

# KIC 004035667

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004035667-01	OBS	2684.01	2.873651	132.586538	169.3	1.411	58.6	67.9	3.17	8173	4.81	15987.84
004035667-02	OBS	No	0.525920	131.671016	16.3	1.564	13.6	15.9	3.17	8173	1.49	153866.03
004035667-03	OBS	No	0.525901	131.942408	8.1	2.011	13.0	9.1	3.17	8173	0.94	153873.43
004035667-04	OBS	No	18.769420	147.423994	133.8	1.623	9.5	7.2	3.17	8173	3.71	1309.49

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004035667-01	OBS	FP	0.00	0	0	0	1	CENT_SATURATED—EPHEM_MATCH
004035667-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004035667-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004035667-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED

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

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

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

## Ephemeris Match Information For 004035667-01

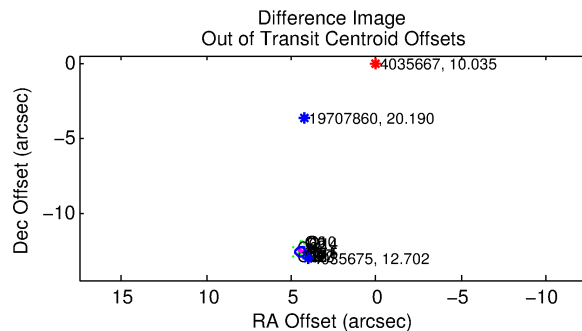
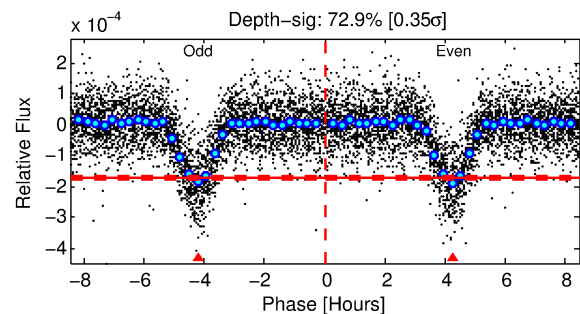
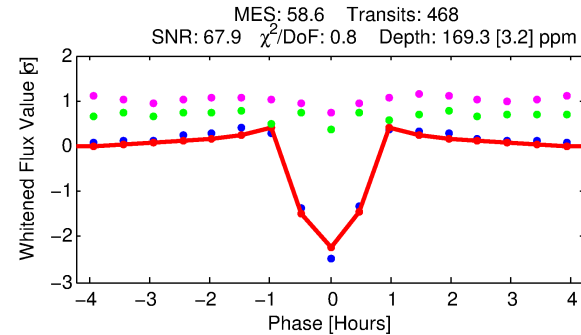
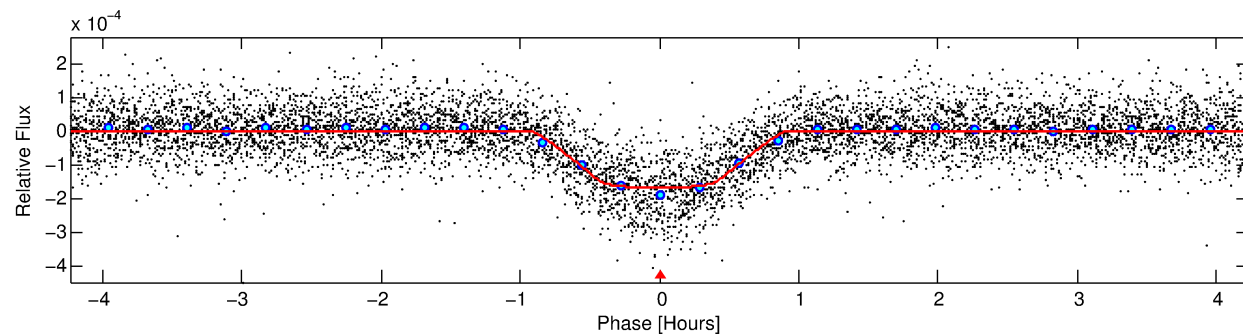
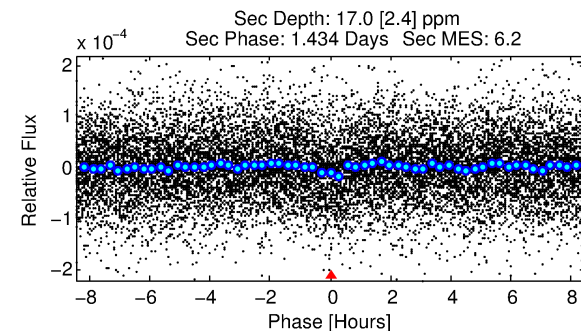
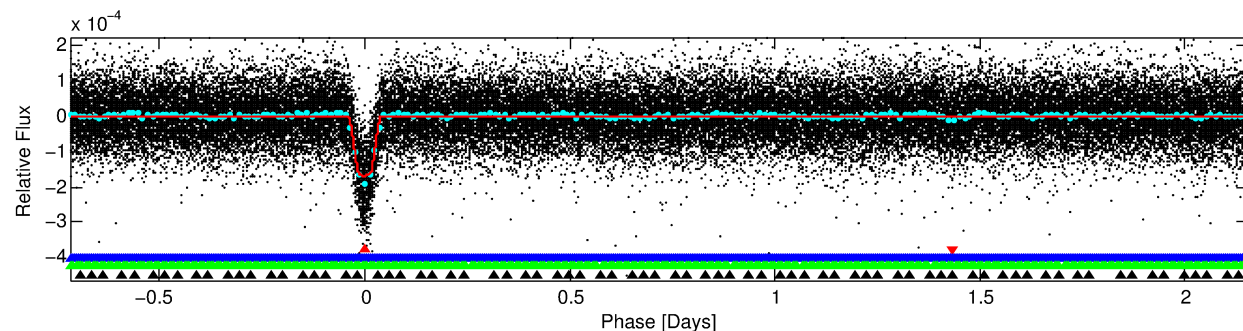
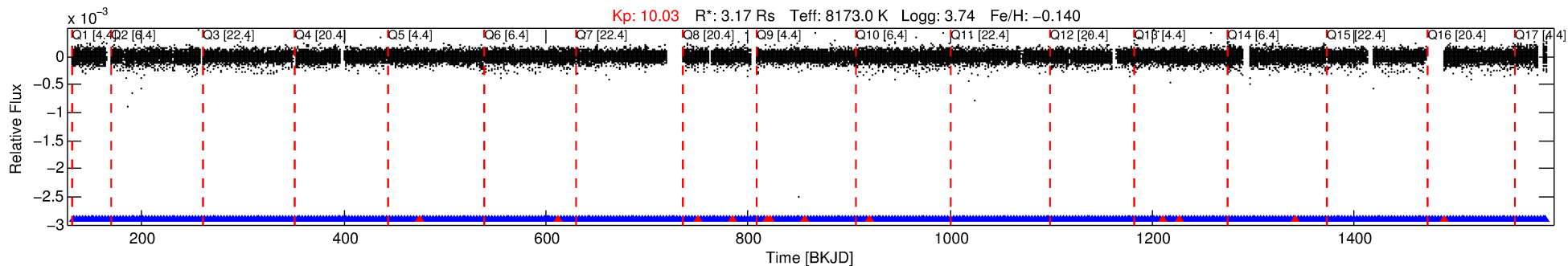
TCE (1)	KIC	Parent (2)	Parent KIC	P <sub>1</sub> :P <sub>2</sub>	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	m <sub>2</sub>	m <sub>1</sub>	D <sub>2</sub> /D <sub>1</sub>	Mechanism	Flag	$\sigma_P$	$\sigma_T$
004035667-01	4035667	6107.01	4035675	1:1	13.7	1	-3	12.70	10.03	270.59	Direct-PRF	0	0.22	0.14

**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: 4035667 Candidate: 1 of 4 Period: 2.874 d

KOI: K02684.01 Corr: 0.953



## DV Fit Results:

Period = 2.87365 [0.00000] d  
Epoch = 132.5865 [0.0003] BKJD  
 $R_p/R^*$  = 0.0139 [0.0009]  
 $a/R^*$  = 7.32 [2.74]  
 $b$  = 0.90 [0.08]  
 $\text{Seff}$  = 15987.84 [11732.68]  
 $T_{\text{eq}}$  = 2867 [526] K  
 $R_p$  = 4.81 [2.34]  $R_{\text{e}}$   
 $a$  = 0.0501 [0.0227] AU  
 $\text{Ag}$  = 1.01 [0.75] [0.02σ]  
 $T_{\text{eff}}$  = 4447 [278] K [2.6σ]

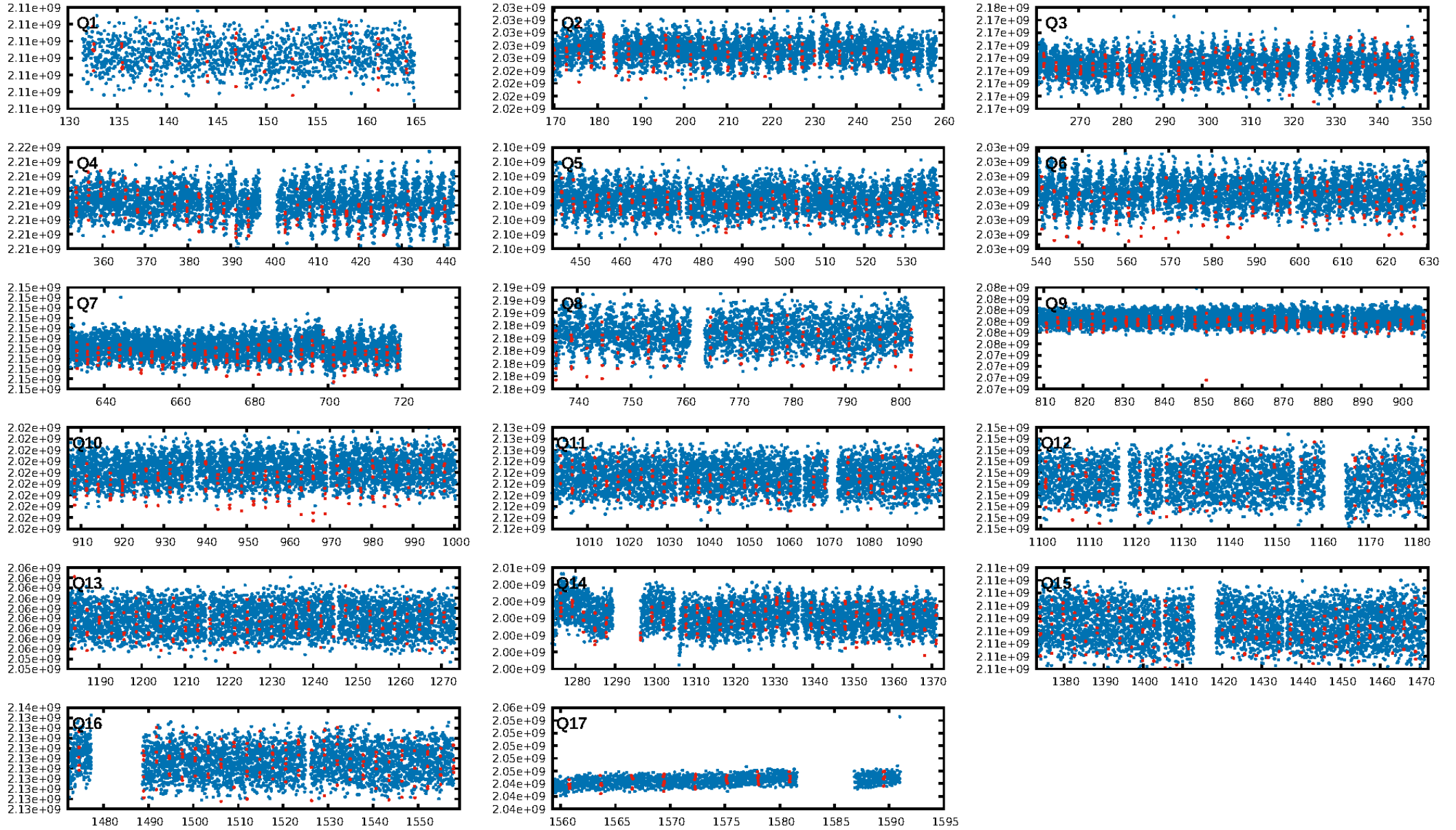
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [26.75σ]  
LongPeriod-sig: 100.0% [177.34σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.97 [435/447]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 35.436 arcsec [57.71σ]  
OotOffset-rm: 13.370 arcsec [124.95σ]  
KicOffset-rm: 13.694 arcsec [171.85σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

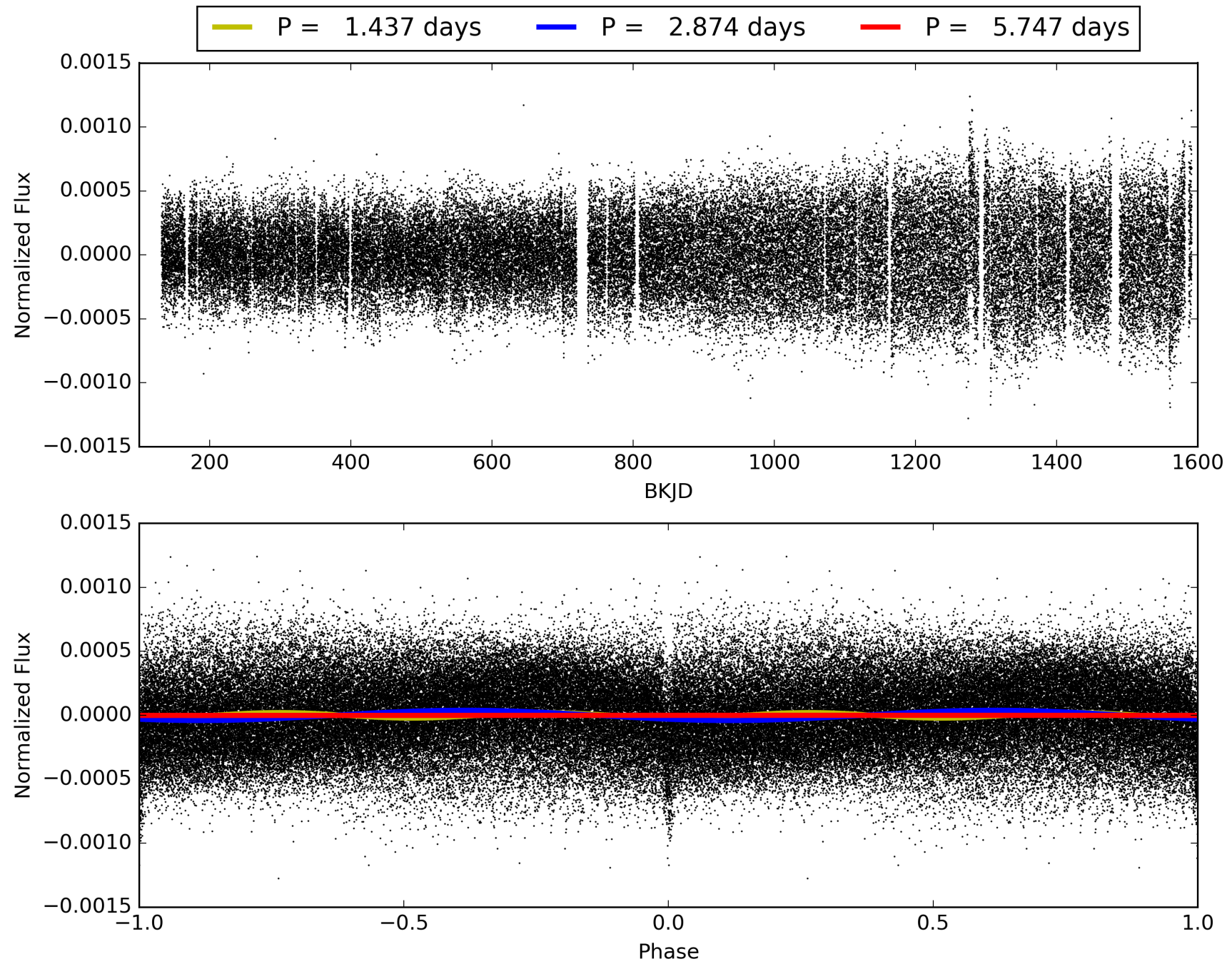
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:50:05 Z

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

# TCE 004035667-01, PDC Light Curves



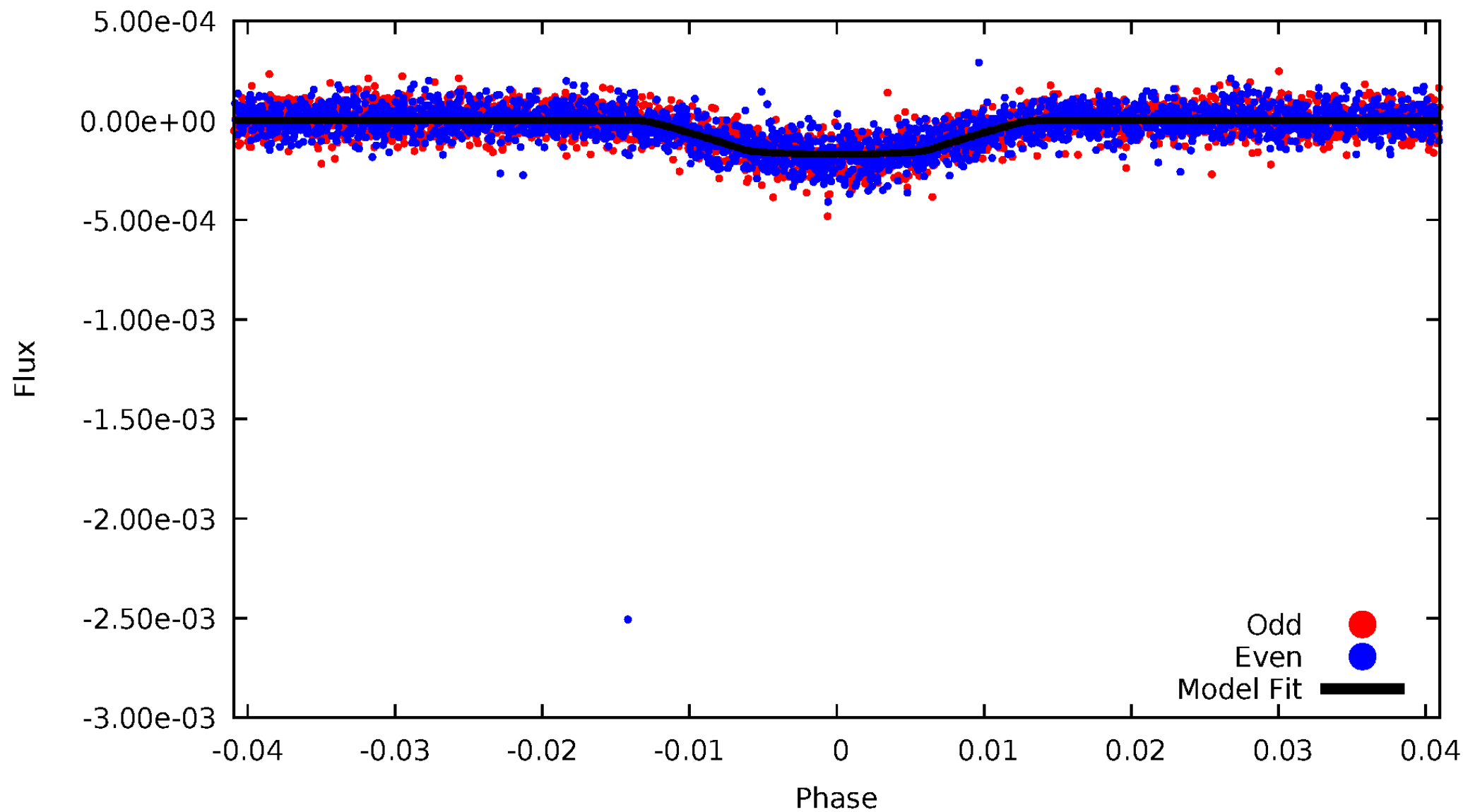
TCE 004035667-01





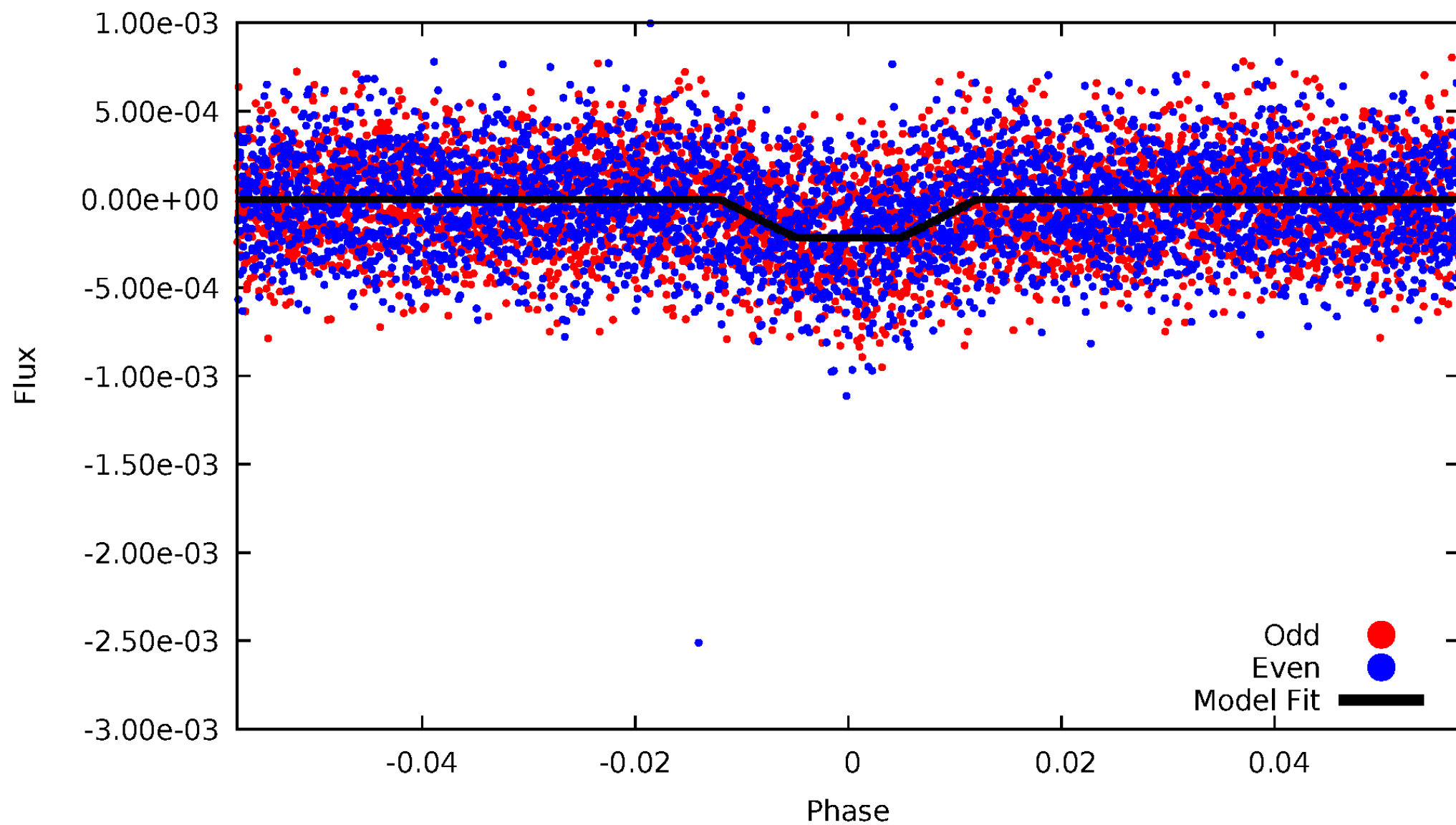
# DV Odd/Even

TCE 004035667-01



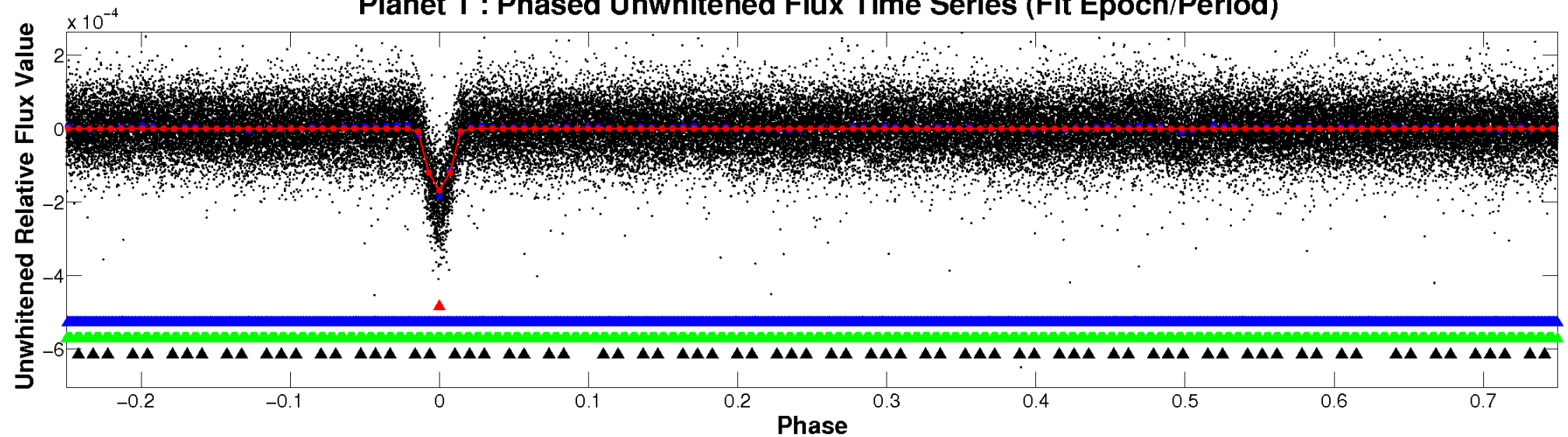
# ALT Odd/Even

TCE 004035667-01

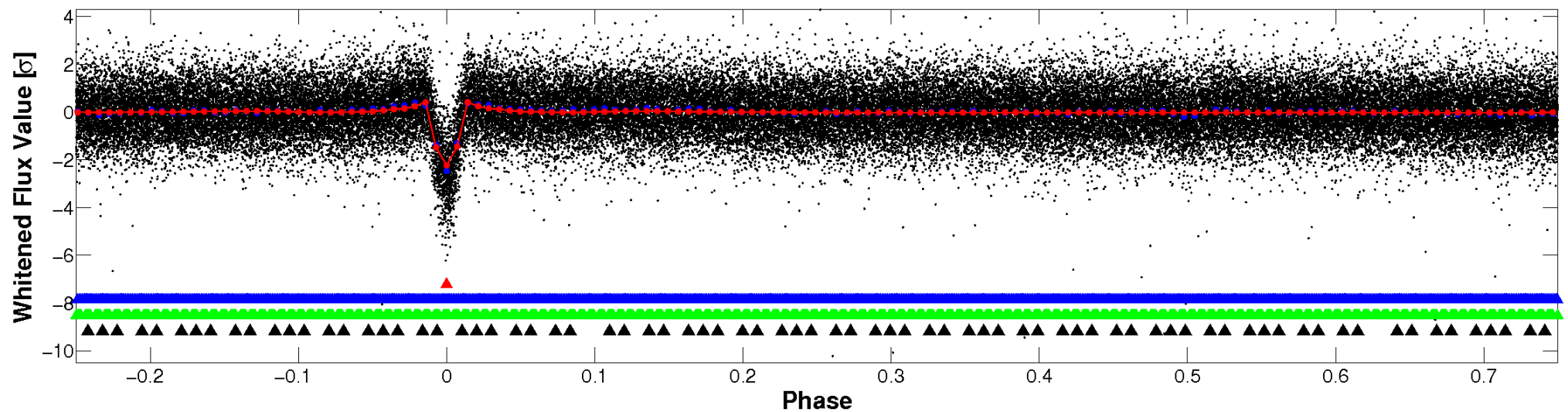


# Non-Whitened Vs. Whitened Light Curve

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

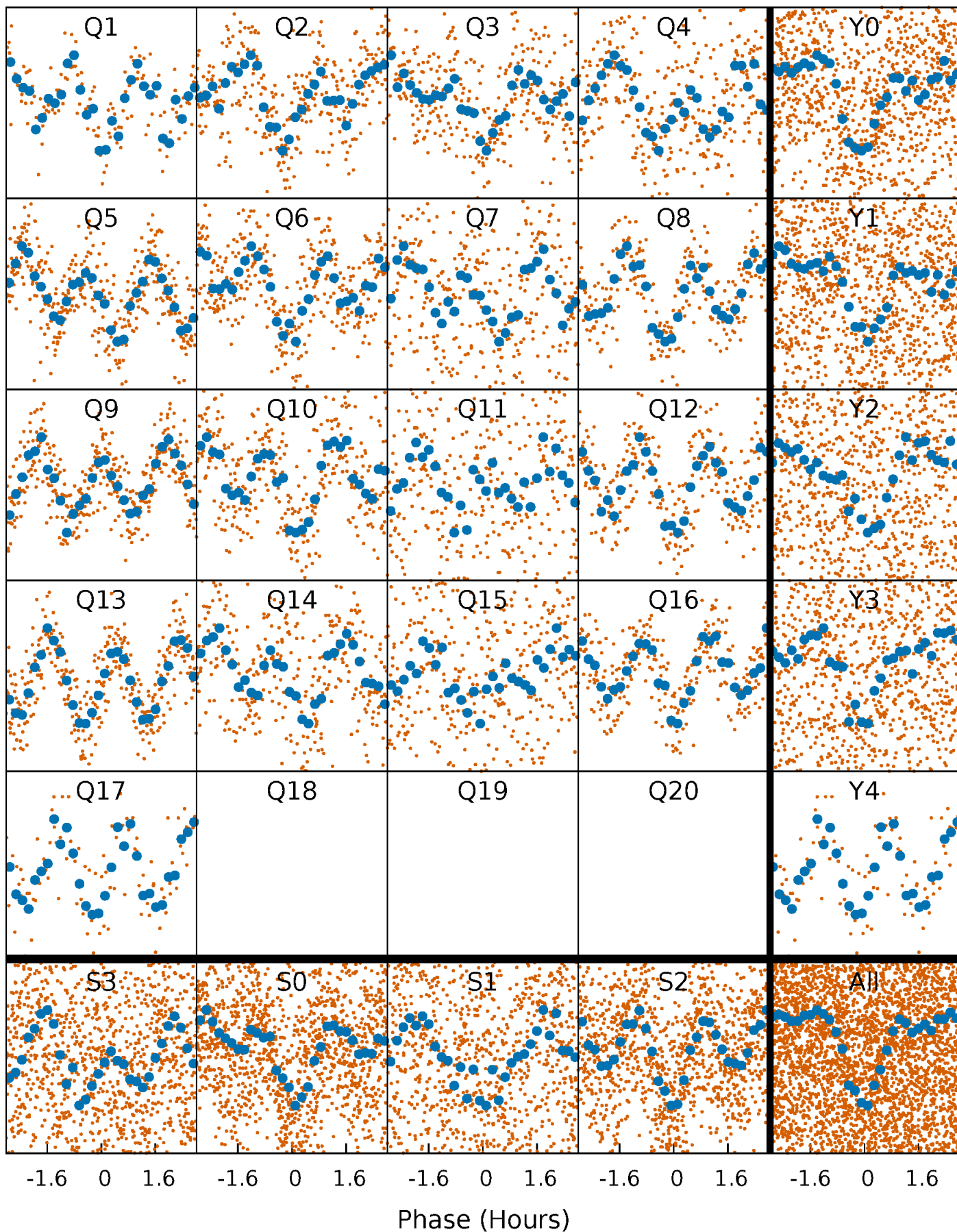


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

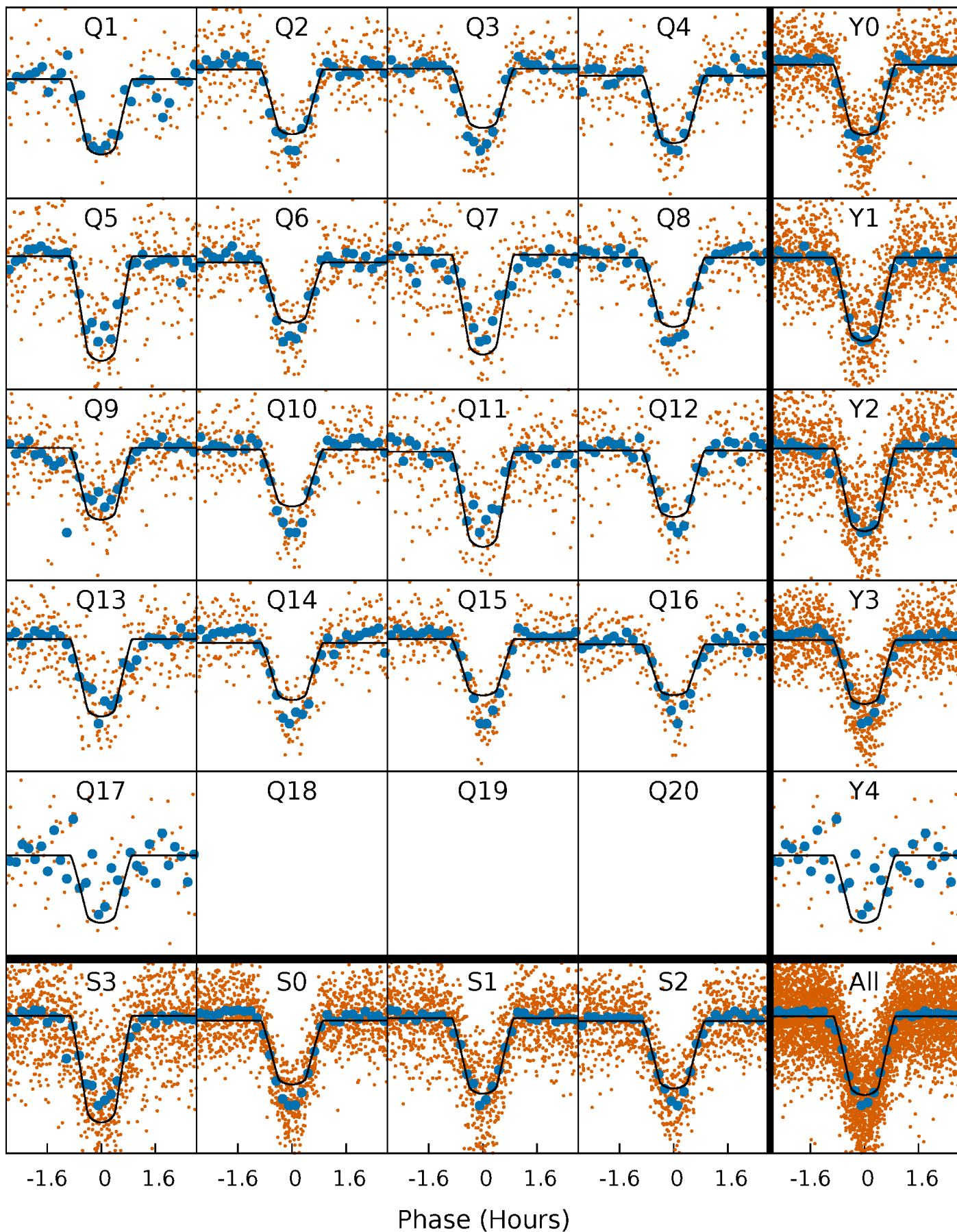
TCE 004035667-01 P= 2.873651 Days  $T_0=132.586538$  (BKJD)





