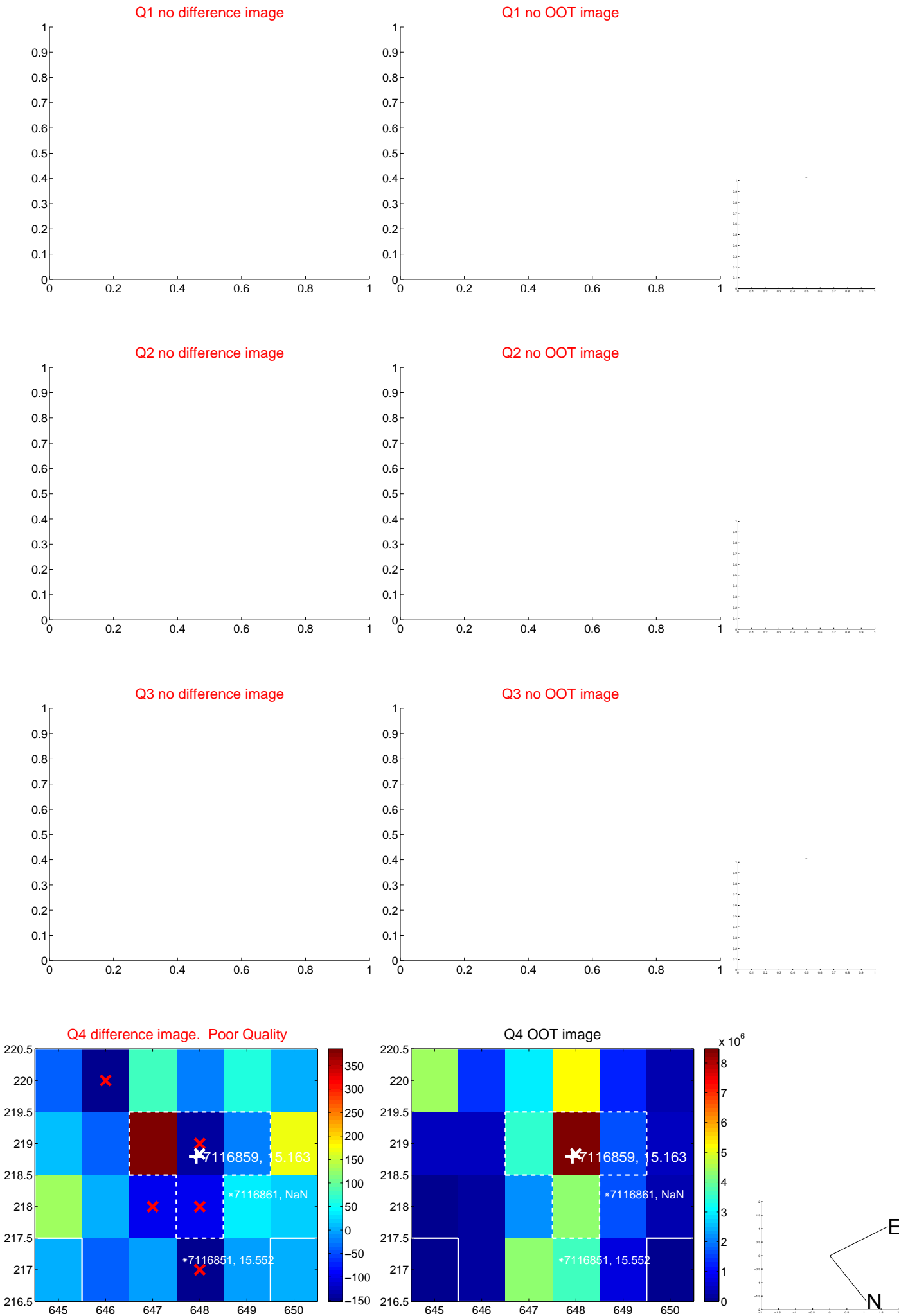
The direct PRF centroid is offset from the target star catalog position by about 0.54 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.968 \pm 0.765$	2.57	$-1.949 \pm 0.726$	$-0.272 \pm 0.561$
PRF-fit source offset from KIC position	$2.073 \pm 0.850$	2.44	$-2.065 \pm 0.818$	$-0.183 \pm 0.627$
photometric centroid source offset	$1.57 \pm 1.29$	1.22	$-1.57 \pm 1.29$	$-0.06 \pm 1.48$

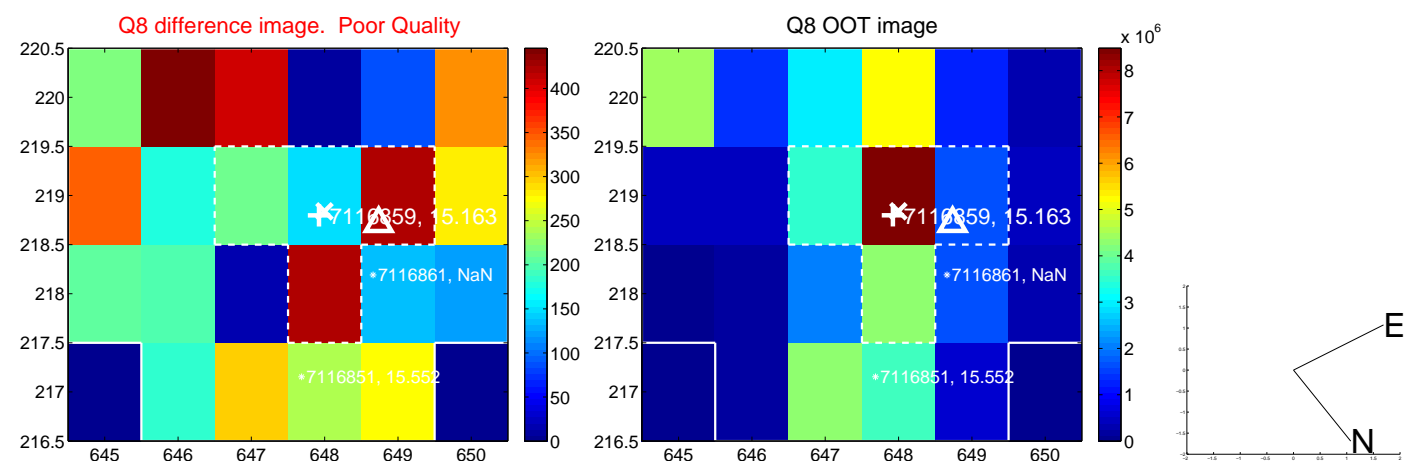
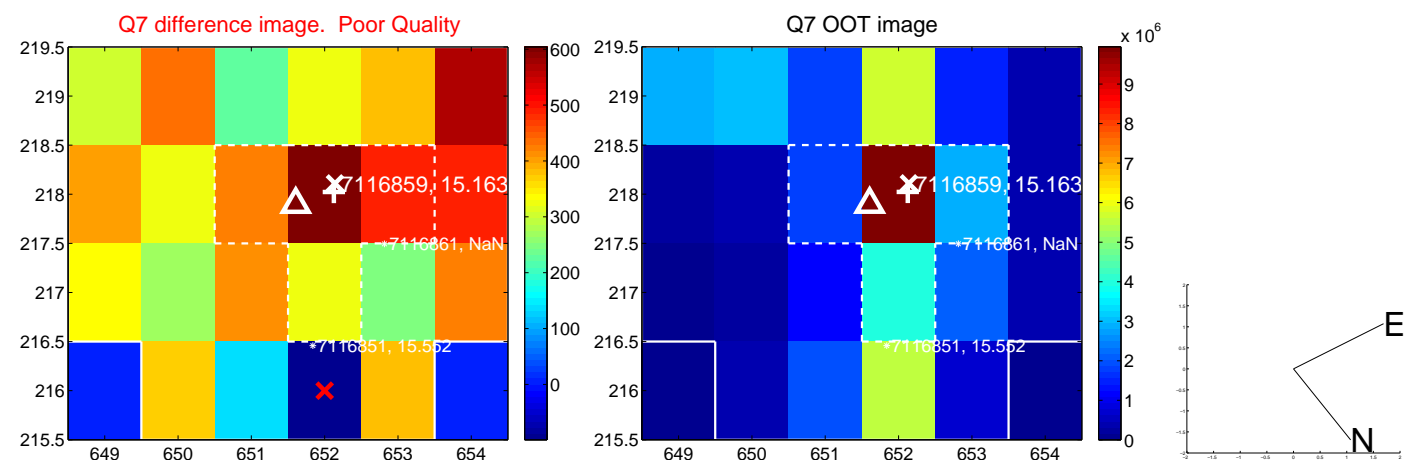
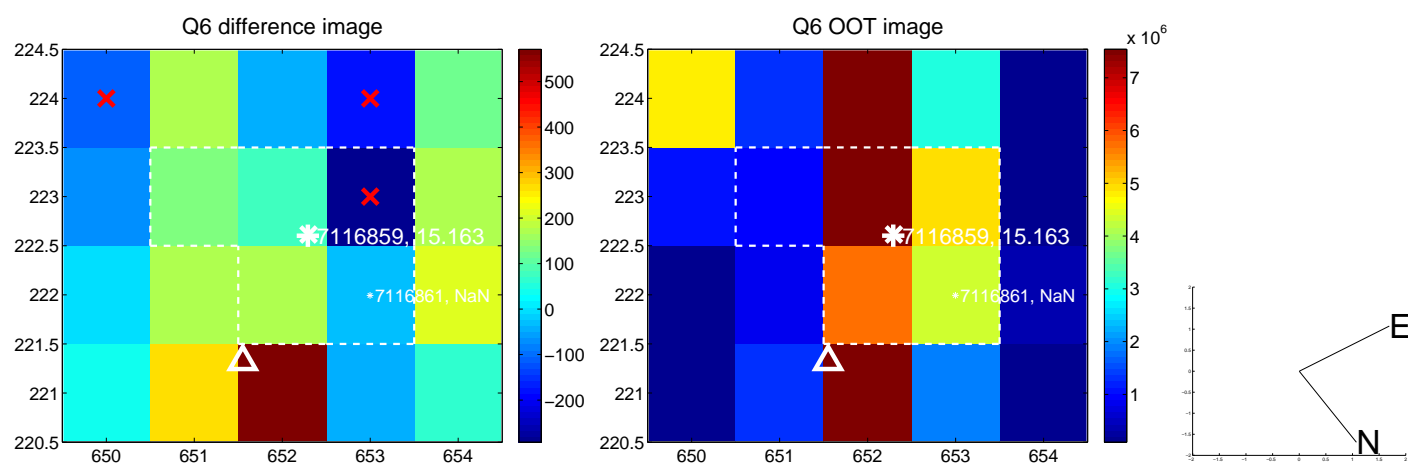
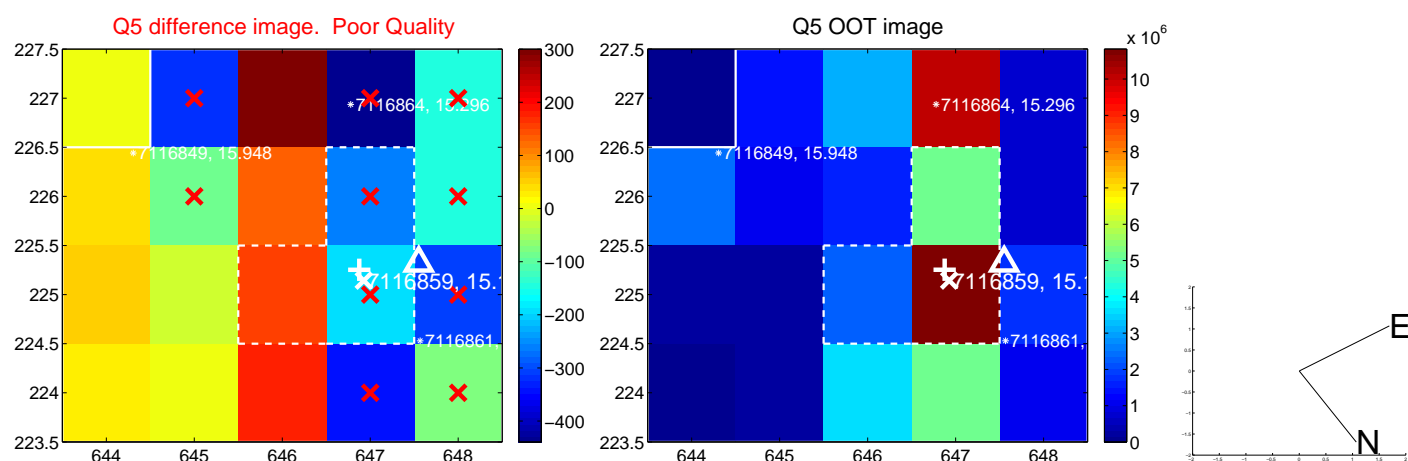


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

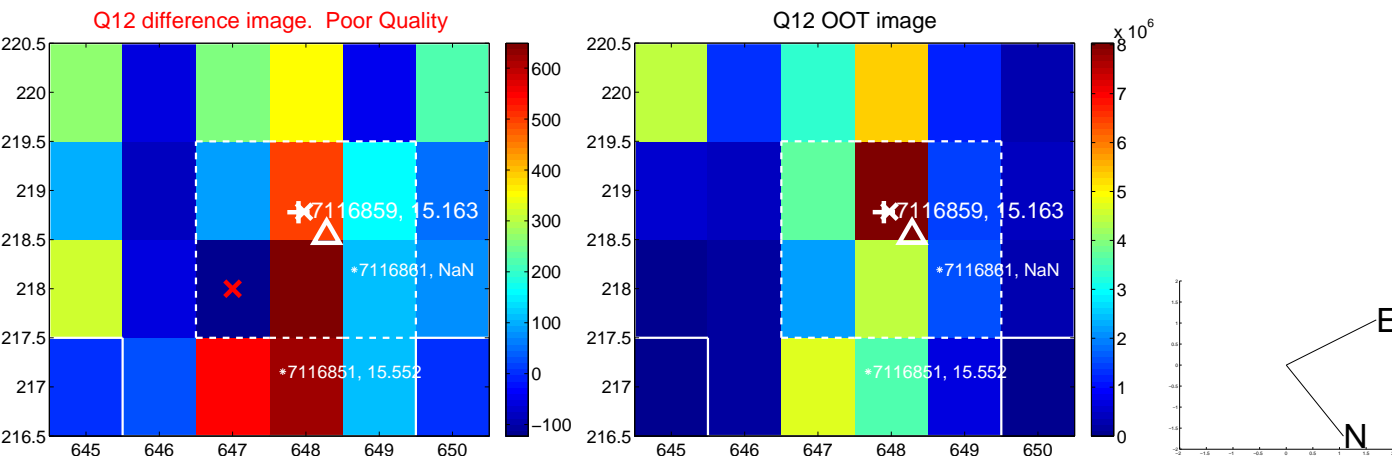
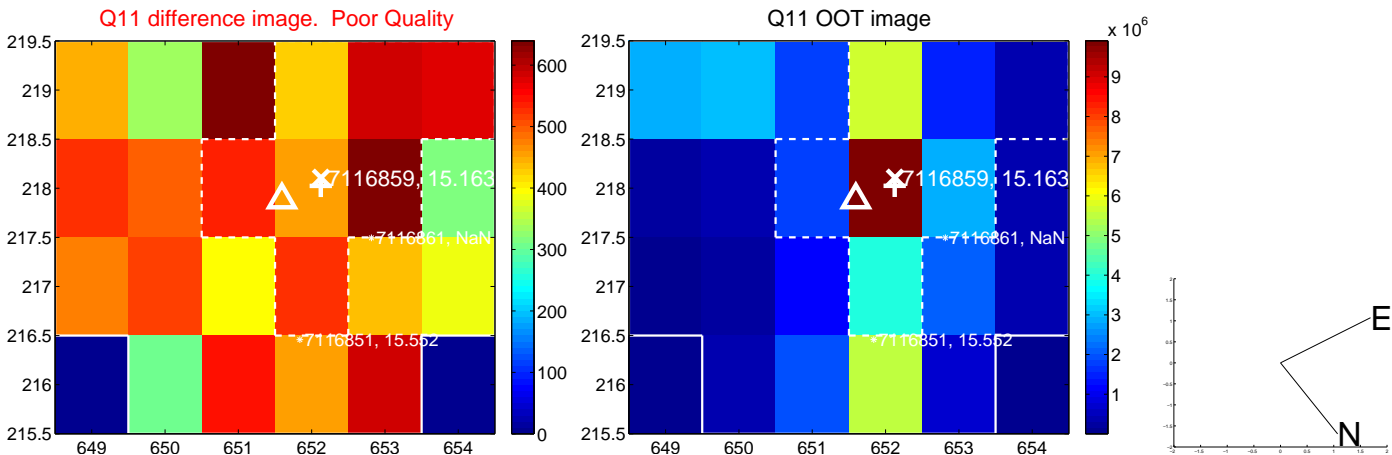
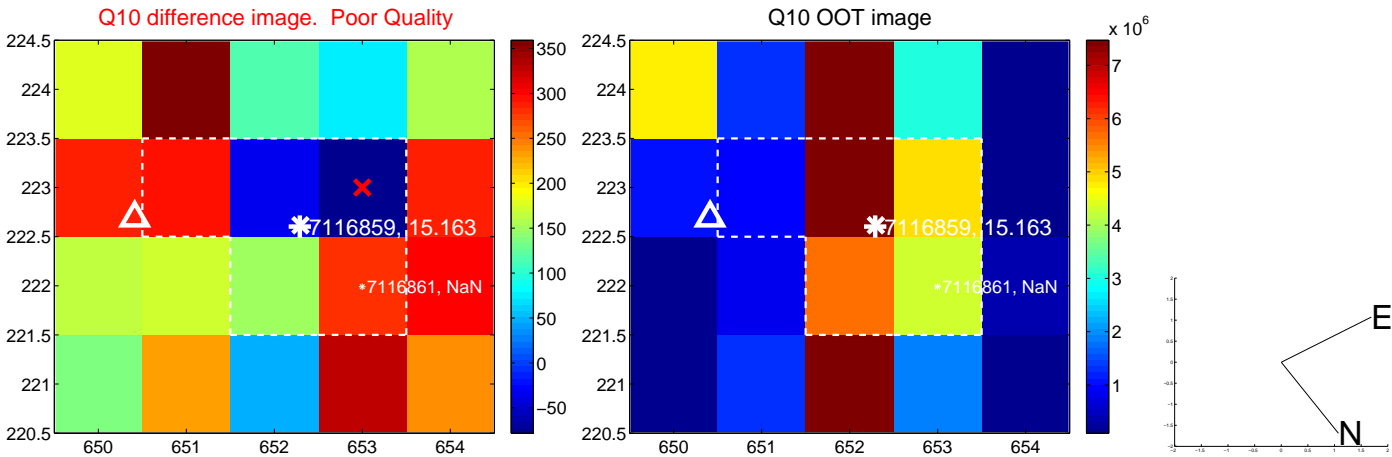
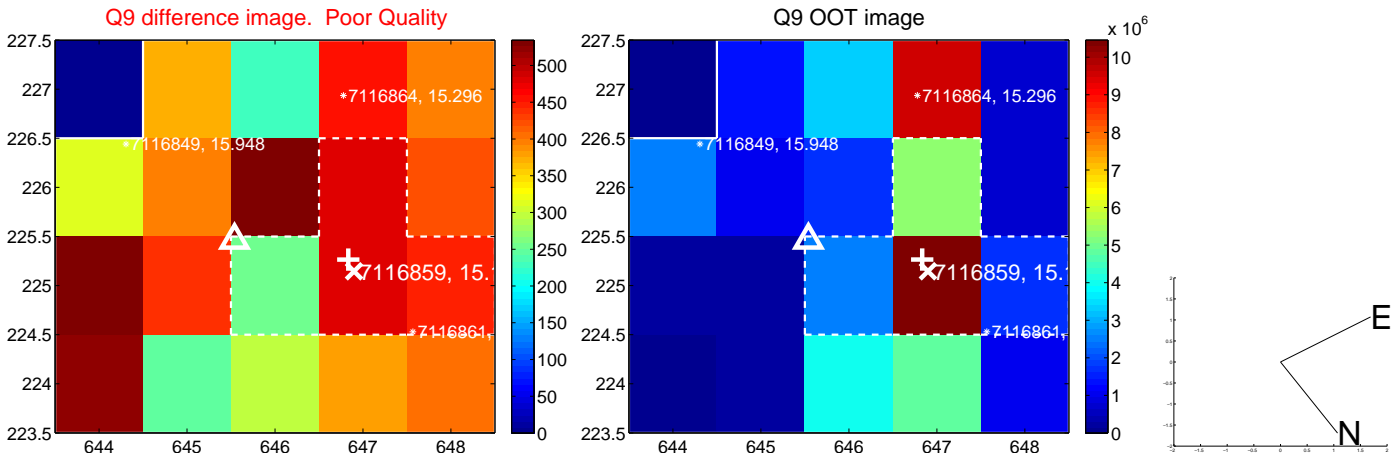


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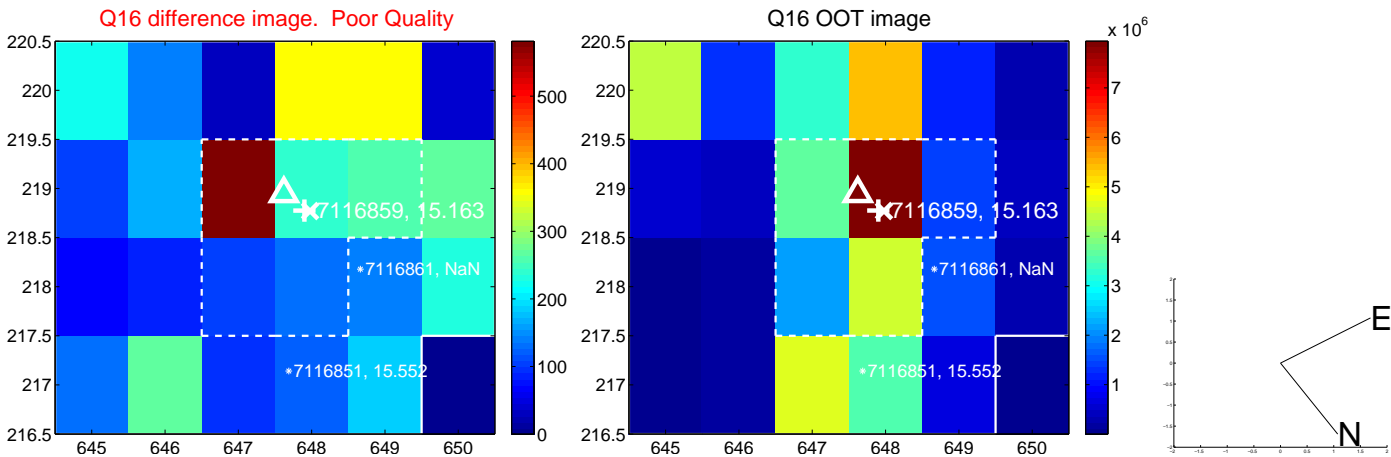
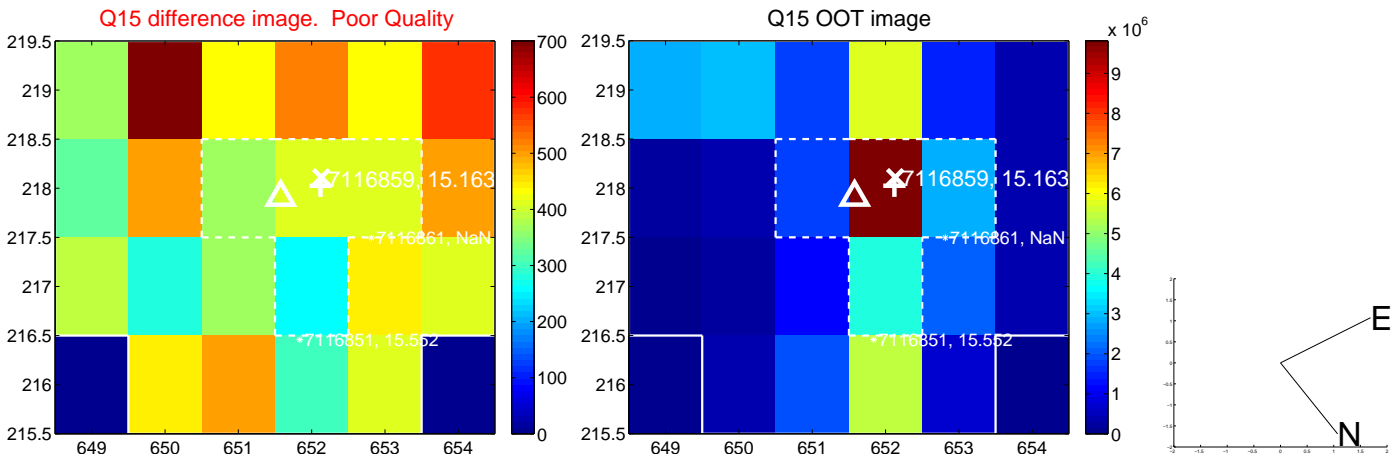
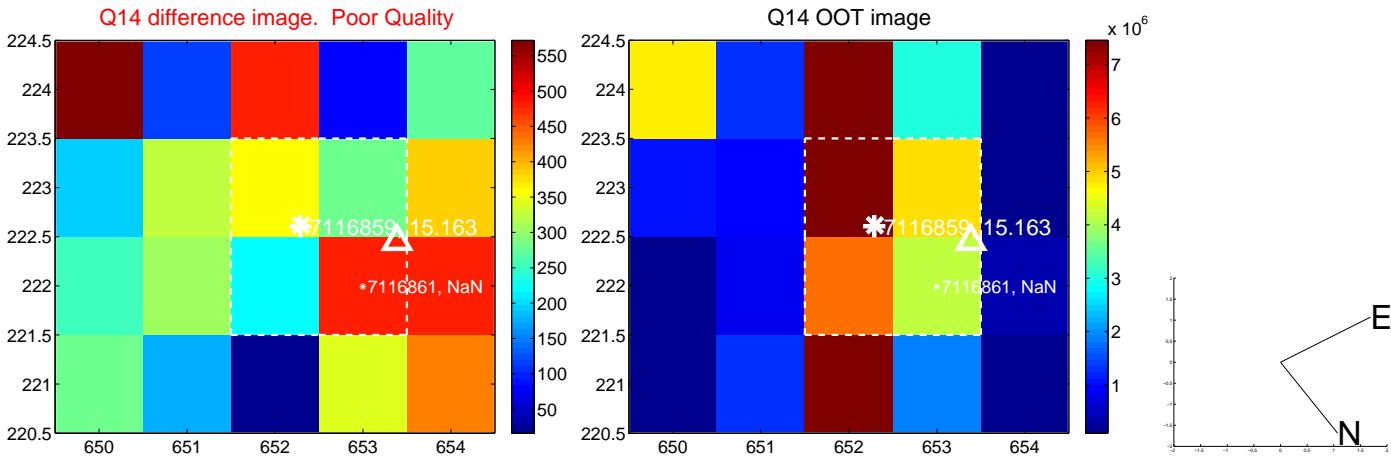
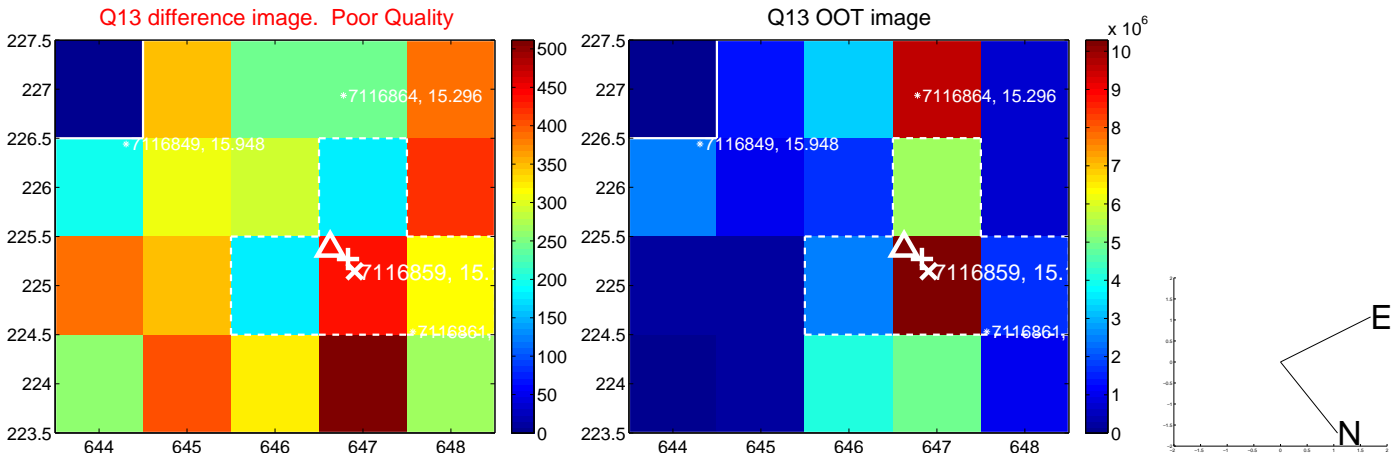




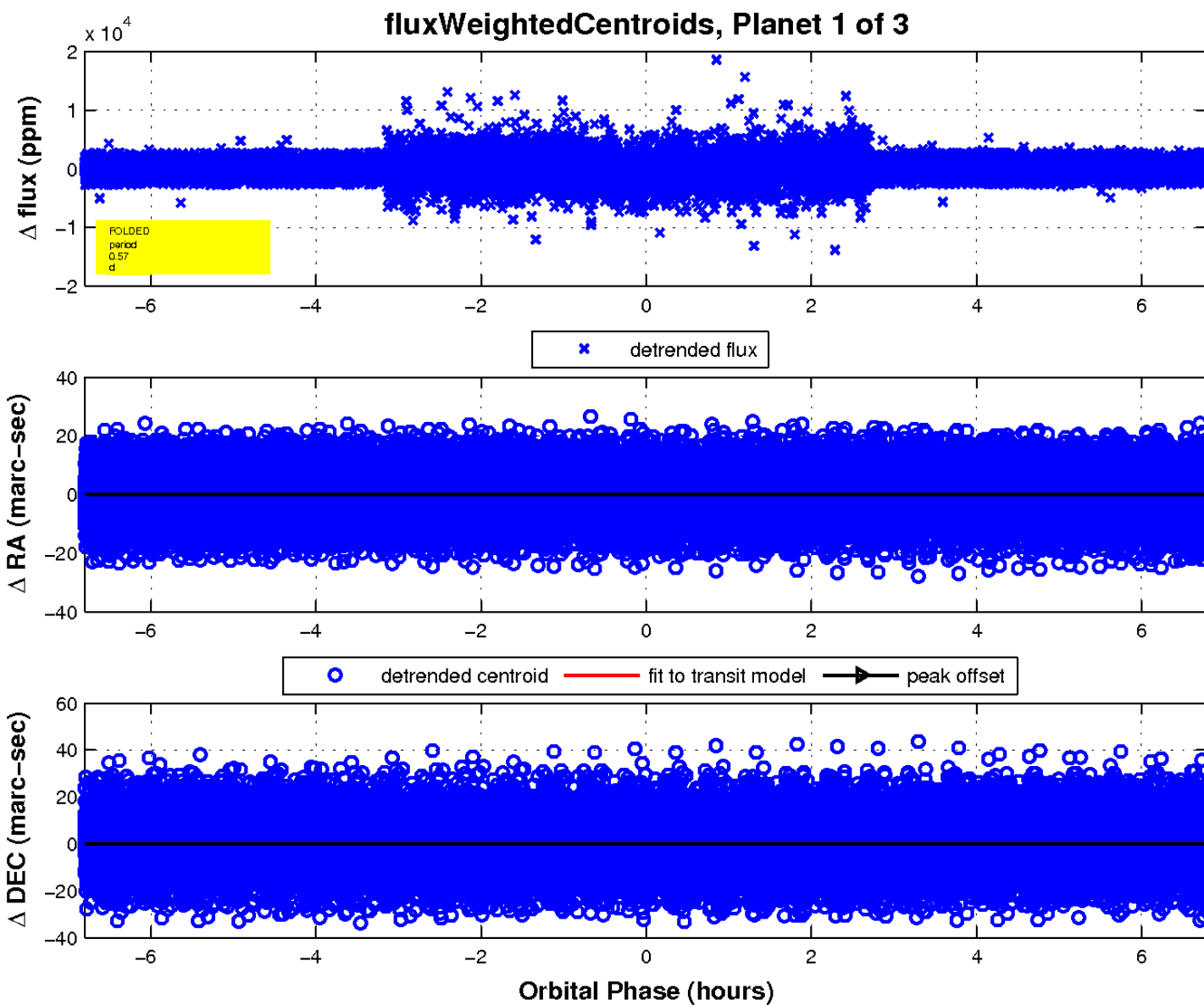
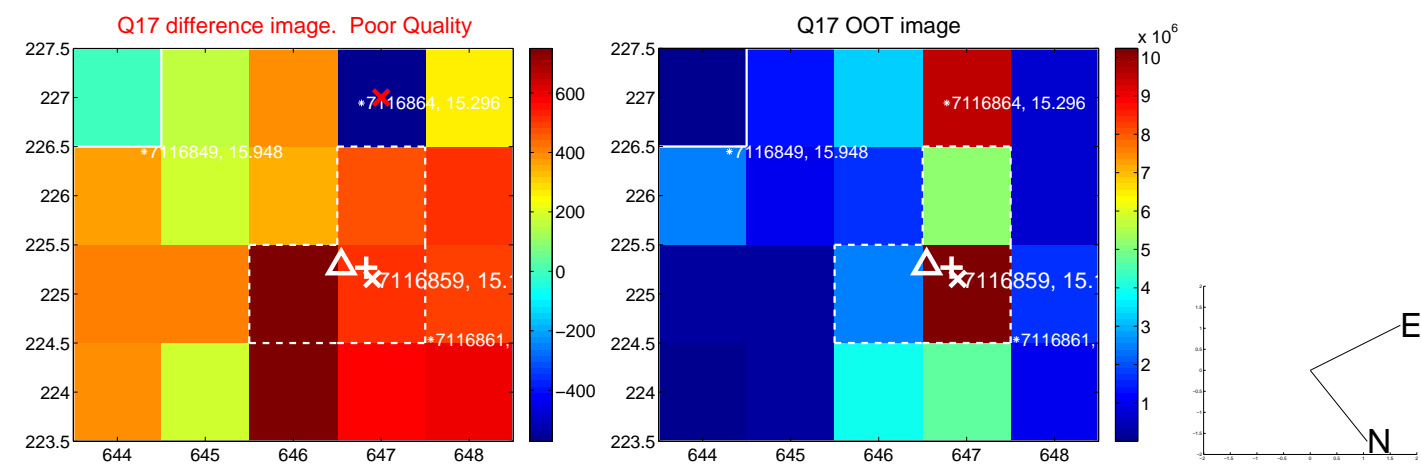
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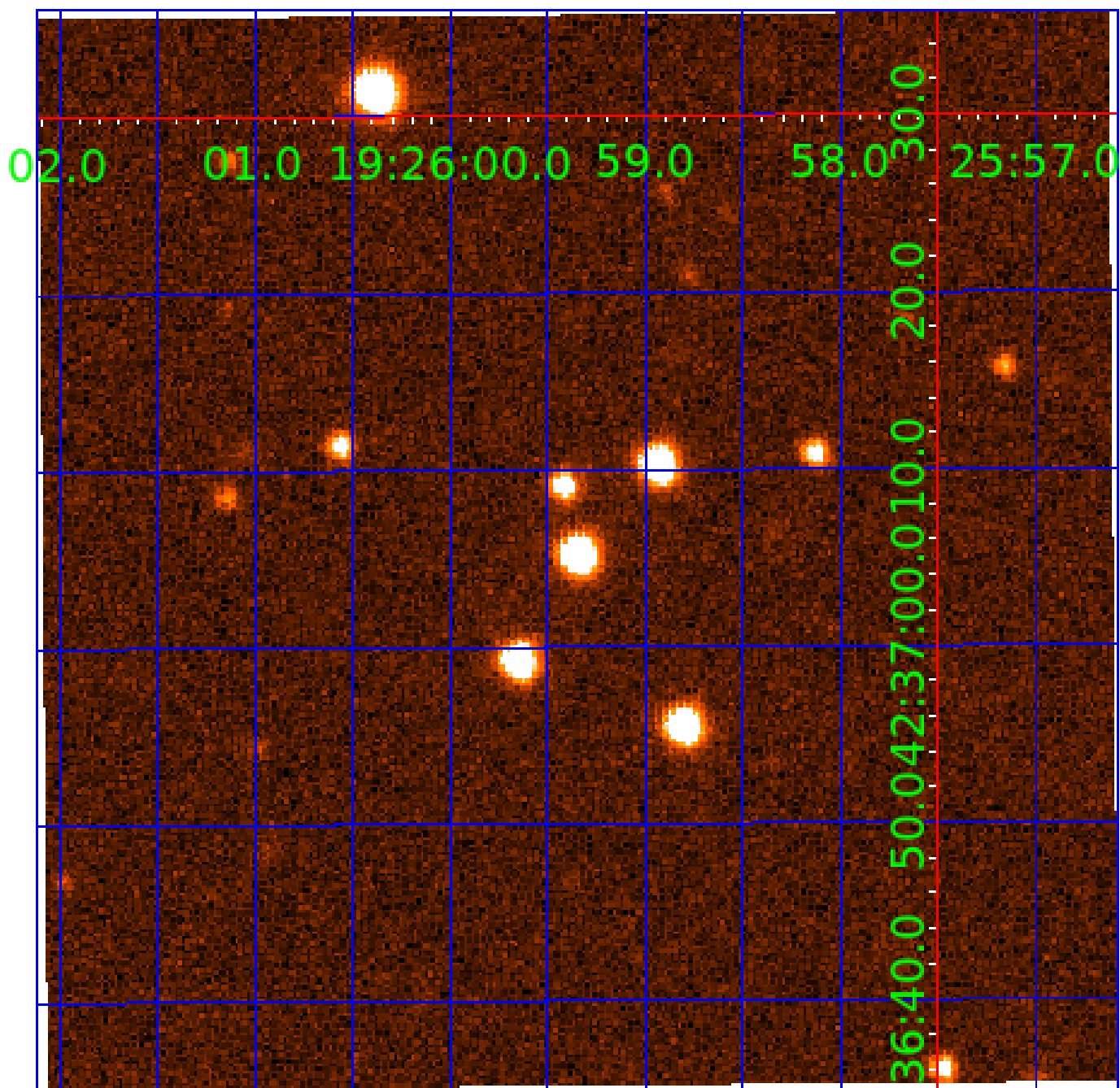


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 007116859

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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007116859-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
007116859-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

**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 007116859-02

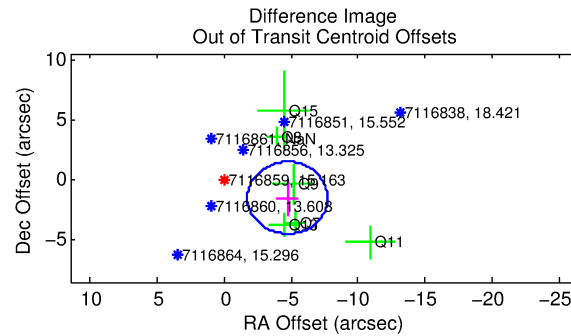
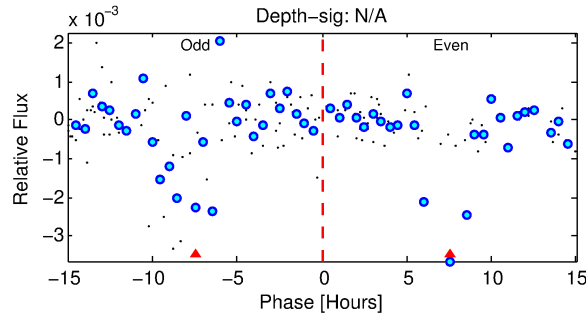
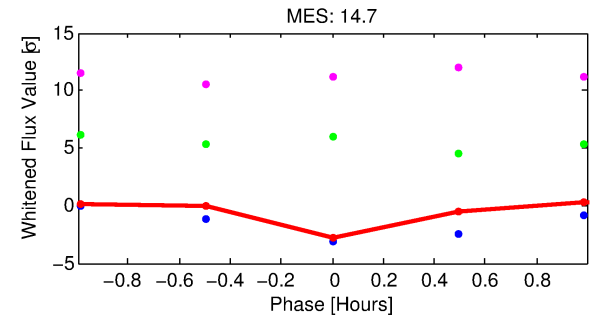
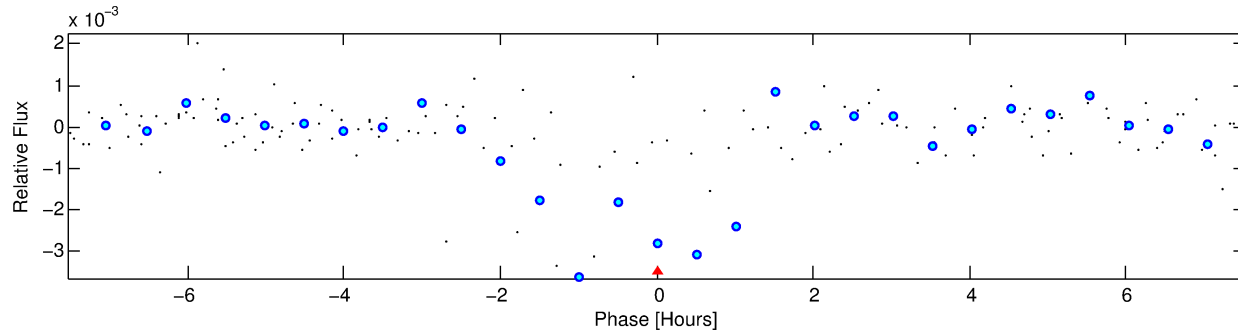
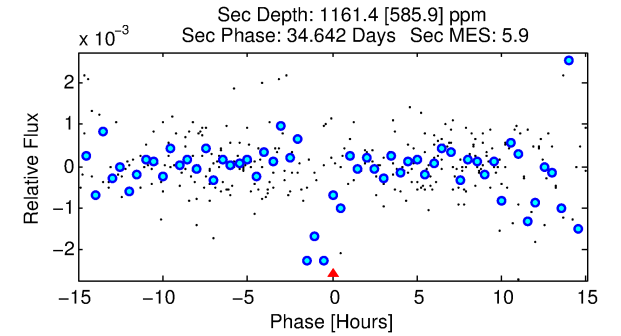
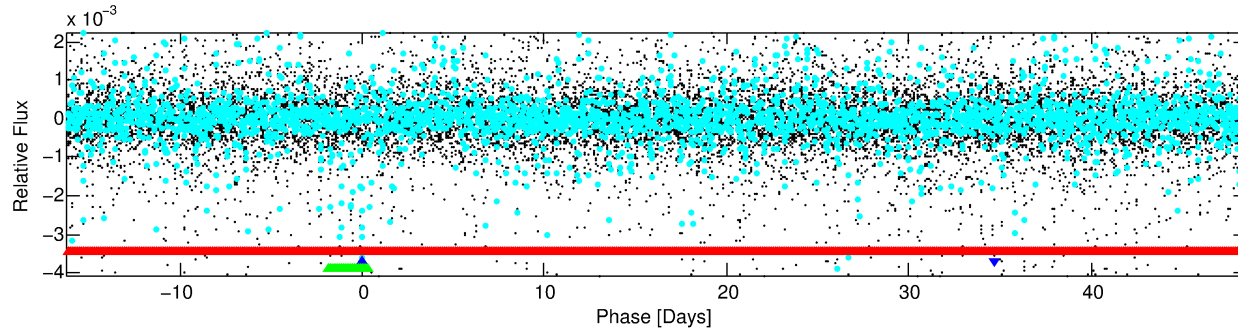
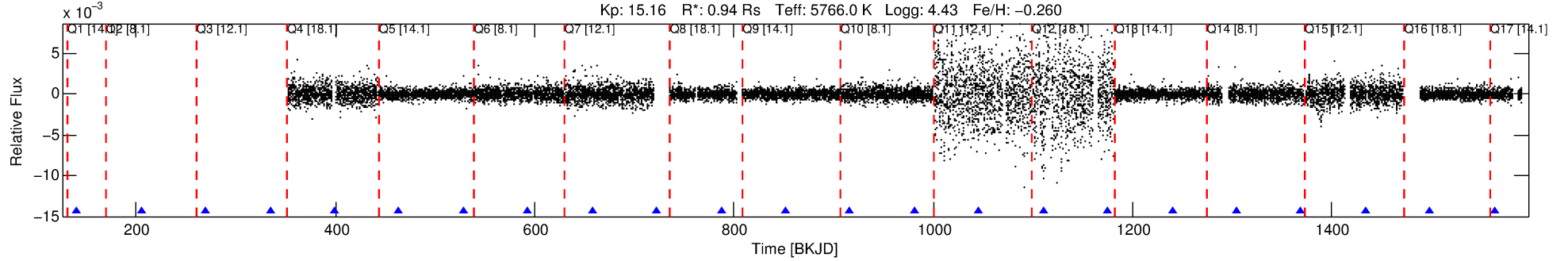
No Significant Match Found

# DV One-Page Summary

KIC: 7116859 Candidate: 2 of 3 Period: 64.660 d

KOI: K07580 Corr: No Ephemeris Match

Kp: 15.16 R\*: 0.94 Rs Teff: 5766.0 K Logg: 4.43 Fe/H: -0.260



TPS TCE Results:

Period = 64.65976 d

Epoch = 140.4949 BKJD

DV fit results are unavailable

DV Diagnostic Results:

ShortPeriod-sig: 43.7% [0.58 $\sigma$ ]

LongPeriod-sig: N/A

ModelChiSquare2-sig: N/A

ModelChiSquareGof-sig: N/A

Bootstrap-pfa: 2.41e-25

RollingBand-fgt: 1.00 [7/7]

GhostDiagnostic-chr: -1.851

Centroid-sig: 7.8%

Centroid-so: 1.437 arcsec [2.46 $\sigma$ ]

OotOffset-rm: 4.947 arcsec [4.95 $\sigma$ ]

KicOffset-rm: 5.308 arcsec [4.60 $\sigma$ ]

OotOffset-st: 0/3/1/2 [6]

KicOffset-st: 0/3/1/2 [6]

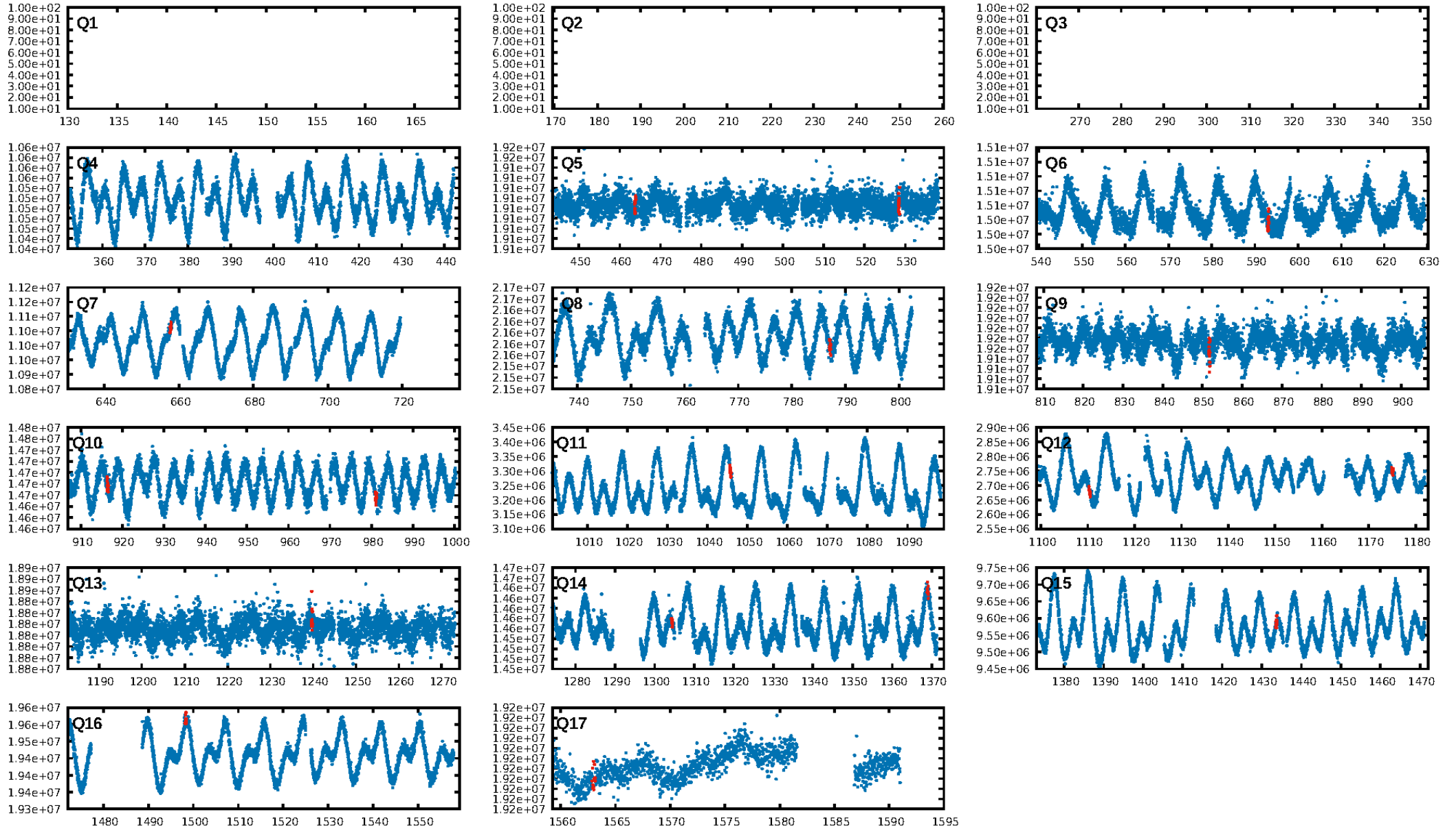
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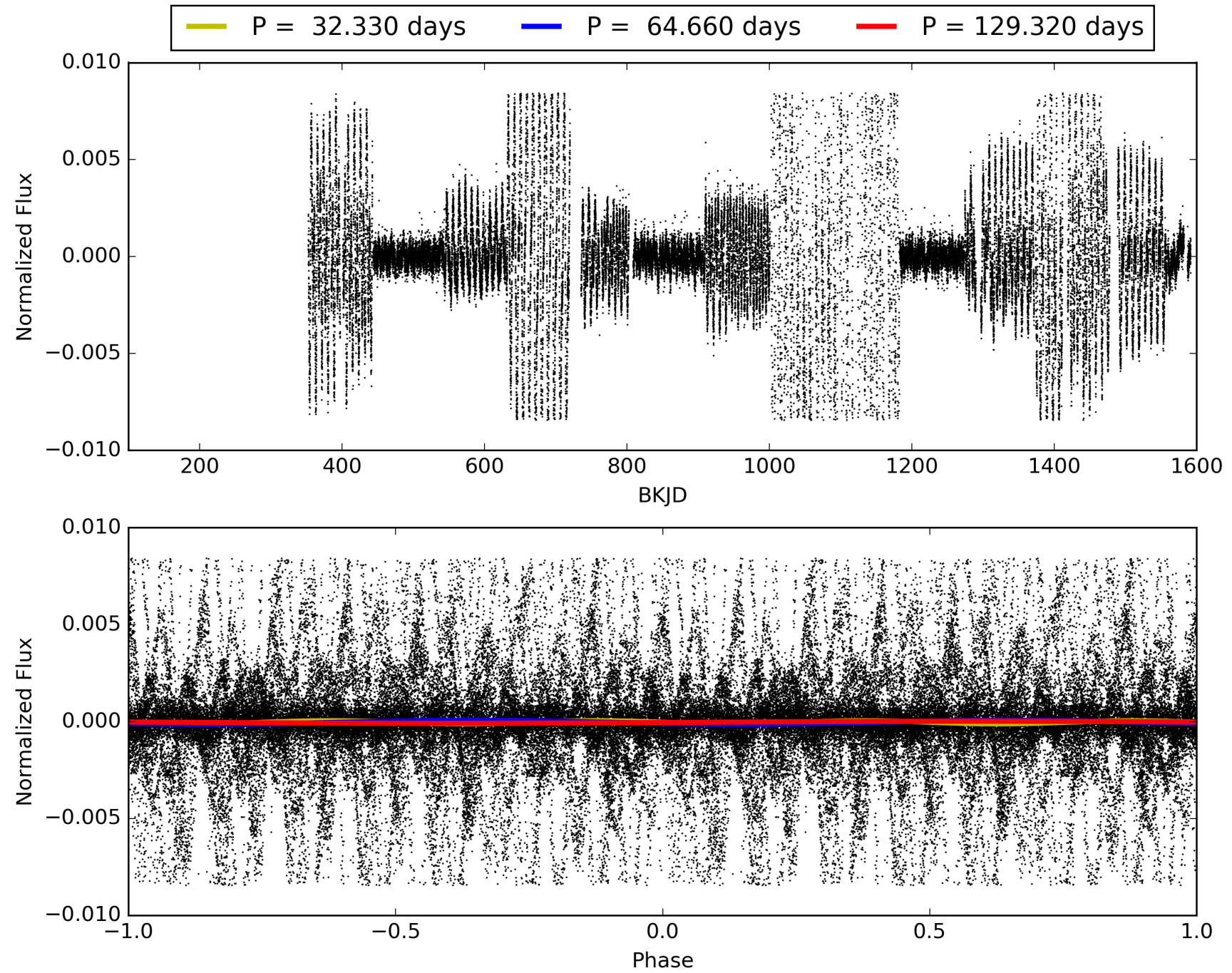
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:58:13 Z