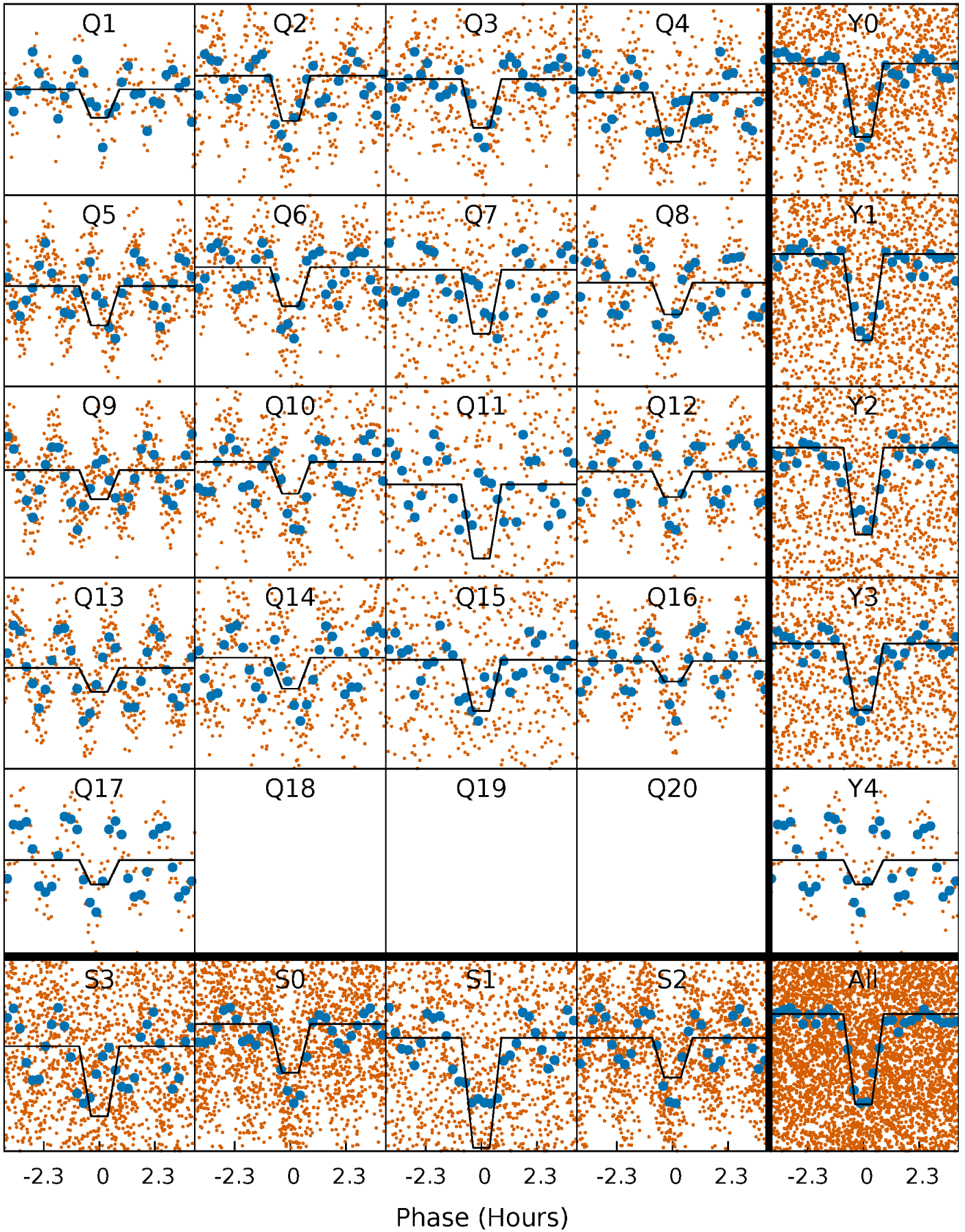
# DV Quarter-Phased Transit Curves

TCE 004035667-01 P= 2.873651 Days  $T_0=132.586538$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

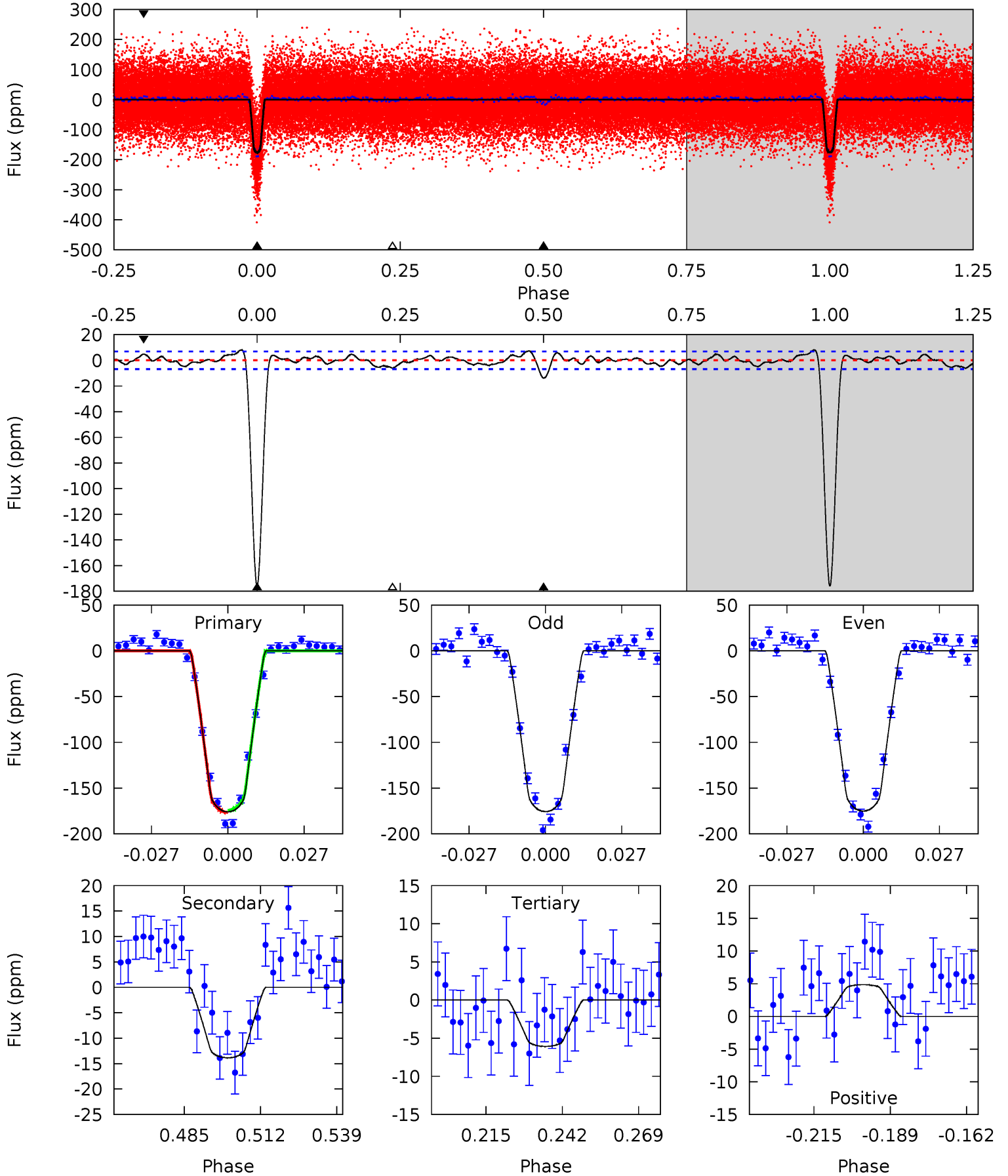
TCE 004035667-01 P= 2.873659 Days  $T_0=132.584207$  (BKJD)



# DV Model-Shift Uniqueness Test

004035667-01, P = 2.873651 Days, E = 129.712887 Days

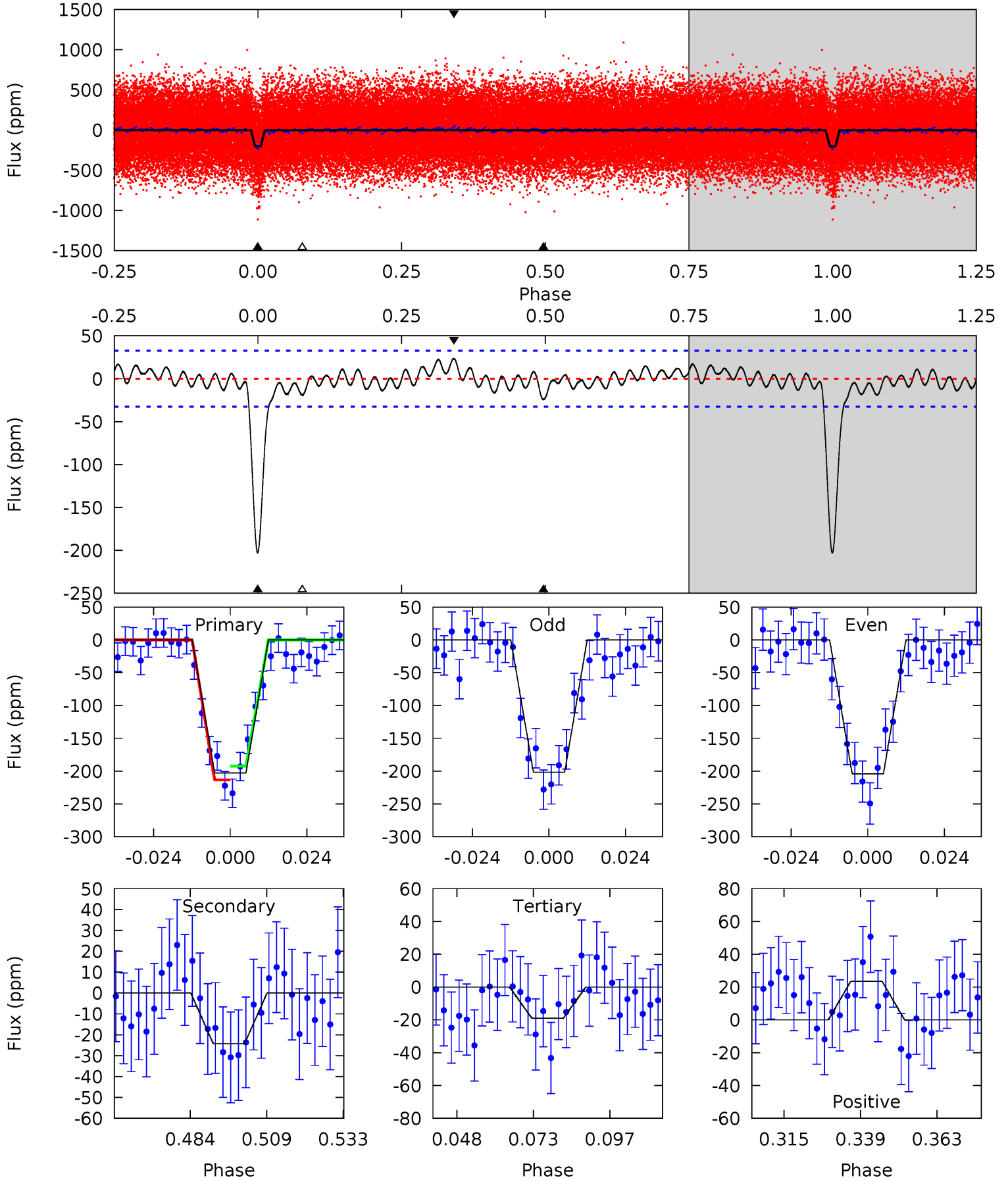
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
122.7	9.66	4.24	3.39	4.83	2.21	1.80	118.5	119.3	5.42	6.27	0.22	1.00	0.04	0.77



# Alt Model-Shift Uniqueness Test

004035667-01, P = 2.873659 Days, E = 129.710548 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
30.2	3.61	2.84	3.50	4.85	2.25	1.28	27.4	26.7	0.77	0.11	0.18	1.03	0.10	1.57





### Stellar Parameters For KIC 004035667

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8173^{+226}_{-340}$	$3.744^{+0.416}_{-0.104}$	$-0.140^{+0.200}_{-0.350}$	$3.169^{+0.654}_{-1.526}$	$2.032^{+0.333}_{-0.499}$	$0.090^{+0.363}_{-0.029}$
	+3%/-4%	+11%/-3%	+143%/-250%	+21%/-48%	+16%/-25%	+404%/-33%
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 004035667-01 / KOI 2684.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-14 \pm 1$	$4.58^{+0.80}_{-1.11}$	$3876^{+291}_{-484}$	$4033^{+195}_{-234}$	$0.924^{+0.579}_{-0.237}$
Alt.	$-24 \pm 7$	$4.89^{+0.78}_{-1.12}$	$3891^{+287}_{-424}$	$4484^{+357}_{-413}$	$1.428^{+0.952}_{-0.523}$

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

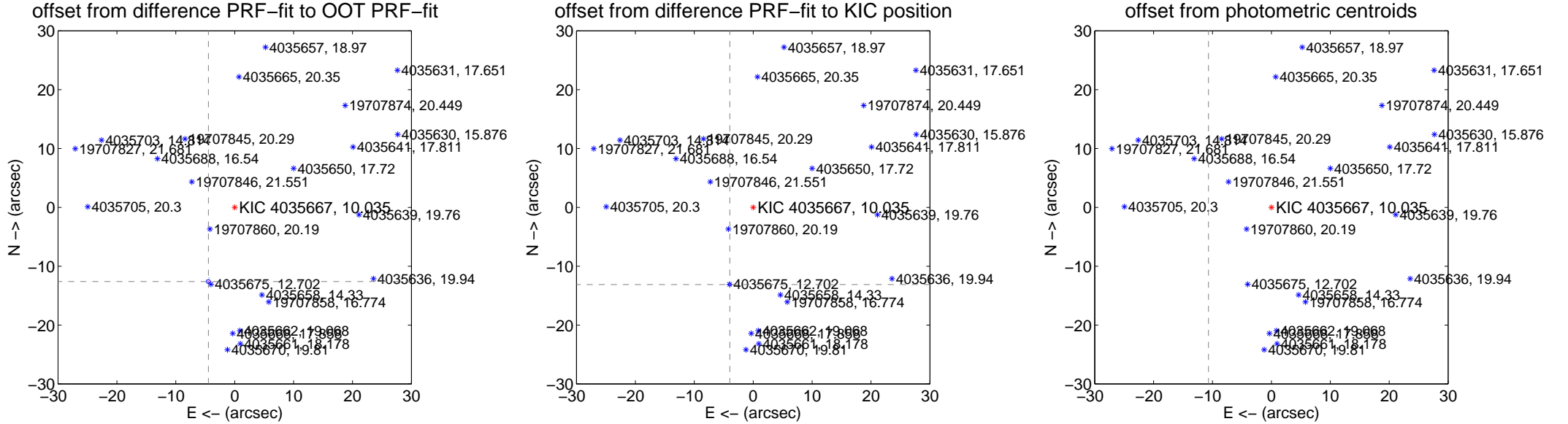
## DV Centroid Data

Supplemental centroid analysis for 004035667-01. **Kepler magnitude: 10.04.** Transit SNR 67.88

There are 17 quarters with good PRF difference image offsets

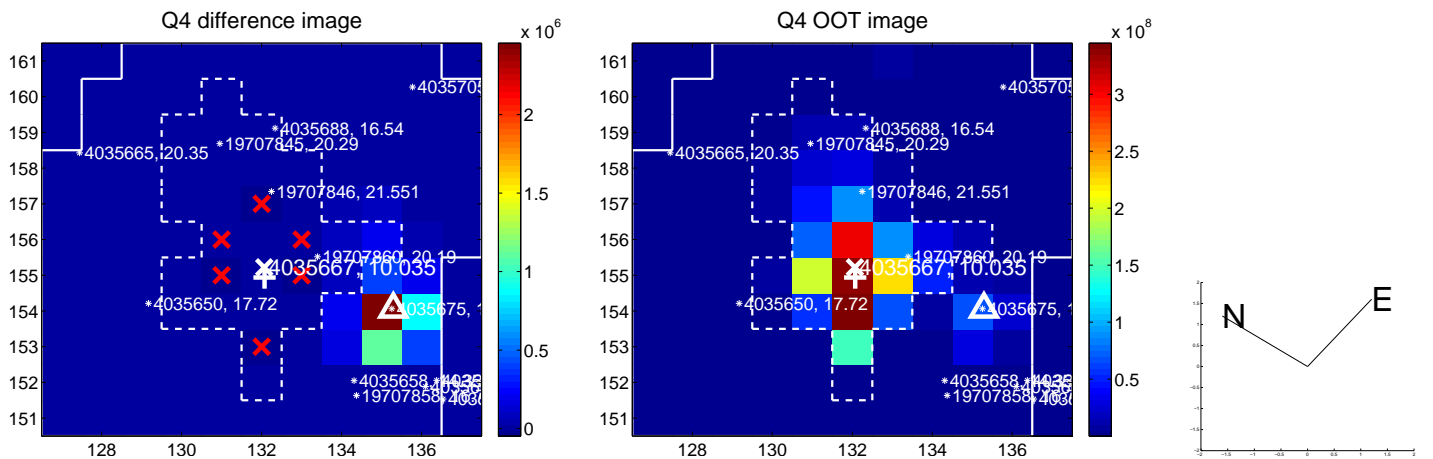
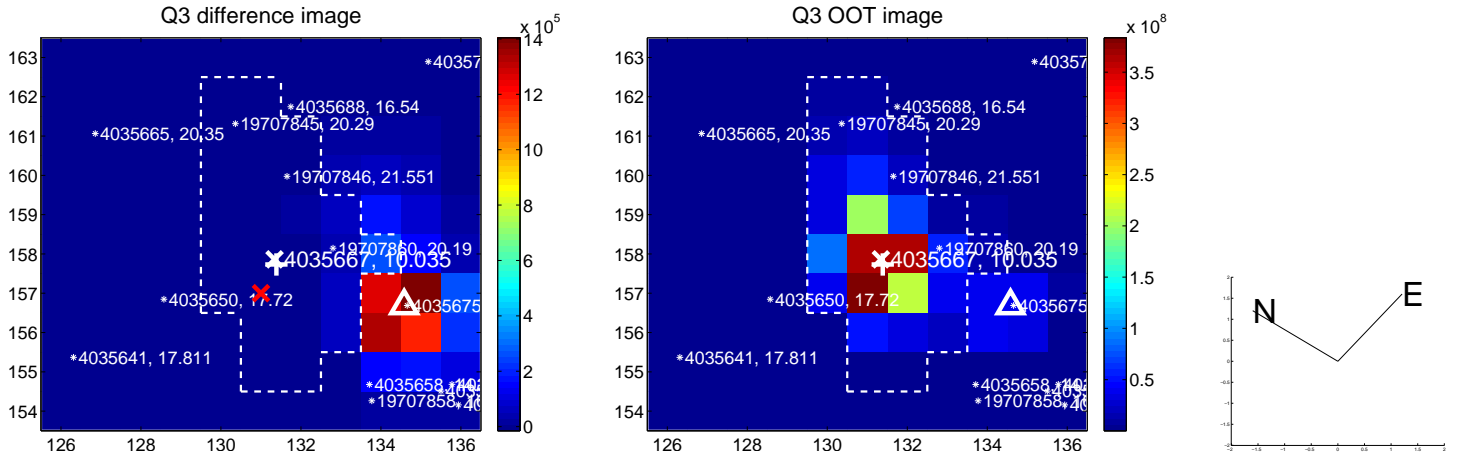
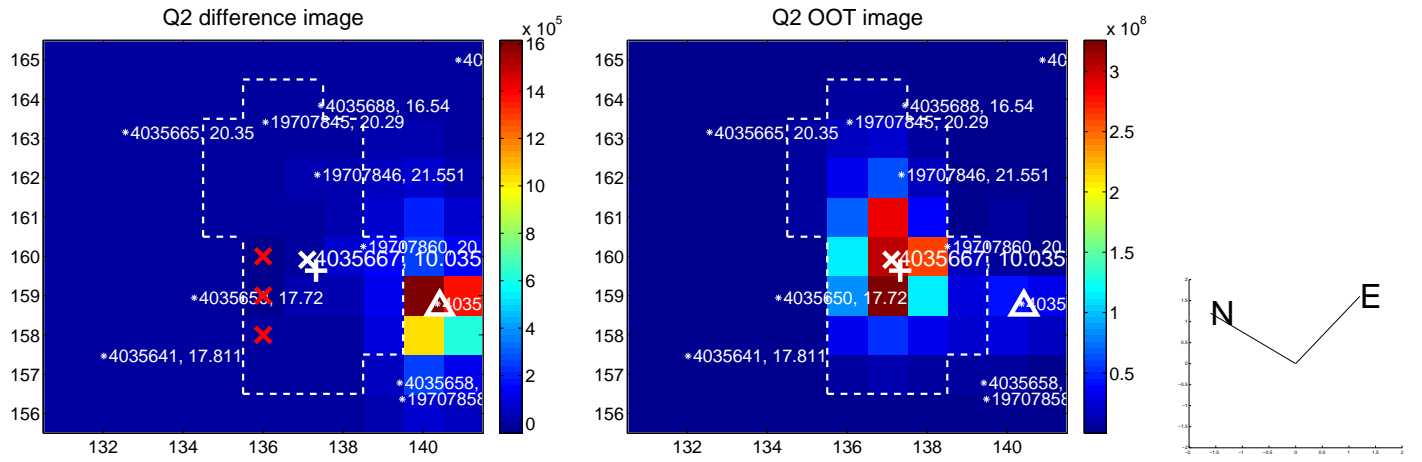
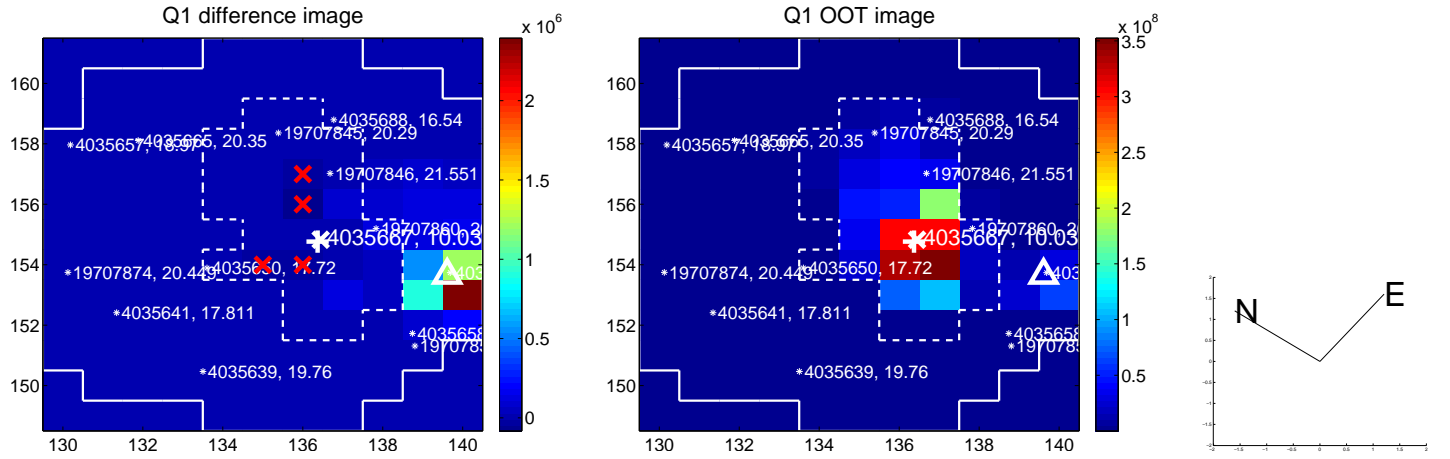
The direct PRF centroid is offset from the target star catalog position by about 0.62 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>13.370 <math>\pm</math> 0.107</b>	<b>124.95</b>	4.460 $\pm$ 0.086	-12.604 $\pm$ 0.108
PRF-fit source offset from KIC position	<b>13.694 <math>\pm</math> 0.080</b>	<b>171.85</b>	3.963 $\pm$ 0.071	-13.108 $\pm$ 0.080
photometric centroid source offset	<b>35.44 <math>\pm</math> 0.61</b>	<b>57.71</b>	10.68 $\pm$ 0.26	-33.79 $\pm$ 0.64