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

# TCE 007116859-02, PDC Light Curves



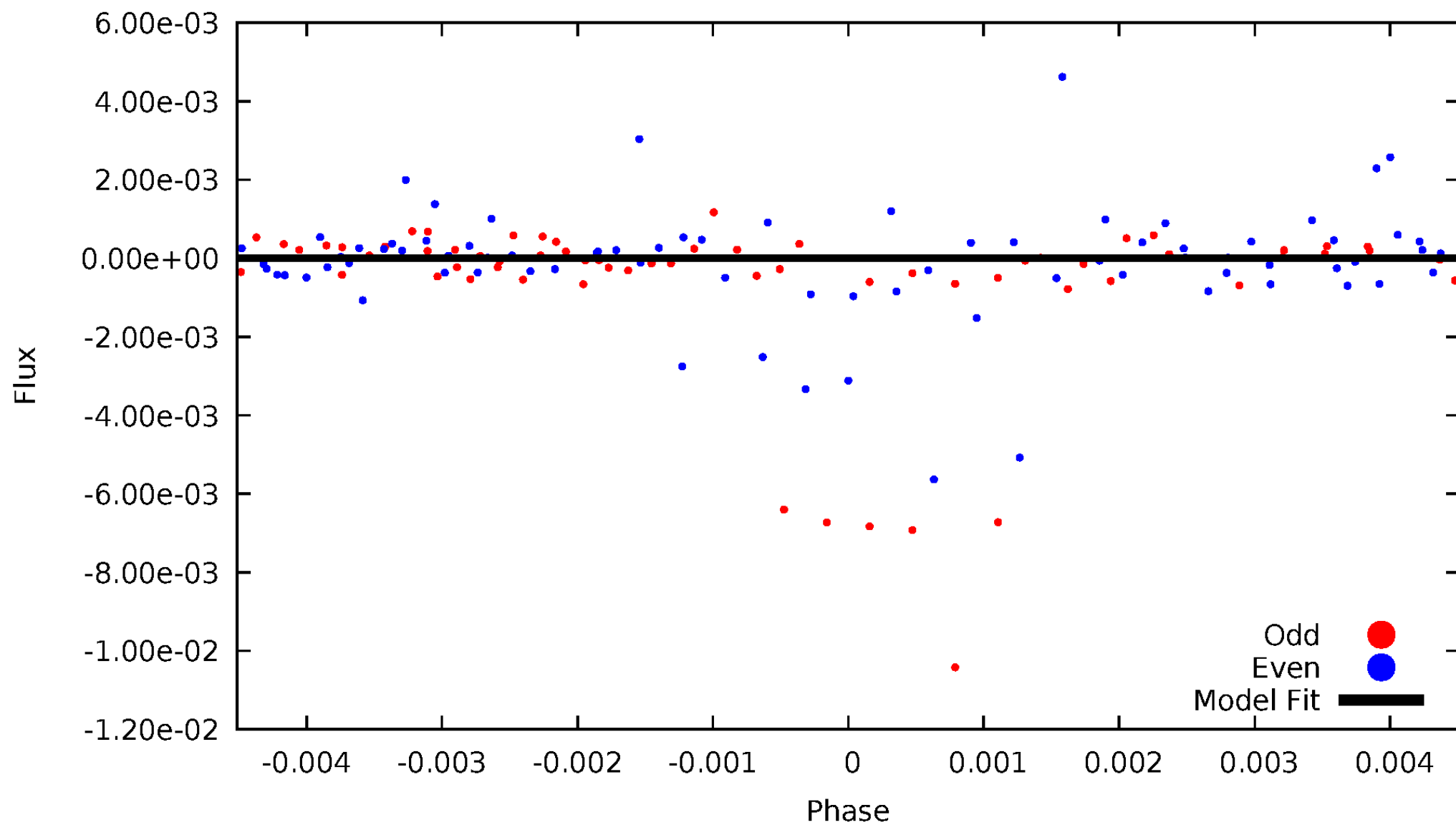
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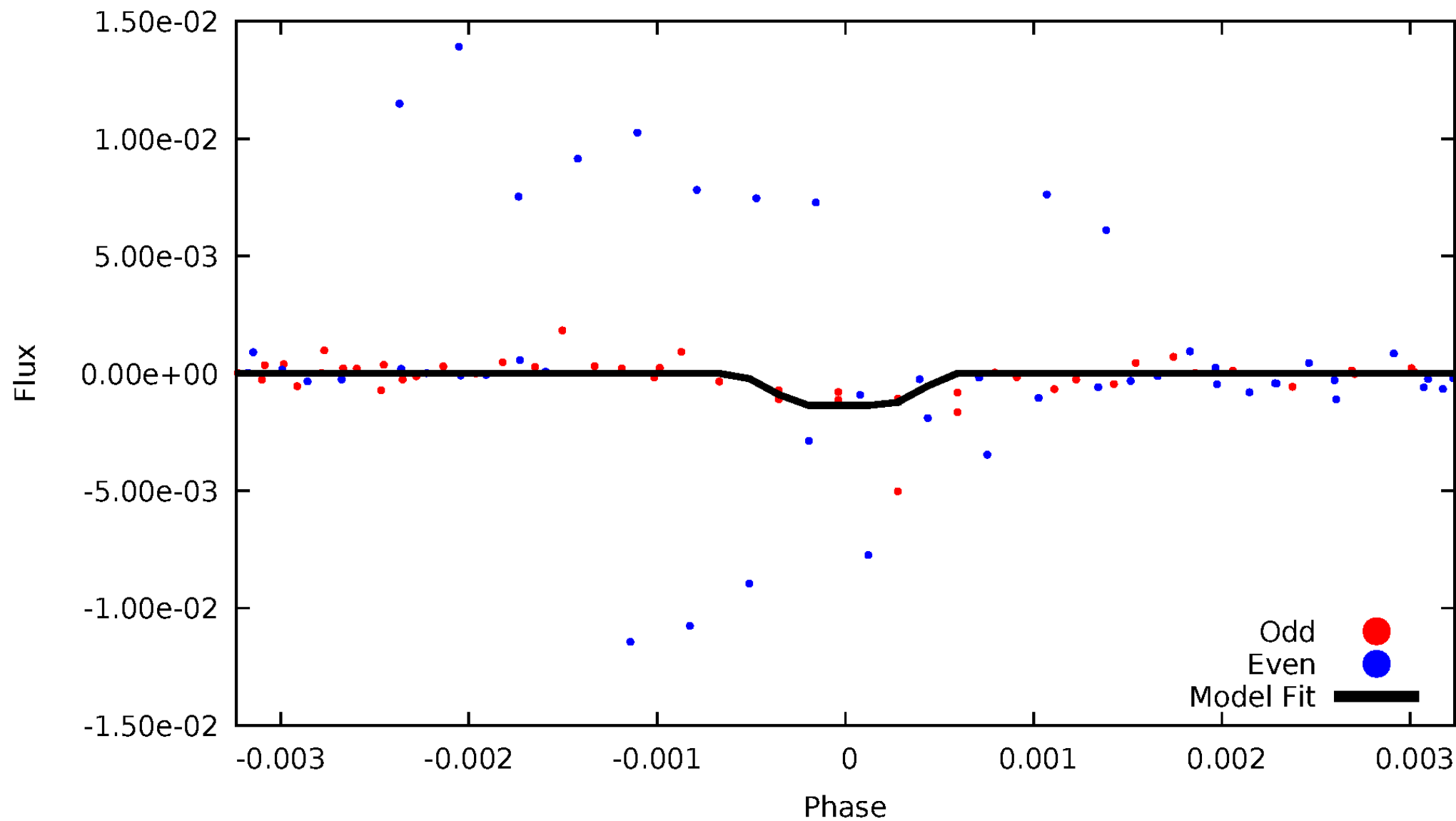
# DV Odd/Even

TCE 007116859-02



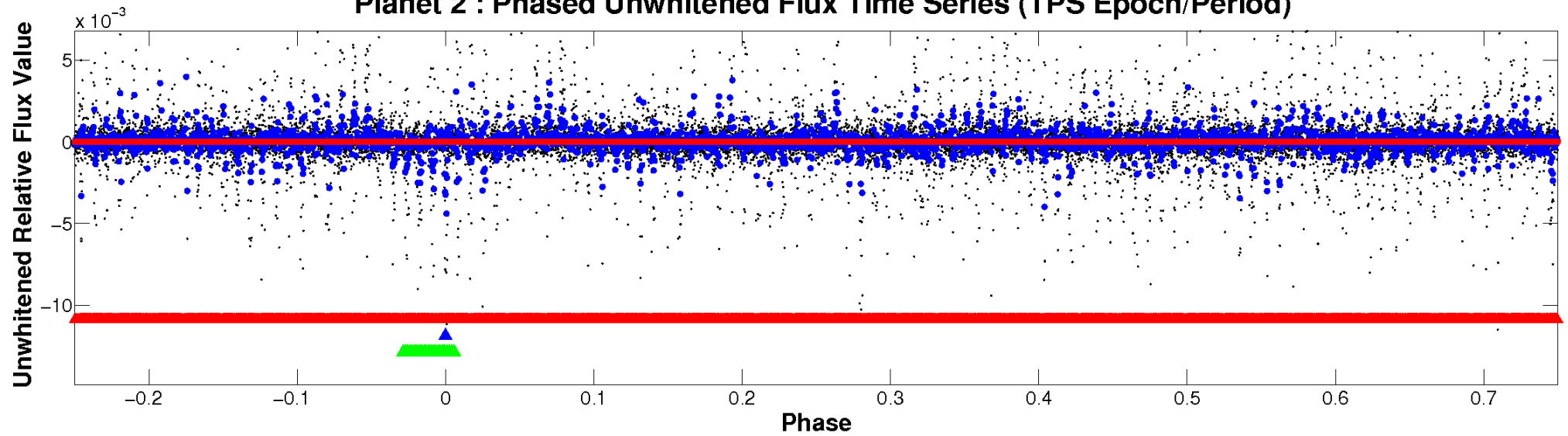
# ALT Odd/Even

TCE 007116859-02



# Non-Whitened Vs. Whitened Light Curve

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

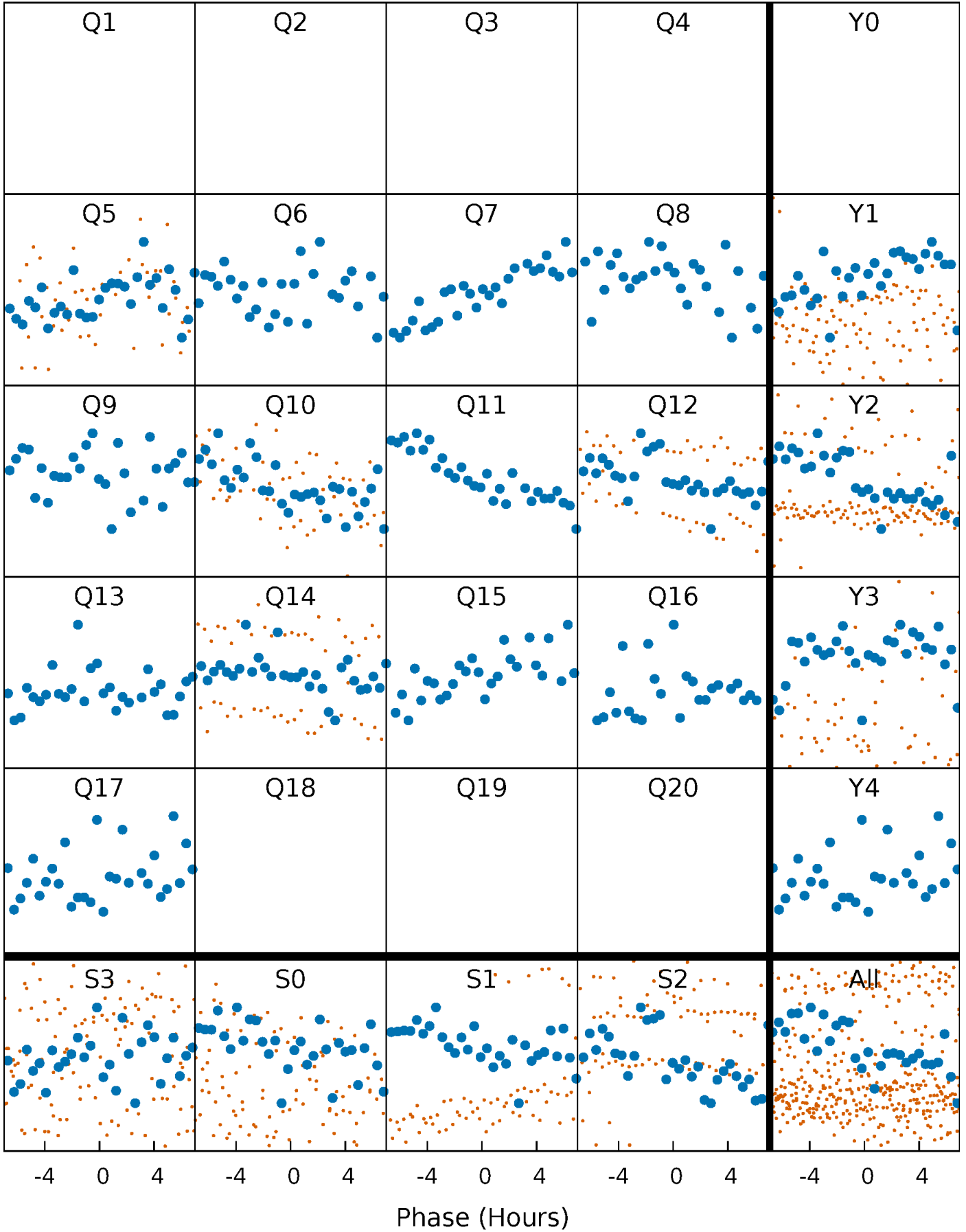


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



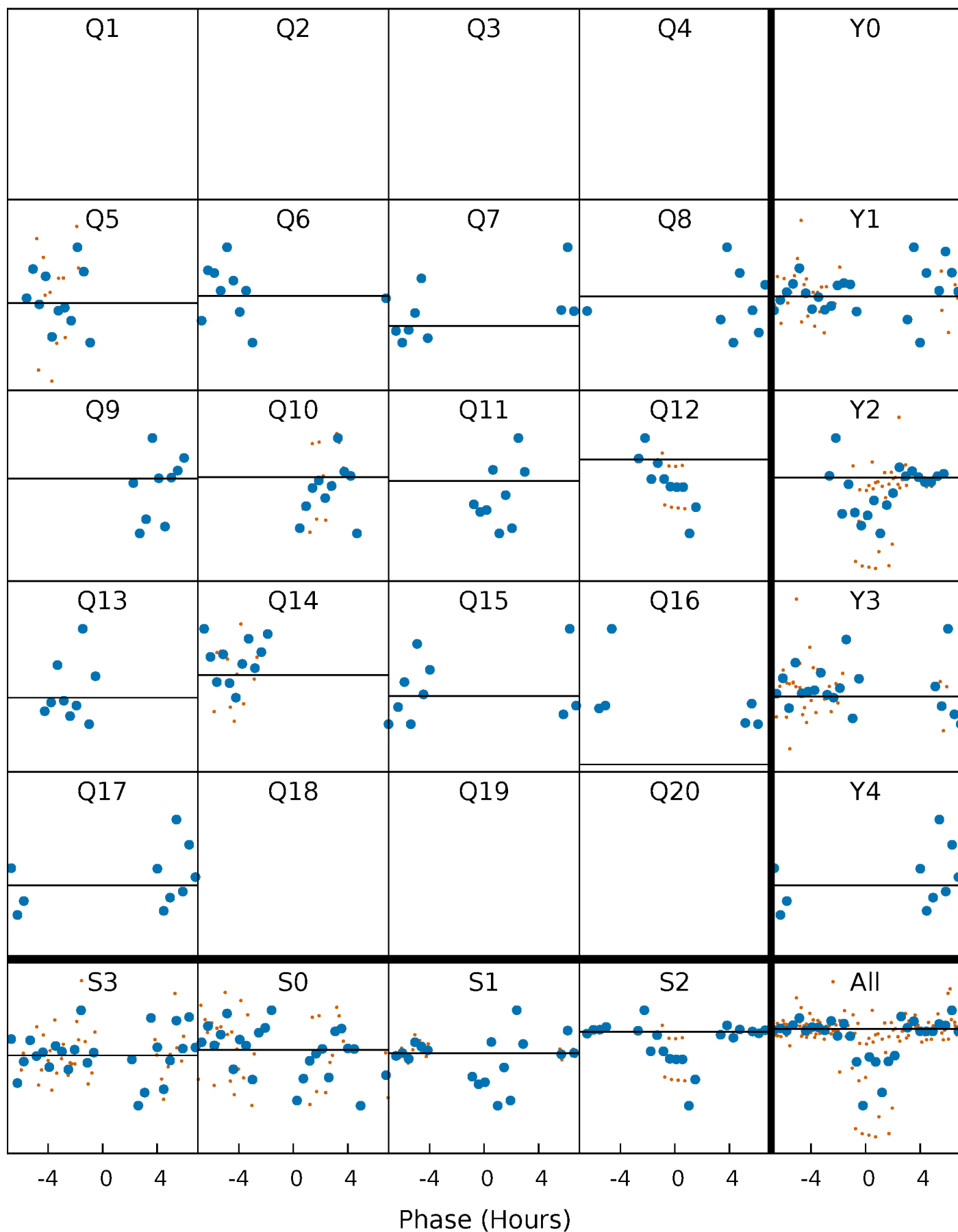
# PDC Quarter-Phased Transit Curves

TCE 007116859-02 P= 64.659758 Days  $T_0=140.494949$  (BKJD)



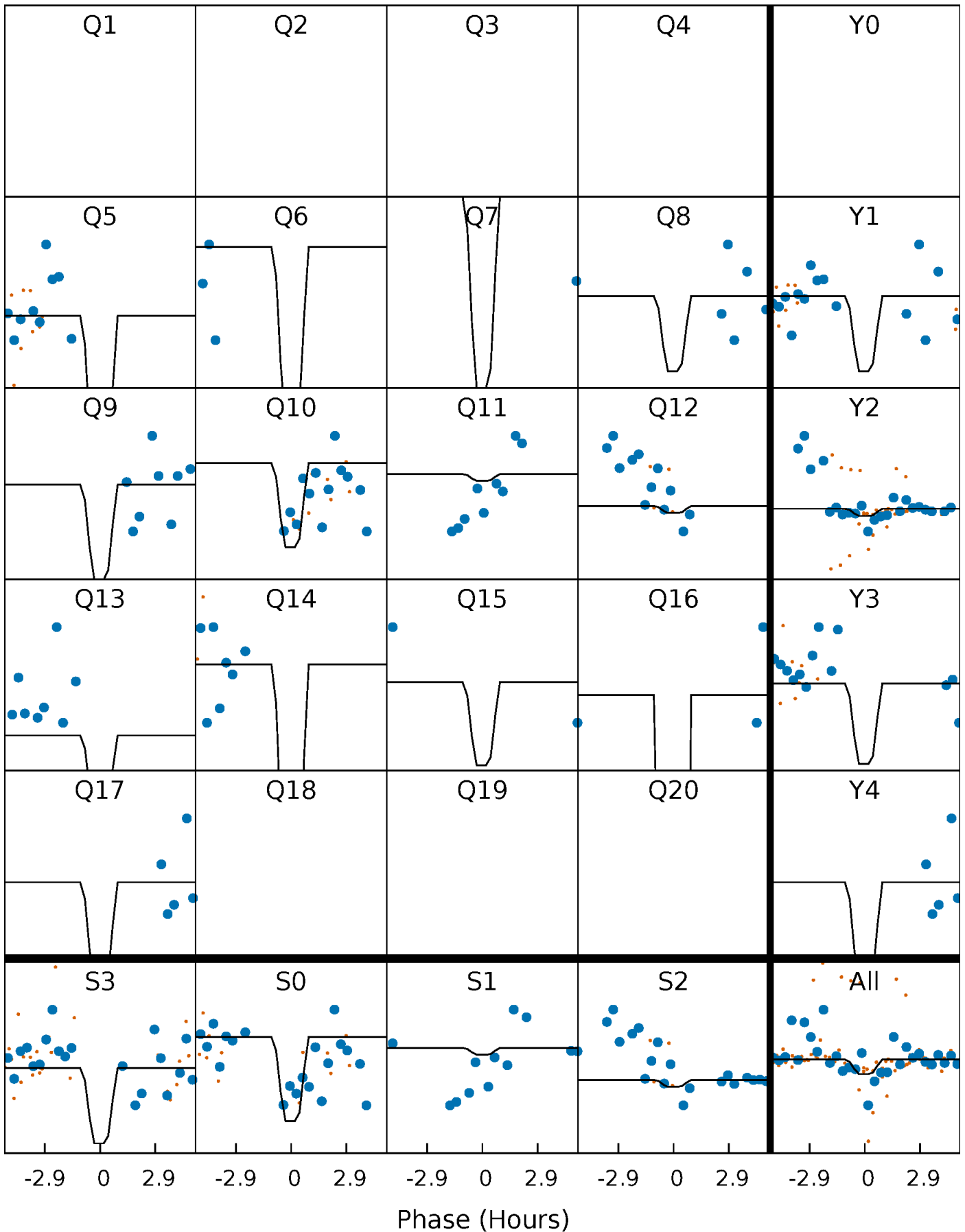
# DV Quarter-Phased Transit Curves

TCE 007116859-02   P= 64.659758 Days    $T_0=140.494949$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007116859-02 P= 64.659758 Days  $T_0=140.527980$  (BKJD)

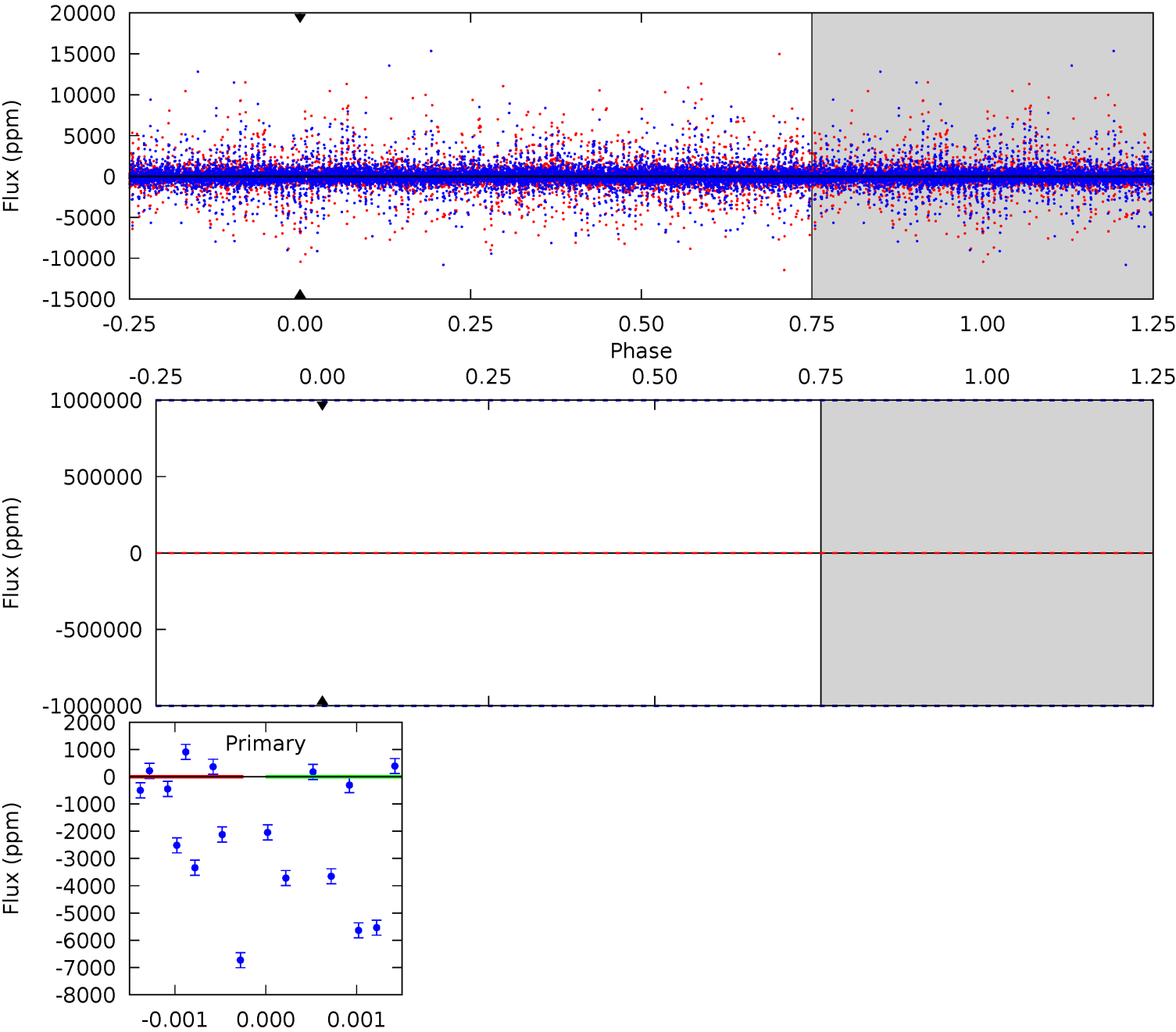




DV Model-Shift Uniqueness Test

007116859-02, P = 64.659758 Days, E = 140.494949 Days

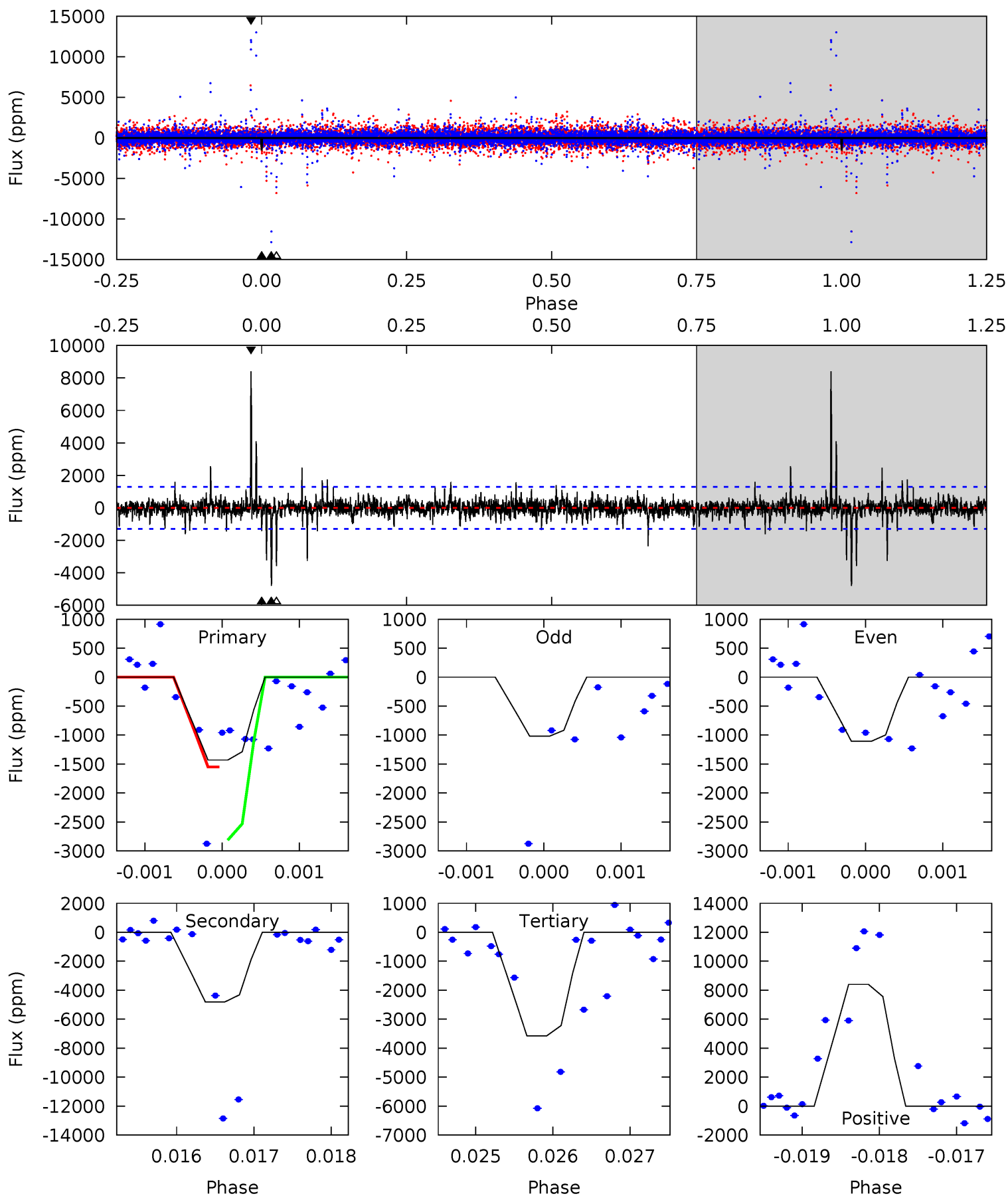
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

007116859-02, P = 64.659758 Days, E = 140.527980 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
6.01	20.2	15.0	35.3	5.44	3.27	1.58	-9.01	-29.3	5.15	-15.1	0.11	0.33	0.64	2.70



### Stellar Parameters For KIC 007116859

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5766^{+172}_{-189}$	$4.433^{+0.116}_{-0.188}$	$-0.260^{+0.300}_{-0.300}$	$0.940^{+0.259}_{-0.139}$	$0.874^{+0.120}_{-0.080}$	$1.483^{+0.698}_{-0.724}$
	+3%/-3%	+3%/-4%	+115%/-115%	+28%/-15%	+14%/-9%	+47%/-49%
Source	KIC0	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 007116859-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$10.04^{+9.01}_{-6.66}$	$631^{+44}_{-36}$	$4109^{+11299}_{-18604}$	$1253^{+76618}_{-77503}$
Alt.	$-4803 \pm 238$	$8.54^{+8.89}_{-5.98}$	$631^{+44}_{-37}$	$5282^{+5342}_{-1276}$	$3270^{+34234}_{-2494}$

$T_{max}$  = 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

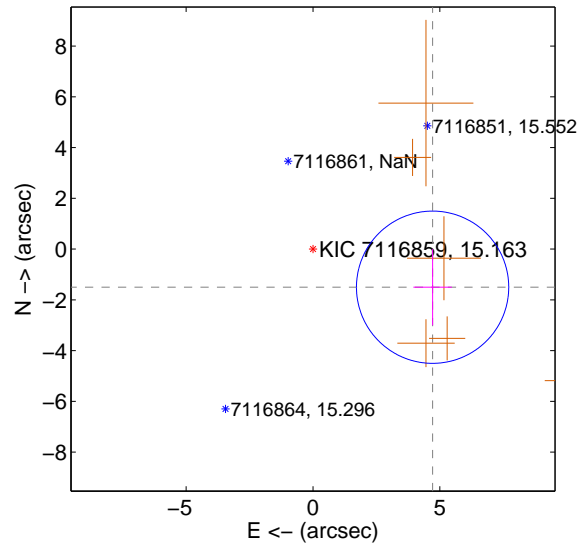
Supplemental centroid analysis for 007116859-02. Kepler magnitude: 15.16. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

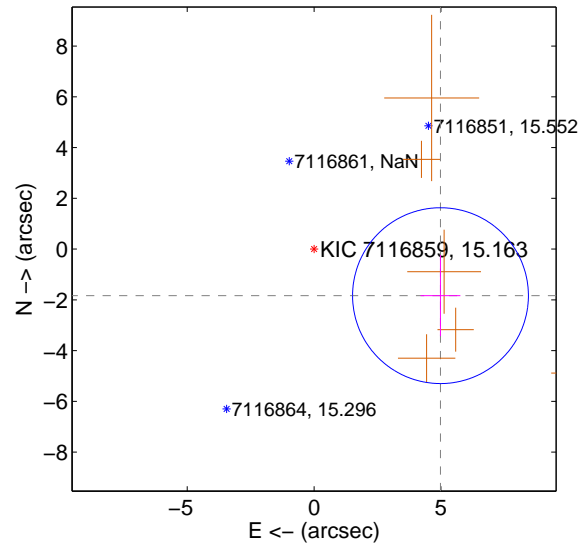
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.947 \pm 1.000$	4.95	$-4.713 \pm 0.758$	$-1.502 \pm 1.501$
PRF-fit source offset from KIC position	$5.308 \pm 1.155$	4.60	$-4.981 \pm 0.785$	$-1.835 \pm 1.598$
photometric centroid source offset	$1.44 \pm 0.58$	2.46	$-0.77 \pm 0.50$	$-1.22 \pm 0.61$

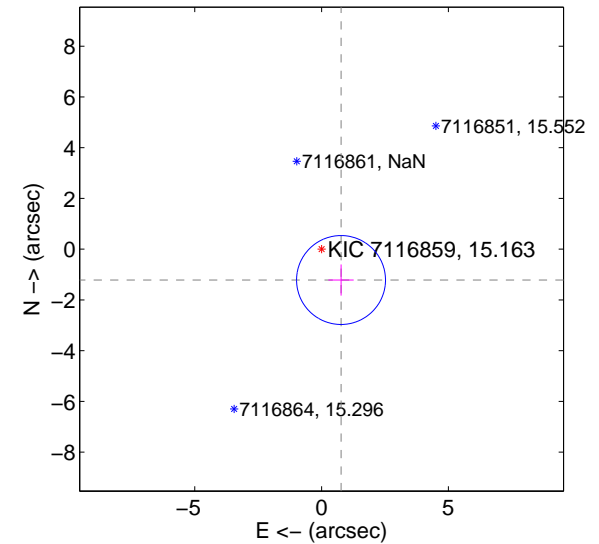
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

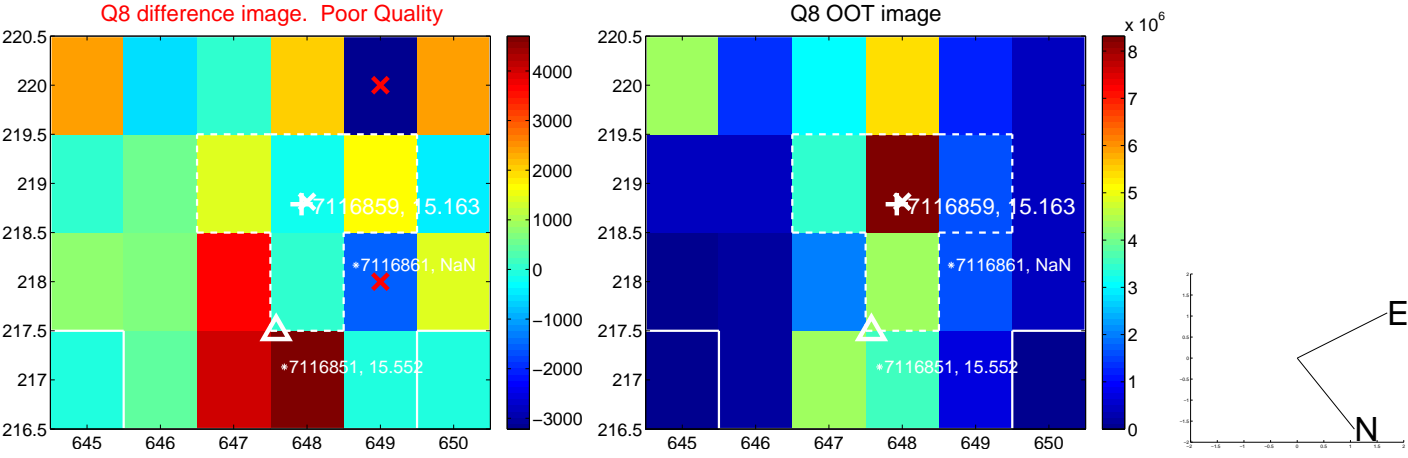
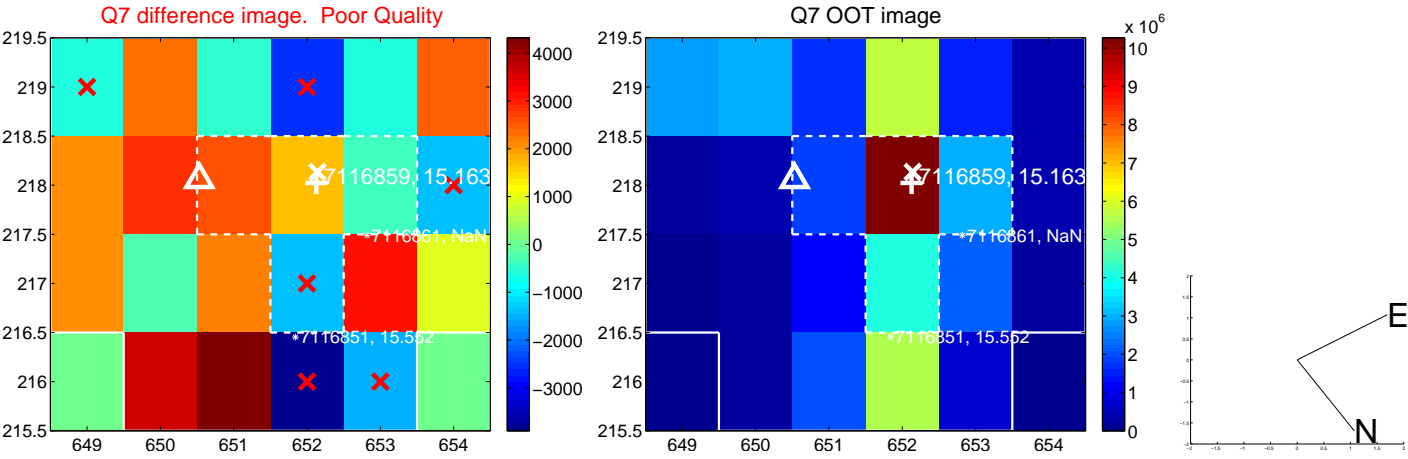
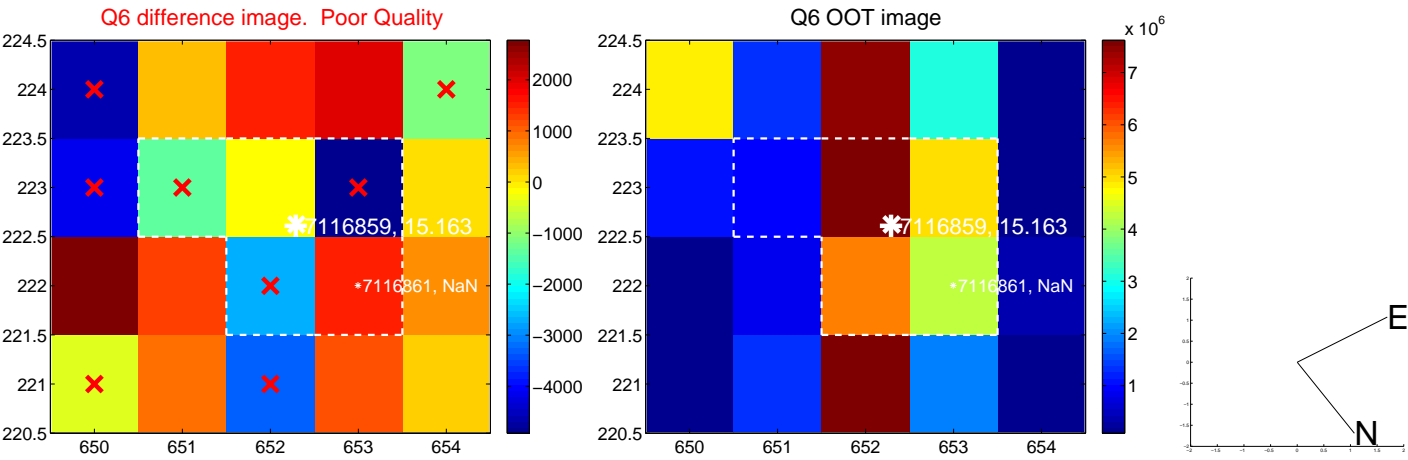
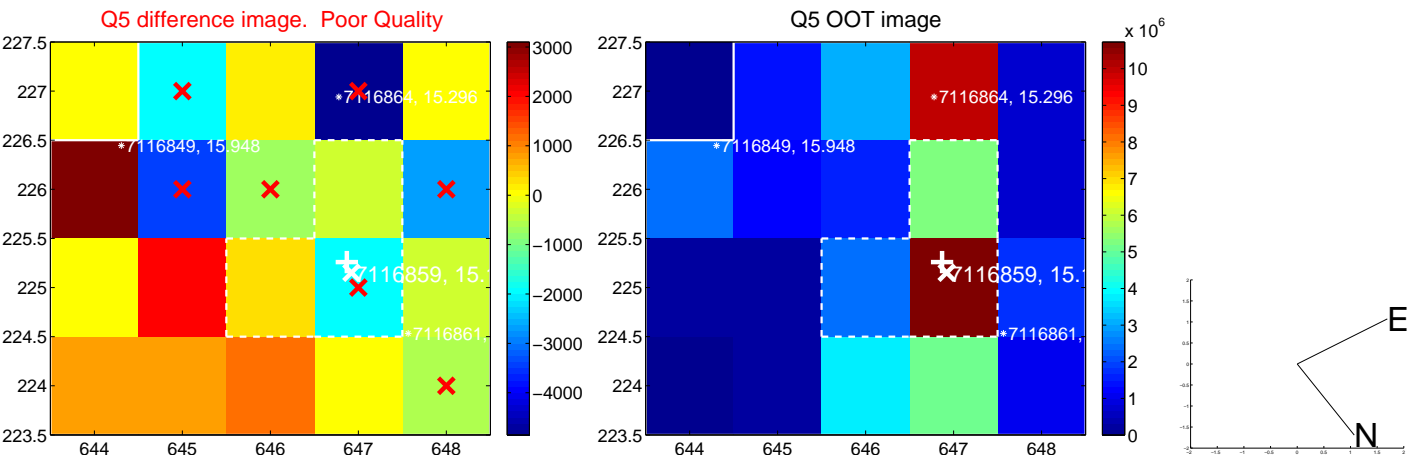


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

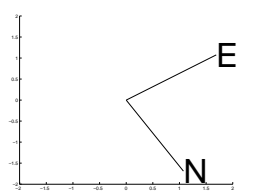
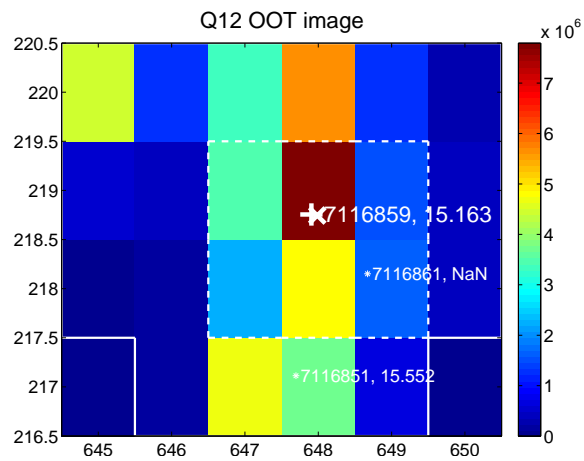
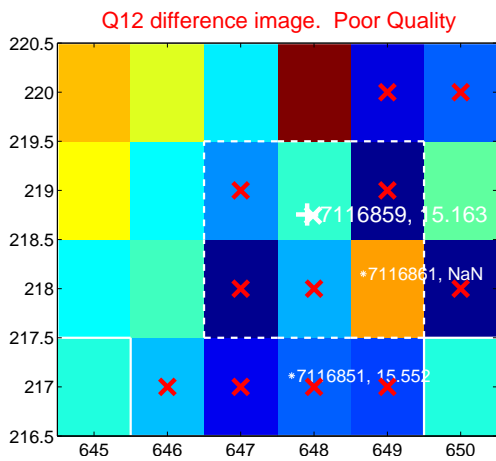
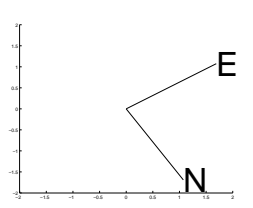
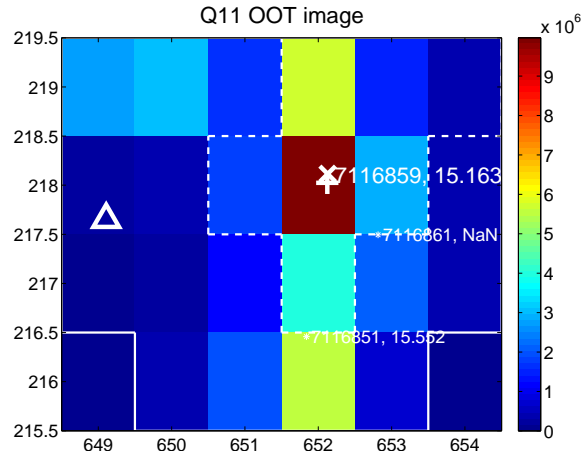
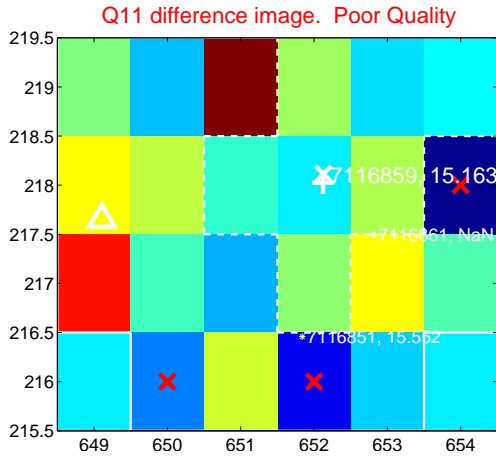
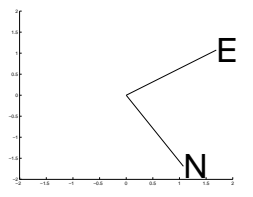
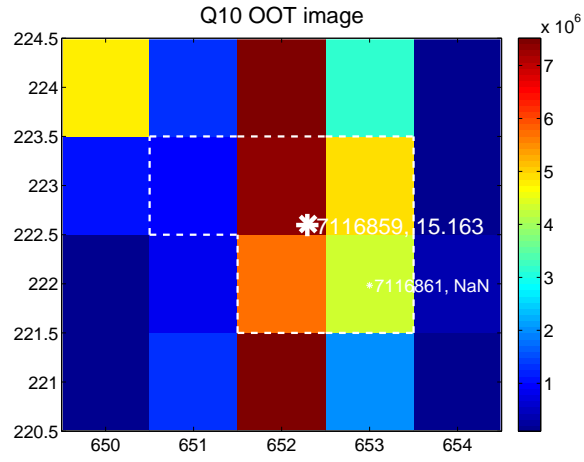
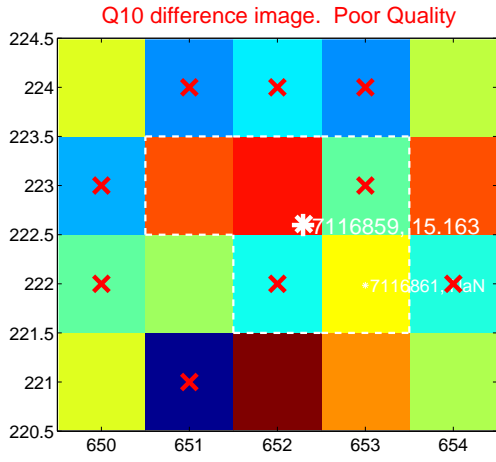
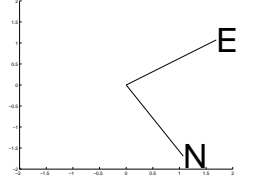
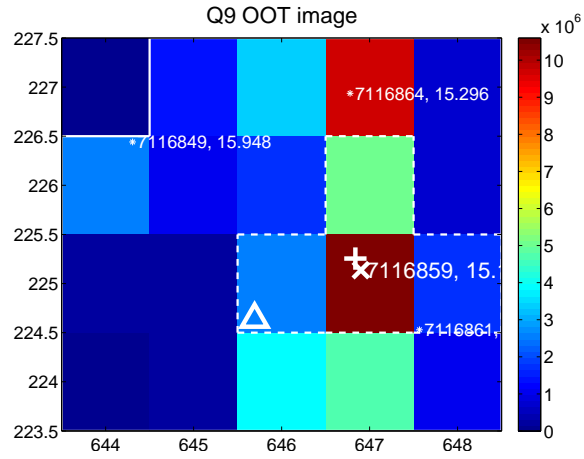
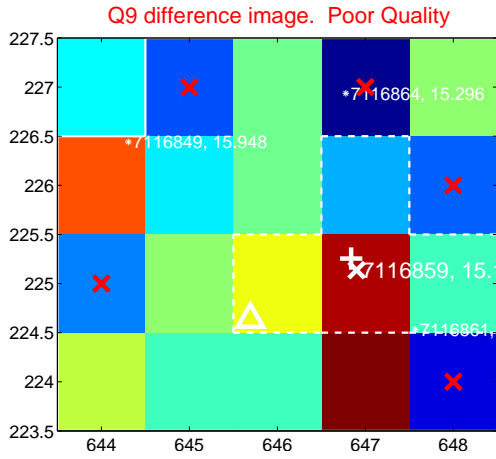