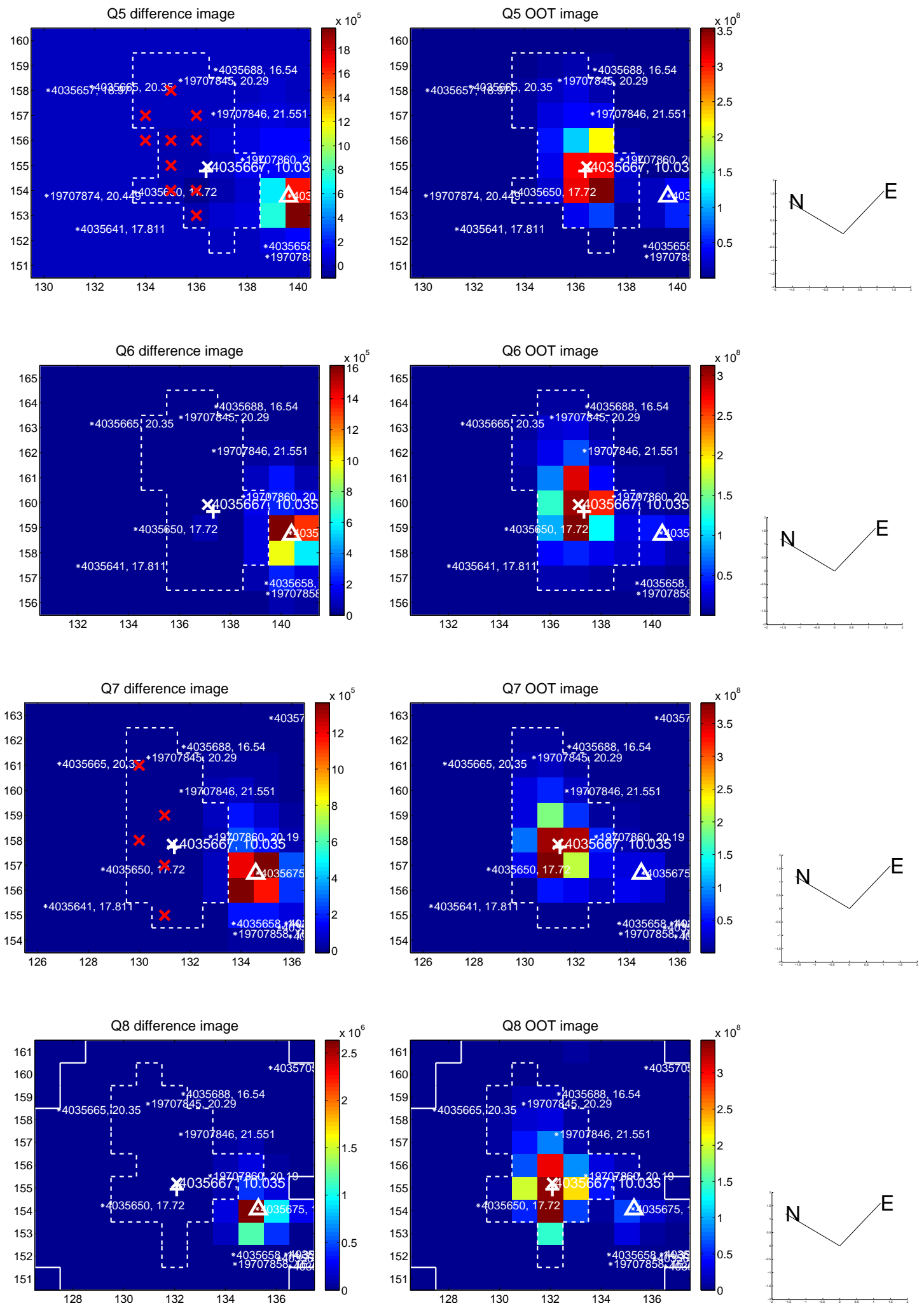


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

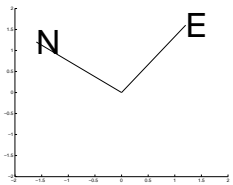
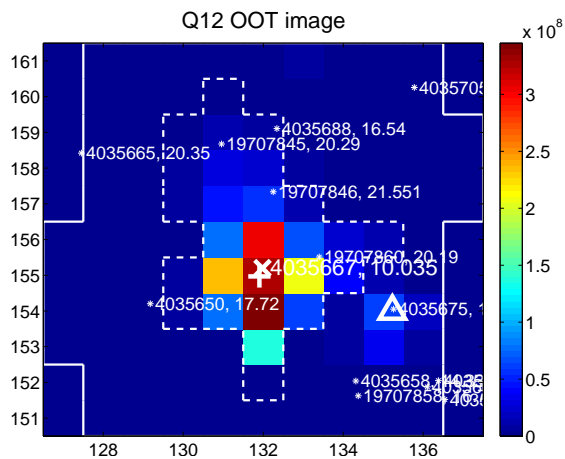
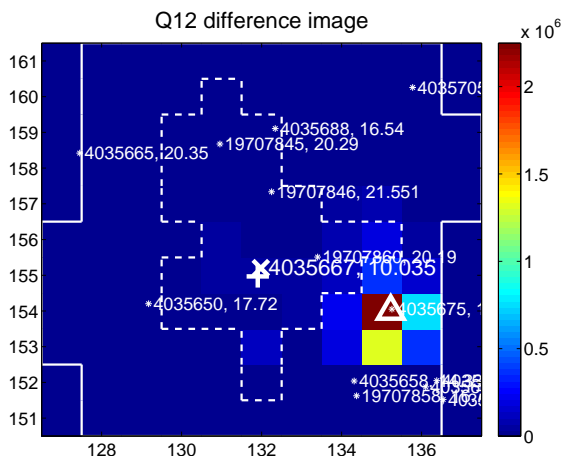
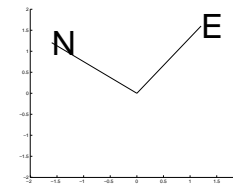
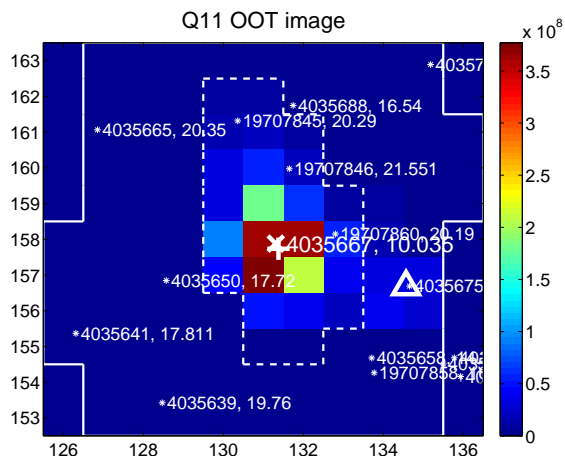
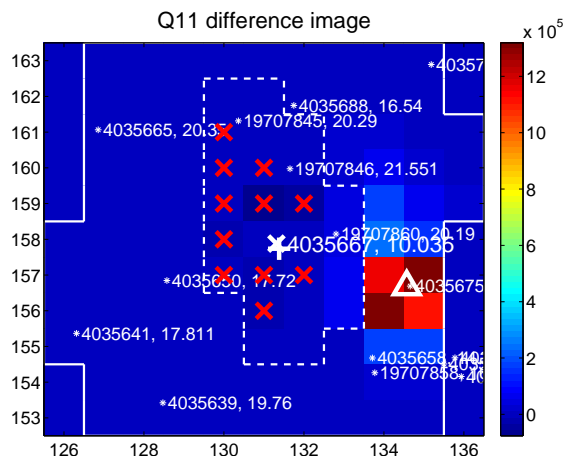
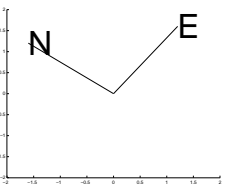
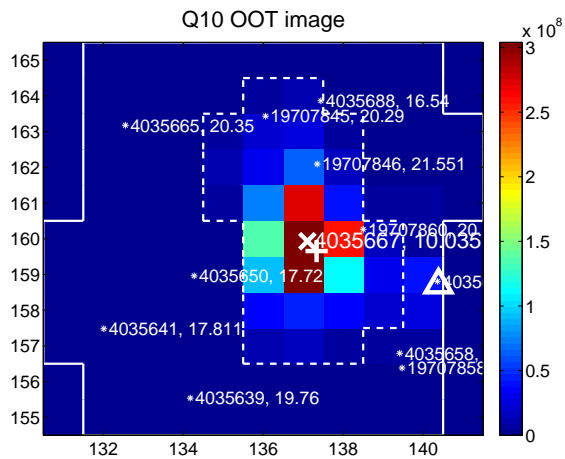
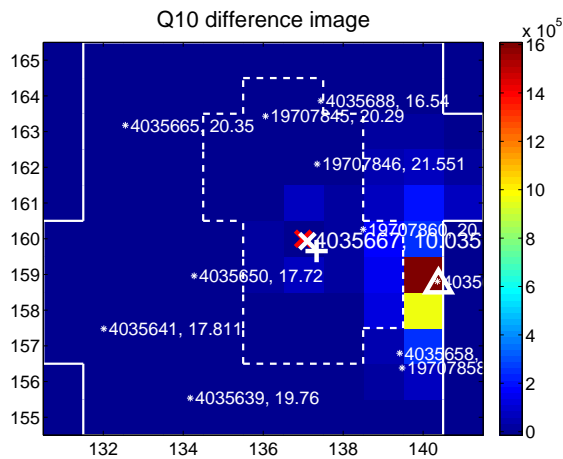
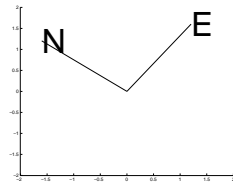
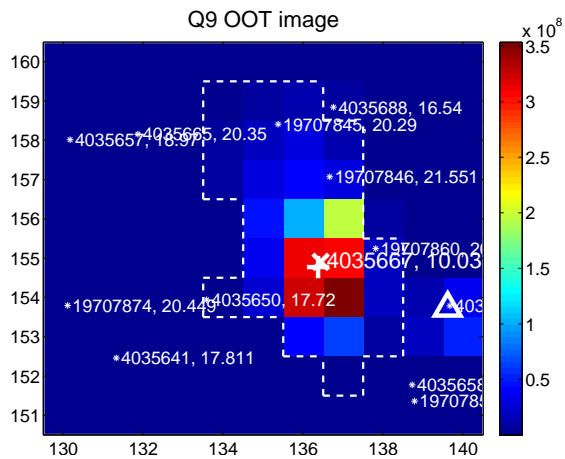
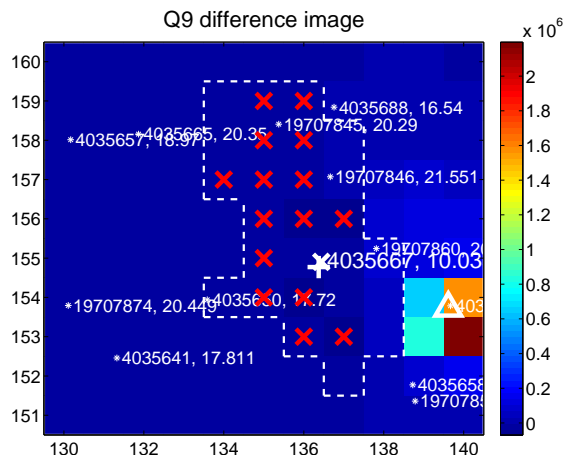


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

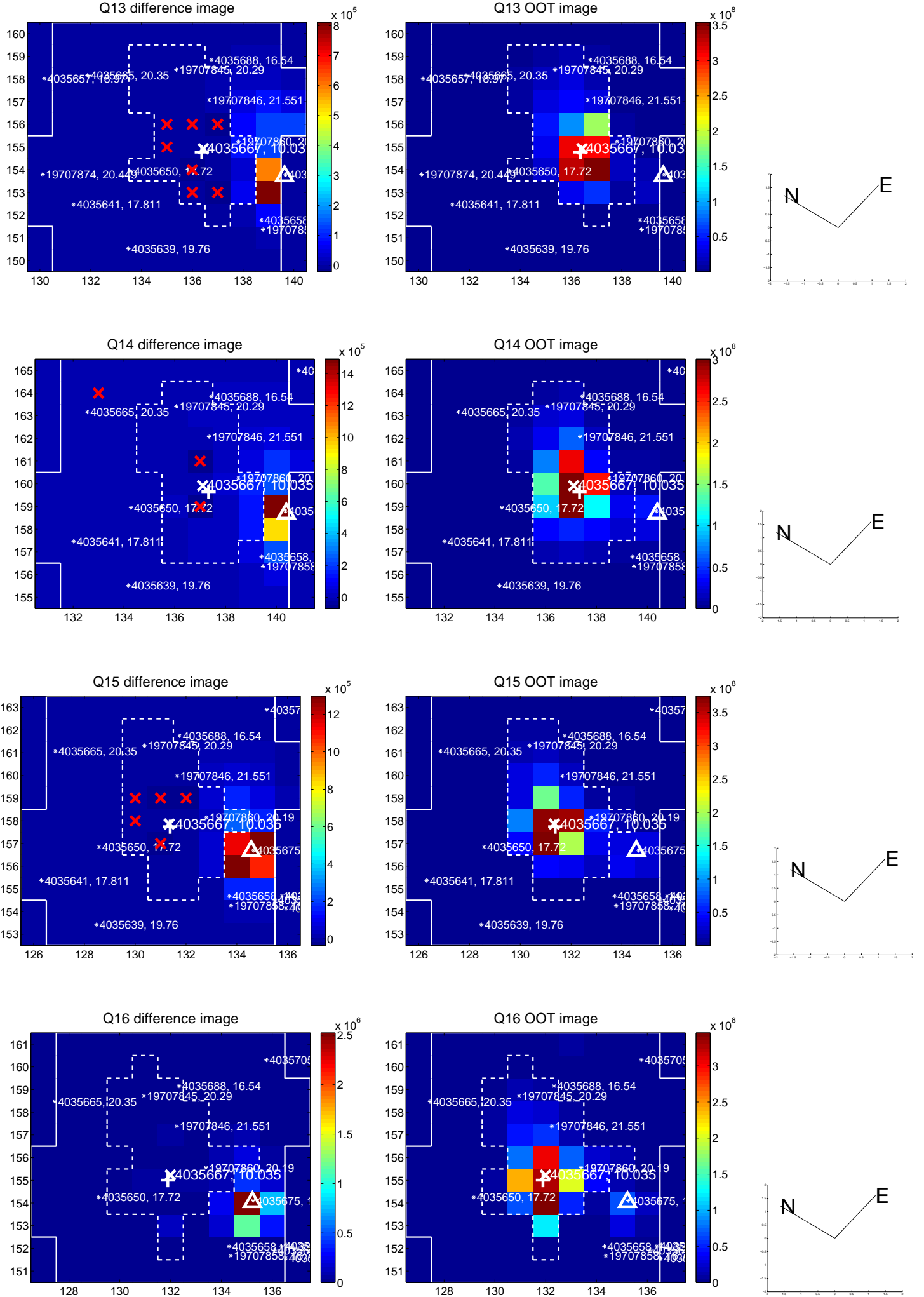




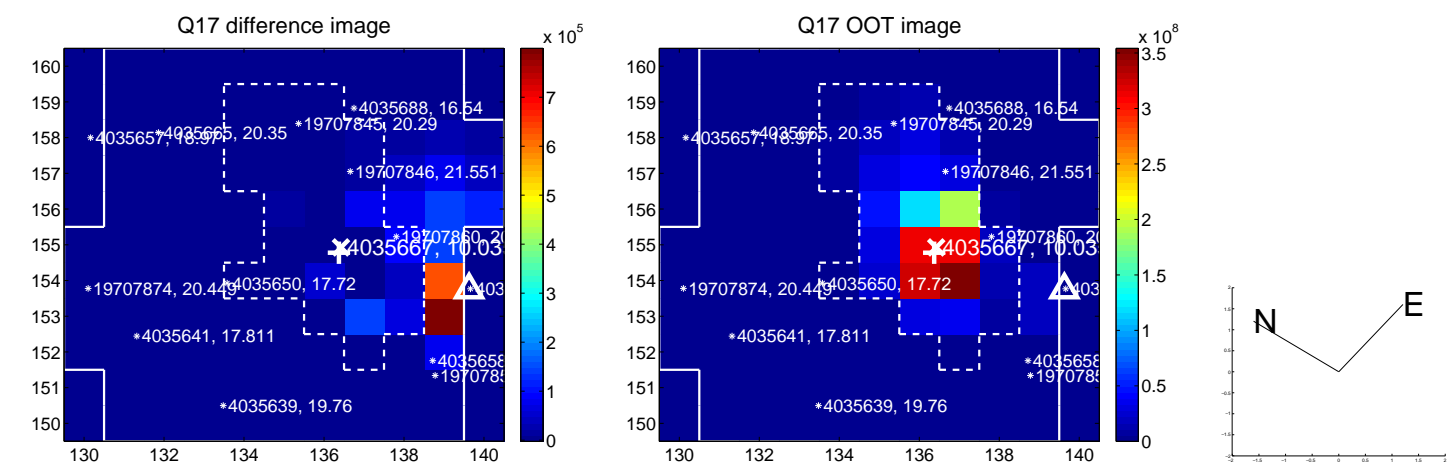
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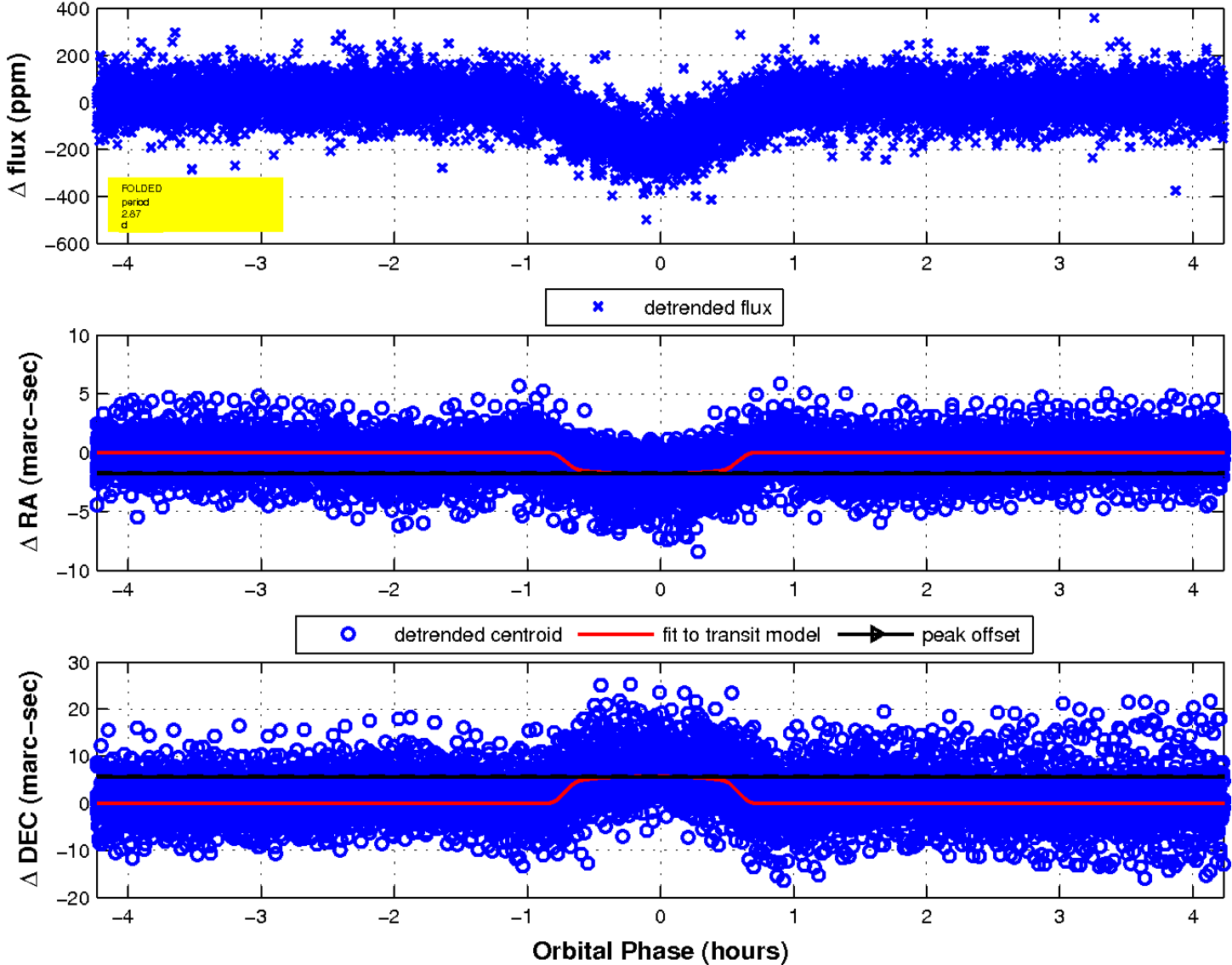
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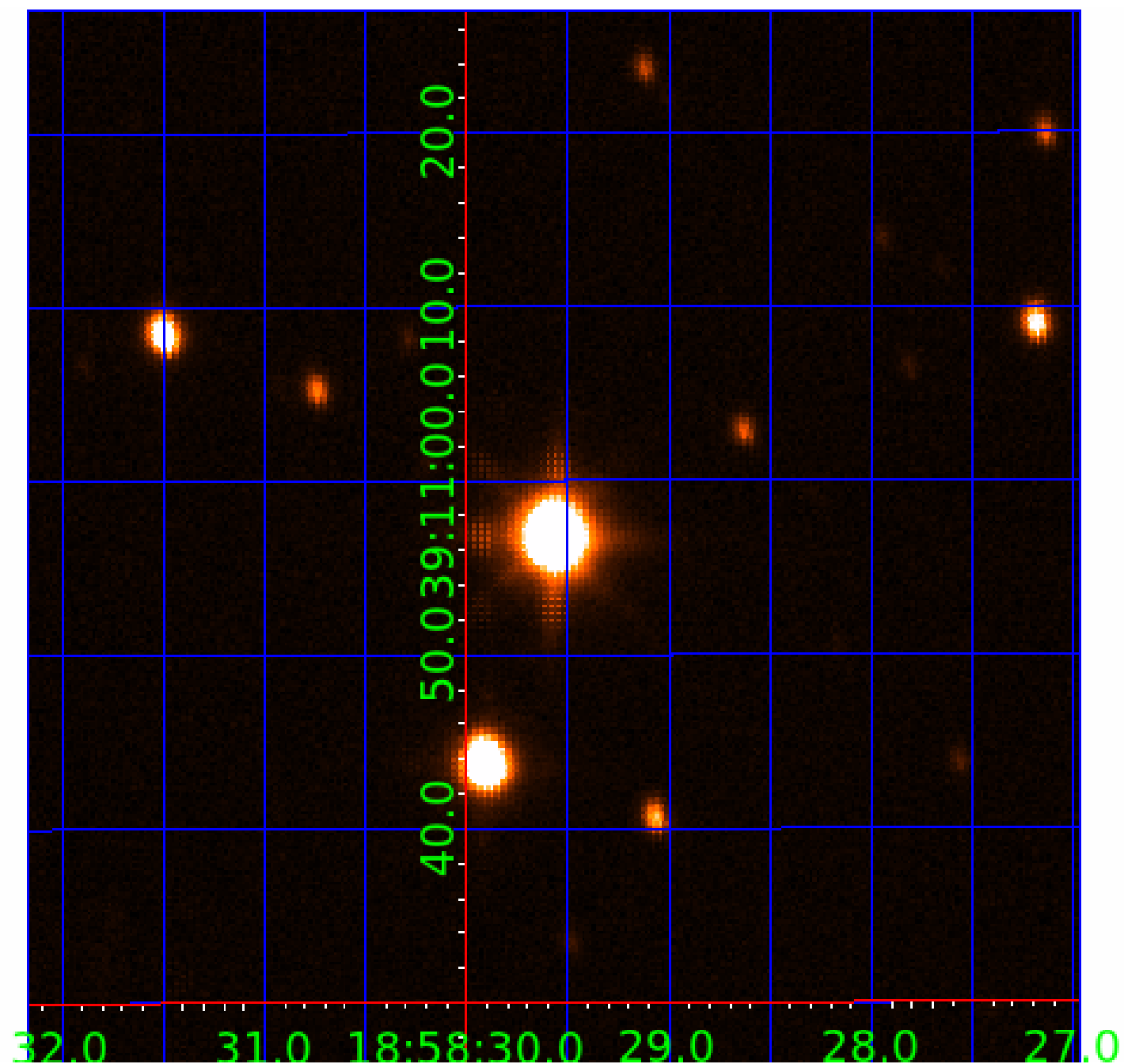


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



# KIC 004035667

## 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

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004035667-01	OBS	FP	0.00	0	0	0	1	CENT_SATURATED—EPHEM_MATCH
004035667-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004035667-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004035667-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED

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

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

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

Ephemeris Match Information For 004035667-02

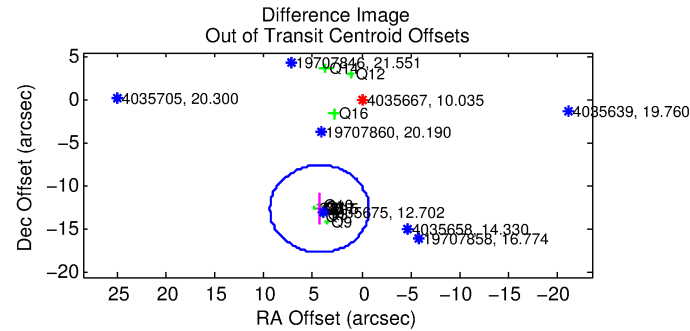
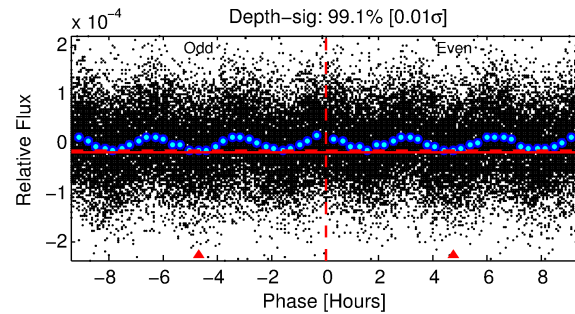
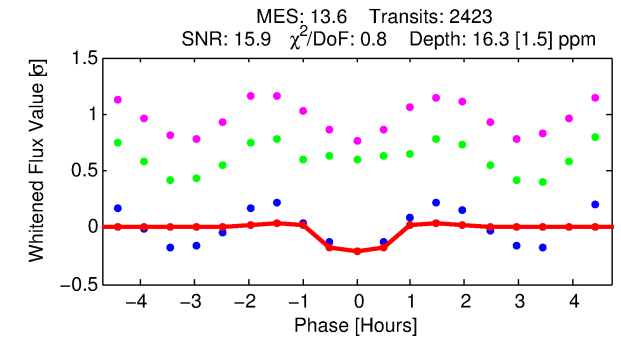
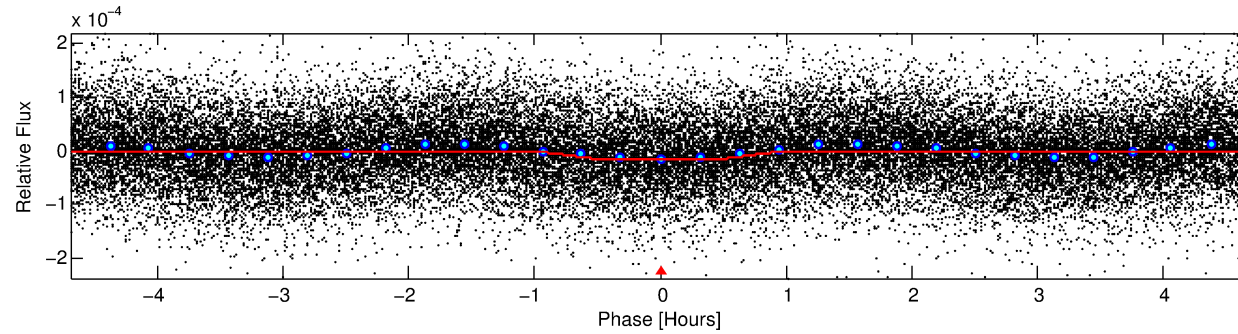
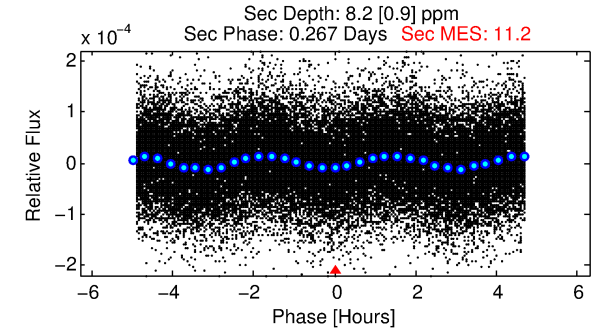
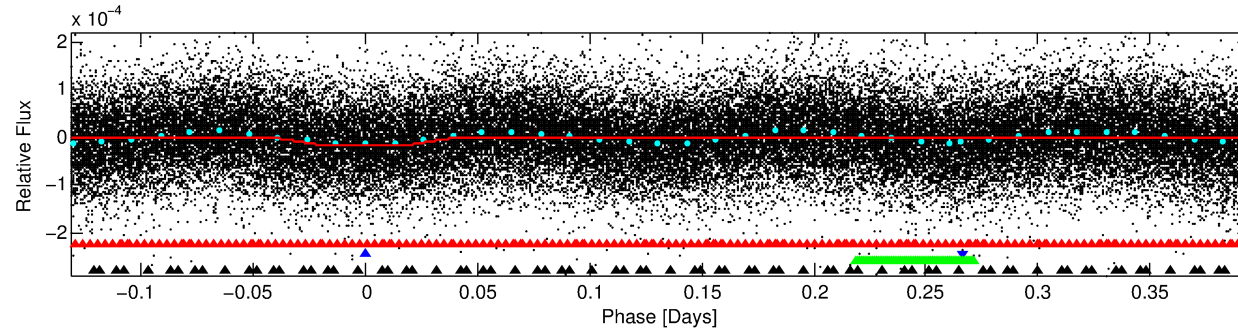
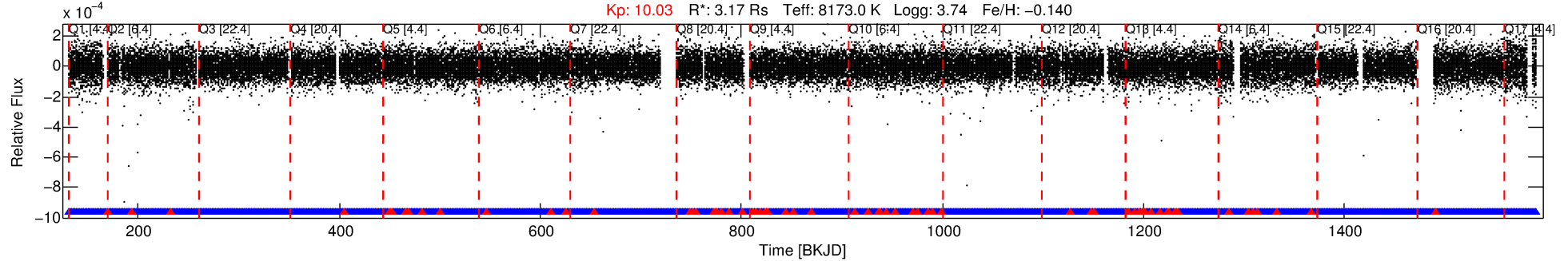
No Significant Match Found



# DV One-Page Summary

KIC: 4035667 Candidate: 2 of 4 Period: 0.526 d  
KOI: K02684 Corr: No Ephemeris Match

Kp: 10.03 R\*: 3.17 Rs Teff: 8173.0 K Logg: 3.74 Fe/H: -0.140



## DV Fit Results:

Period = 0.52592 [0.00001] d  
Epoch = 131.6710 [0.0012] BKJD  
Rp/R\* = 0.0043 [0.0004]  
a/R\* = 1.48 [0.44]  
b = 0.90 [0.12]  
Seff = 153866.03 [112914.67]  
Teq = 5050 [927] K  
Rp = 1.49 [0.73] Re  
a = 0.0162 [0.0073] AU  
Ag = 0.53 [0.40] [-1.18σ]  
Teffp = 6665 [468] K [1.56σ]