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

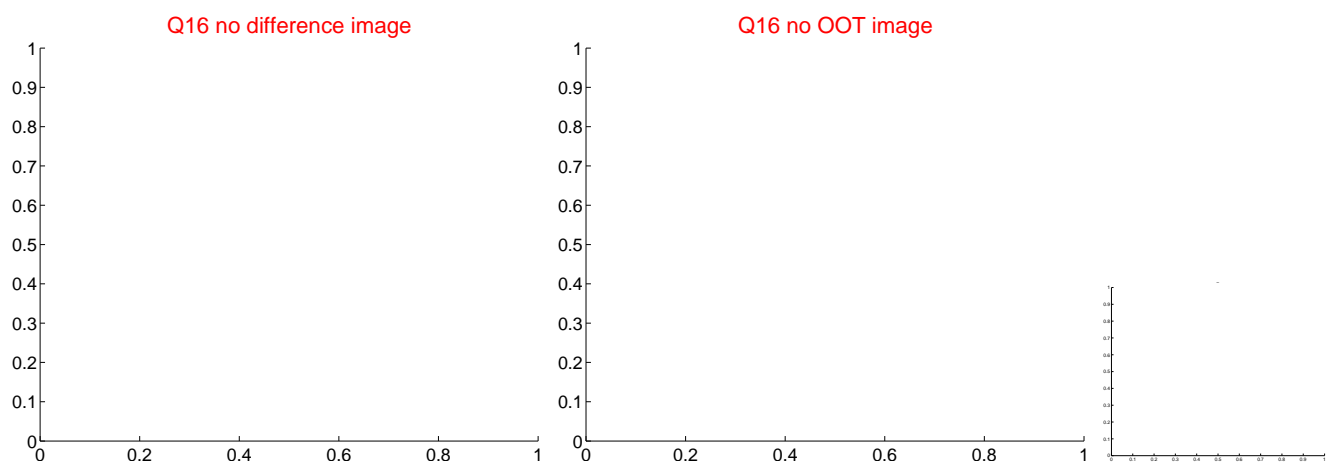
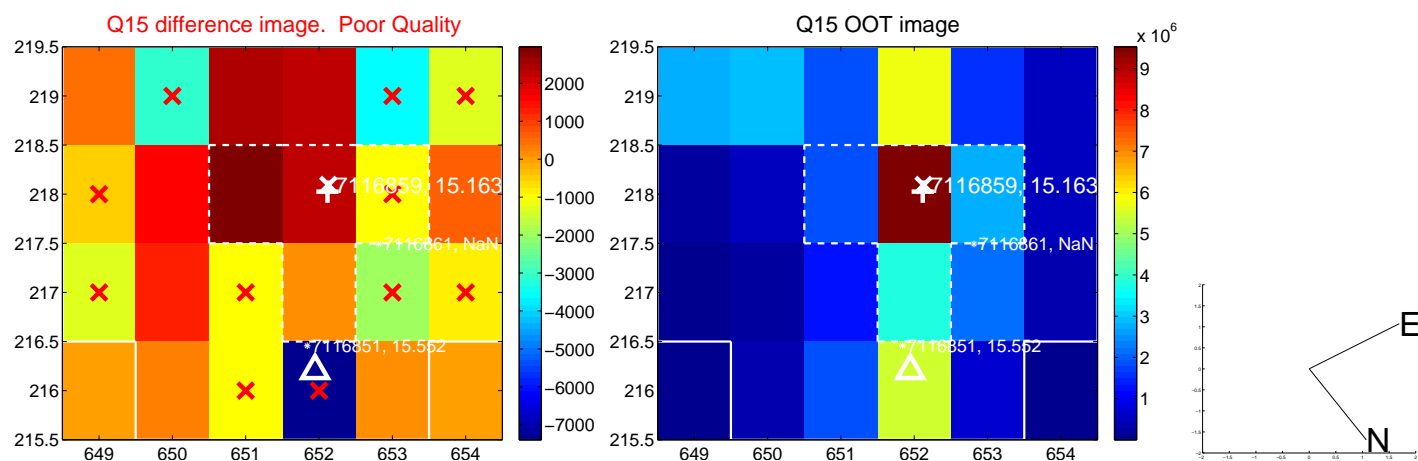
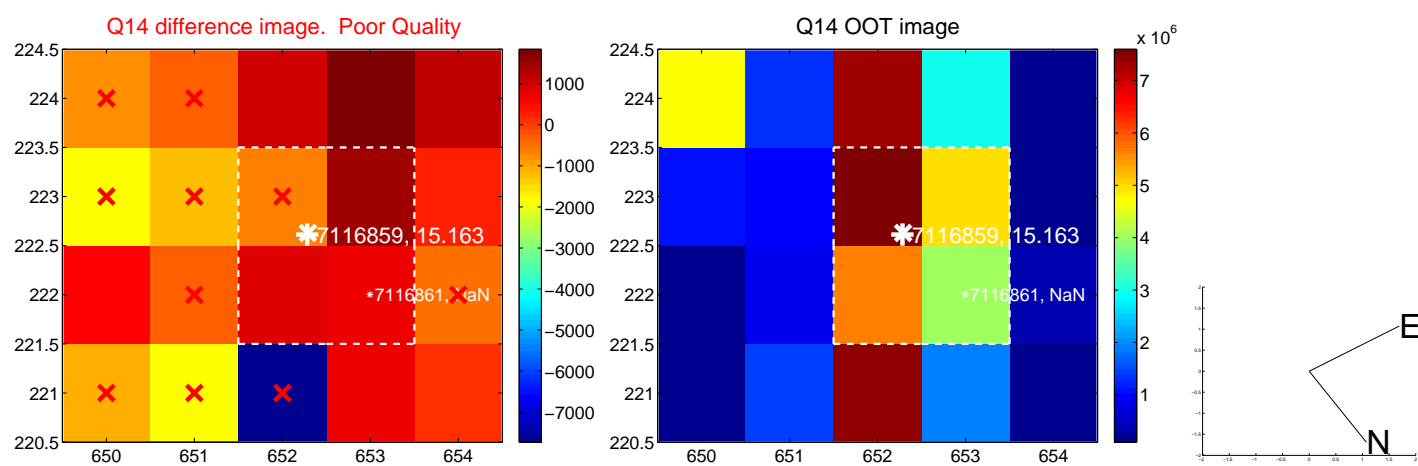
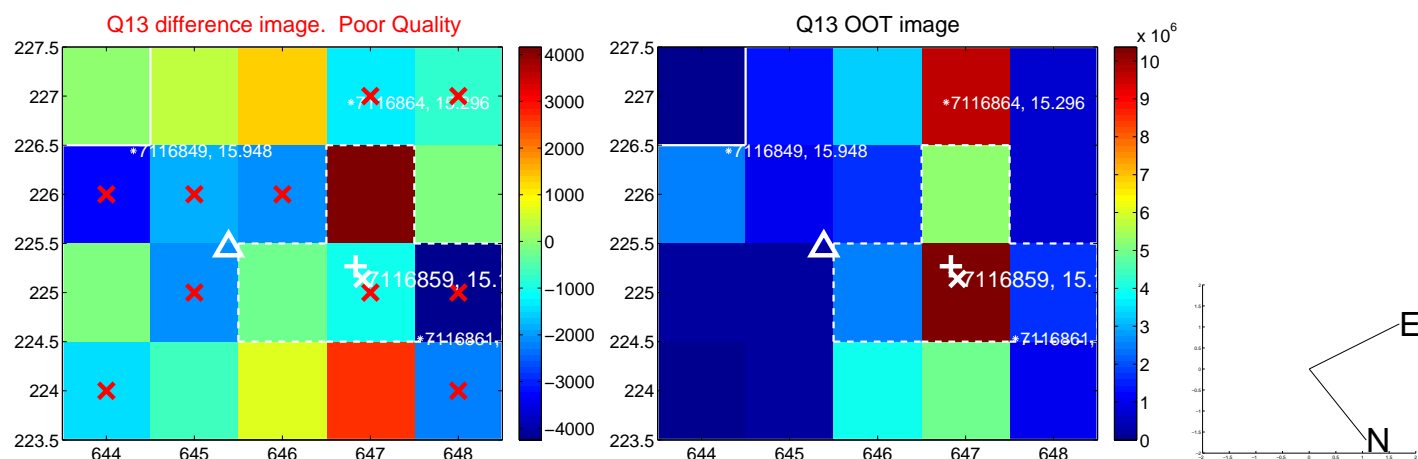




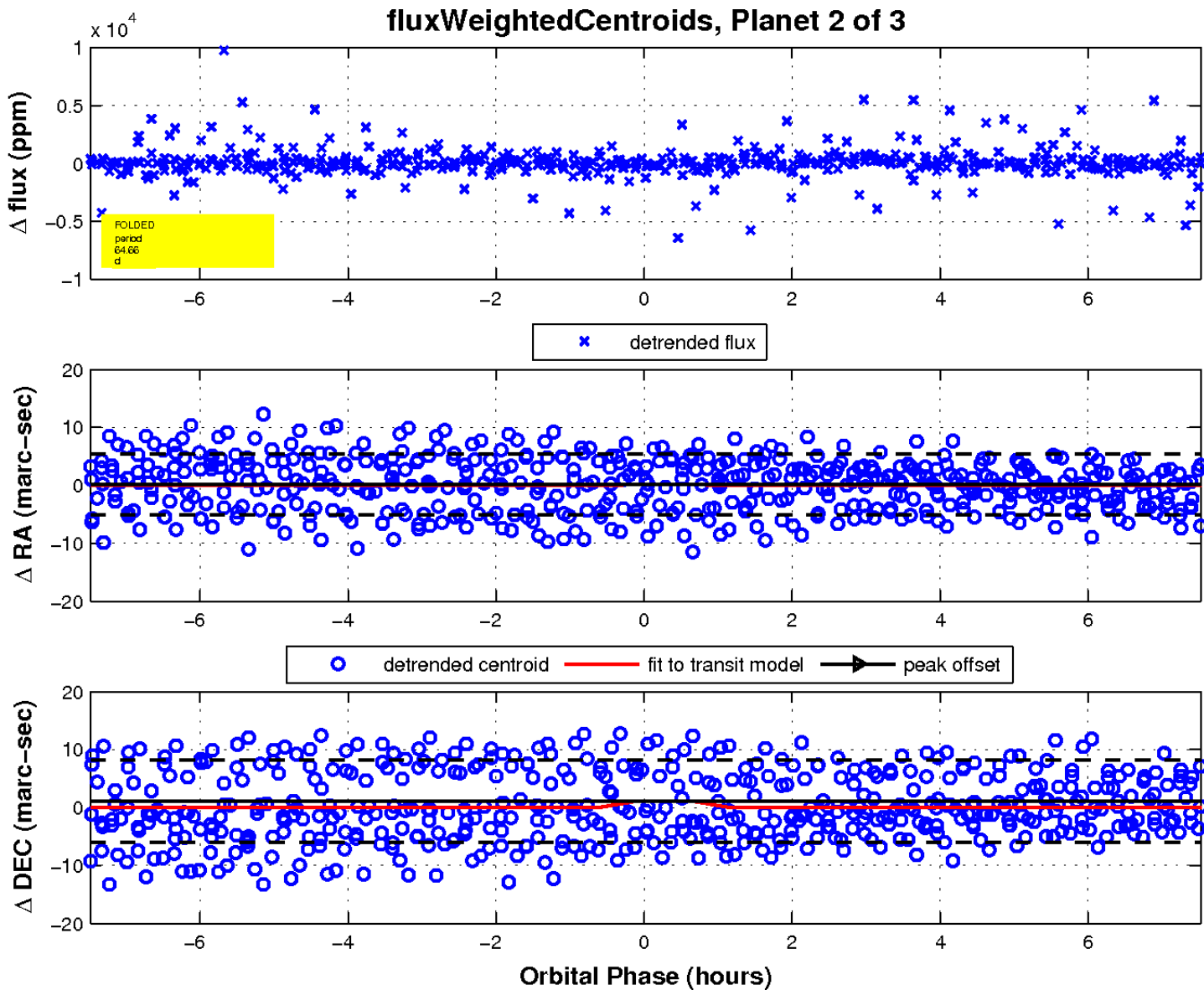
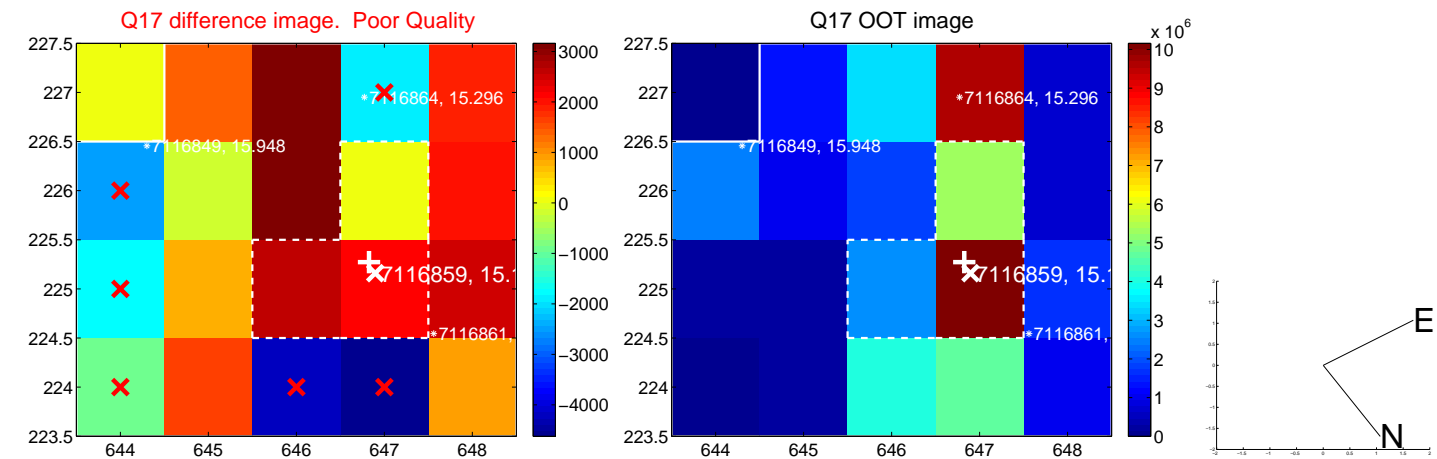
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

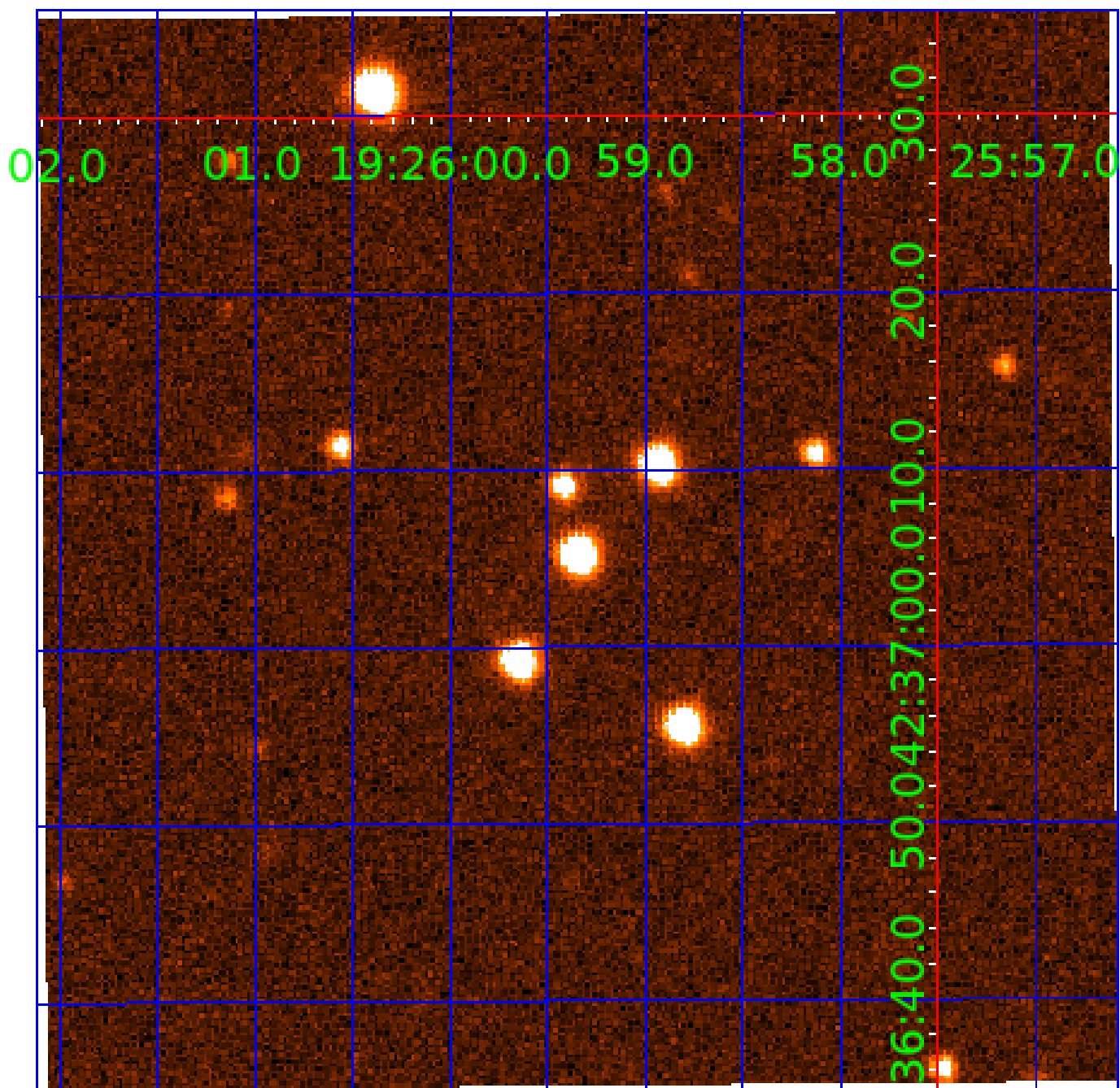


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 007116859

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007116859-01	OBS	7580.01	0.566788	131.820177	43.7	2.958	7.3	7.3	0.94	5766	0.74	5328.24
007116859-02	OBS	No	64.659758	140.494949	3686.0	3.500	14.7	-1.0	0.94	5766	5.67	9.63
007116859-03	OBS	No	64.559130	140.864791	2891.5	2.268	13.2	8.4	0.94	5766	5.04	9.65

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007116859-01	OBS	FP	0.00	1	0	0	1	LPP_DV—MOD_NONUNIQ_ALT—EPHEM_MATCH
007116859-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS
007116859-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

**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 007116859-03

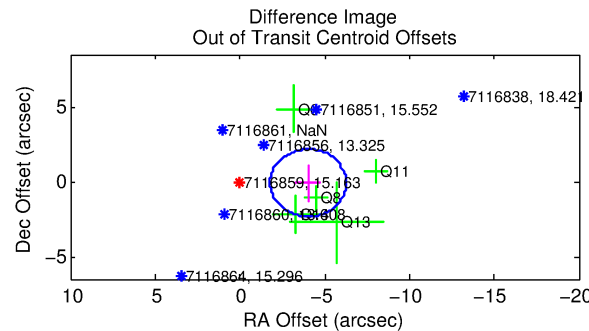
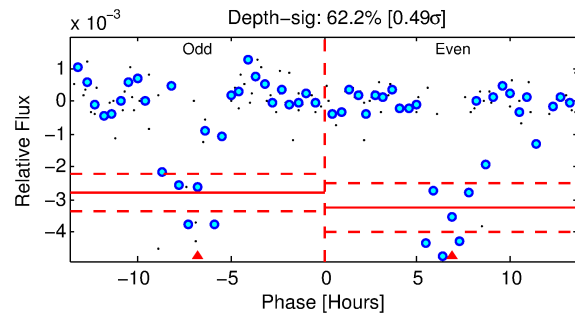
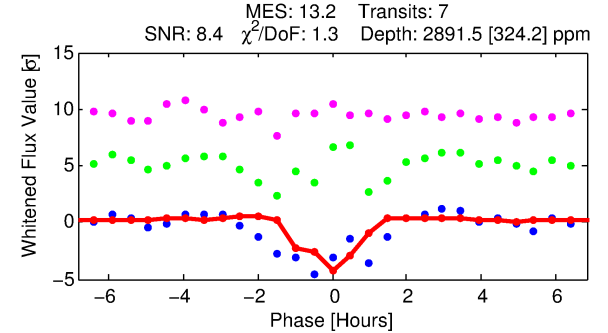
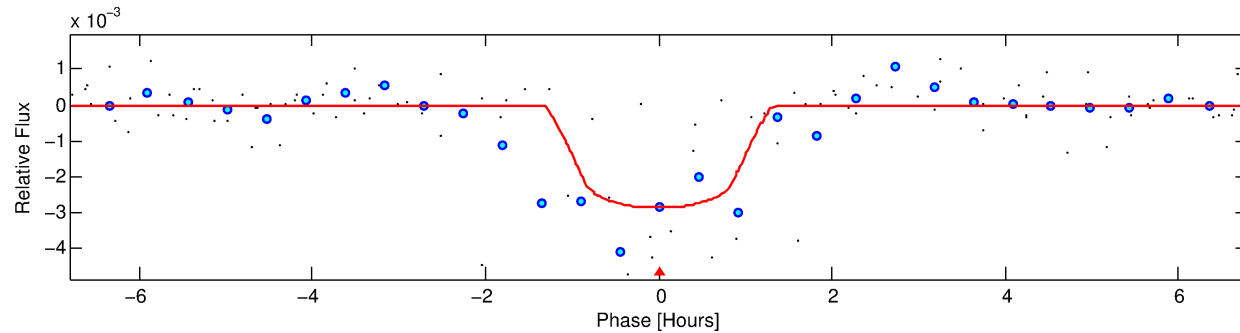
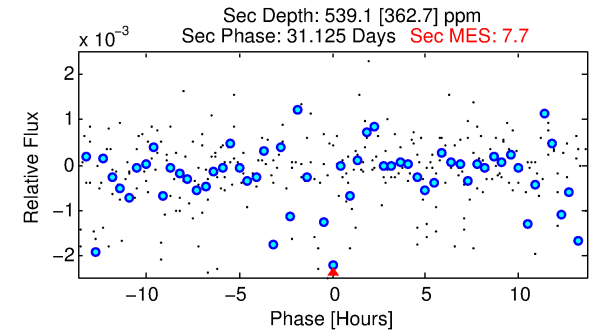
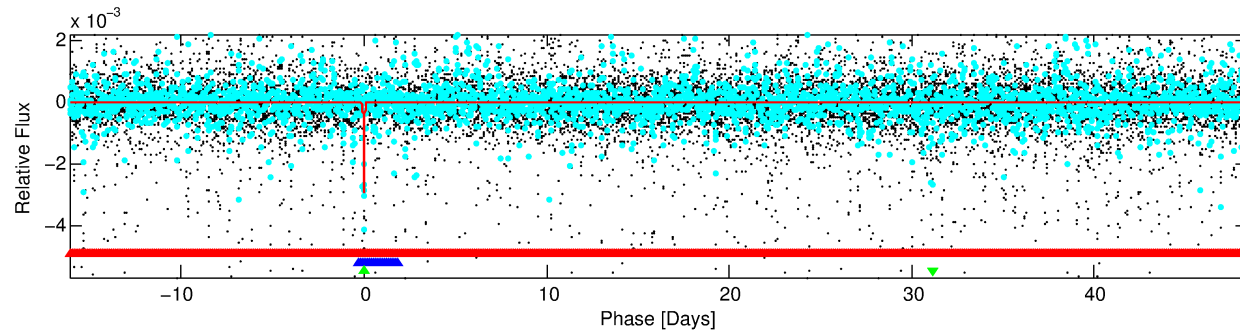
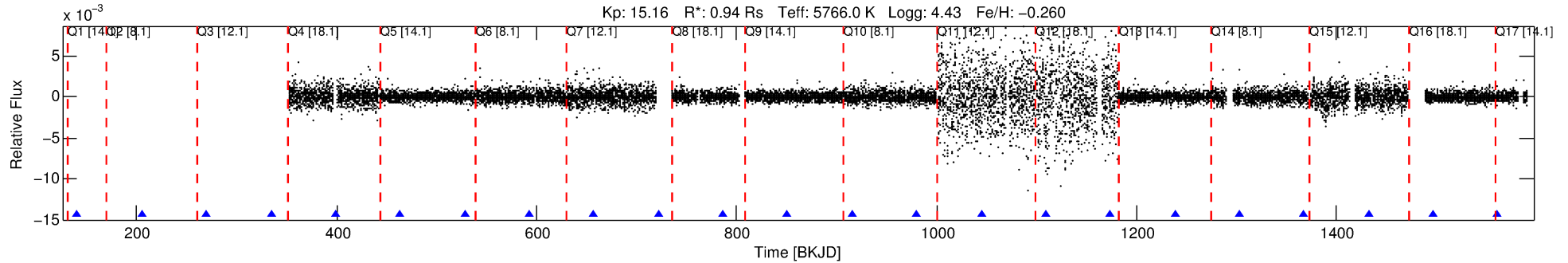
No Significant Match Found



# DV One-Page Summary

KIC: 7116859 Candidate: 3 of 3 Period: 64.559 d  
KOI: K07580 Corr: No Ephemeris Match

Kp: 15.16 R\*: 0.94 Rs Teff: 5766.0 K Logg: 4.43 Fe/H: -0.260



## DV Fit Results:

Period = 64.55913 [0.00072] d  
Epoch = 140.8648 [0.0097] BKJD  
Rp/R\* = 0.0492 [0.1199]  
a/R\* = 224.52 [2483.22]  
b = 0.19 [57.56]  
Seff = 9.65 [3.54]  
Teq = 449 [41] K  
Rp = 5.04 [12.38] Re  
a = 0.3011 [0.0703] AU  
Ag = 1056.98 [5217.19] [0.20σ]  
Teffp = 3962 [4879] K [0.72σ]

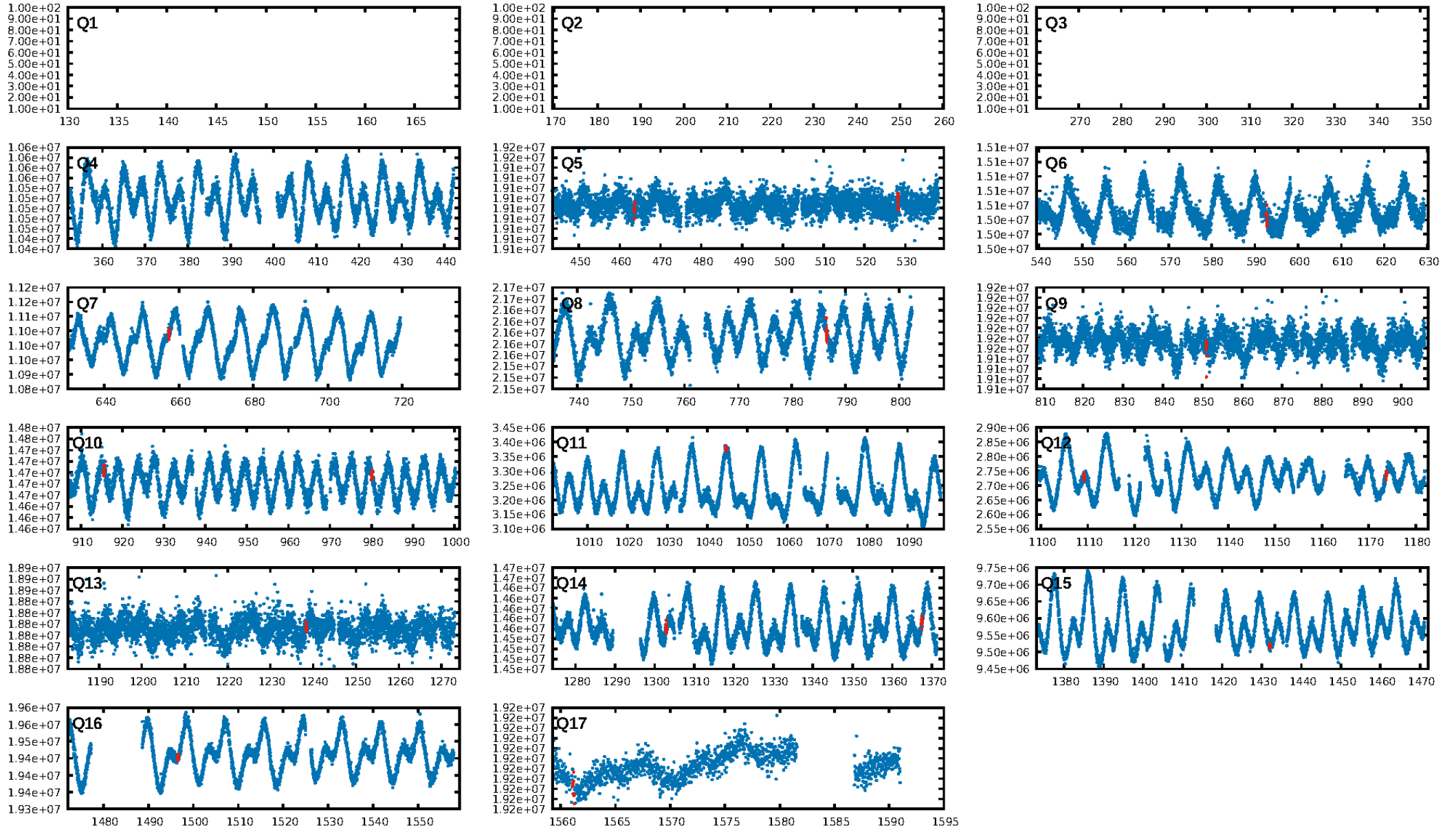
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [412.00σ]  
LongPeriod-sig: 43.7% [0.58σ]  
ModelChiSquare2-sig: 0.3%  
ModelChiSquareGof-sig: 97.1%  
Bootstrap-pfa: 2.07e-17  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 1.162  
Centroid-sig: 0.5%  
Centroid-so: 0.835 arcsec [3.16σ]  
OotOffset-rm: 4.021 arcsec [5.38σ]  
KicOffset-rm: 4.217 arcsec [6.15σ]  
OotOffset-st: 2/1/1/1 [5]  
KicOffset-st: 2/1/1/1 [5]  
DiffImageQuality-fgm: 0.00 [0/5]  
DiffImageOverlap-fno: 0.00 [0/13]

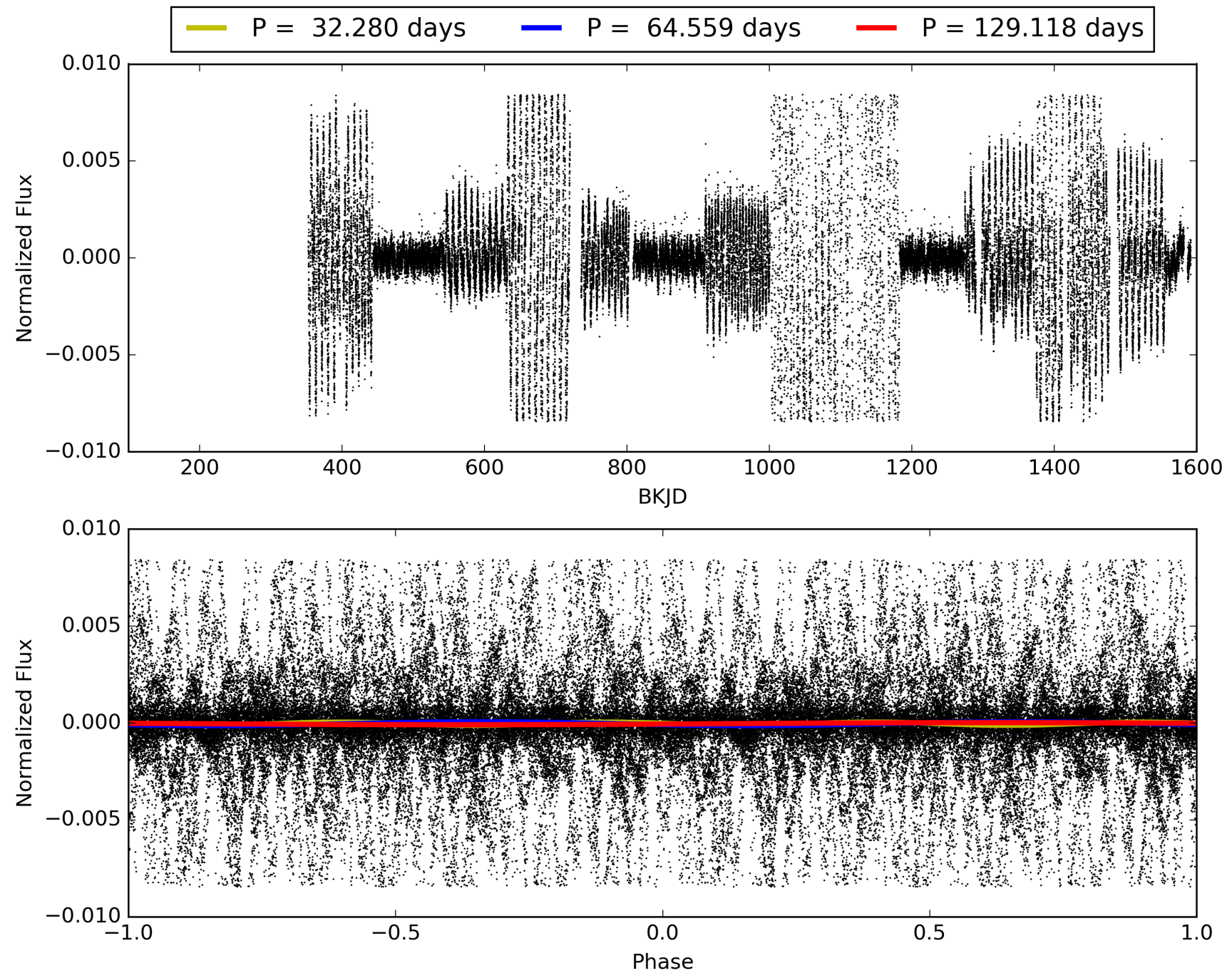
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 09:58:18 Z

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

# TCE 007116859-03, PDC Light Curves

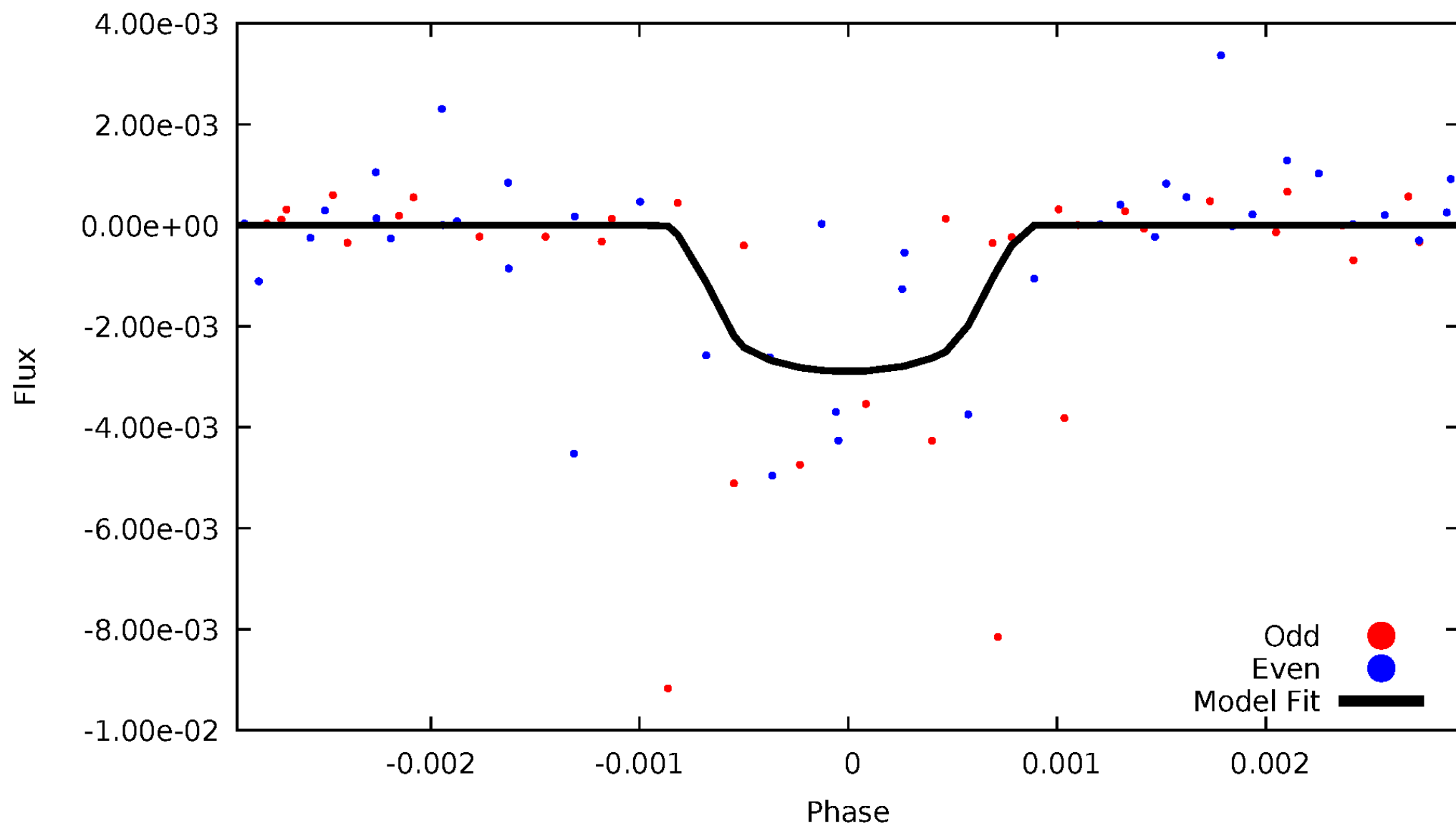


# TCE 007116859-03



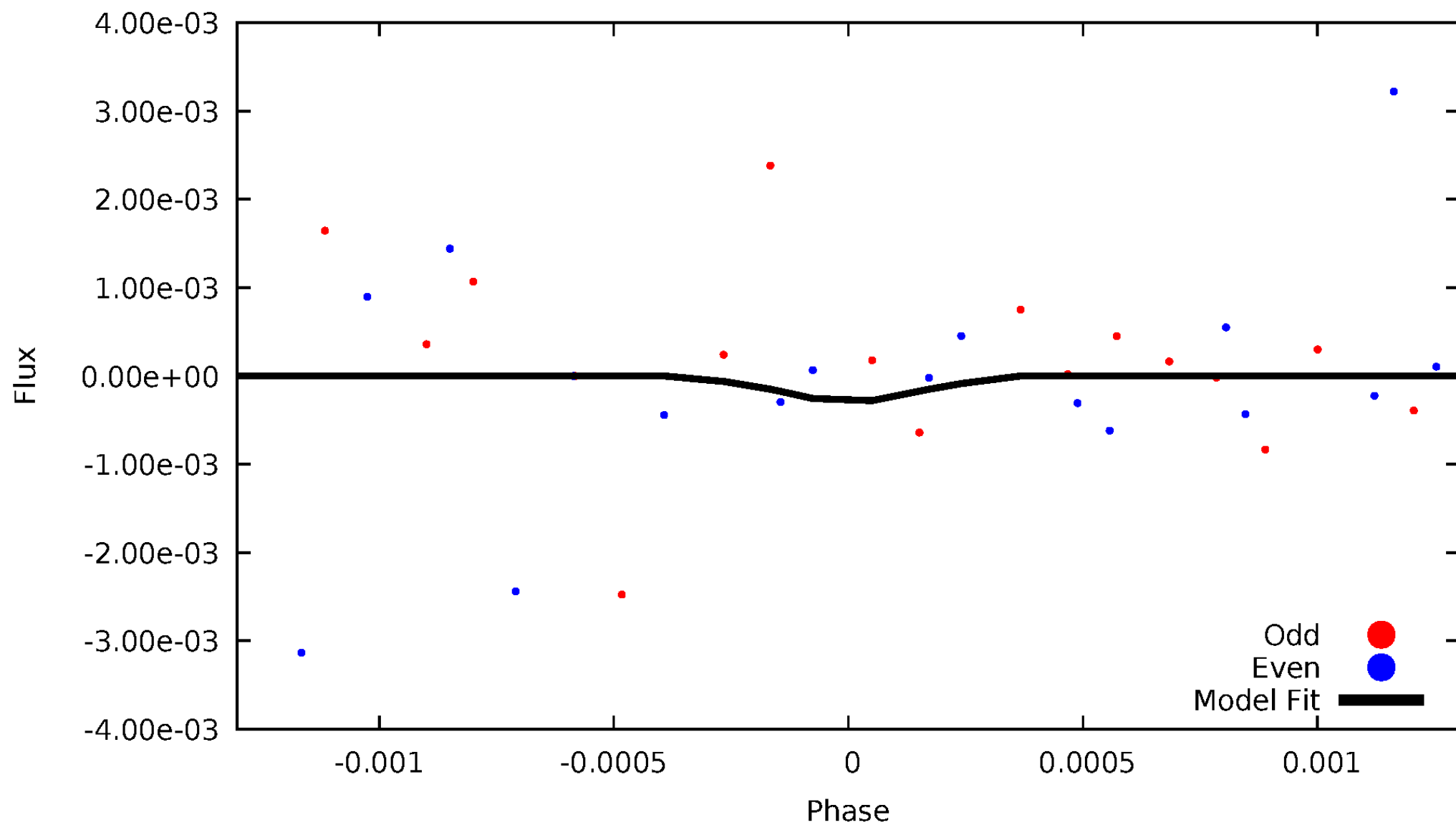
# DV Odd/Even

TCE 007116859-03



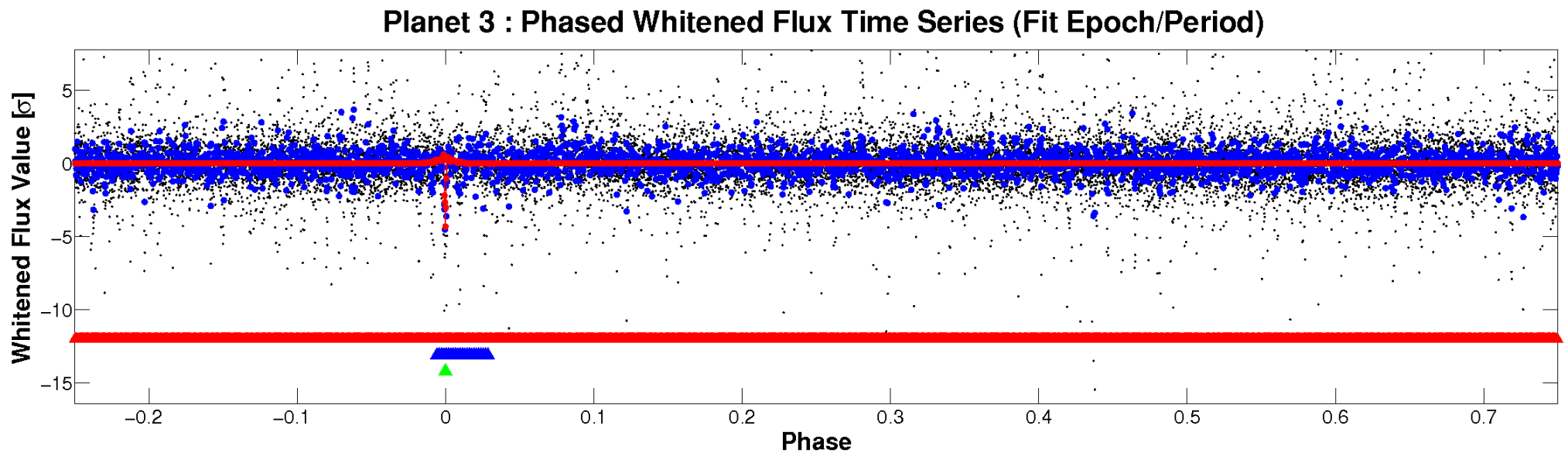
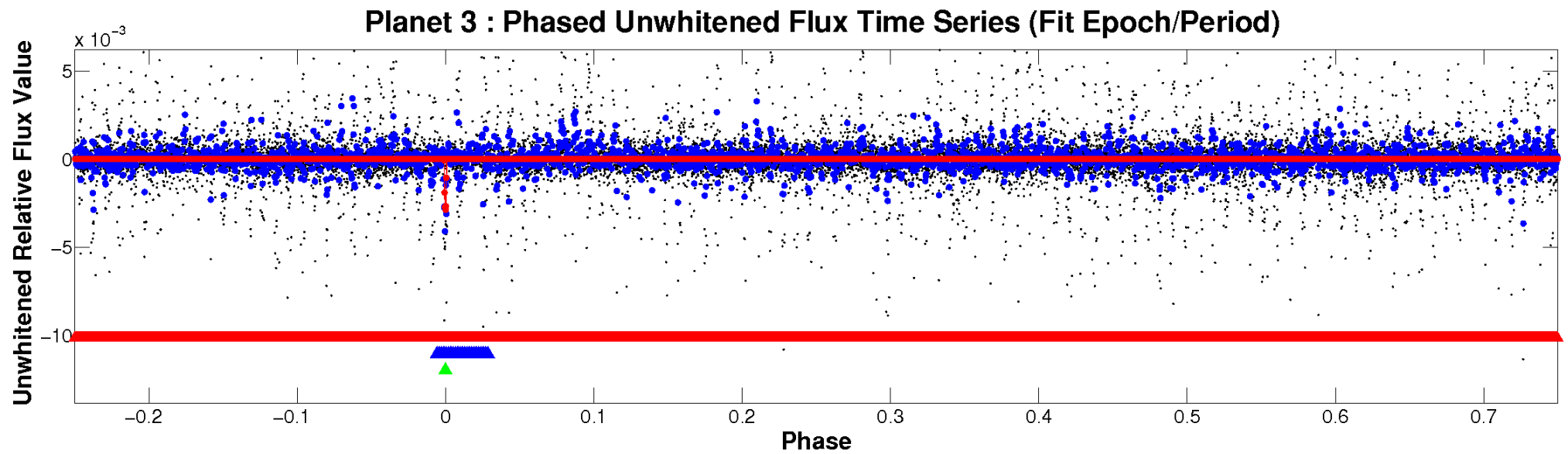
# ALT Odd/Even