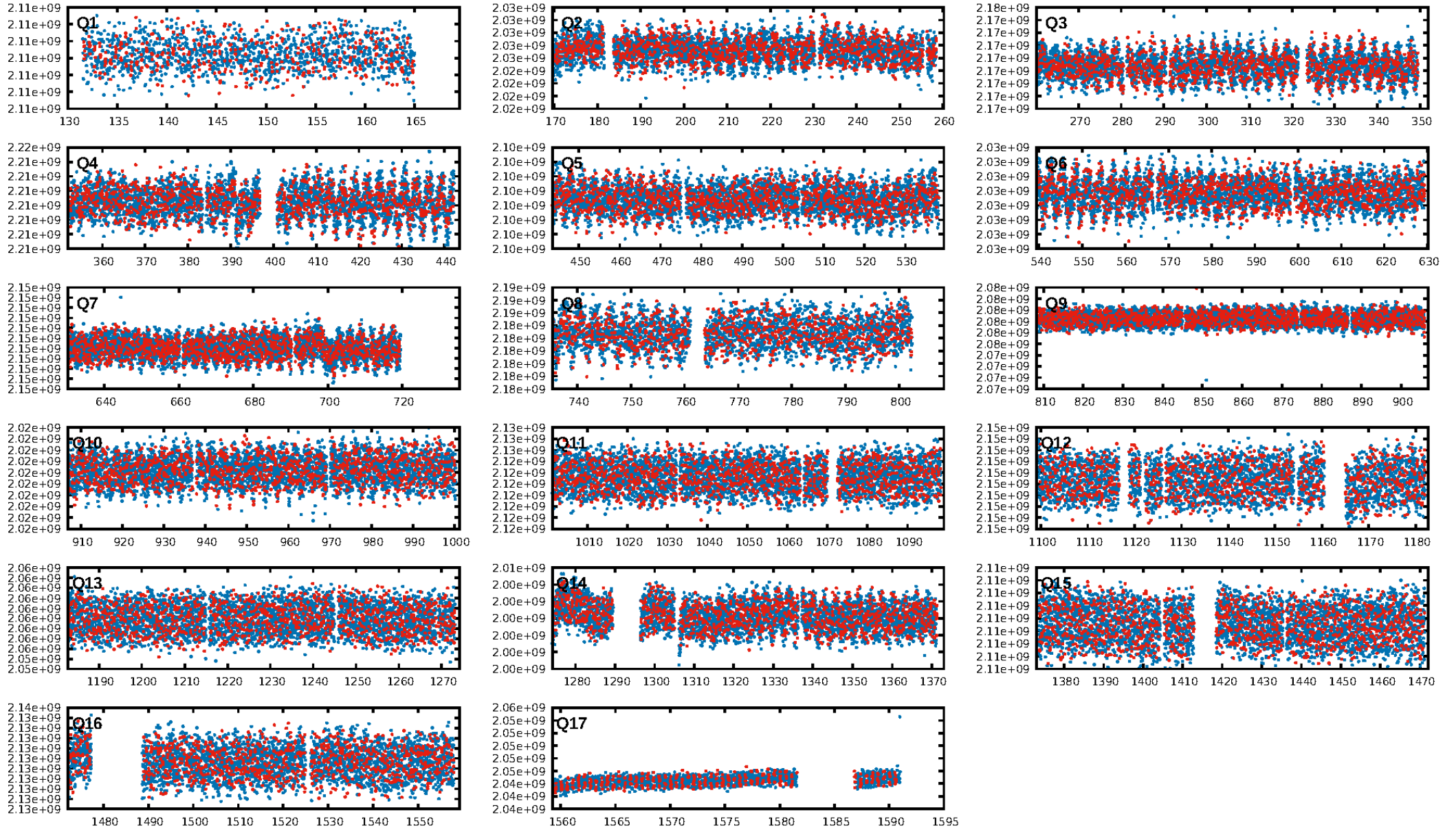
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [26.75σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.26e-26  
RollingBand-fgt: 0.97 [2237/2313]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 86.1%  
Centroid-so: 0.640 arcsec [0.51σ]  
OotOffset-rm: 13.343 arcsec [7.91σ]  
KicOffset-rm: 13.612 arcsec [7.67σ]  
OotOffset-st: 2/4/3/4 [13]  
KicOffset-st: 2/4/3/4 [13]  
DiffImageQuality-fgm: 0.31 [4/13]  
DiffImageOverlap-fno: 0.00 [0/17]

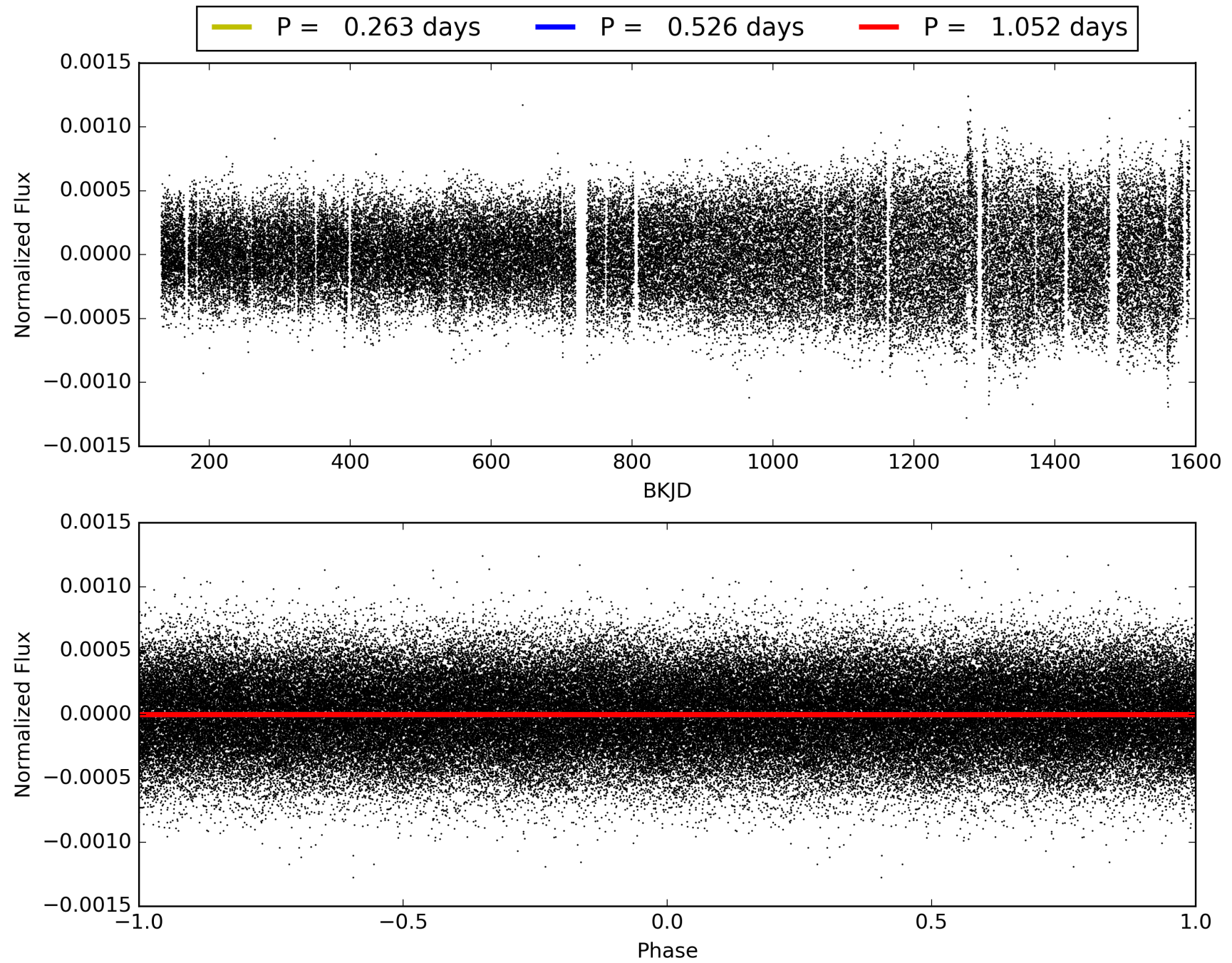
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:50:14 Z

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

# TCE 004035667-02, PDC Light Curves



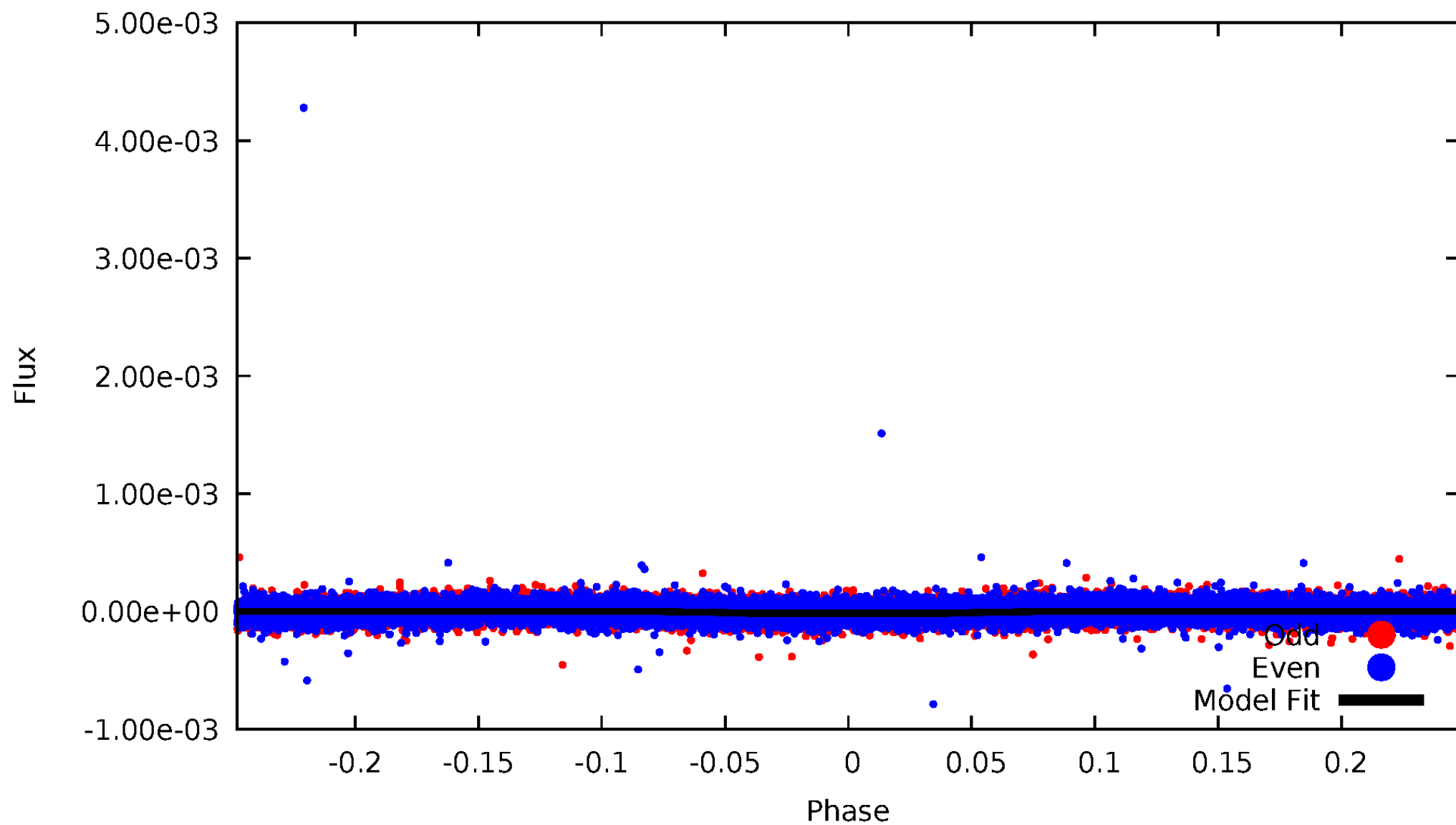
TCE 004035667-02





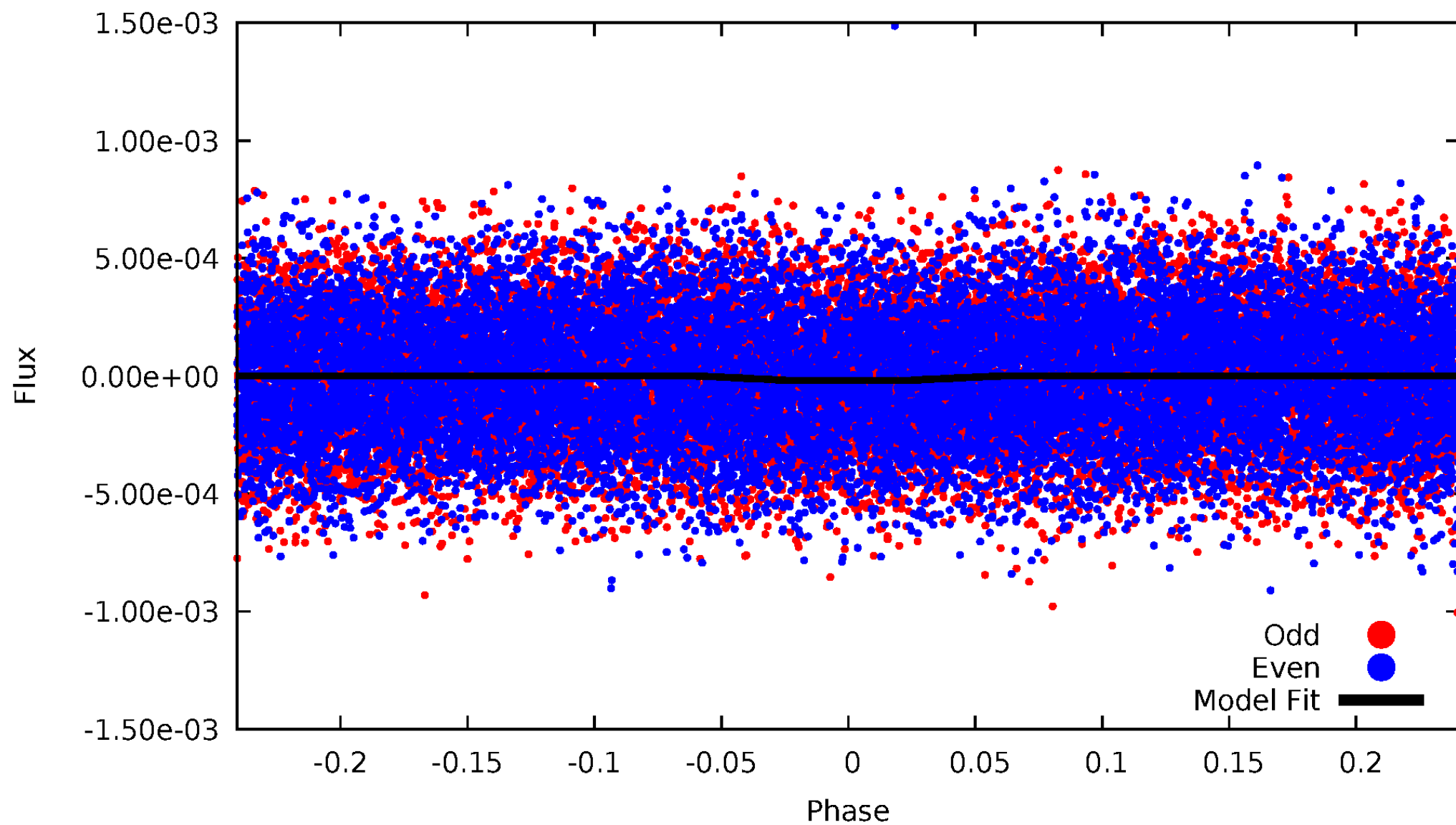
# DV Odd/Even

TCE 004035667-02



ALT Odd/Even

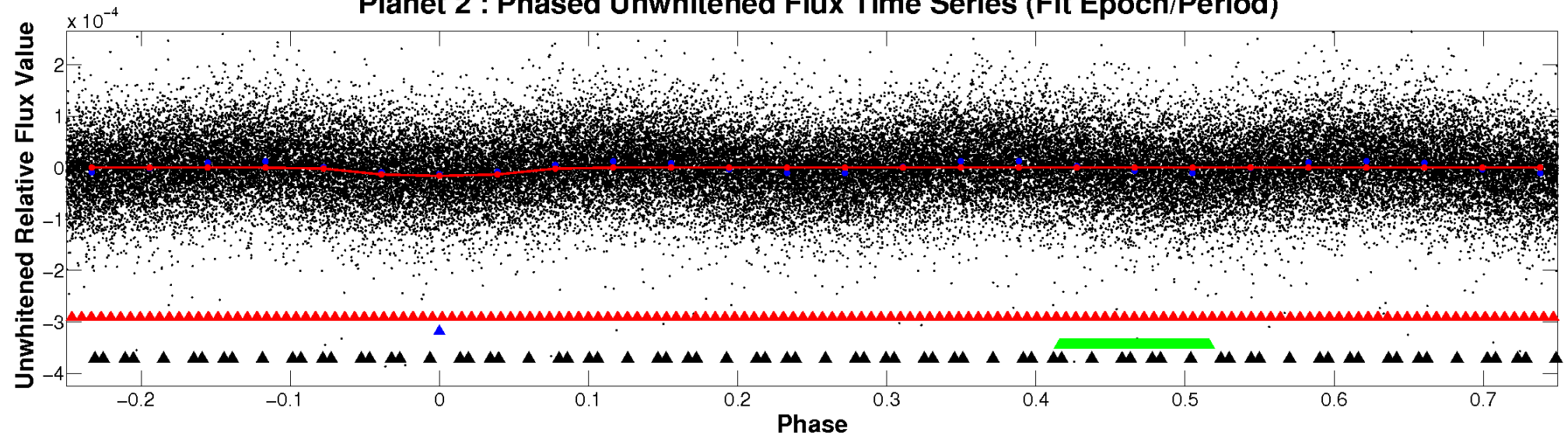
TCE 004035667-02



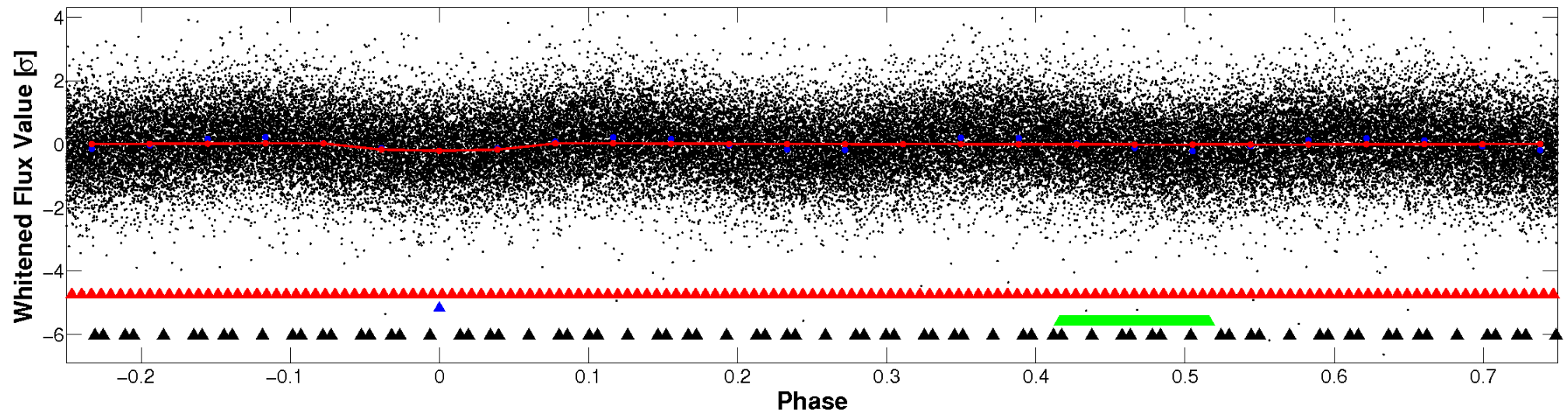


# Non-Whitened Vs. Whitened Light Curve

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

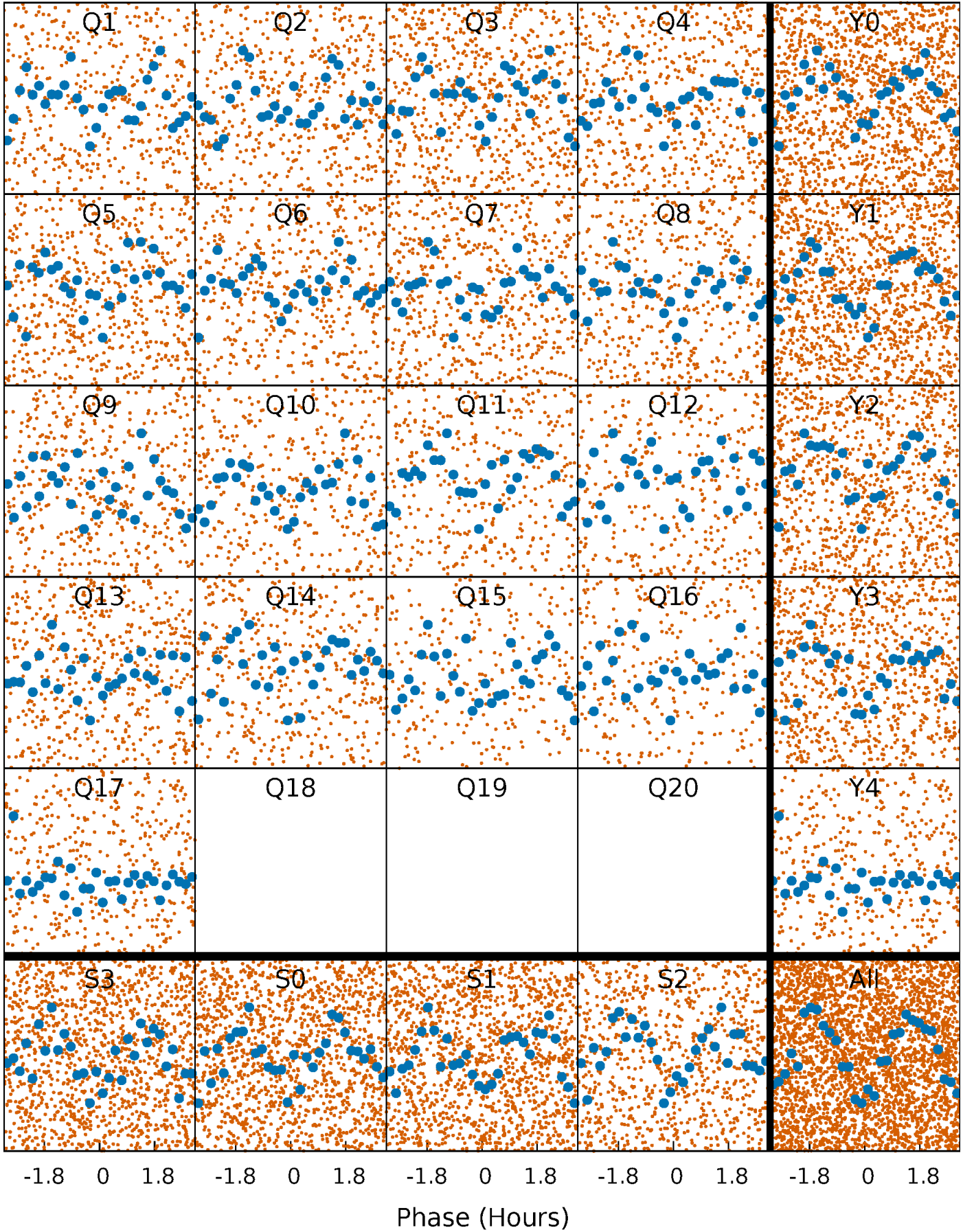


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

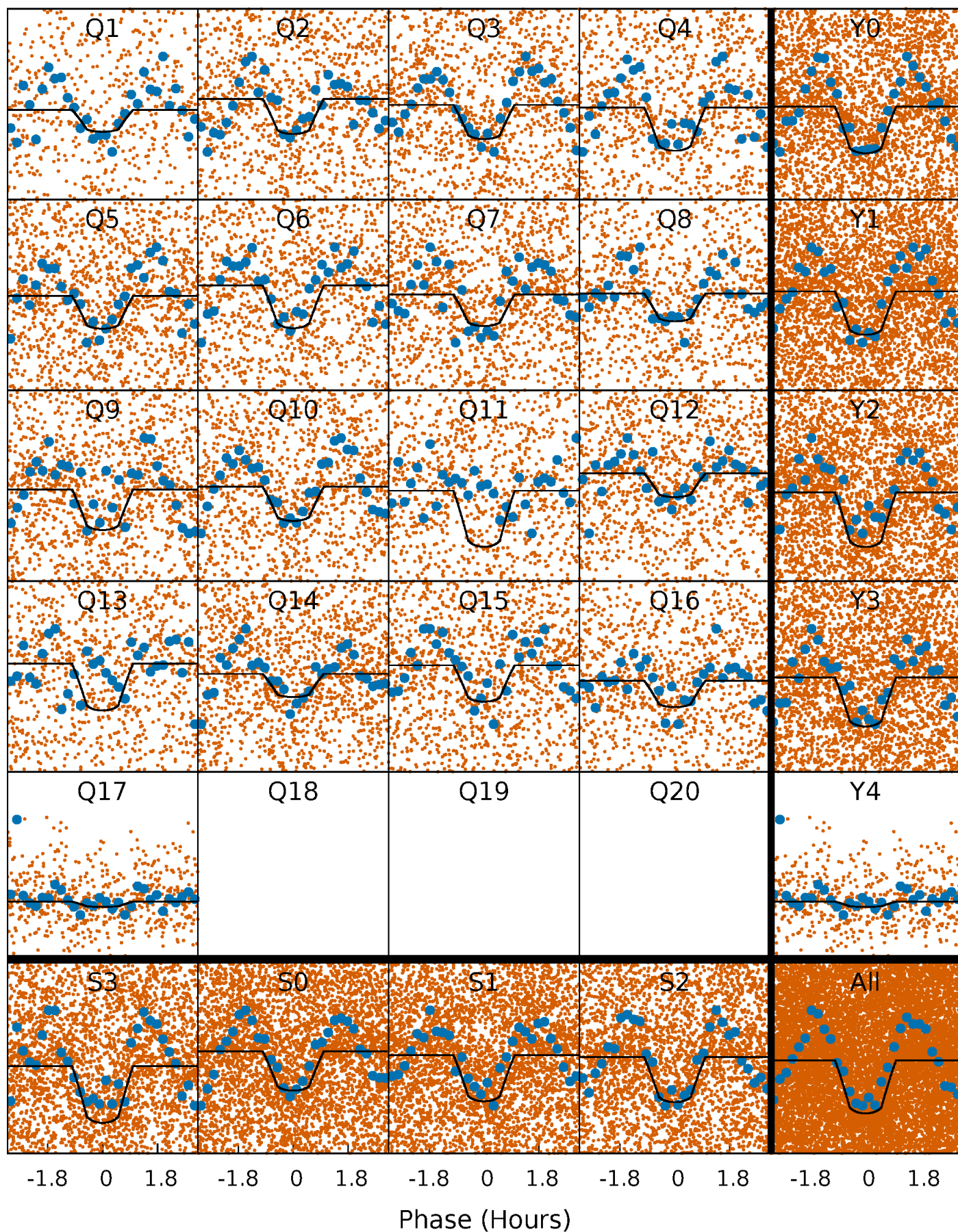
TCE 004035667-02     $P = 0.525920$  Days     $T_0 = 131.671016$  (BKJD)





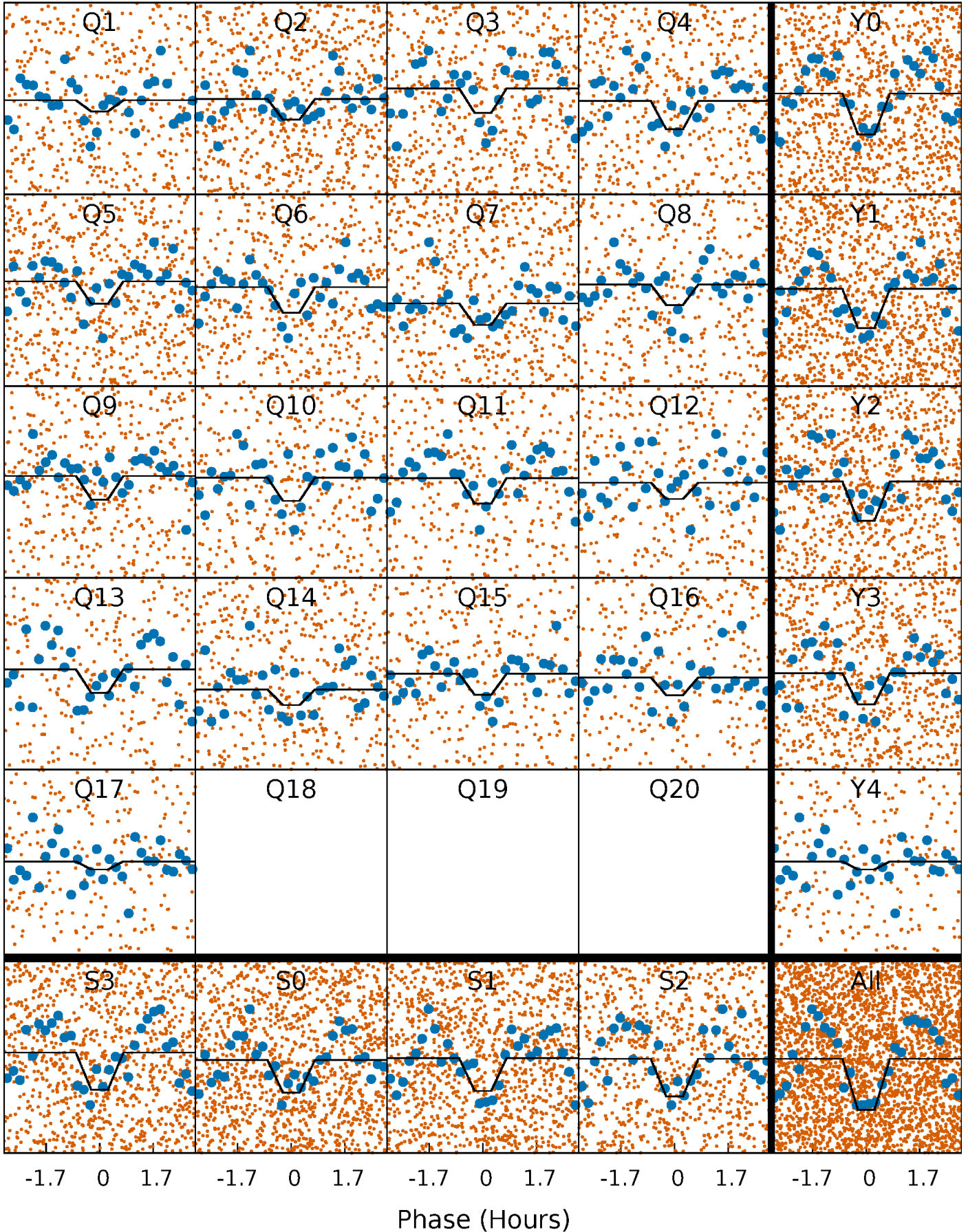
# DV Quarter-Phased Transit Curves

TCE 004035667-02   P= 0.525920 Days    $T_0=131.671016$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

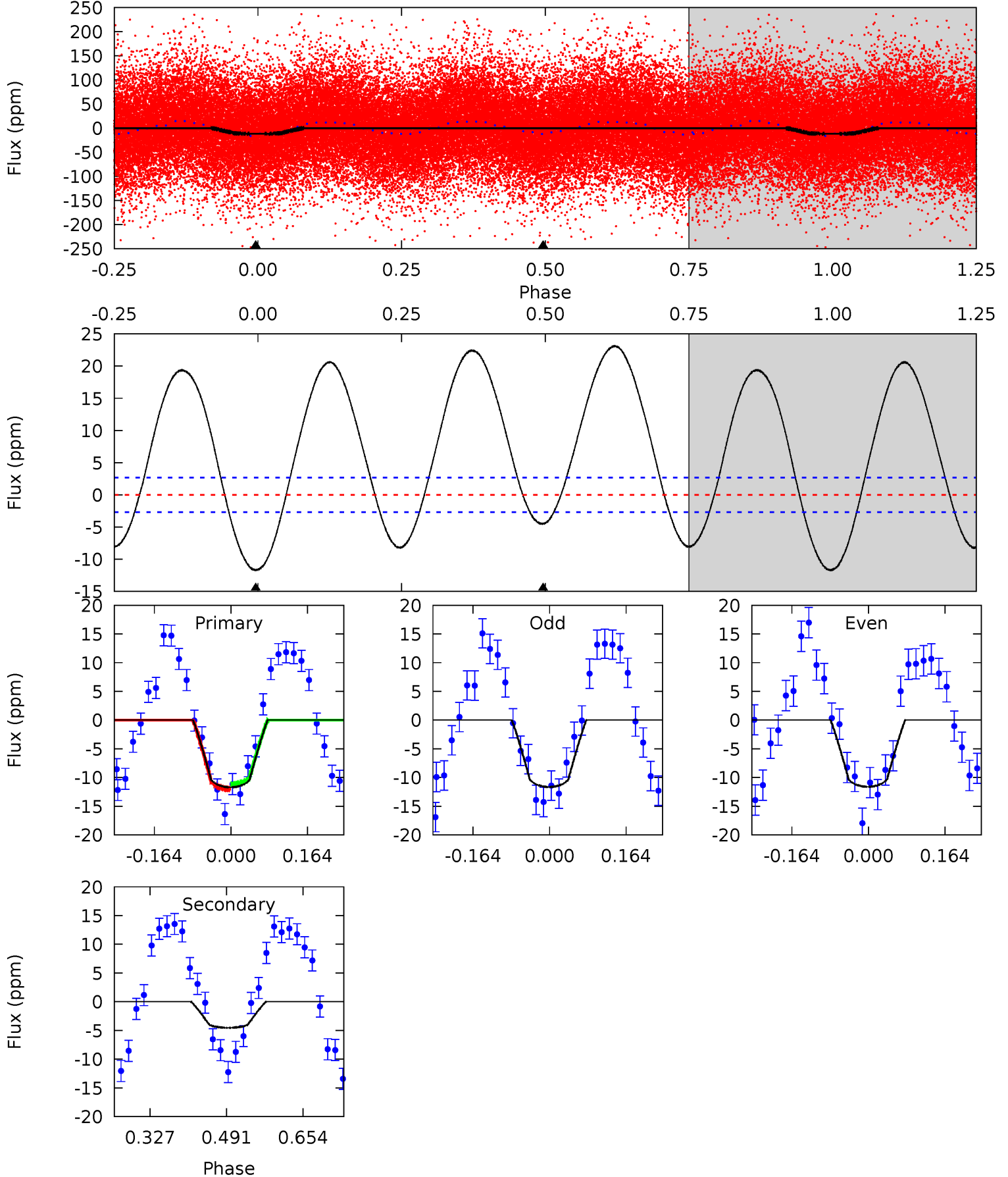
TCE 004035667-02   P= 0.525918 Days    $T_0=131.669925$  (BKJD)



# DV Model-Shift Uniqueness Test

004035667-02, P = 0.525920 Days, E = 131.145096 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
19.5	7.53	0	0	4.46	1.39	12.4	19.5	19.5	7.53	7.53	0.03	0.97	0.66	0.66

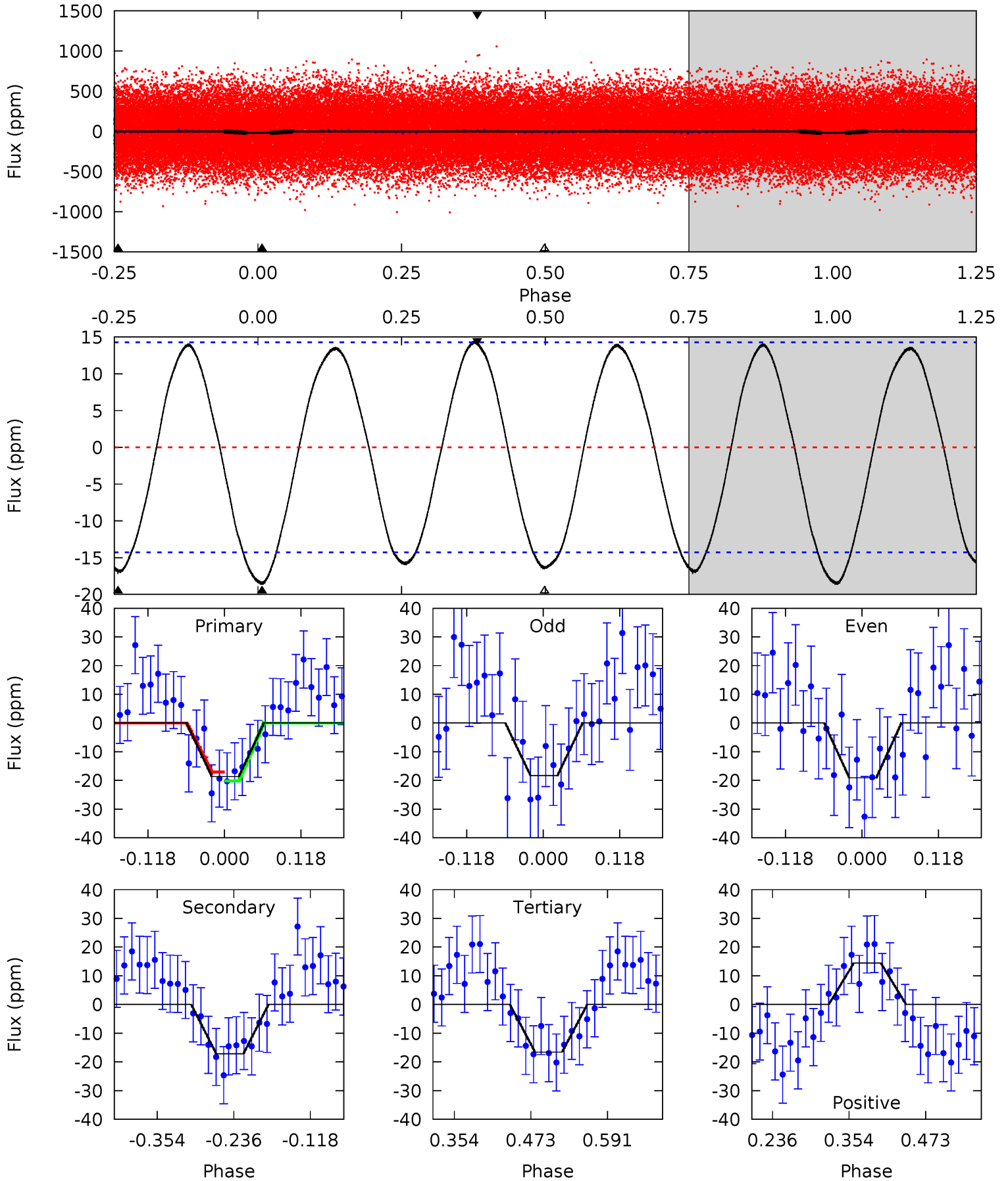




# Alt Model-Shift Uniqueness Test

004035667-02, P = 0.525918 Days, E = 131.144007 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.93	5.46	5.26	4.59	4.53	1.56	3.41	0.67	1.33	0.20	0.86	0.13	1.18	0.44	0.48



### Stellar Parameters For KIC 004035667

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8173^{+226}_{-340}$	$3.744^{+0.416}_{-0.104}$	$-0.140^{+0.200}_{-0.350}$	$3.169^{+0.654}_{-1.526}$	$2.032^{+0.333}_{-0.499}$	$0.090^{+0.363}_{-0.029}$
	+3%/-4%	+11%/-3%	+143%/-250%	+21%/-48%	+16%/-25%	+404%/-33%
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 004035667-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-5 \pm 1$	$1.40^{+0.28}_{-0.30}$	$6875^{+497}_{-827}$	$3623^{+1185}_{-7777}$	$0.336^{+0.199}_{-0.101}$
Alt.	$-17 \pm 3$	$1.44^{+0.31}_{-0.34}$	$6881^{+482}_{-842}$	$7183^{+816}_{-791}$	$1.194^{+0.722}_{-0.395}$

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

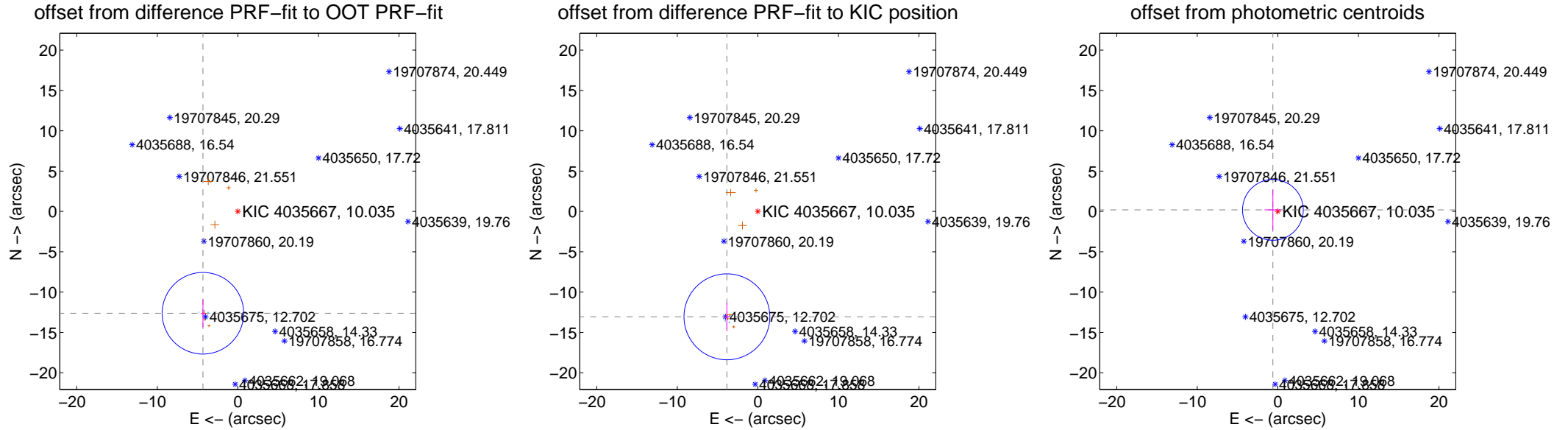
## DV Centroid Data

Supplemental centroid analysis for 004035667-02. **Kepler magnitude: 10.04.** Transit SNR 15.88

There are 4 quarters with good PRF difference image offsets

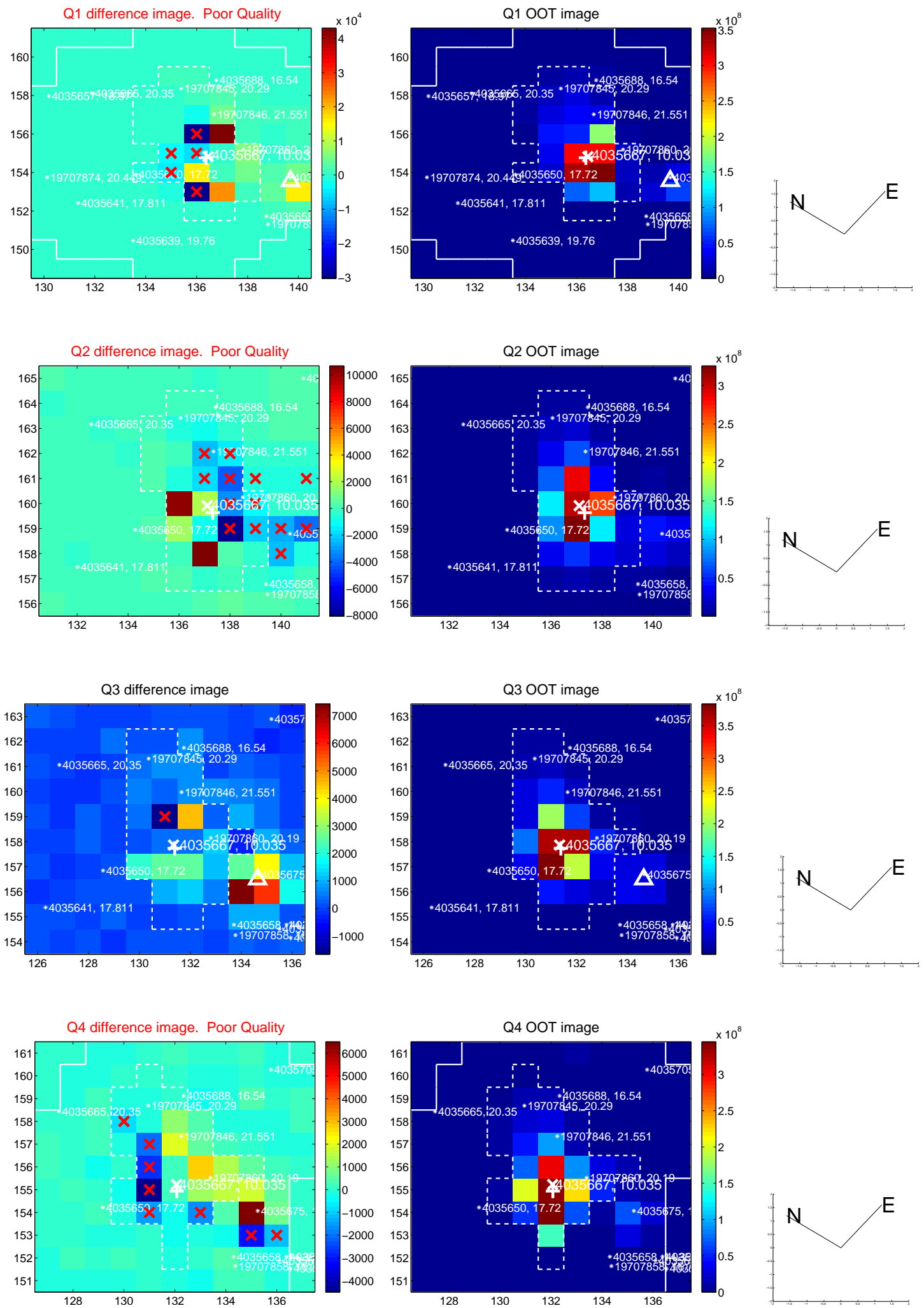
The direct PRF centroid is offset from the target star catalog position by about 0.61 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>13.343 <math>\pm</math> 1.686</b>	<b>7.91</b>	4.333 $\pm$ 0.263	-12.619 $\pm$ 1.719
PRF-fit source offset from KIC position	<b>13.612 <math>\pm</math> 1.775</b>	<b>7.67</b>	3.837 $\pm$ 0.315	-13.060 $\pm$ 1.782
photometric centroid source offset	0.64 $\pm$ 1.26	0.51	0.61 $\pm$ 1.04	0.20 $\pm$ 2.51

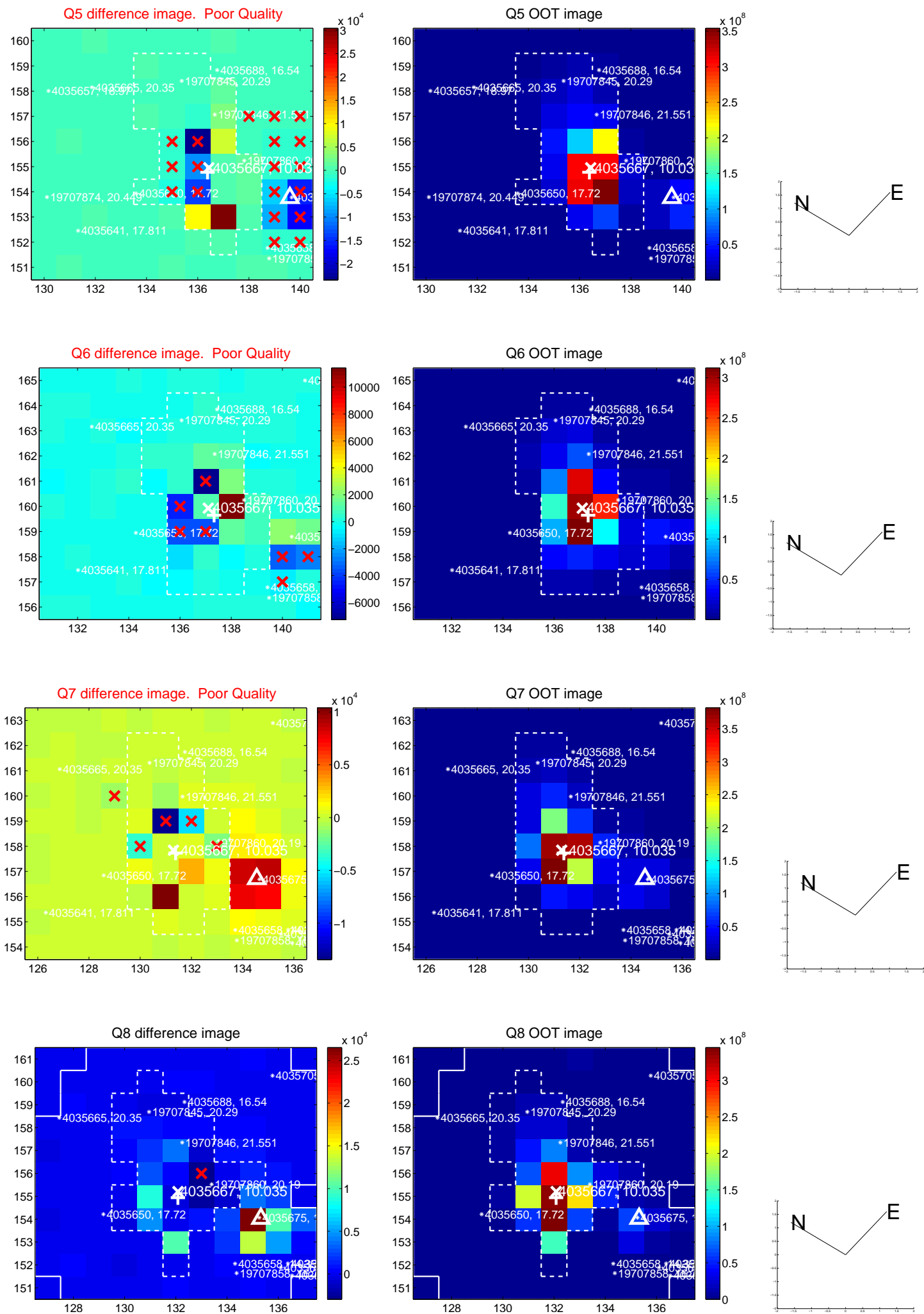


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

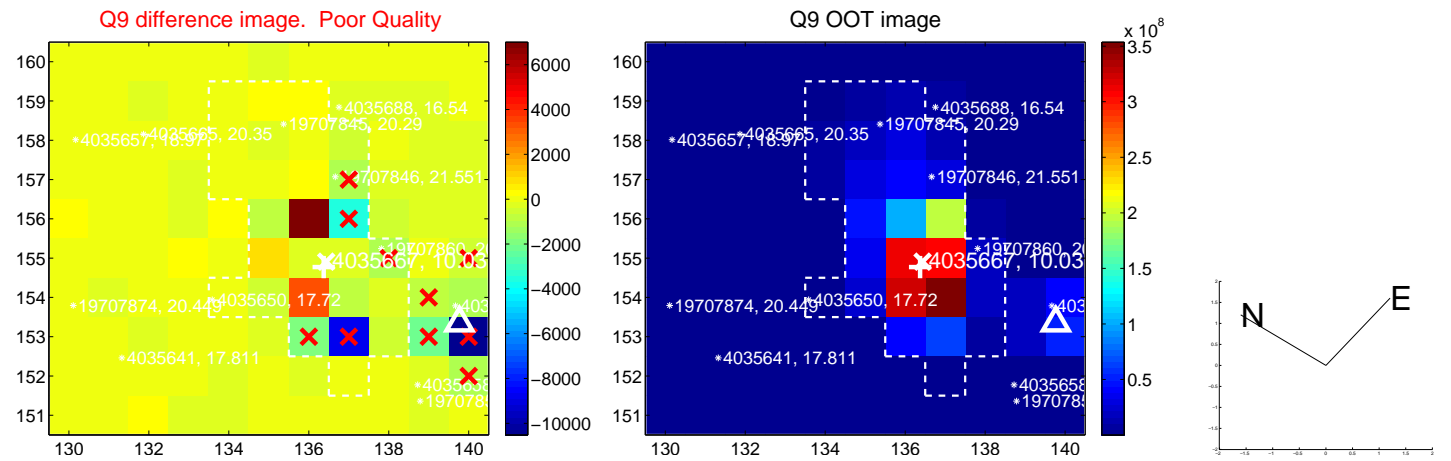


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

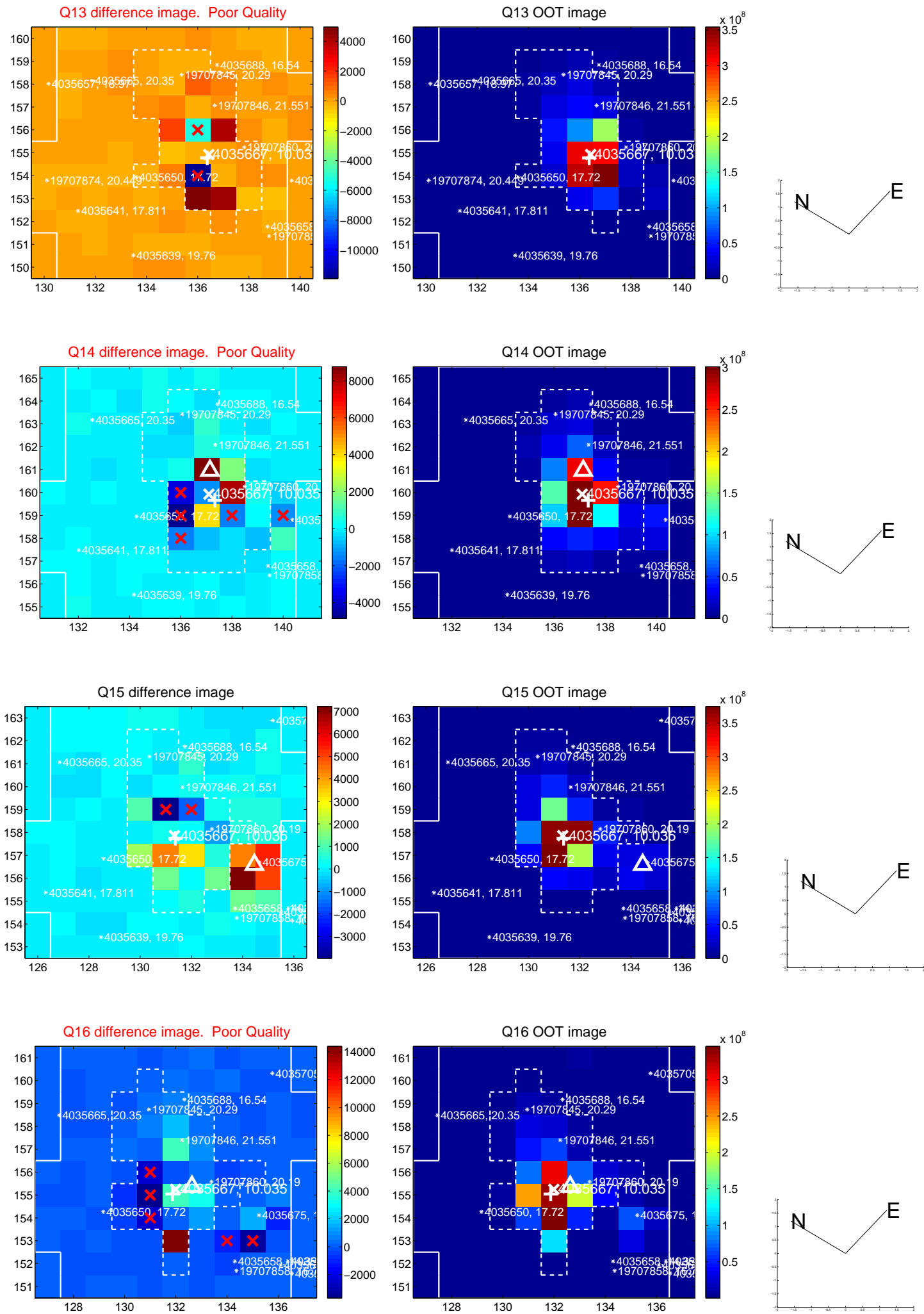




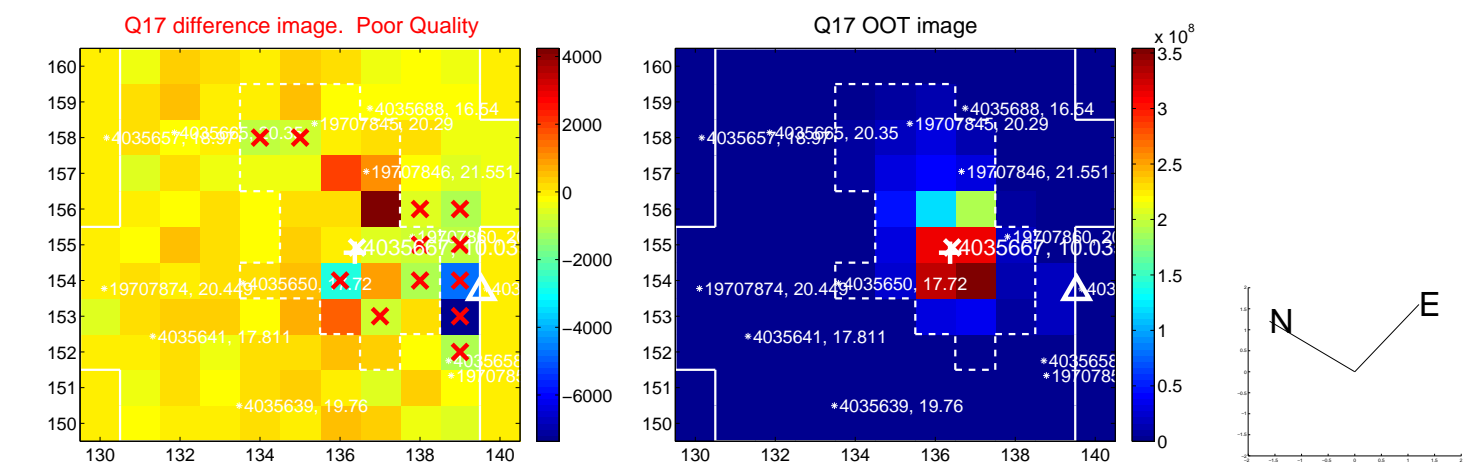
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



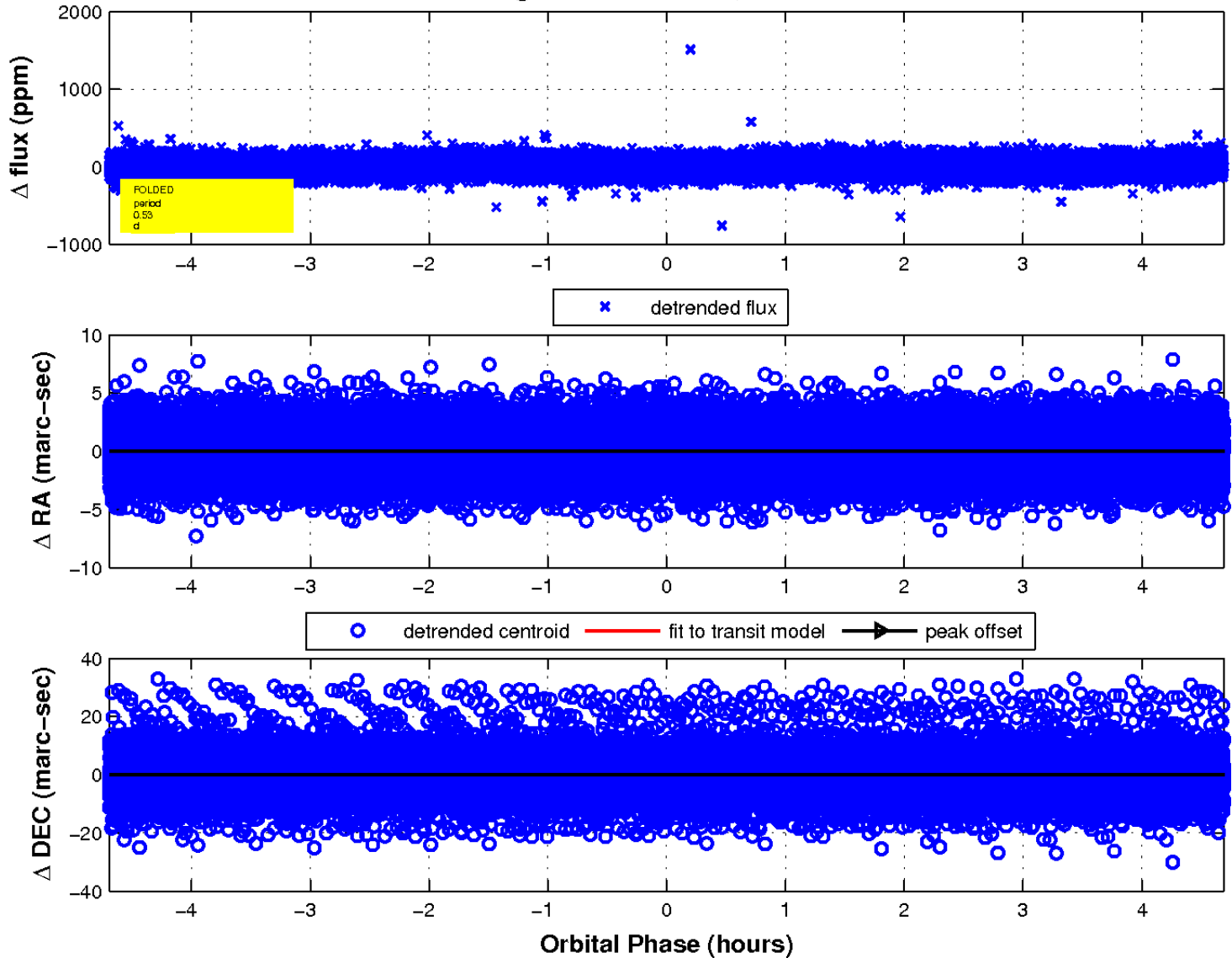
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

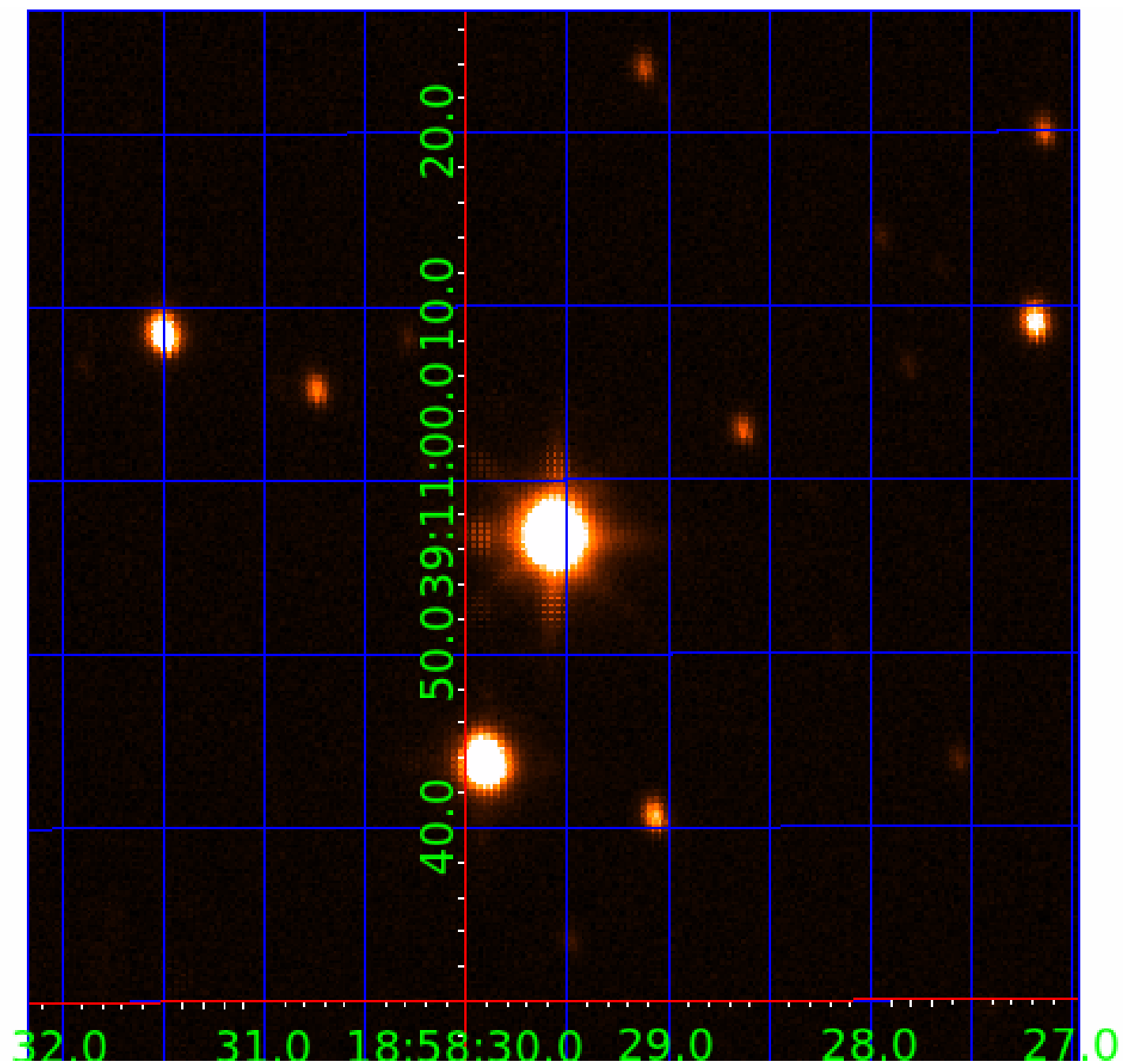


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



# KIC 004035667

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004035667-01	OBS	2684.01	2.873651	132.586538	169.3	1.411	58.6	67.9	3.17	8173	4.81	15987.84
004035667-02	OBS	No	0.525920	131.671016	16.3	1.564	13.6	15.9	3.17	8173	1.49	153866.03
004035667-03	OBS	No	0.525901	131.942408	8.1	2.011	13.0	9.1	3.17	8173	0.94	153873.43
004035667-04	OBS	No	18.769420	147.423994	133.8	1.623	9.5	7.2	3.17	8173	3.71	1309.49