TCE 007116859-03



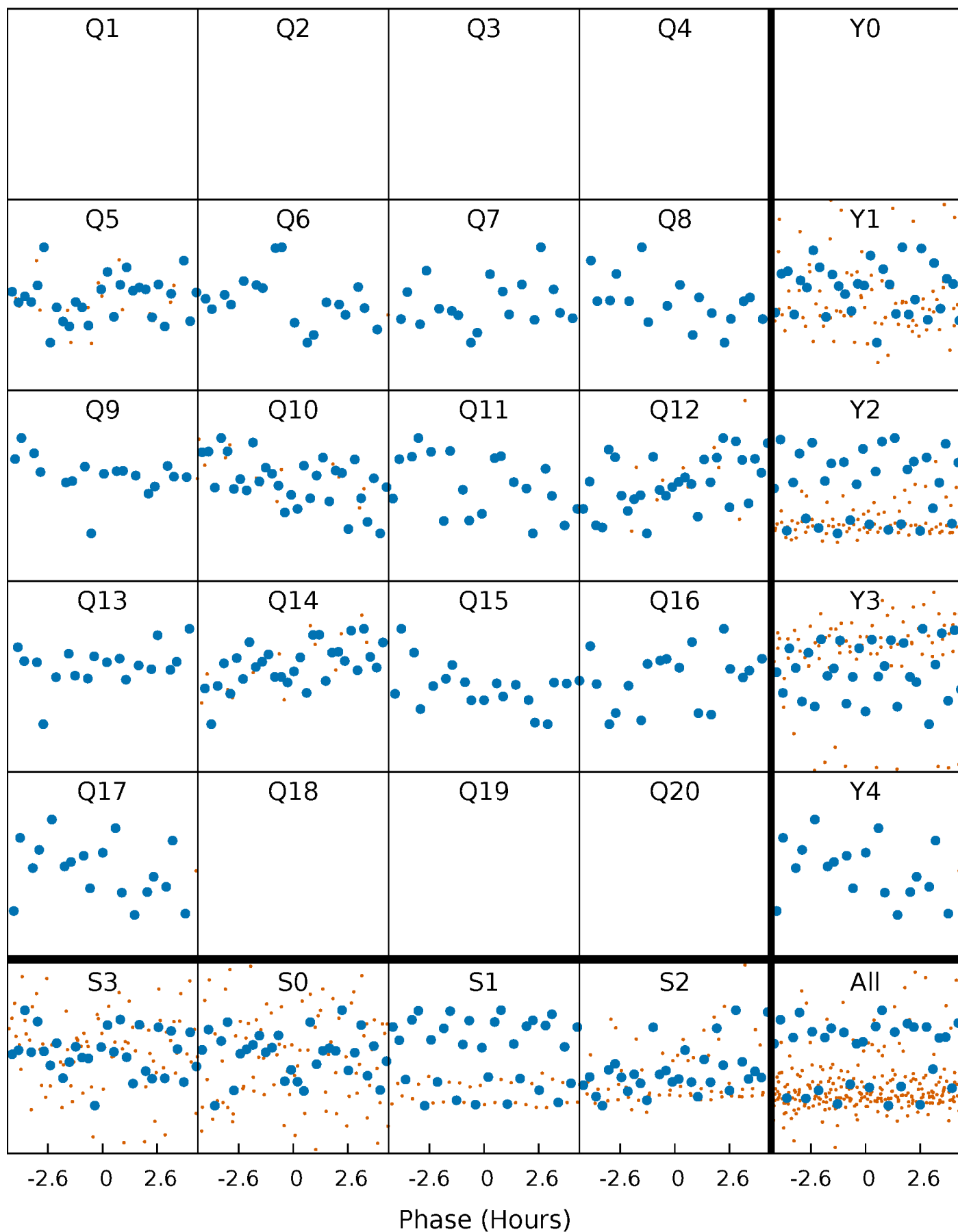


# Non-Whitened Vs. Whitened Light Curve



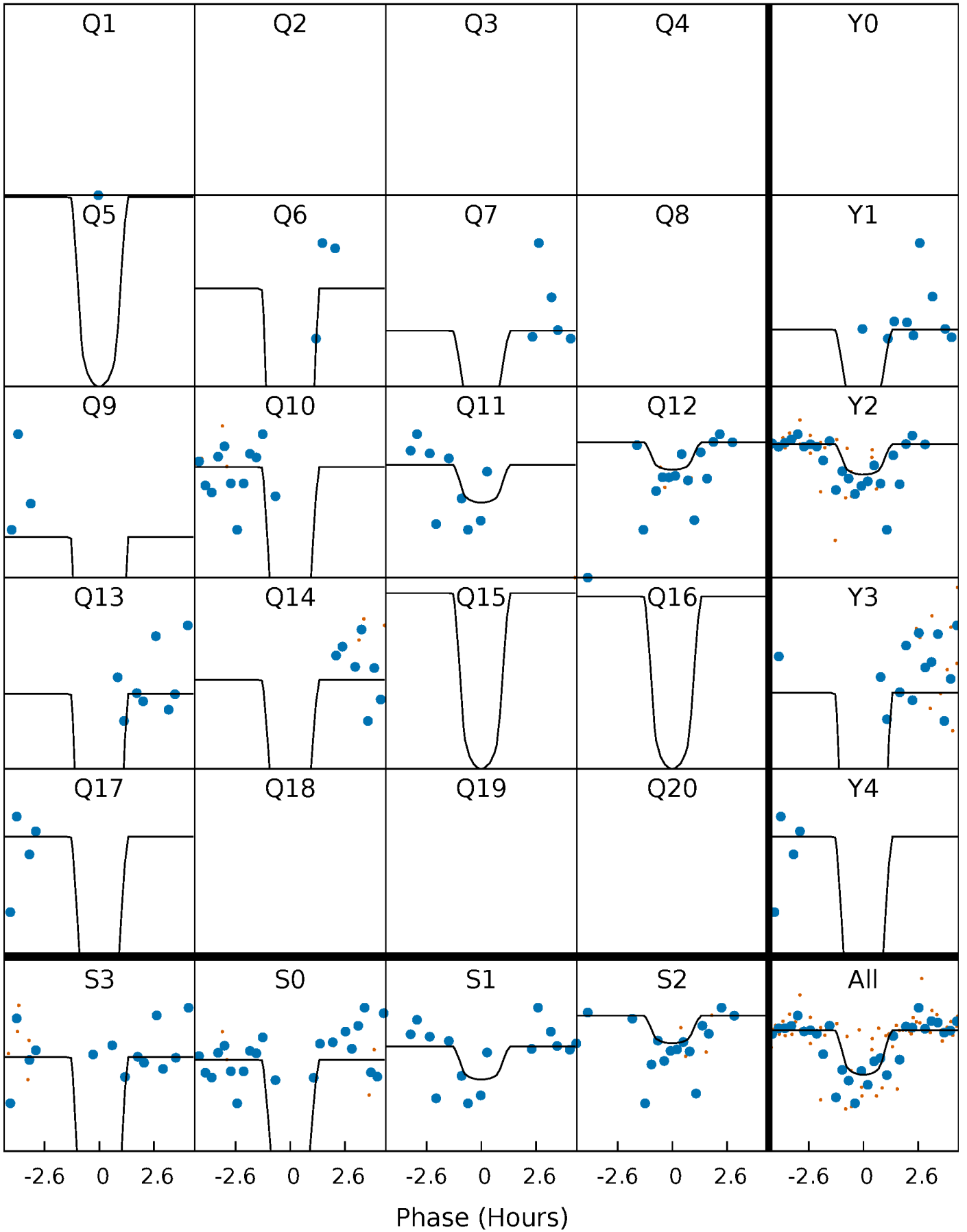
# PDC Quarter-Phased Transit Curves

TCE 007116859-03   P= 64.559130 Days    $T_0=140.864791$  (BKJD)



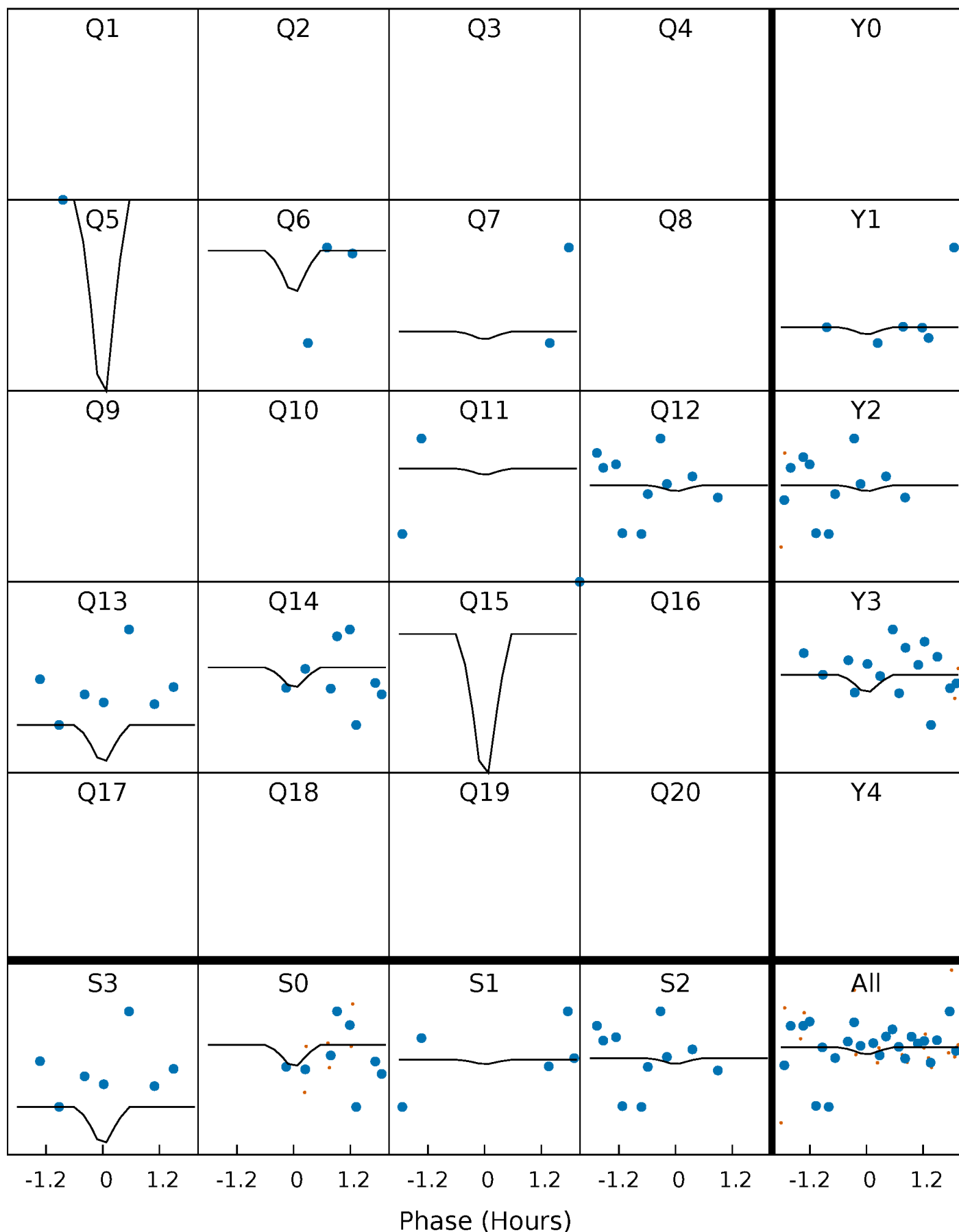
# DV Quarter-Phased Transit Curves

TCE 007116859-03   P= 64.559130 Days    $T_0=140.864791$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

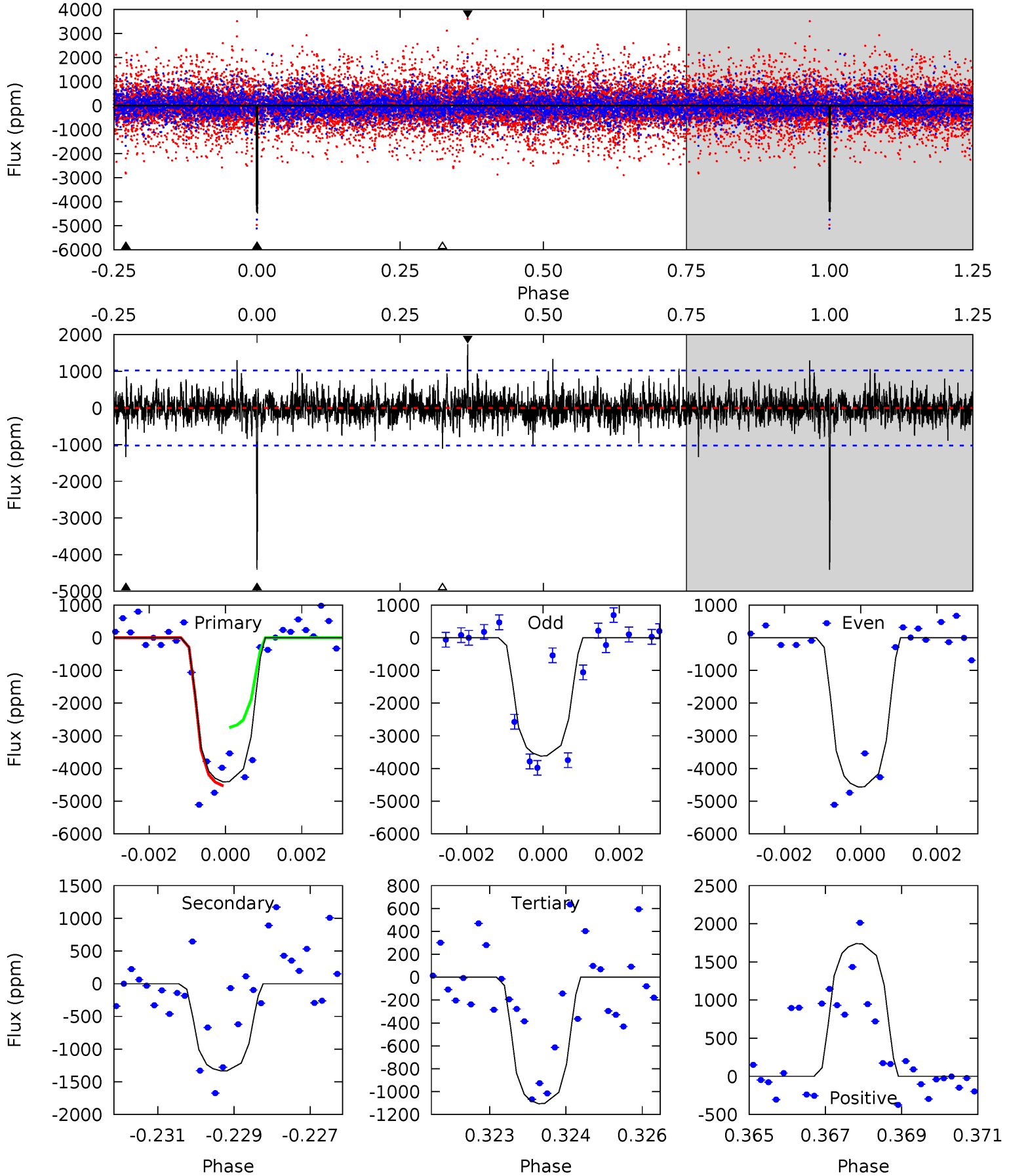
TCE 007116859-03 P= 64.564461 Days  $T_0=140.862321$  (BKJD)



# DV Model-Shift Uniqueness Test

007116859-03, P = 64.559130 Days, E = 140.864791 Days

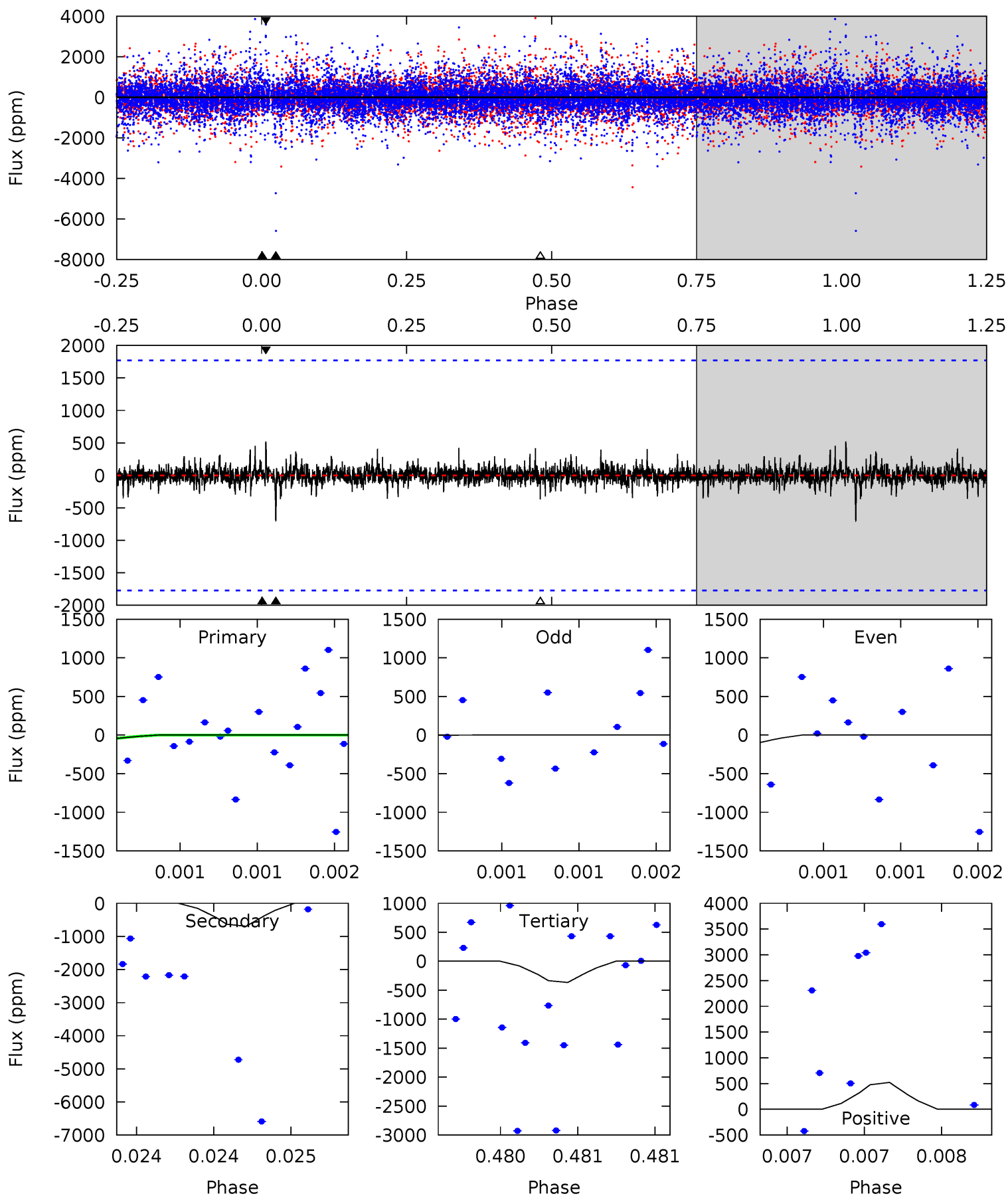
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	6.98	5.79	9.11	5.36	3.14	1.37	17.3	14.0	1.19	-2.13	2.51	0.81	0.28	5.10



# Alt Model-Shift Uniqueness Test

007116859-03, P = 64.564461 Days, E = 140.862321 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
0.16	2.18	1.15	1.64	5.57	3.48	0.25	-0.99	-1.48	1.03	0.54	0.18	0.23	0.43	0.00



### Stellar Parameters For KIC 007116859

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5766^{+172}_{-189}$	$4.433^{+0.116}_{-0.188}$	$-0.260^{+0.300}_{-0.300}$	$0.940^{+0.259}_{-0.139}$	$0.874^{+0.120}_{-0.080}$	$1.483^{+0.698}_{-0.724}$
	+3%/-3%	+3%/-4%	+115%/-115%	+28%/-15%	+14%/-9%	+47%/-49%
Source	KIC0	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 007116859-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1334 \pm 191$	$10.81^{+10.62}_{-7.01}$	$633^{+46}_{-36}$	$3829^{+1967}_{-756}$	$580^{+4179}_{-436}$
Alt.	$-694 \pm 318$	$9.06^{+9.09}_{-6.28}$	$630^{+46}_{-36}$	$3560^{+2047}_{-688}$	$380^{+3854}_{-289}$

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



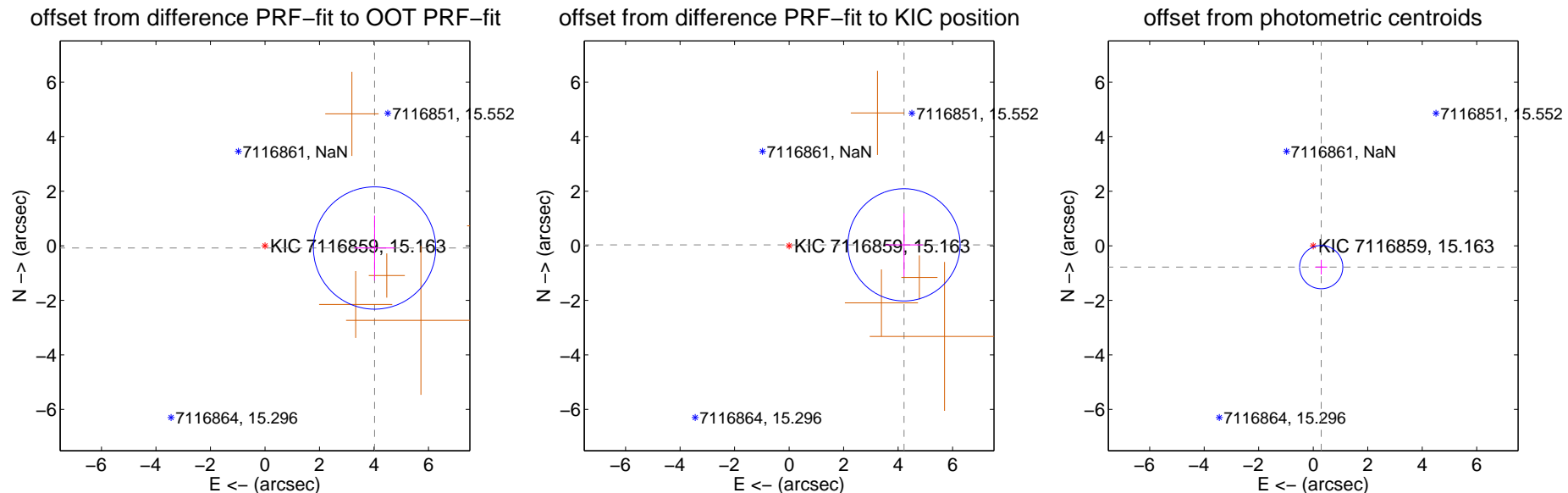
## DV Centroid Data

Supplemental centroid analysis for 007116859-03. Kepler magnitude: 15.16. Transit SNR 8.36

There are 0 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.021 \pm 0.748$	5.38	$-4.021 \pm 0.741$	$-0.081 \pm 1.189$
PRF-fit source offset from KIC position	$4.217 \pm 0.686$	6.15	$-4.217 \pm 0.686$	$0.035 \pm 1.162$
photometric centroid source offset	$0.84 \pm 0.26$	3.16	$-0.29 \pm 0.22$	$-0.78 \pm 0.27$

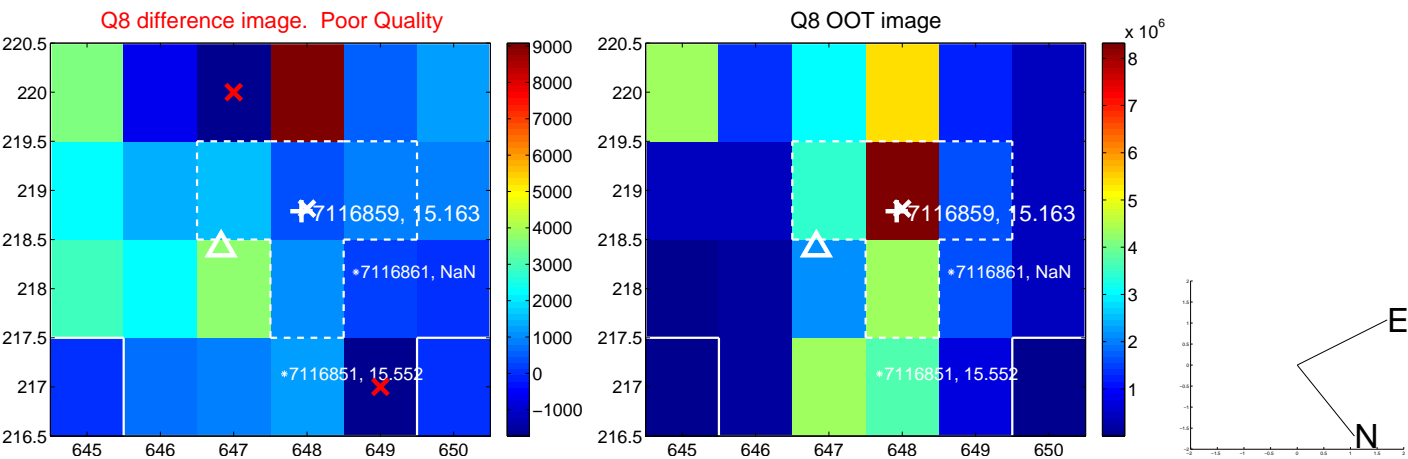
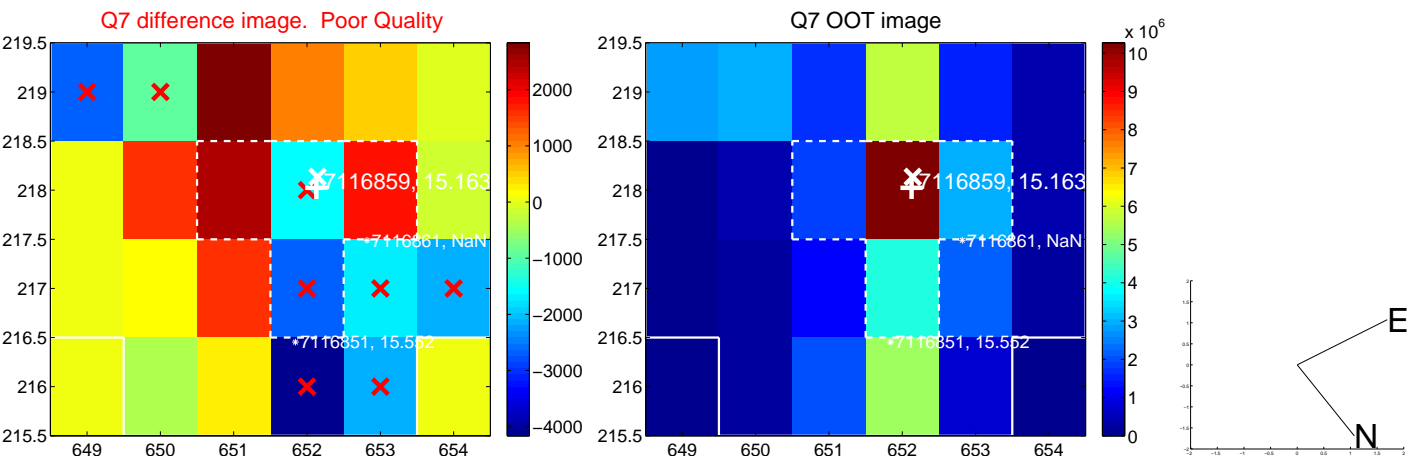
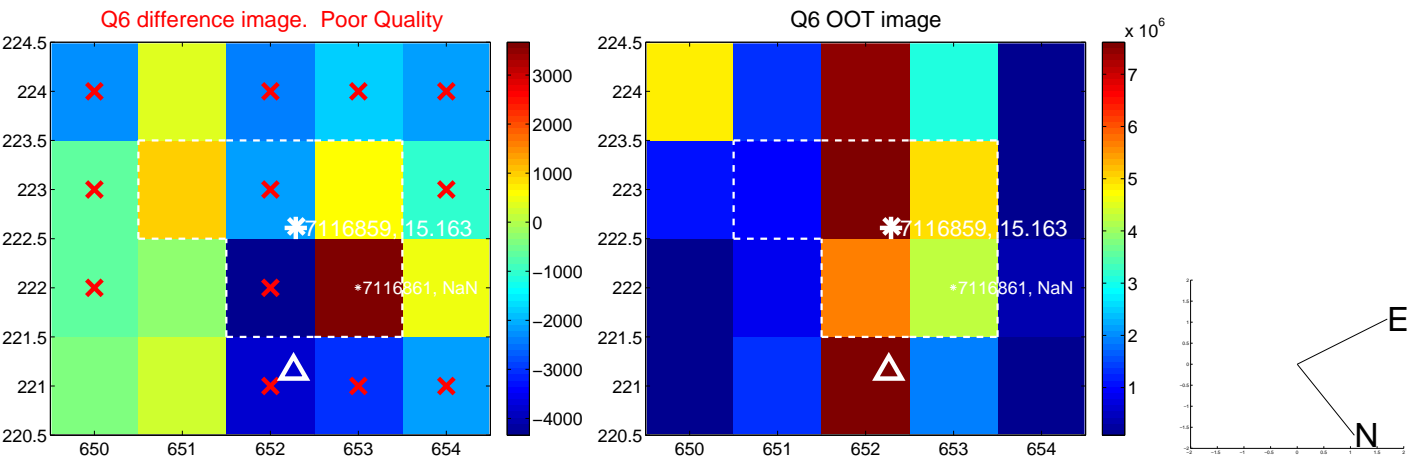
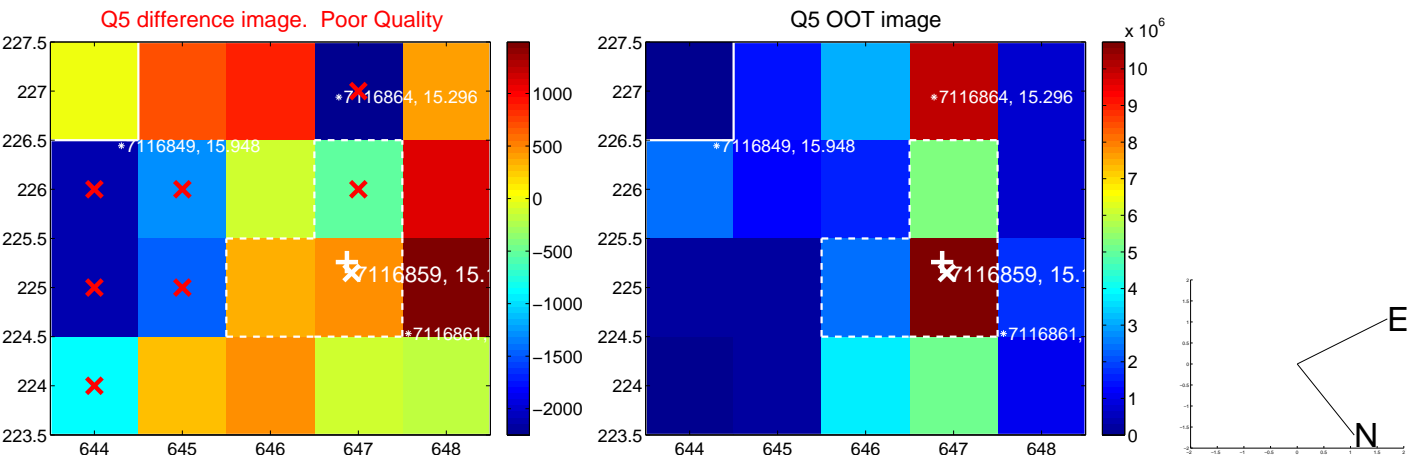