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004035667-01	OBS	FP	0.00	0	0	0	1	CENT_SATURATED—EPHEM_MATCH
004035667-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004035667-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004035667-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED

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

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

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

Ephemeris Match Information For 004035667-03

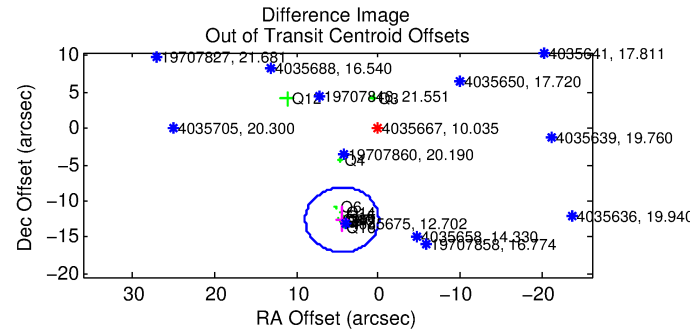
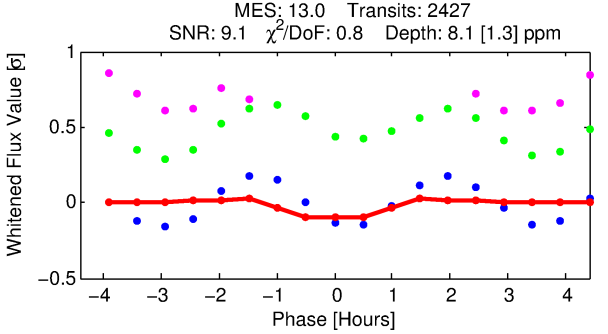
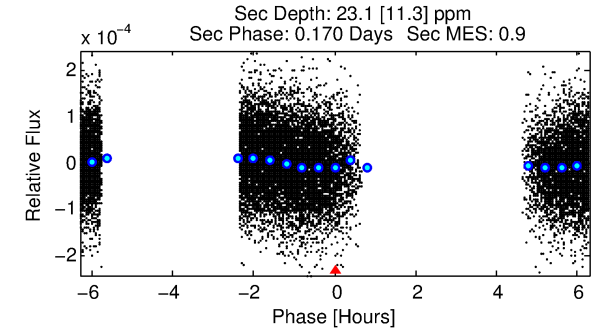
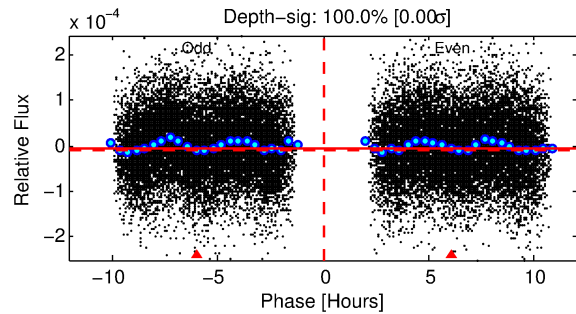
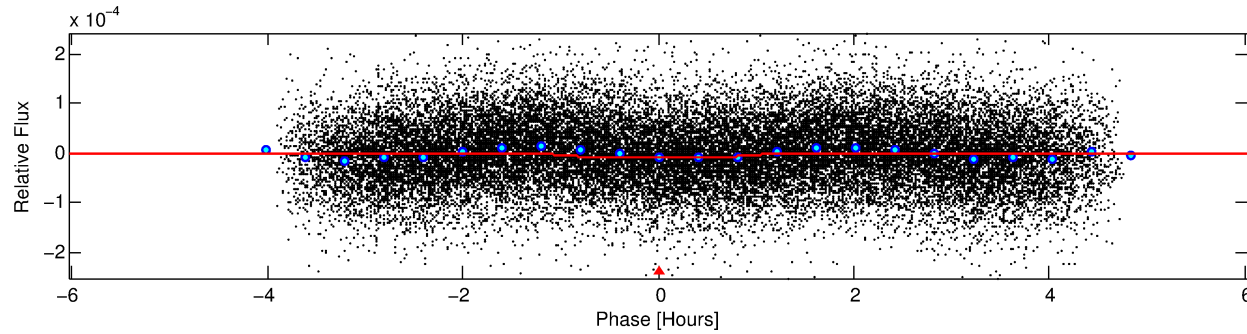
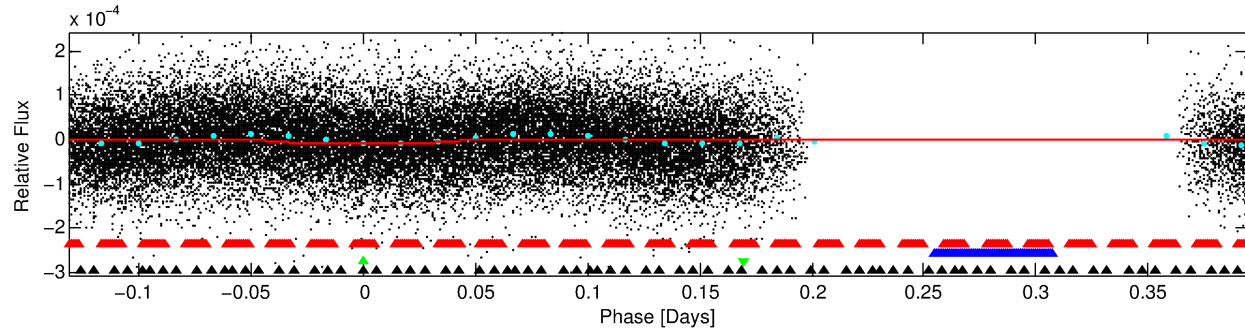
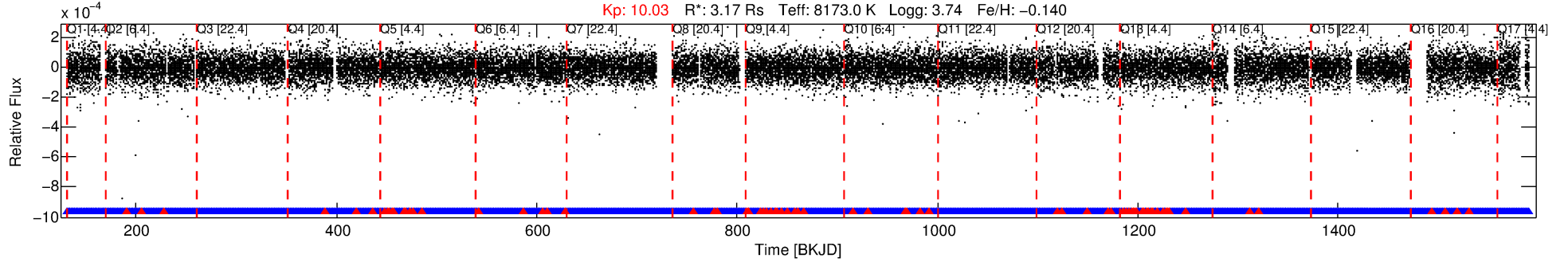
No Significant Match Found

# DV One-Page Summary

KIC: 4035667 Candidate: 3 of 4 Period: 0.526 d

KOI: K02684 Corr: No Ephemeris Match

Kp: 10.03 R\*: 3.17 Rs Teff: 8173.0 K Logg: 3.74 Fe/H: -0.140



## DV Fit Results:

Period = 0.52590 [0.00001] d  
Epoch = 131.9424 [0.0025] BKJD  
Rp/R\* = 0.0027 [0.0005]  
a/R\* = 1.85 [1.13]  
b = 0.53 [1.18]  
Seff = 153873.43 [112920.09]  
Teff = 5050 [927] K  
Rp = 0.94 [0.48] Re  
a = 0.0162 [0.0073] AU  
Ag = 3.76 [3.51] [0.79σ]  
Teffp = 10876 [1685] K [3.03σ]

## DV Diagnostic Results:

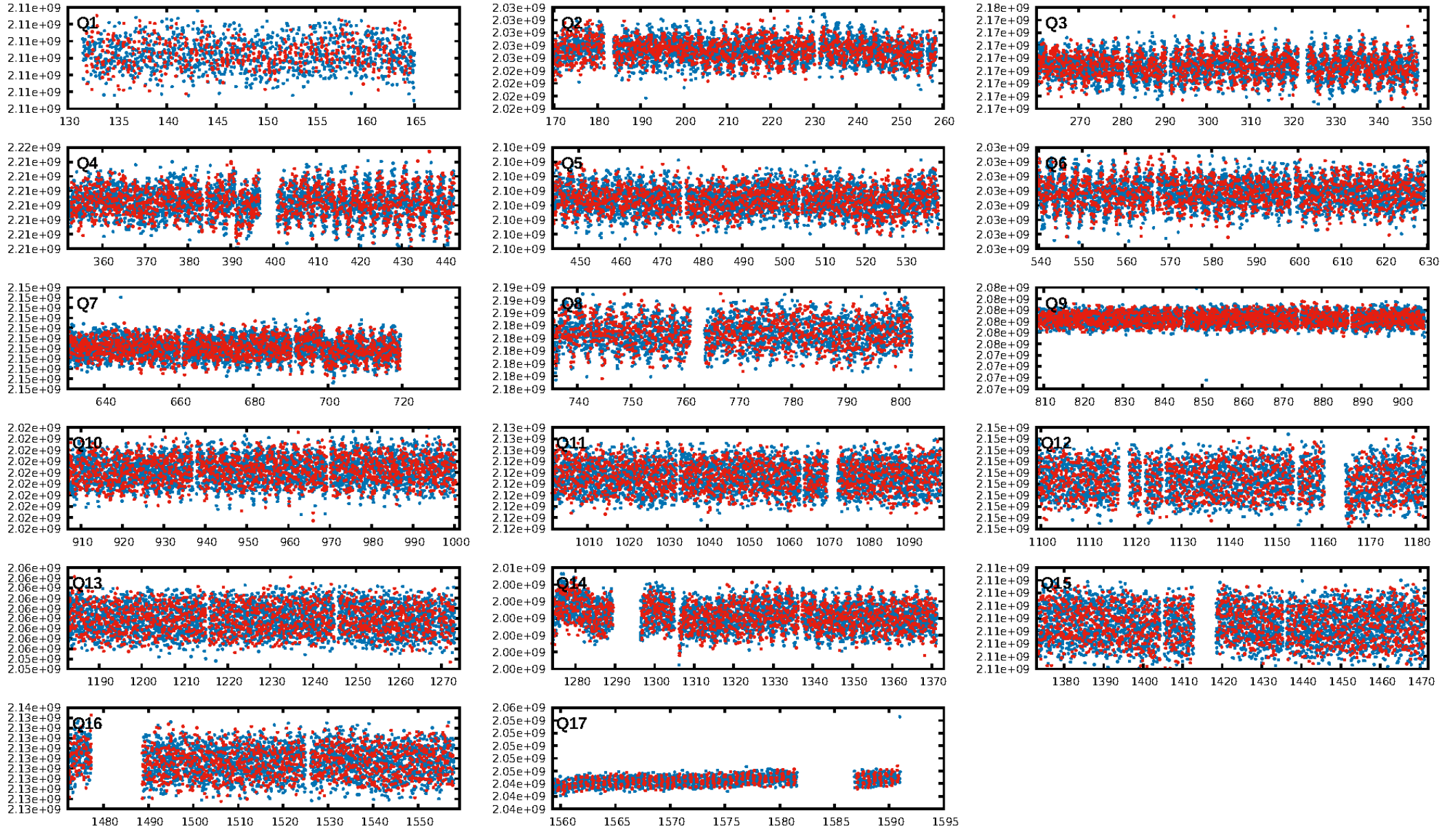
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.59e-13  
RollingBand-fgt: 0.97 [2237/2317]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 14.4%  
Centroid-so: 4.140 arcsec [1.04σ]  
OotOffset-rm: 13.360 arcsec [8.96σ]  
KicOffset-rm: 13.640 arcsec [8.30σ]  
OotOffset-st: 3/3/4/3 [13]  
KicOffset-st: 3/3/4/3 [13]  
DiffImageQuality-fgm: 0.31 [4/13]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:50:26 Z

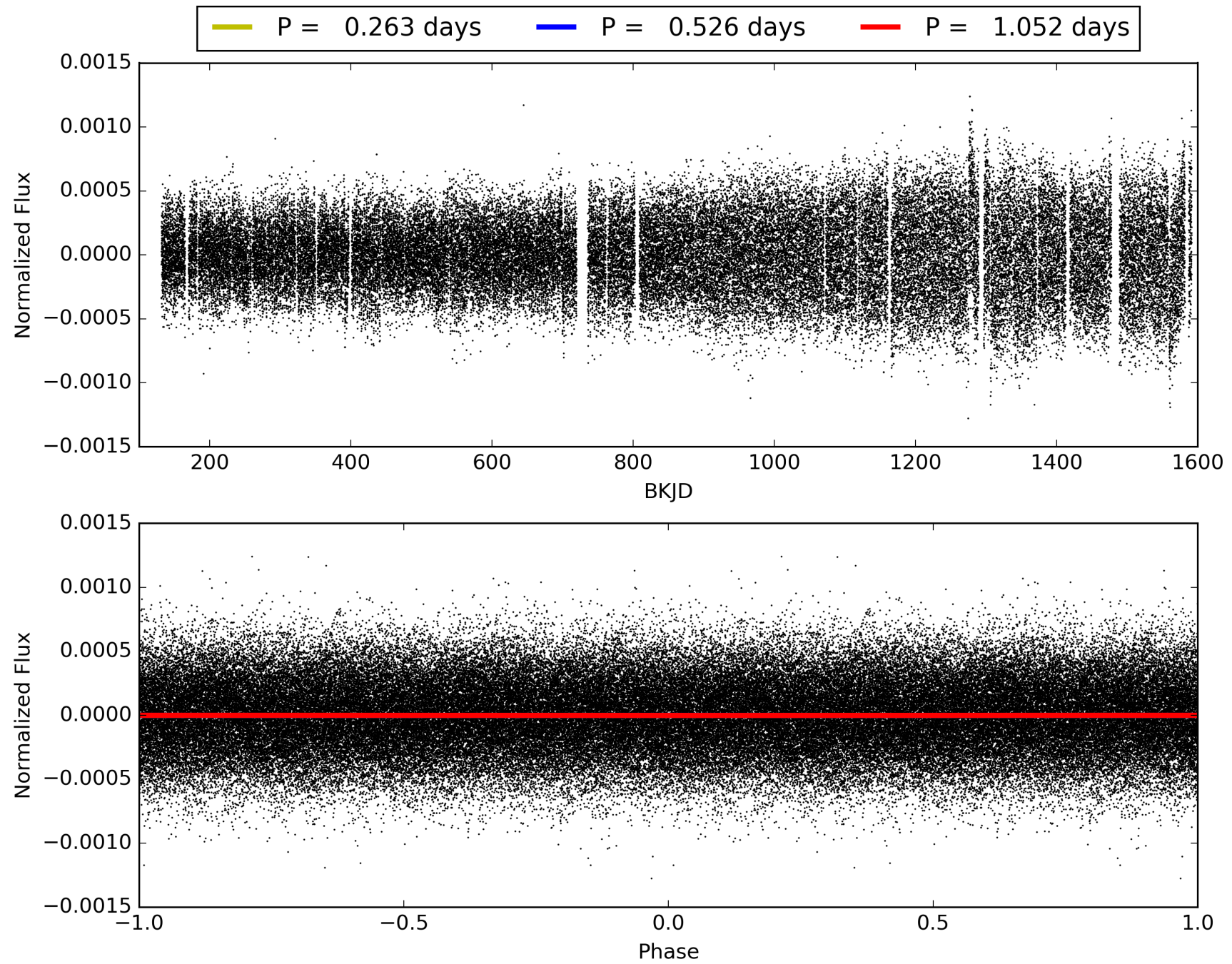
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004035667-03, PDC Light Curves

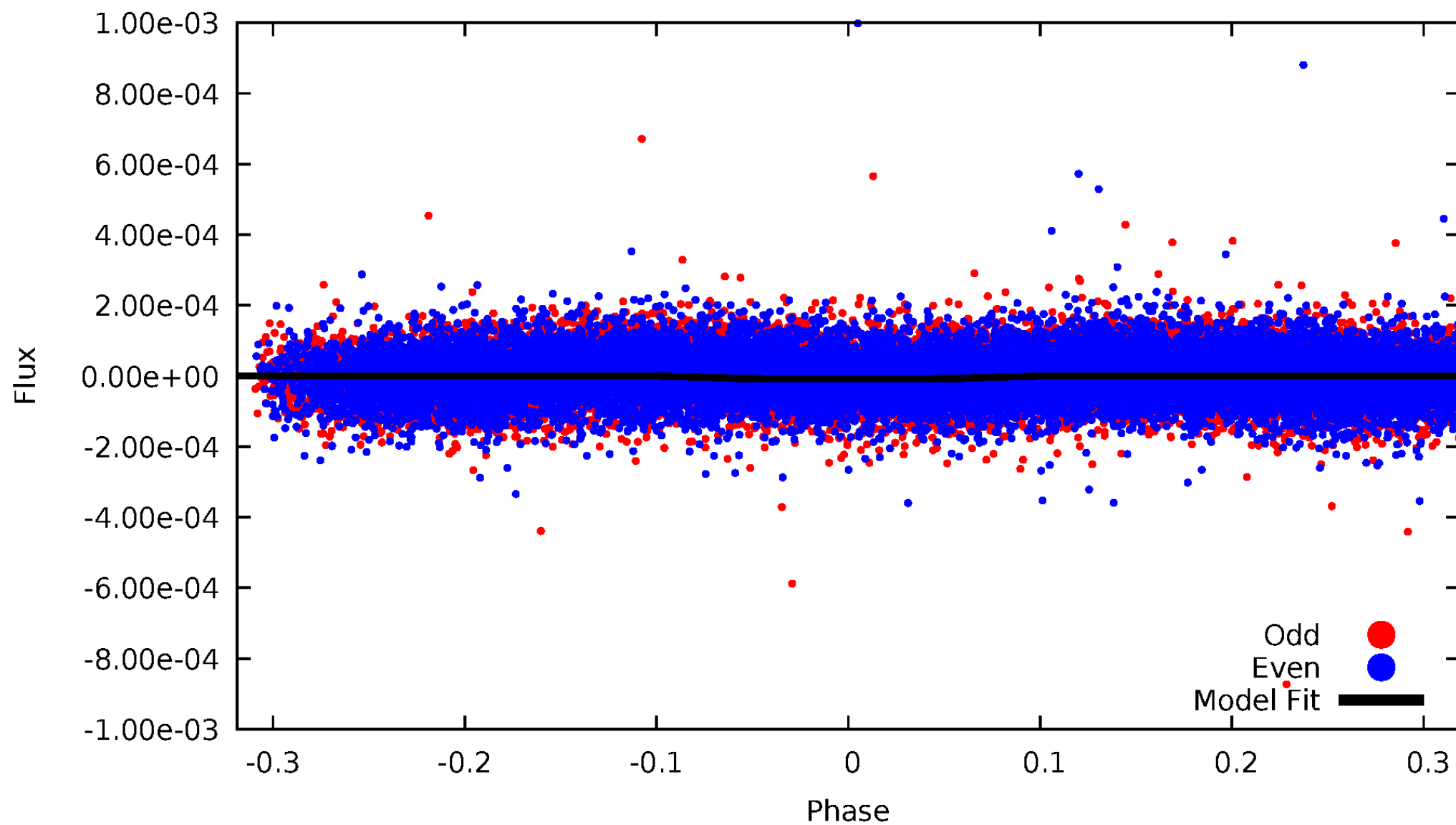


TCE 004035667-03



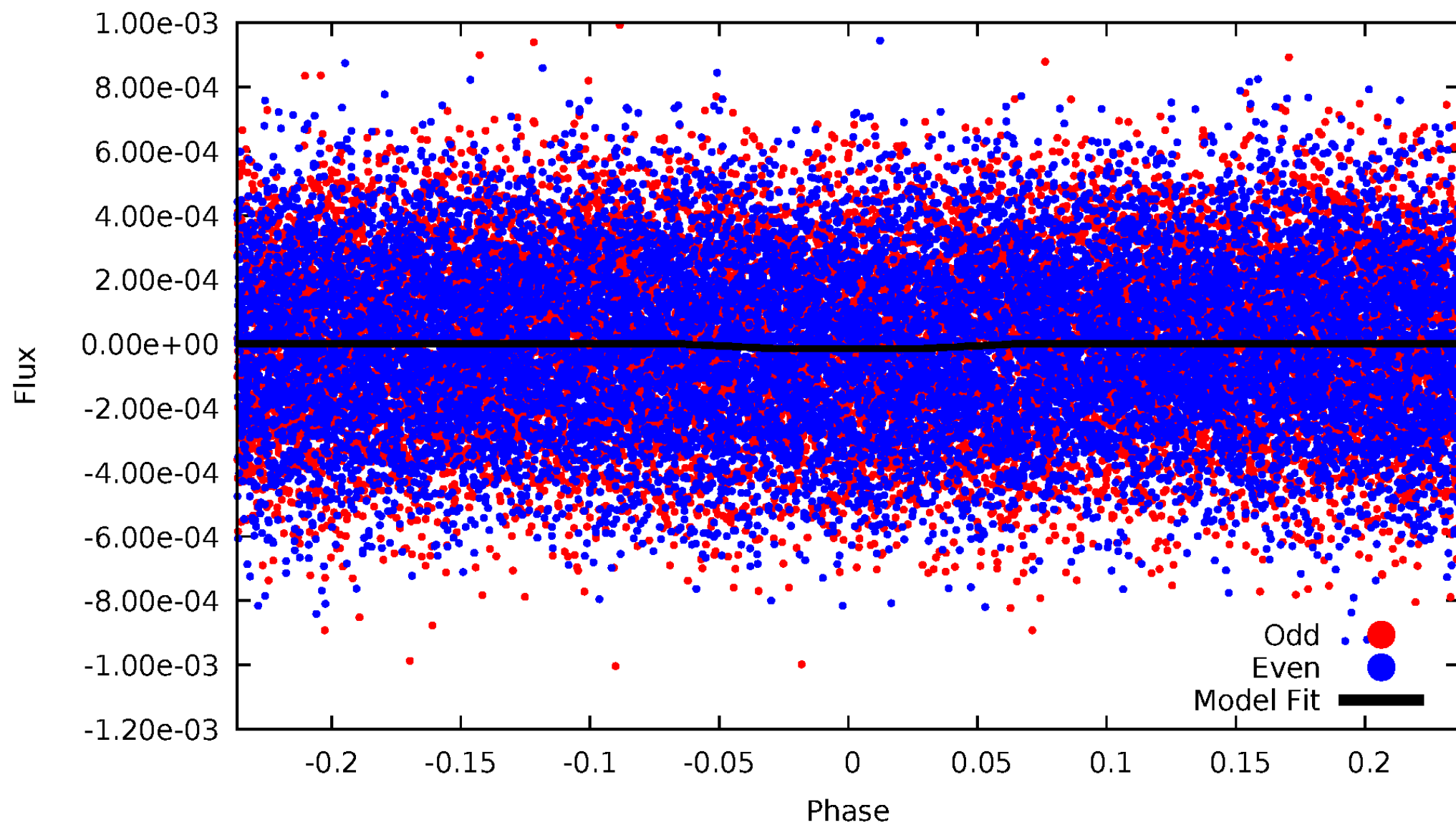
# DV Odd/Even

TCE 004035667-03



# ALT Odd/Even

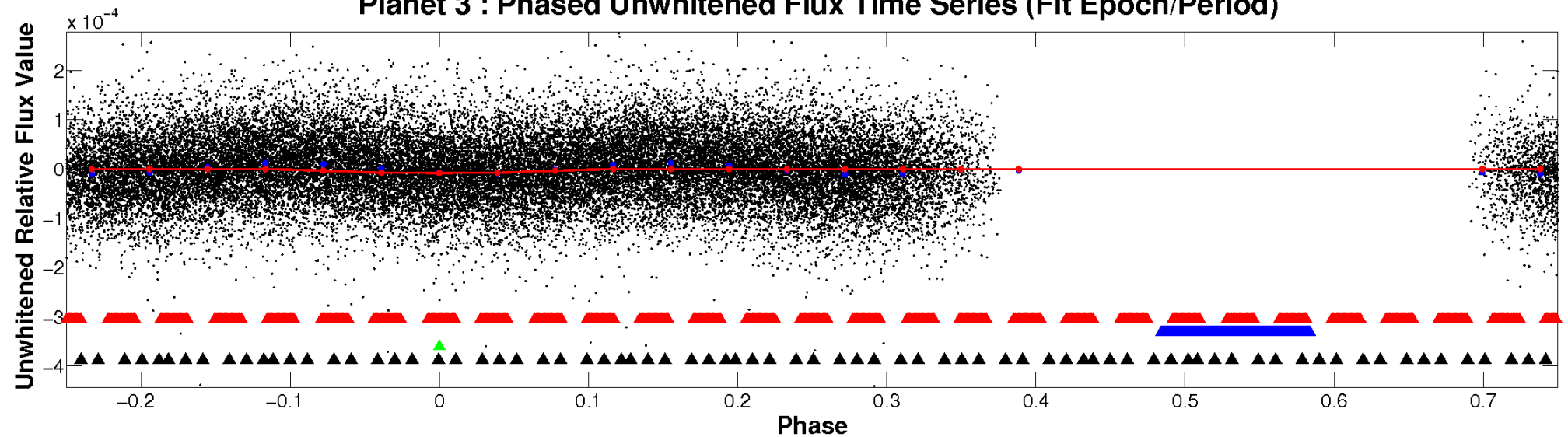
TCE 004035667-03



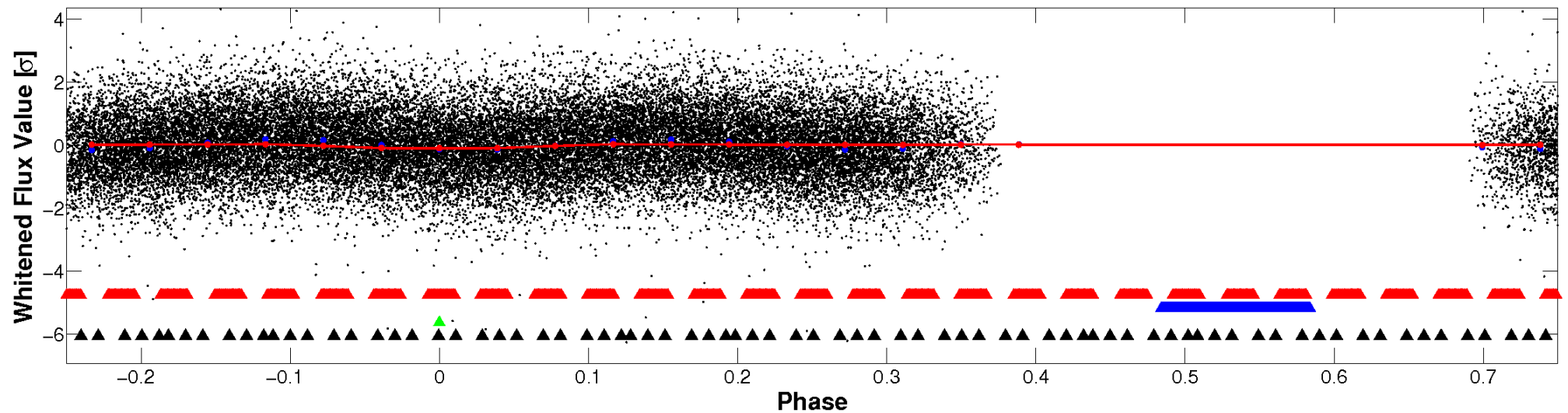


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



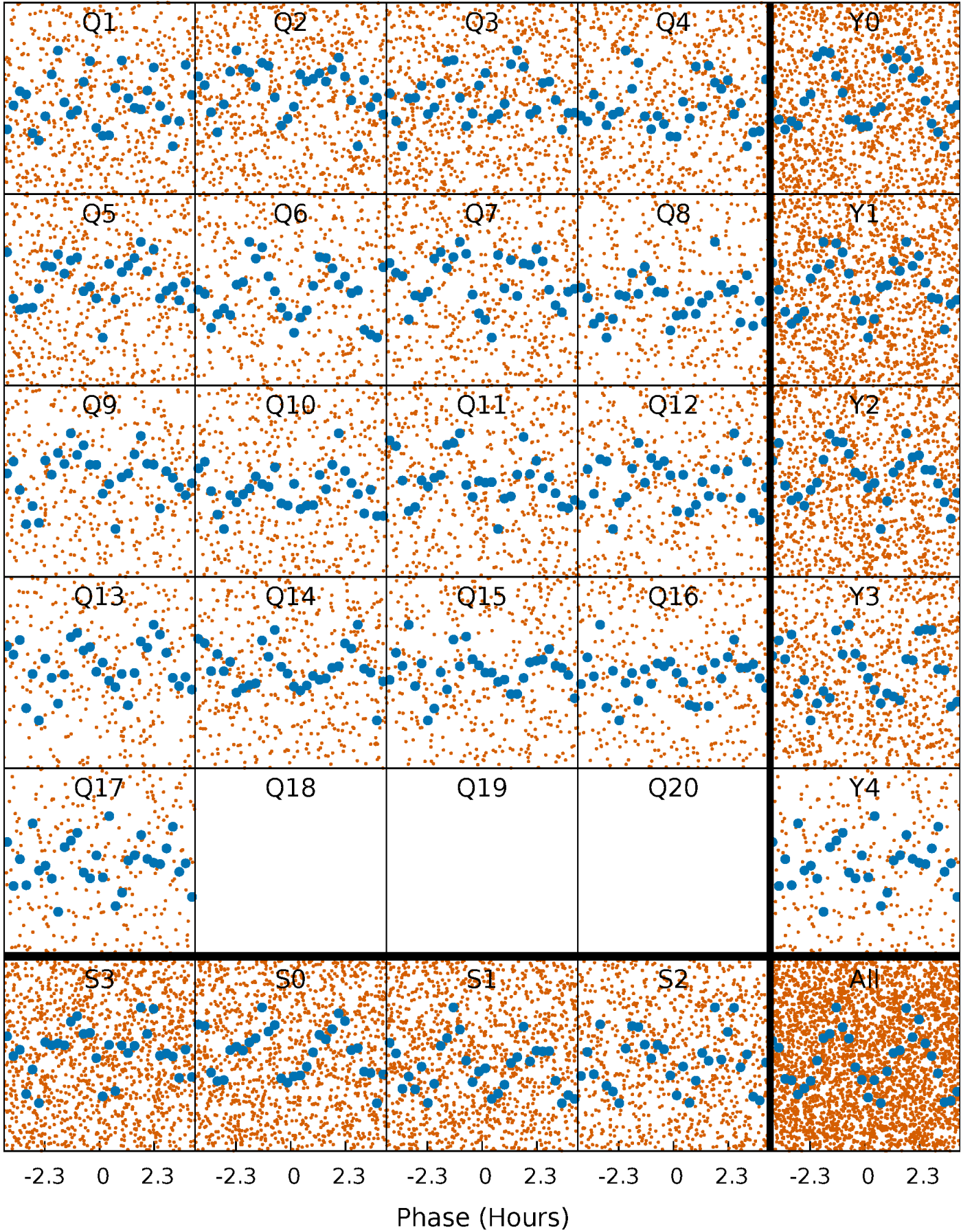
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





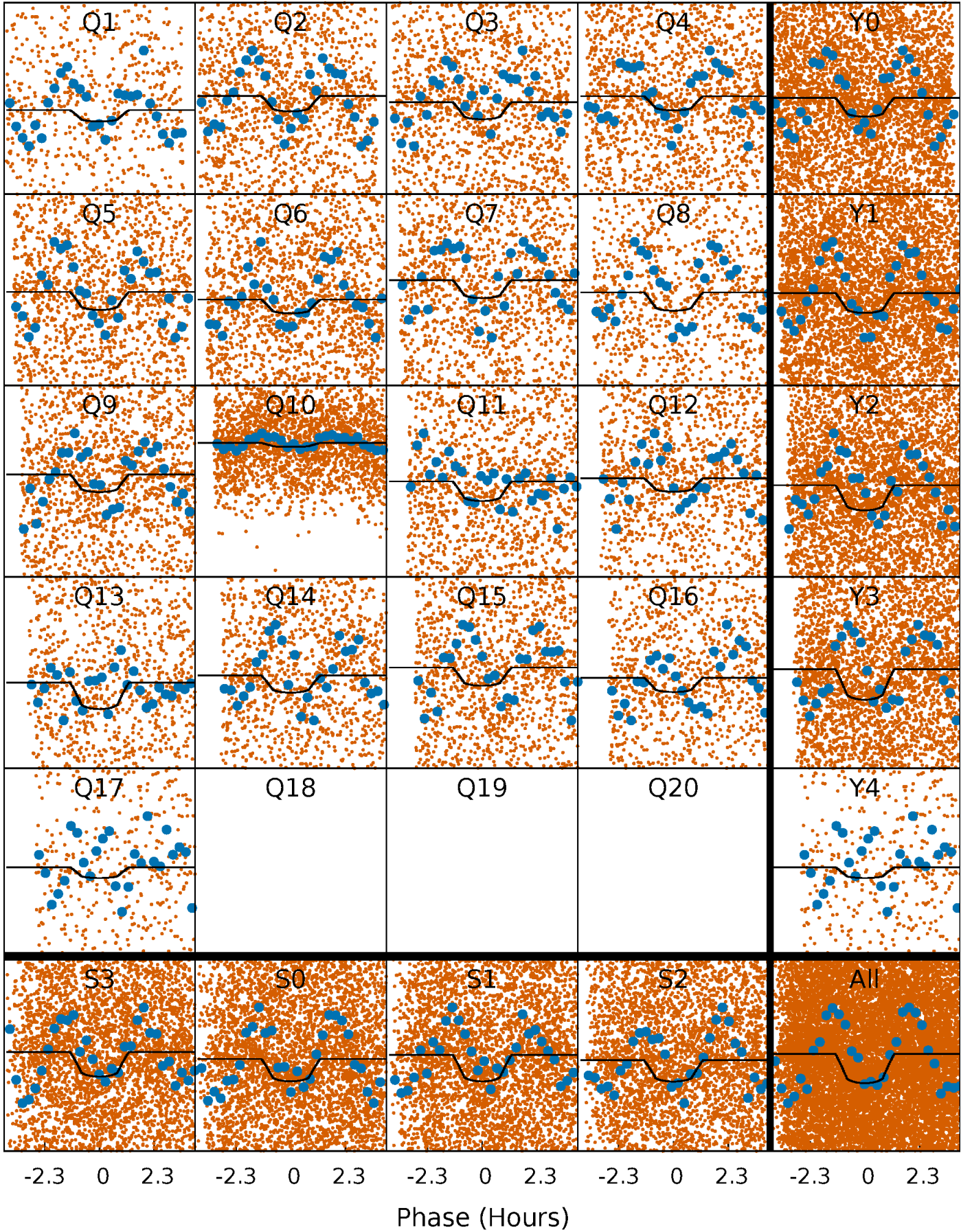
# PDC Quarter-Phased Transit Curves

TCE 004035667-03     $P = 0.525901$  Days     $T_0 = 131.942408$  (BKJD)



# DV Quarter-Phased Transit Curves

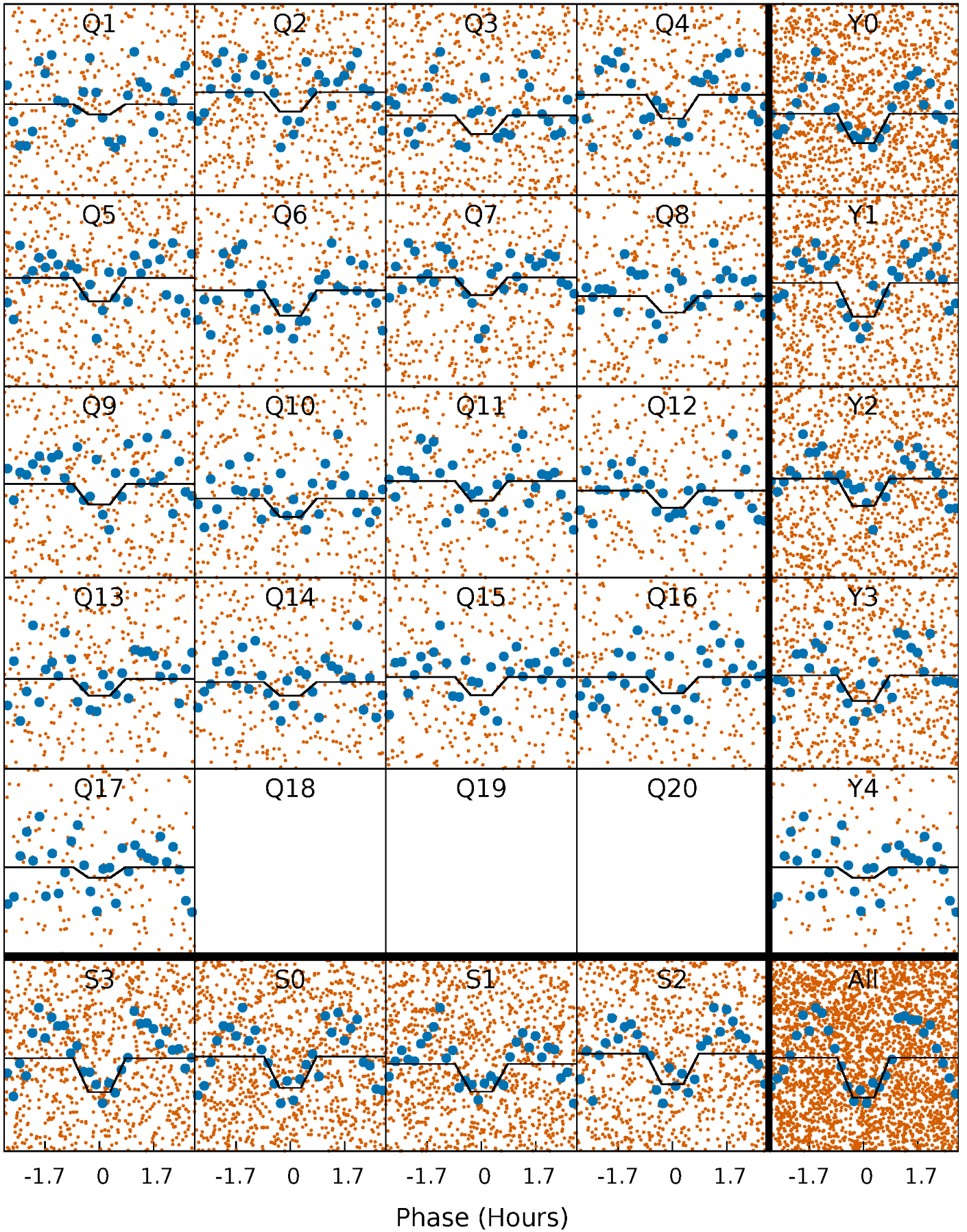
TCE 004035667-03   P= 0.525901 Days    $T_0=131.942408$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

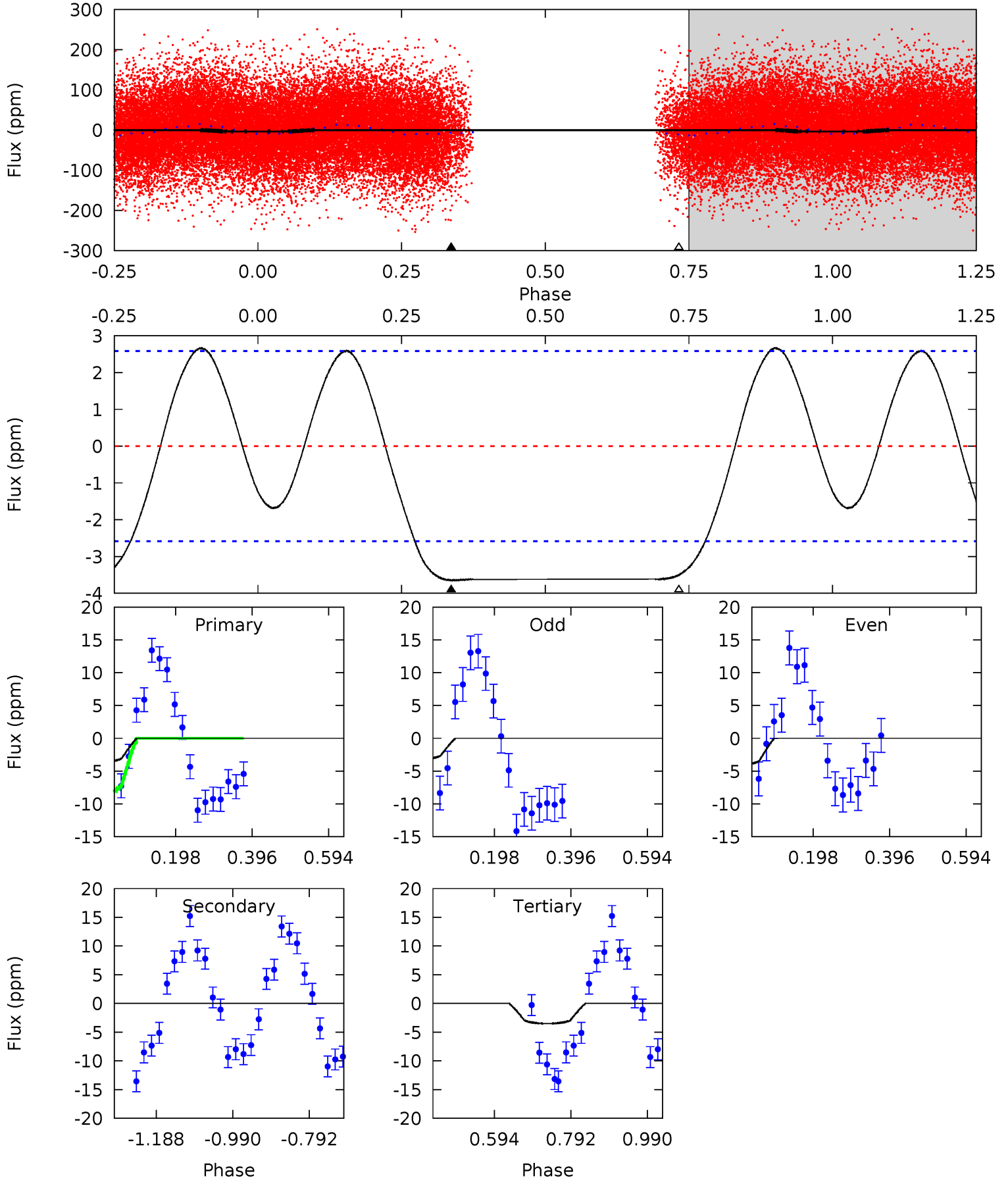
TCE 004035667-03 P= 0.525919 Days  $T_0=131.932975$  (BKJD)



# DV Model-Shift Uniqueness Test

004035667-03, P = 0.525901 Days, E = 131.416507 Days

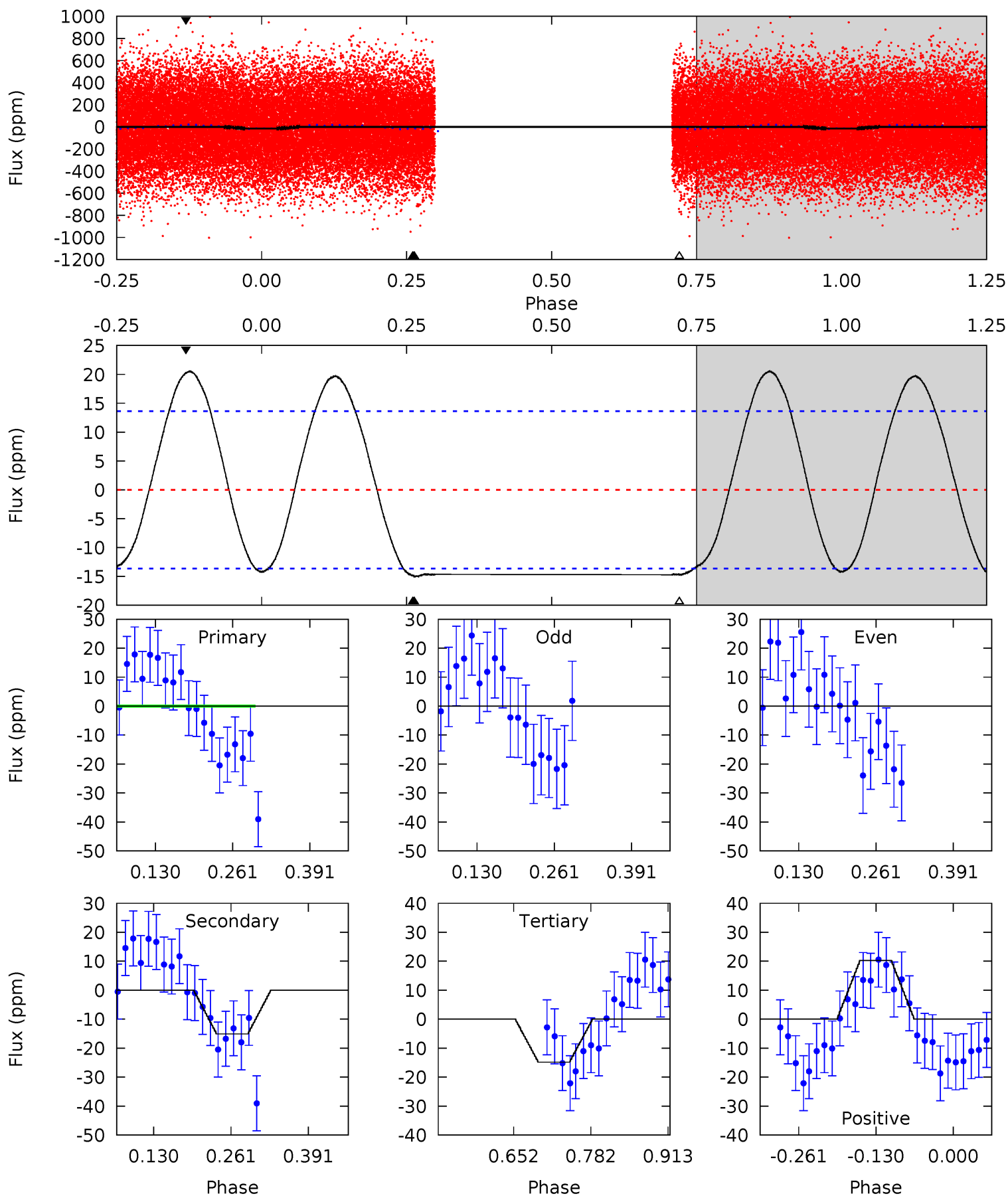
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.25	0	6.00	0	4.42	1.29	3.13	0.25	6.25	-6.00	0	0.79	0.94	0.42	6.37



# Alt Model-Shift Uniqueness Test

004035667-03, P = 0.525919 Days, E = 131.407056 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
4.95	4.99	4.91	6.71	4.51	1.51	4.18	0.04	-1.76	0.08	-1.72	0.34	0.94	0.58	0.05





### Stellar Parameters For KIC 004035667

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8173^{+226}_{-340}$	$3.744^{+0.416}_{-0.104}$	$-0.140^{+0.200}_{-0.350}$	$3.169^{+0.654}_{-1.526}$	$2.032^{+0.333}_{-0.499}$	$0.090^{+0.363}_{-0.029}$
	+3%/-4%	+11%/-3%	+143%/-250%	+21%/-48%	+16%/-25%	+404%/-33%
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 004035667-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0\pm1$	$0.87^{+0.24}_{-0.23}$	$6859^{+503}_{-771}$	$-5443^{+793}_{-594}$	$0.002^{+0.117}_{-0.122}$
Alt.	$-15\pm3$	$1.29^{+0.29}_{-0.31}$	$6862^{+467}_{-761}$	$7446^{+1022}_{-911}$	$1.341^{+0.865}_{-0.485}$

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

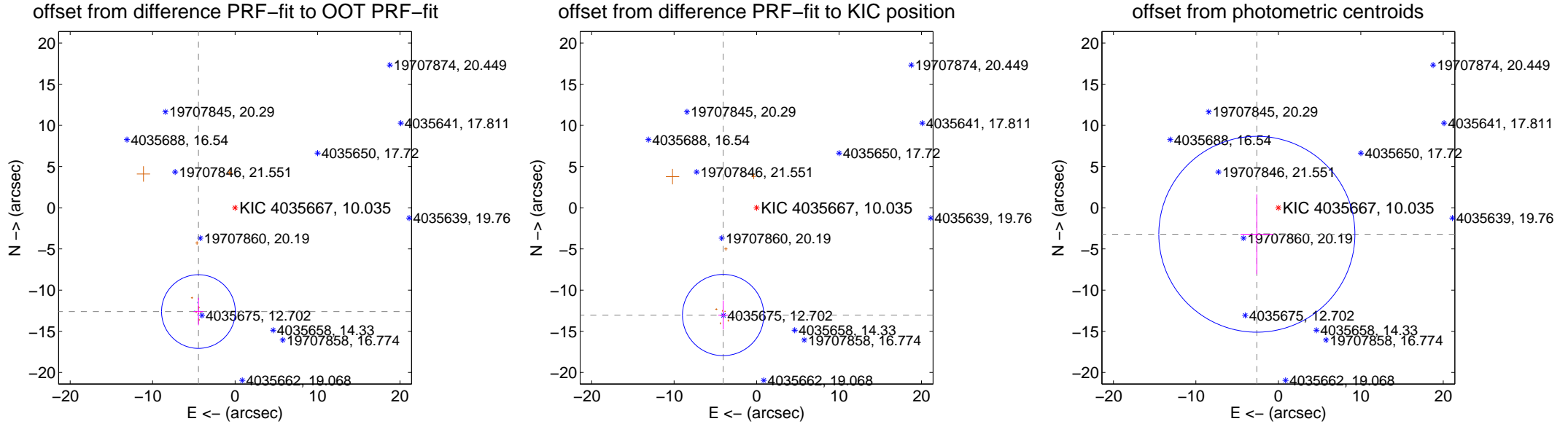
## DV Centroid Data

Supplemental centroid analysis for 004035667-03. **Kepler magnitude: 10.04.** Transit SNR 9.05

There are 4 quarters with good PRF difference image offsets

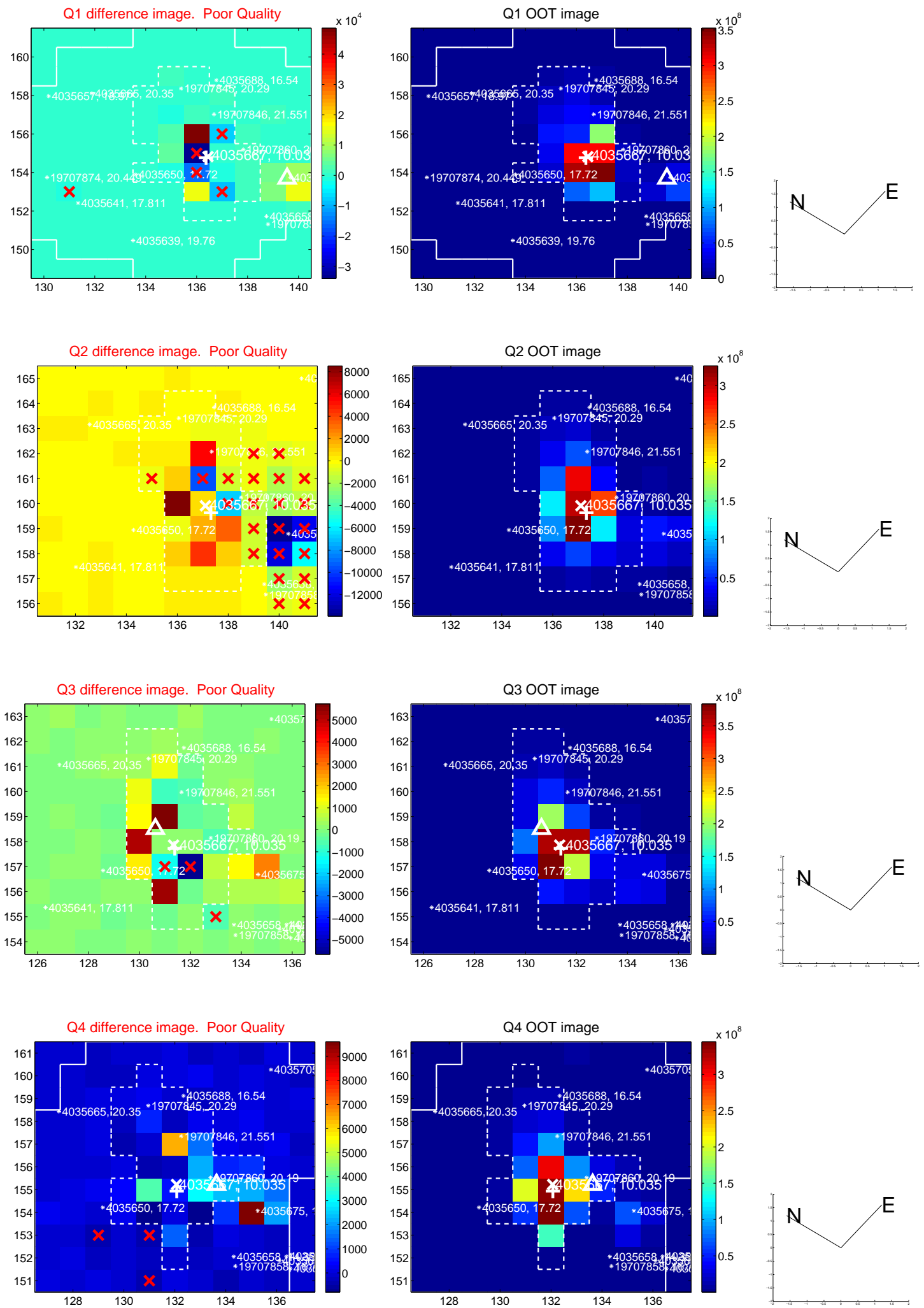
The direct PRF centroid is offset from the target star catalog position by about 0.62 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>13.360 <math>\pm</math> 1.490</b>	<b>8.96</b>	4.444 $\pm$ 0.586	-12.600 $\pm$ 1.666
PRF-fit source offset from KIC position	<b>13.640 <math>\pm</math> 1.643</b>	<b>8.30</b>	4.054 $\pm$ 0.583	-13.023 $\pm$ 1.748
photometric centroid source offset	4.14 $\pm$ 3.96	1.04	2.60 $\pm$ 1.98	-3.22 $\pm$ 4.84

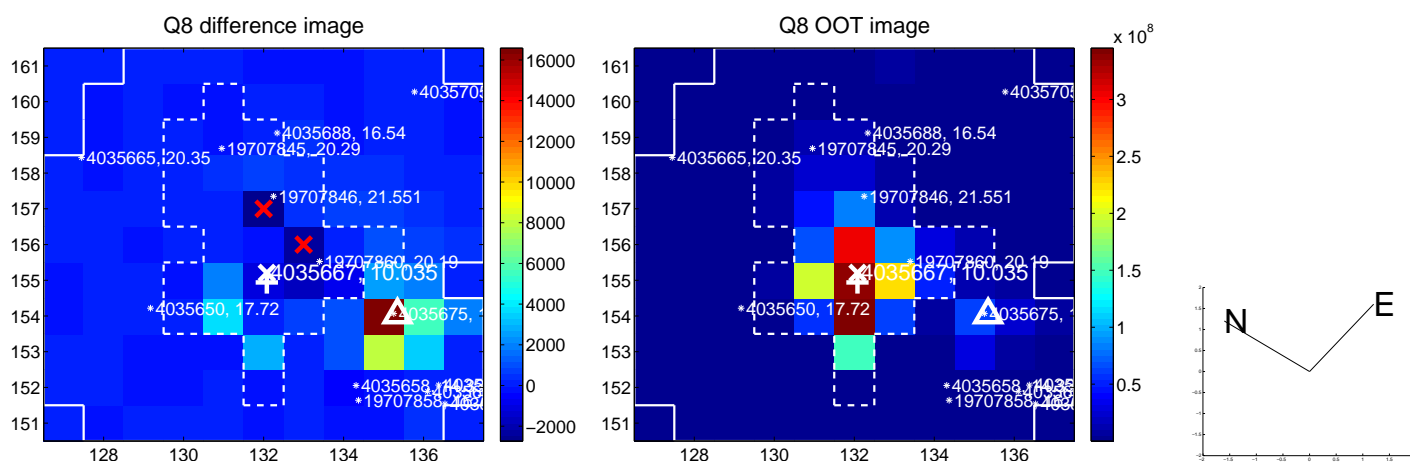
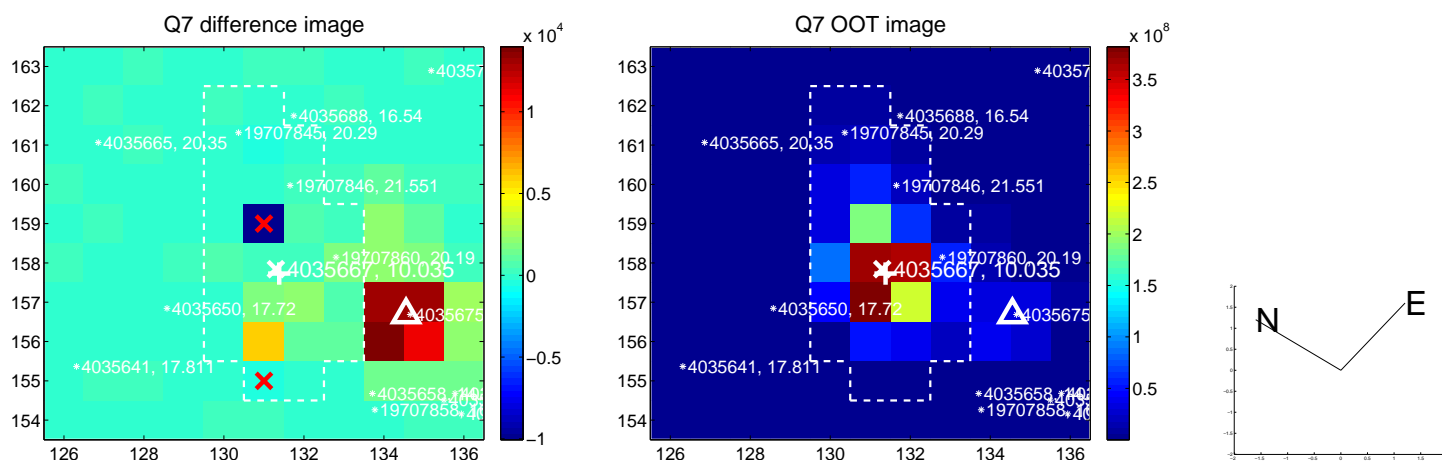
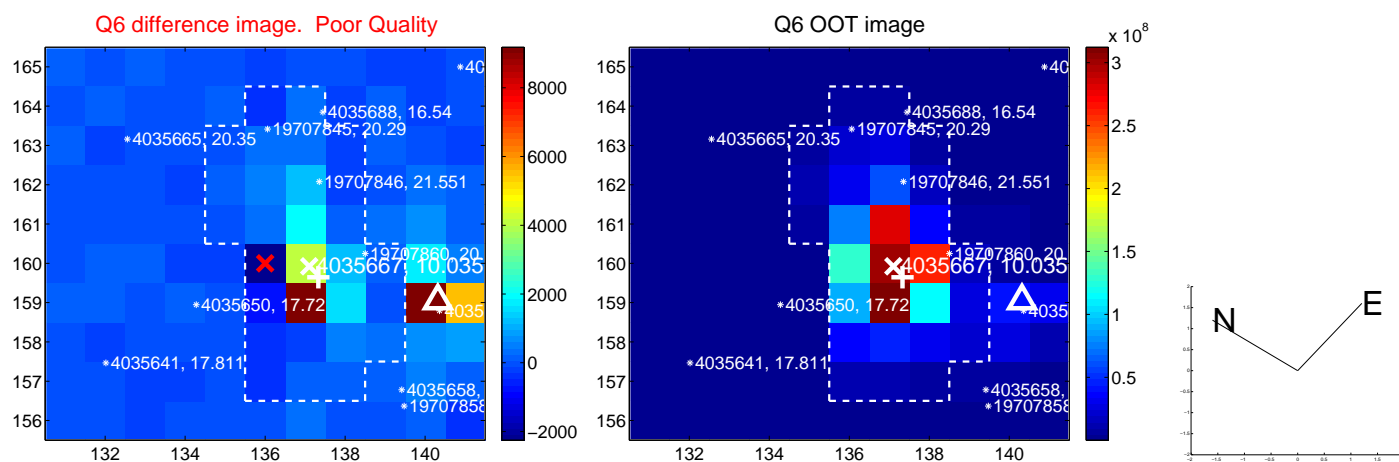
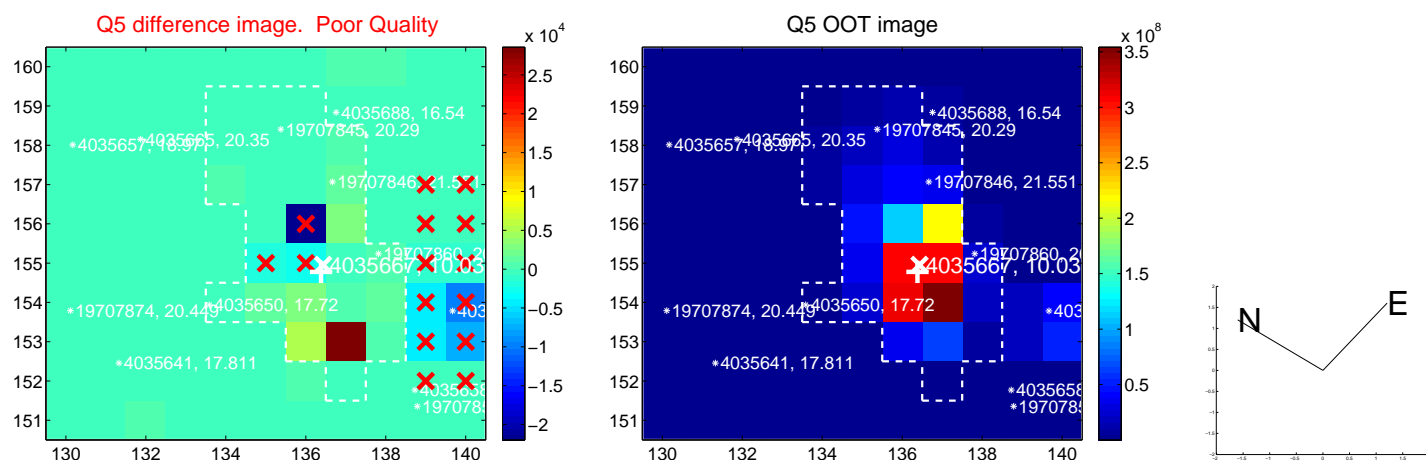