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

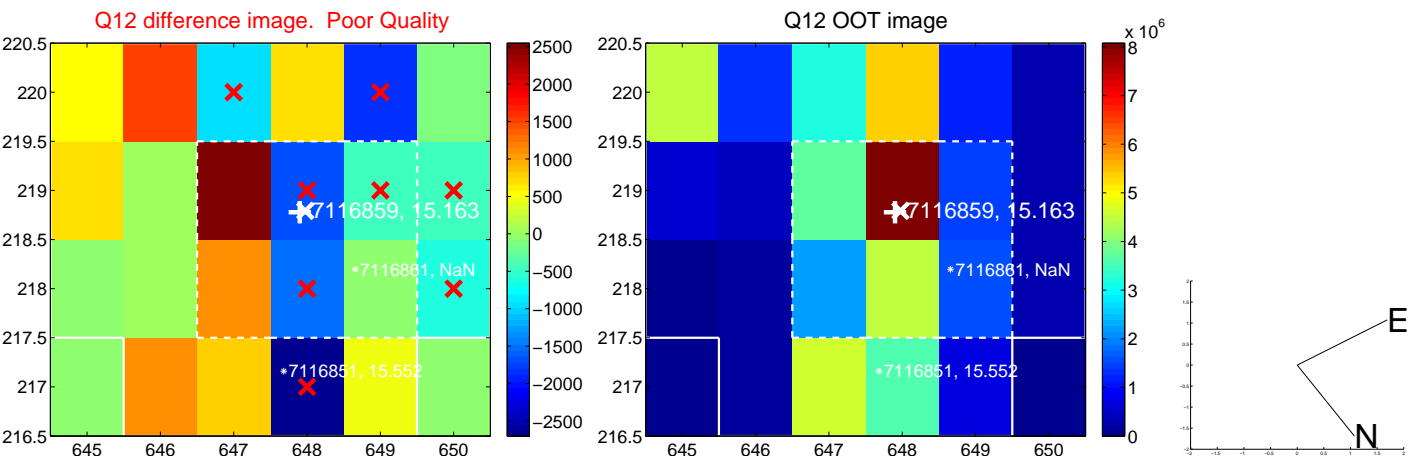
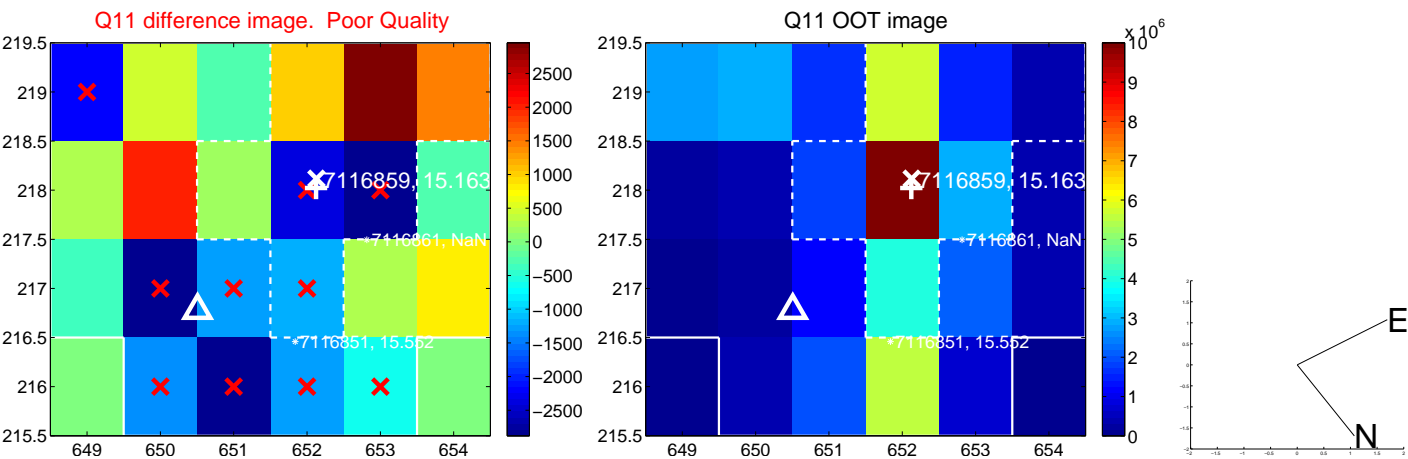
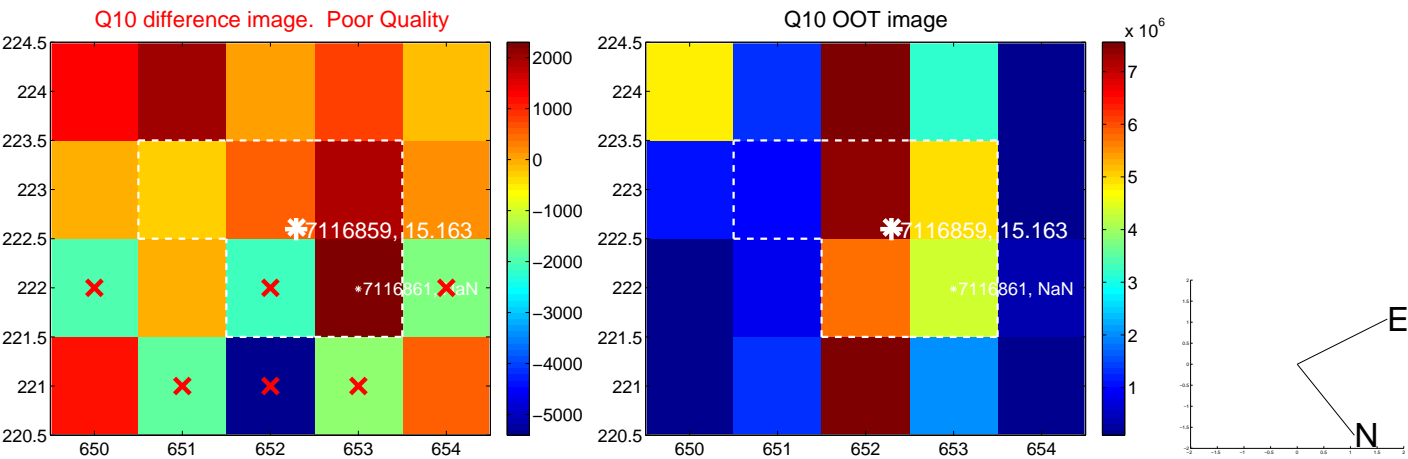
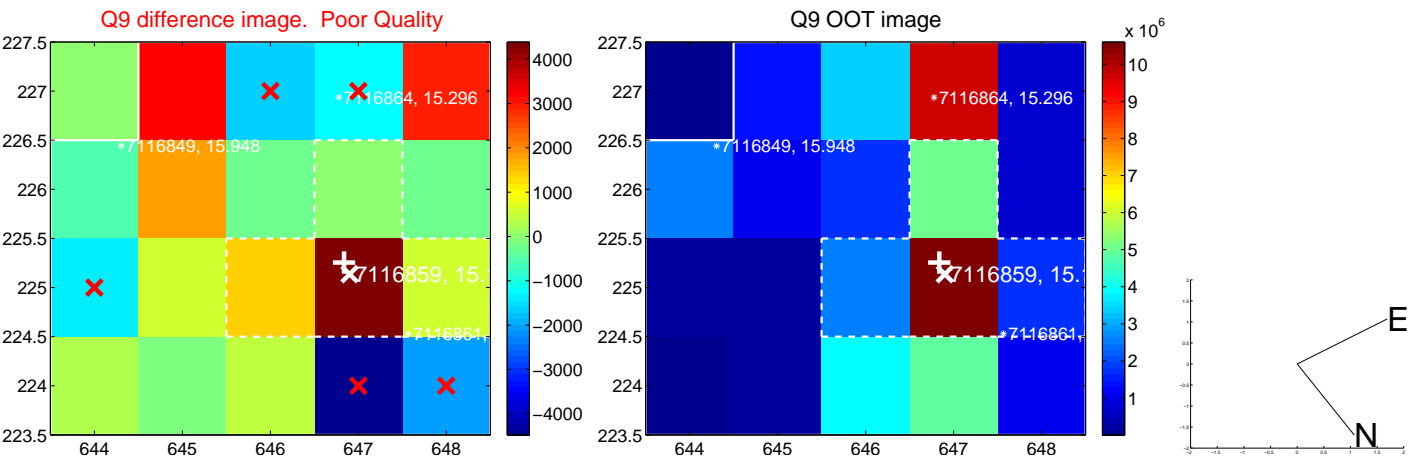
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



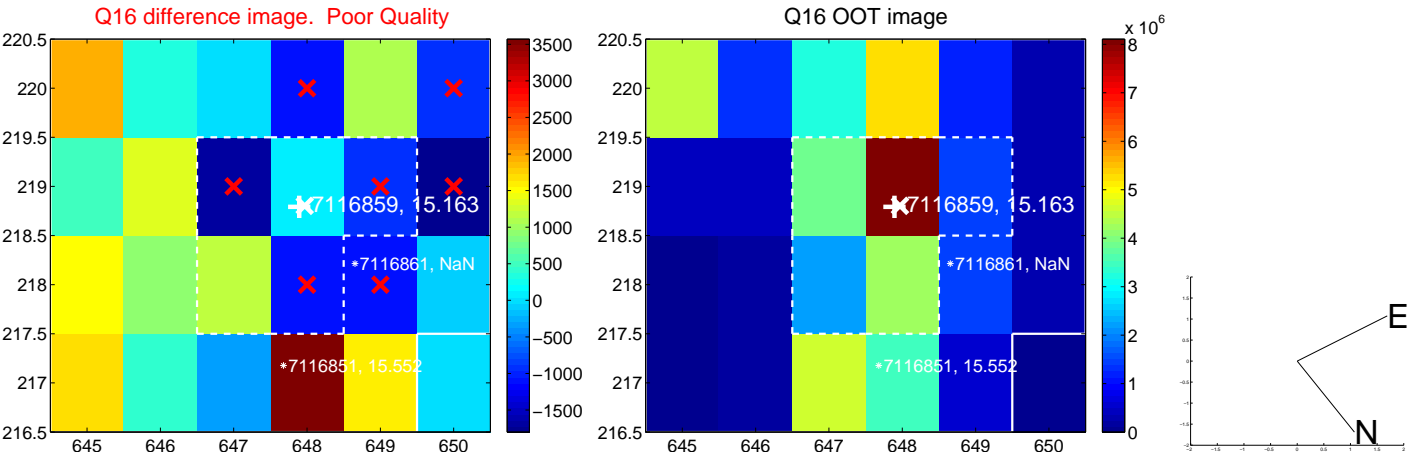
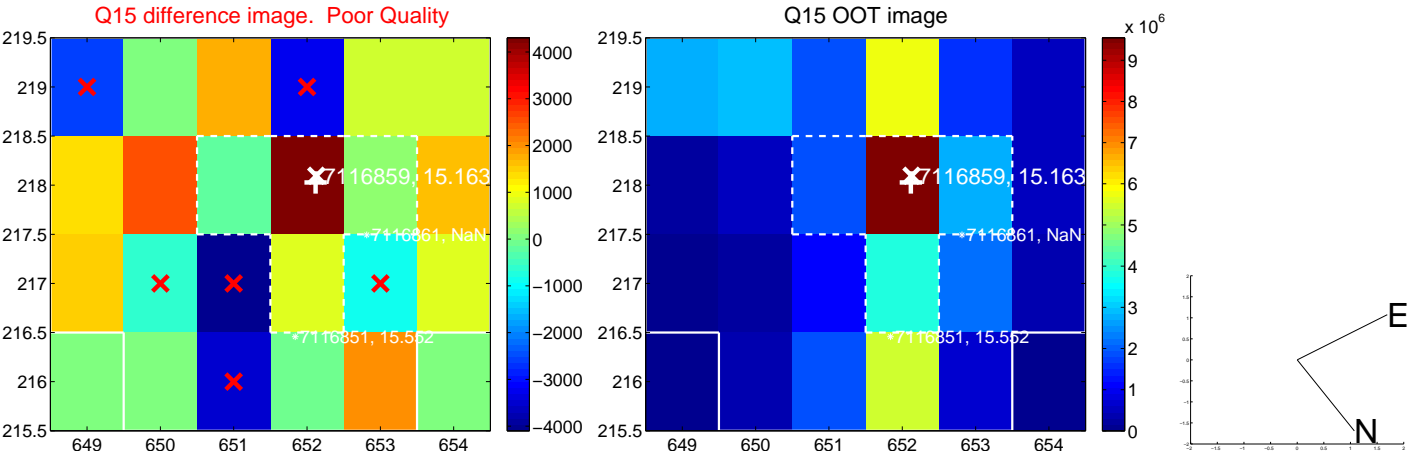
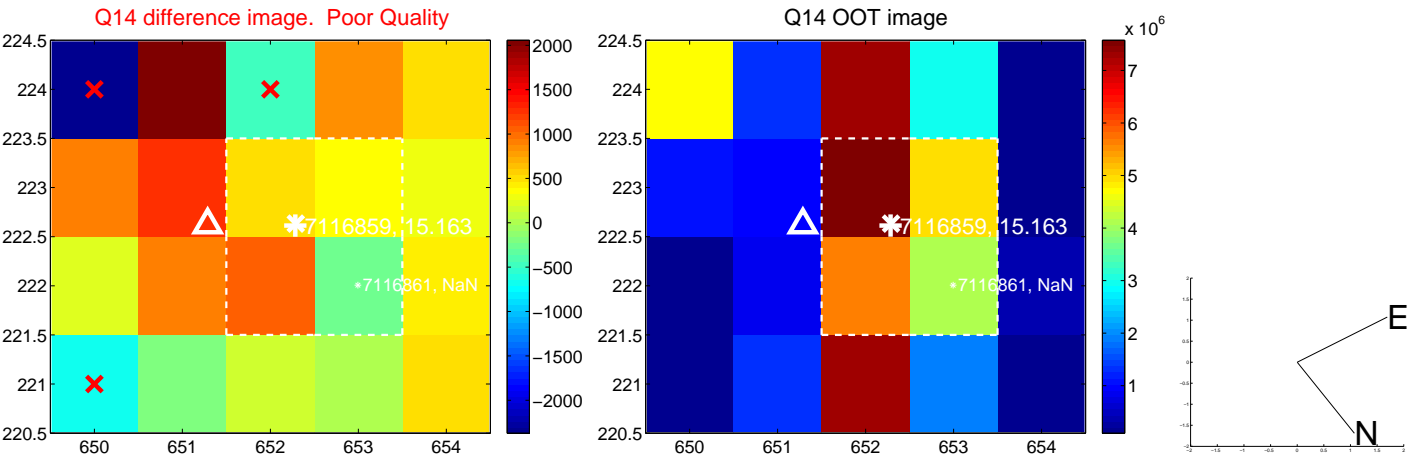
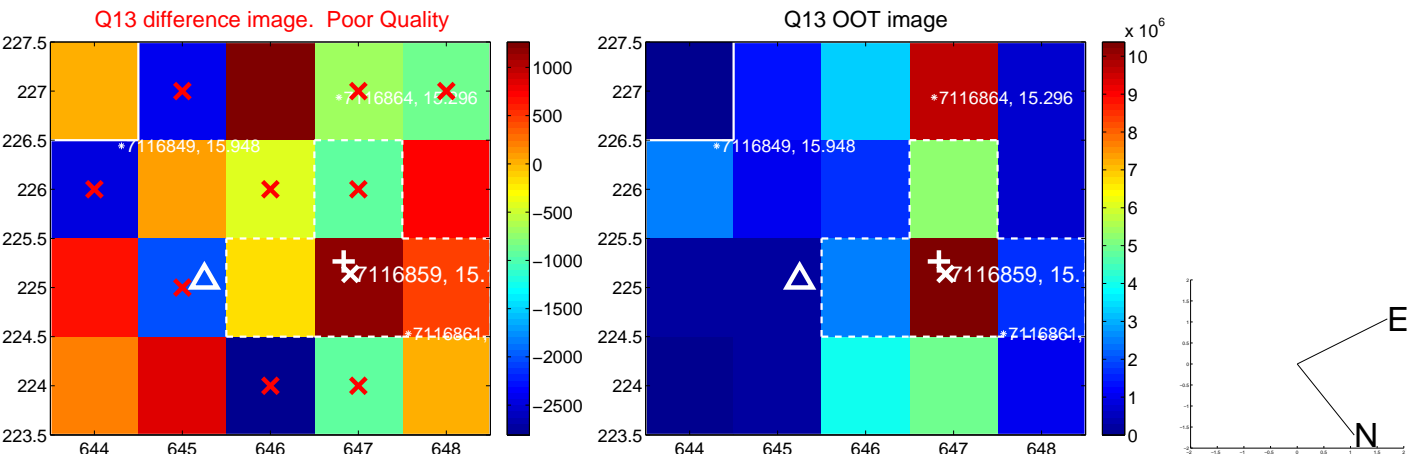
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



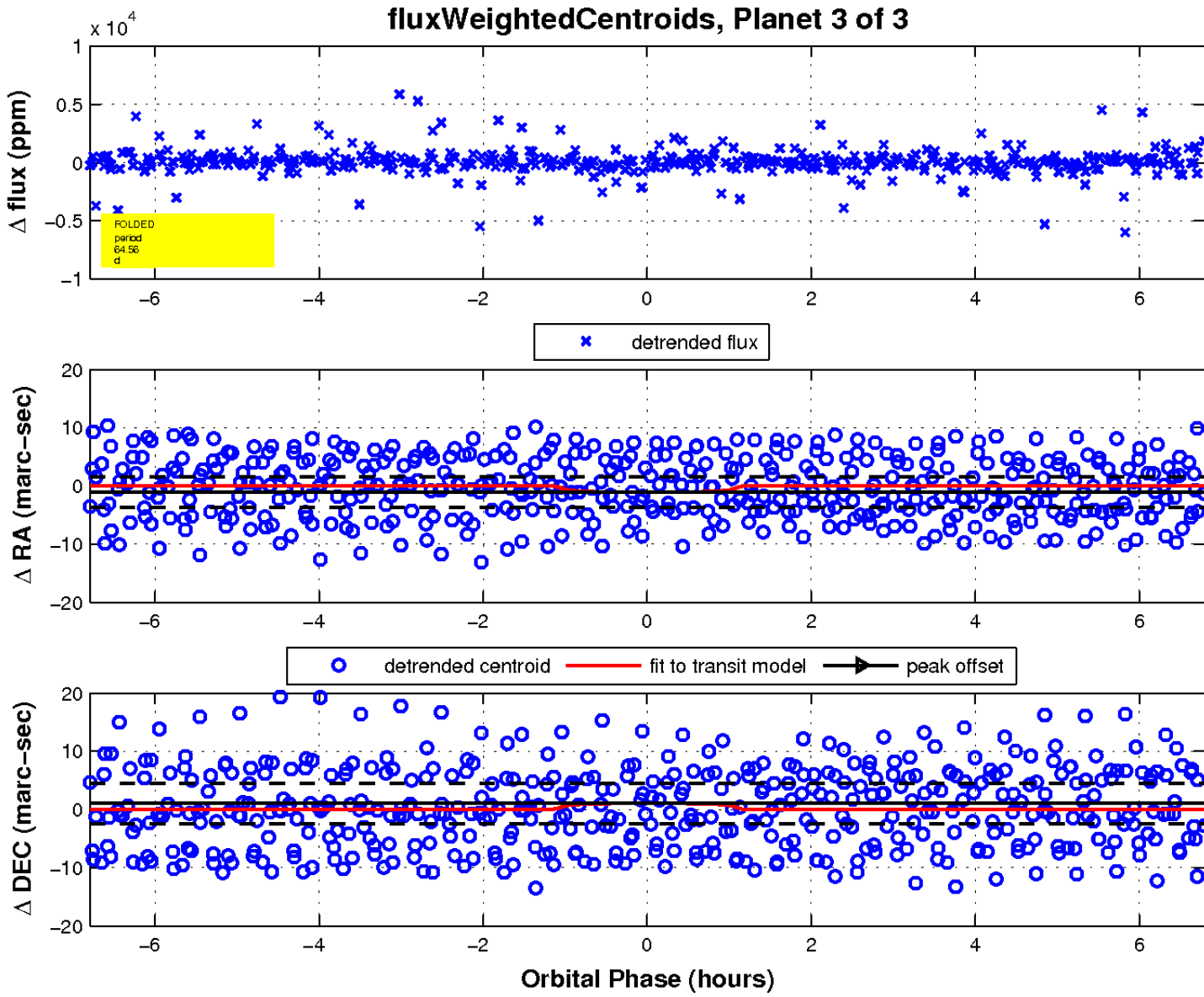
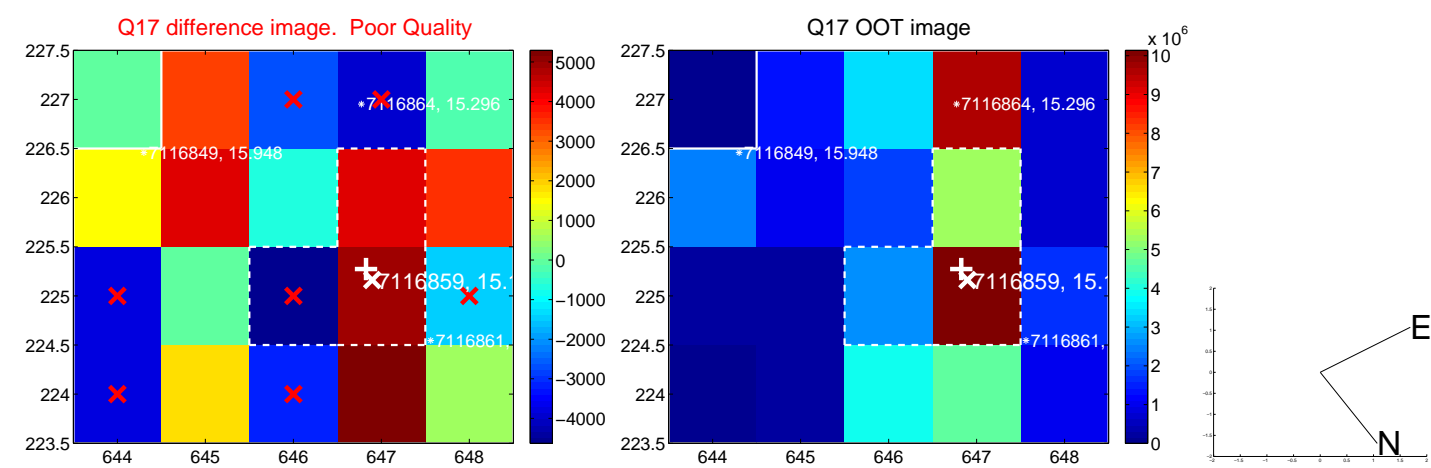
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