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

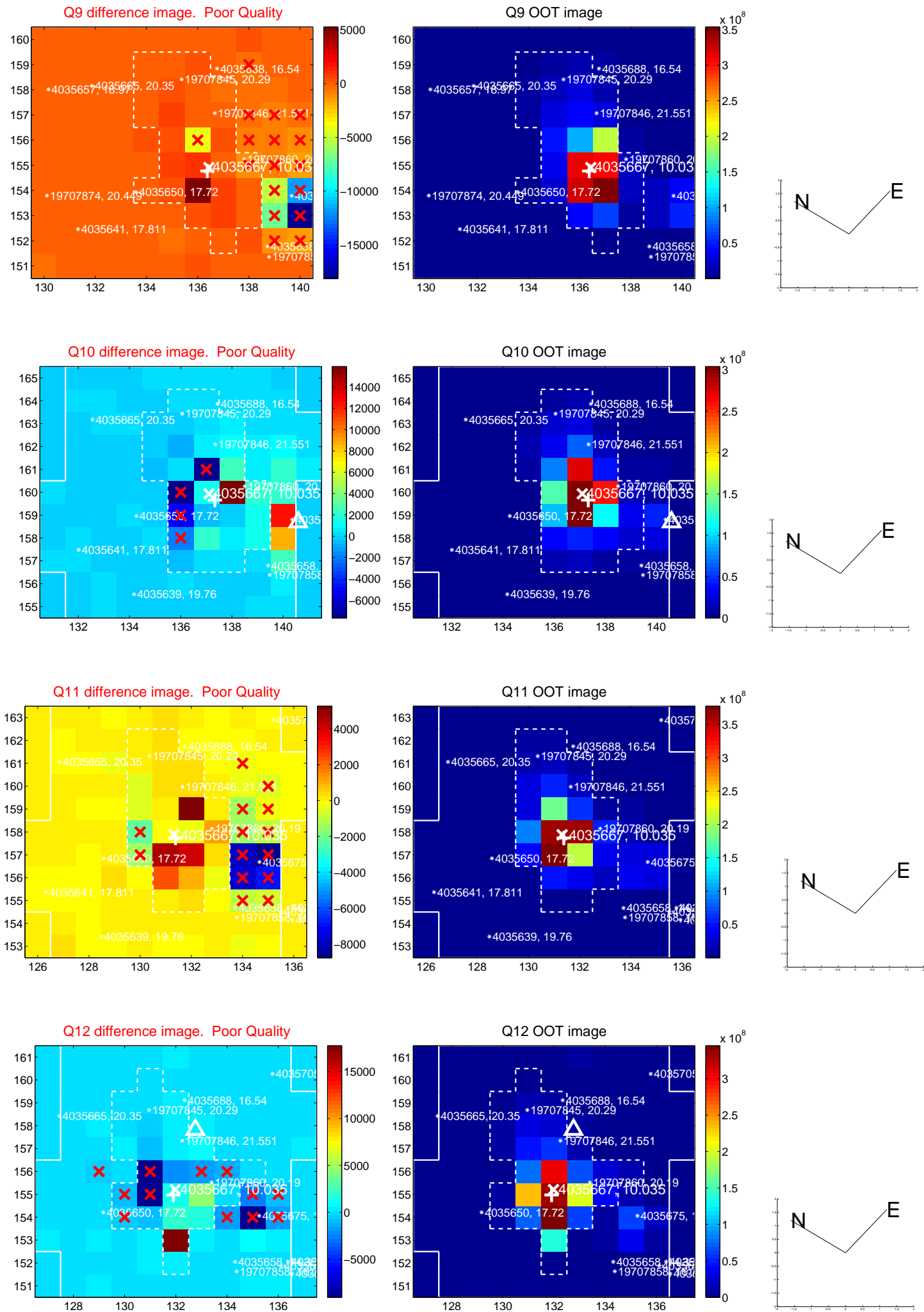
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

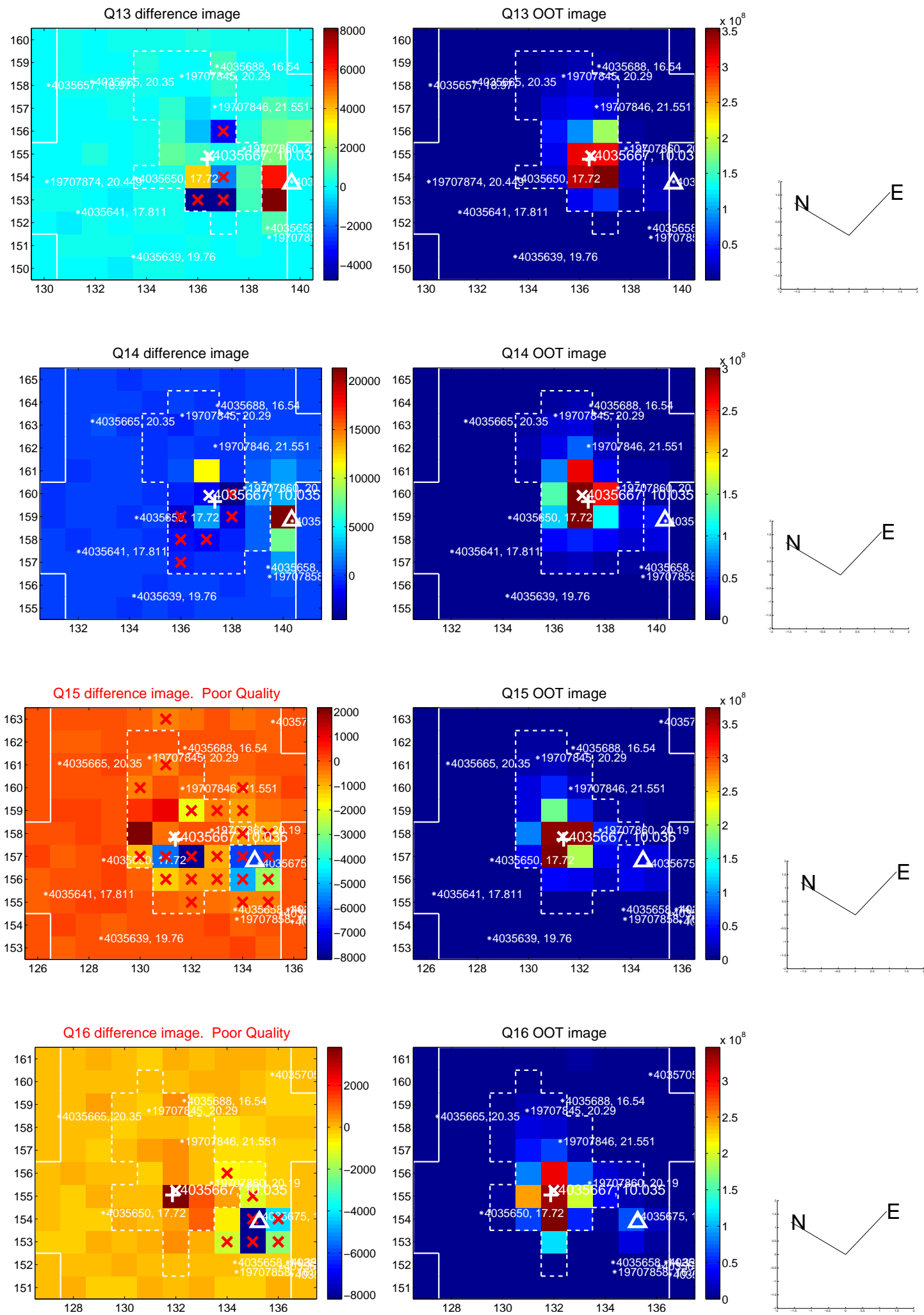


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

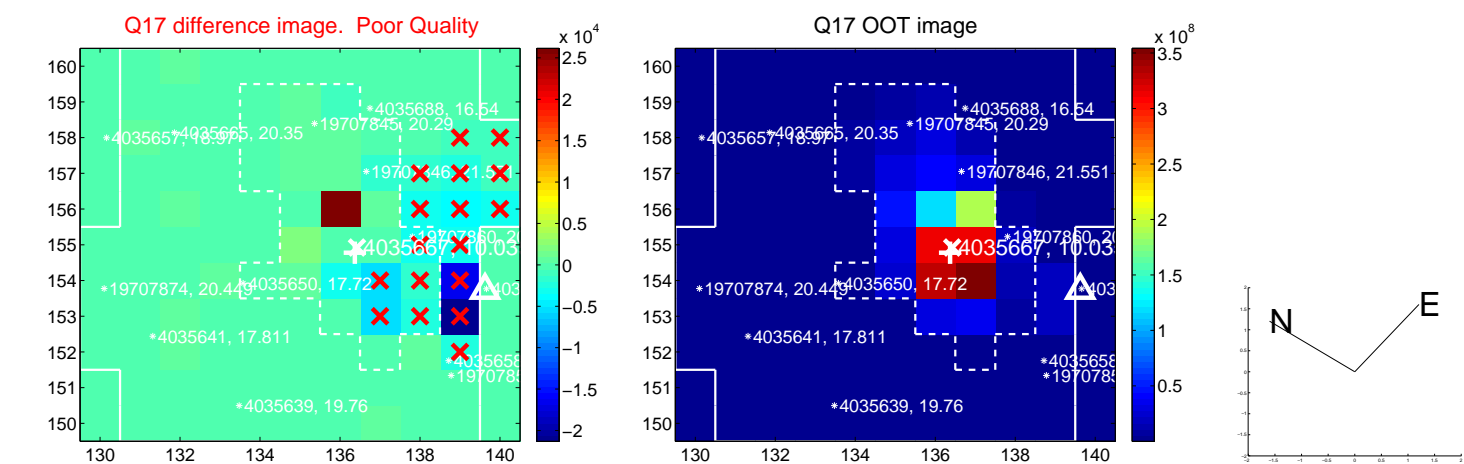




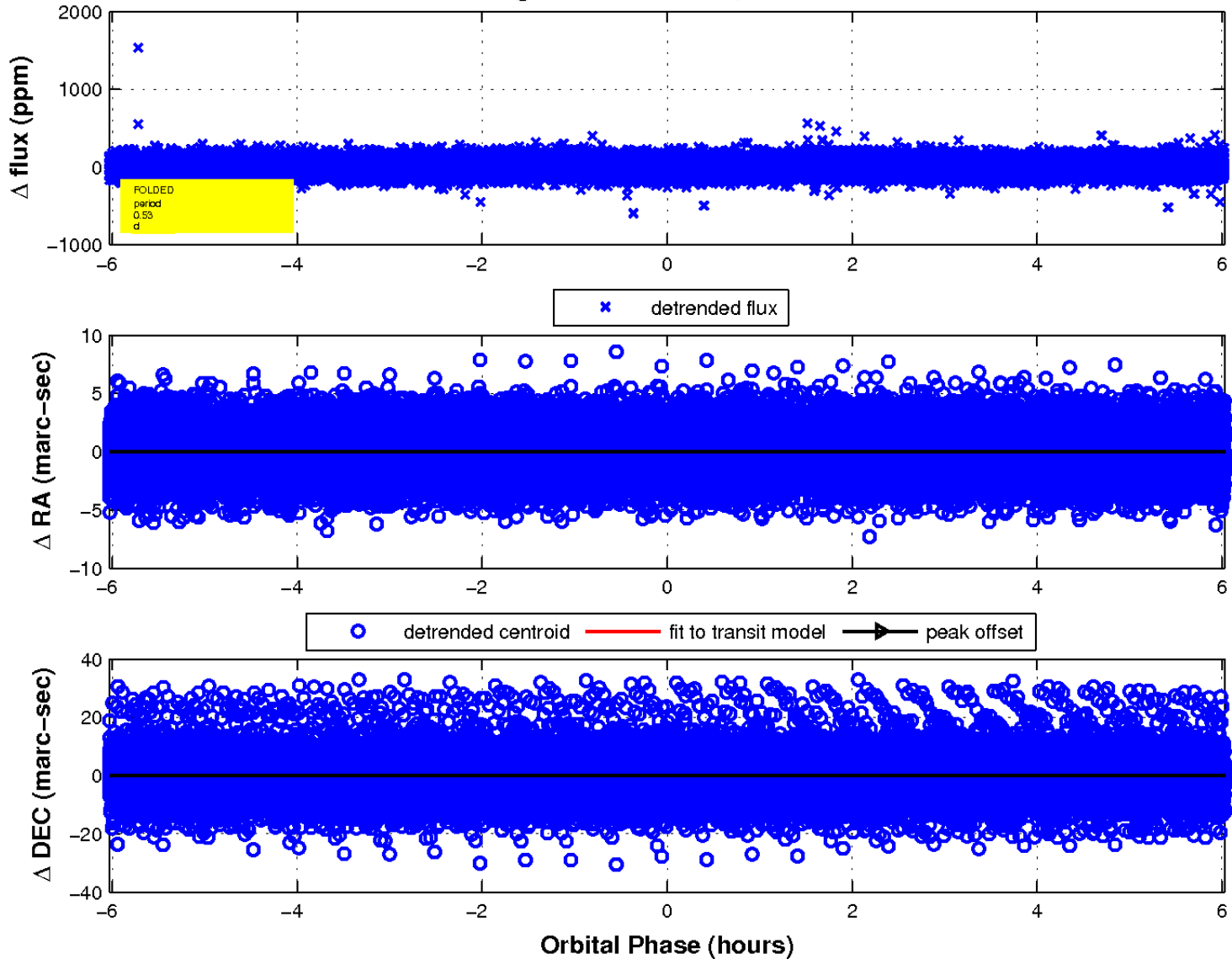
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

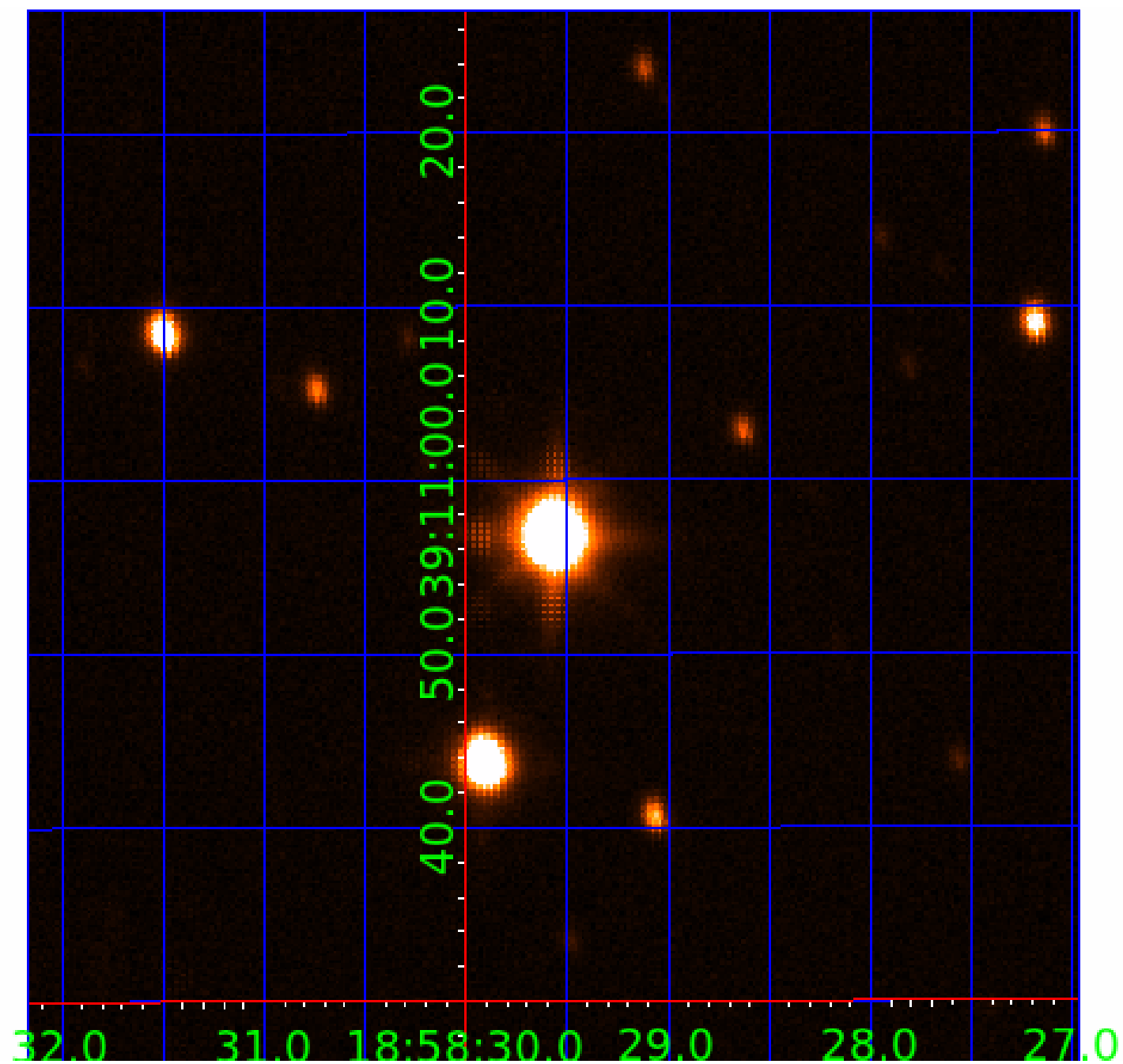


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 004035667

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004035667-01	OBS	2684.01	2.873651	132.586538	169.3	1.411	58.6	67.9	3.17	8173	4.81	15987.84
004035667-02	OBS	No	0.525920	131.671016	16.3	1.564	13.6	15.9	3.17	8173	1.49	153866.03
004035667-03	OBS	No	0.525901	131.942408	8.1	2.011	13.0	9.1	3.17	8173	0.94	153873.43
004035667-04	OBS	No	18.769420	147.423994	133.8	1.623	9.5	7.2	3.17	8173	3.71	1309.49

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004035667-01	OBS	FP	0.00	0	0	0	1	CENT_SATURATED—EPHEM_MATCH
004035667-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004035667-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004035667-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED

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

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

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

Ephemeris Match Information For 004035667-04

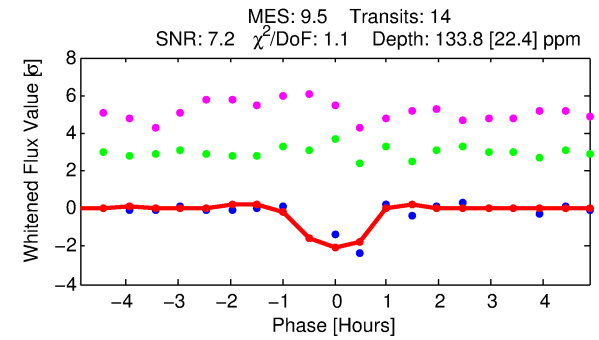
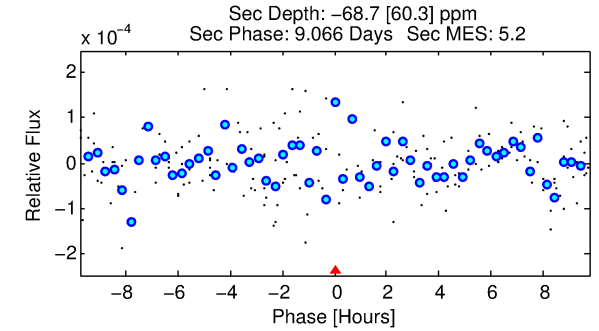
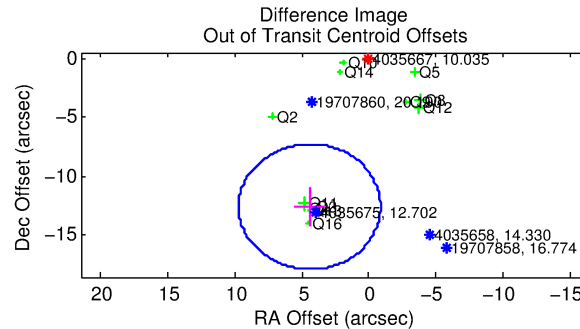
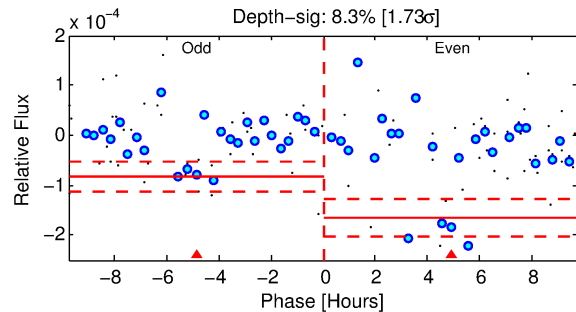
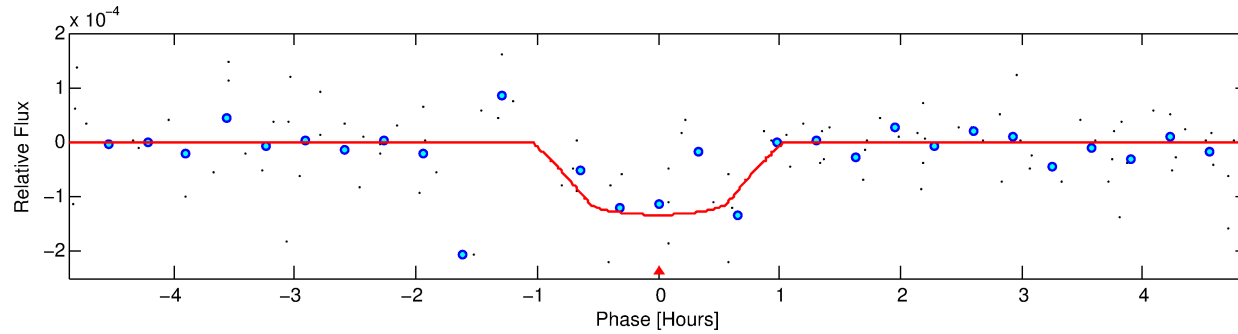
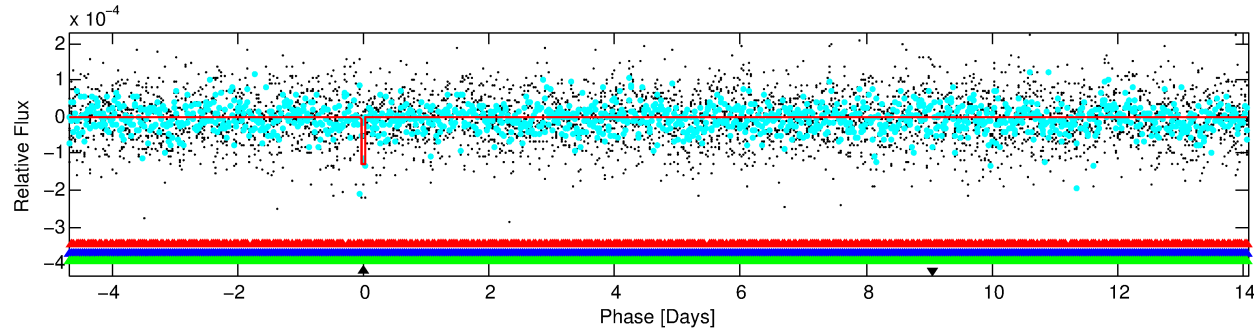
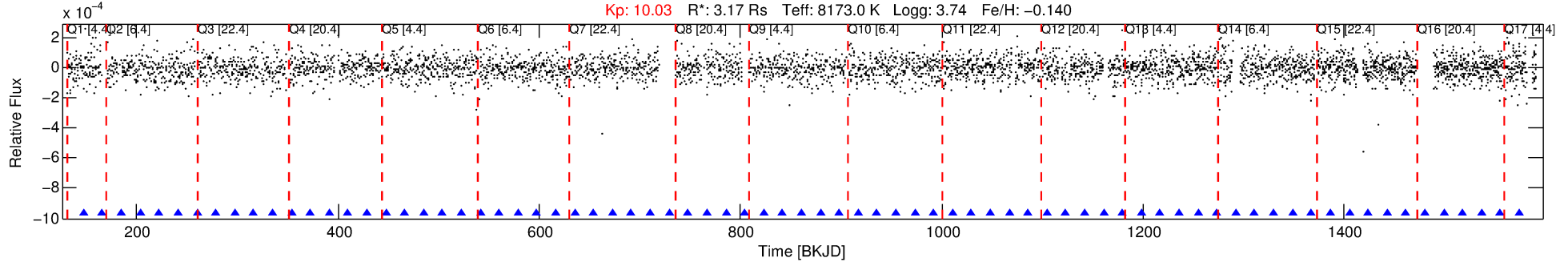
No Significant Match Found

# DV One-Page Summary

KIC: 4035667 Candidate: 4 of 4 Period: 18.769 d

KOI: K02684 Corr: No Ephemeris Match

Kp: 10.03 R\*: 3.17 Rs Teff: 8173.0 K Logg: 3.74 Fe/H: -0.140



## DV Fit Results:

Period = 18.76942 [0.00019] d  
Epoch = 147.4240 [0.0087] BKJD  
Rp/R\* = 0.0107 [0.0202]  
a/R\* = 89.07 [948.25]  
b = 0.07 [155.94]  
Seff = 1309.49 [960.97]  
Teq = 1534 [281] K  
Rp = 3.71 [7.22] Re  
a = 0.1751 [0.0793] AU  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

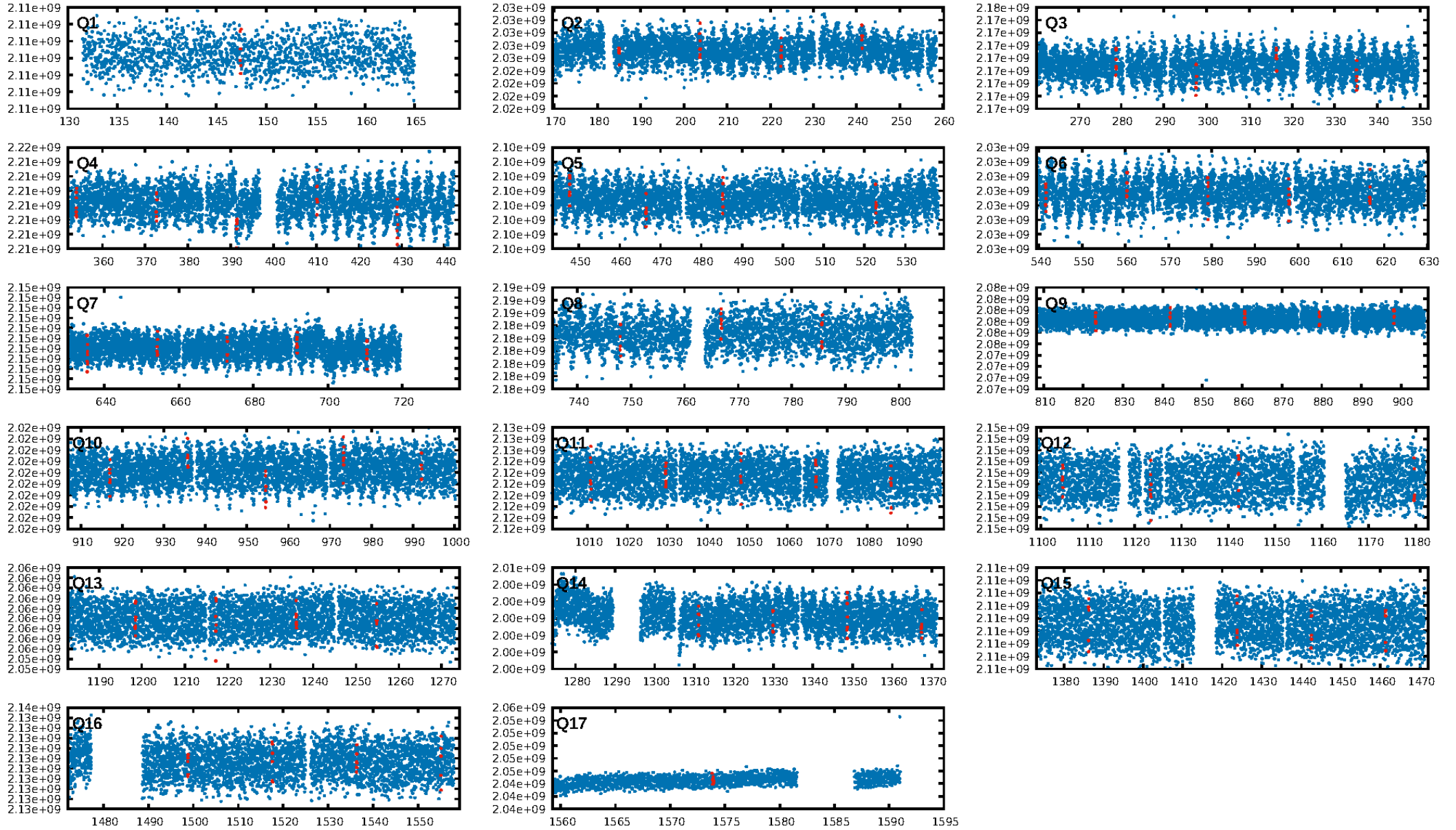
ShortPeriod-sig: 100.0% [177.34σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 24.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.83e-13  
RollingBand-fgt: 1.00 [14/14]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 2.2%  
Centroid-so: 3.125 arcsec [1.63σ]  
OotOffset-rm: 13.320 arcsec [7.54σ]  
KicOffset-rm: 13.550 arcsec [9.11σ]  
OotOffset-st: 3/2/4/3 [12]  
KicOffset-st: 3/2/4/3 [12]  
DiffImageQuality-fgm: 0.33 [4/12]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 04:50:33 Z

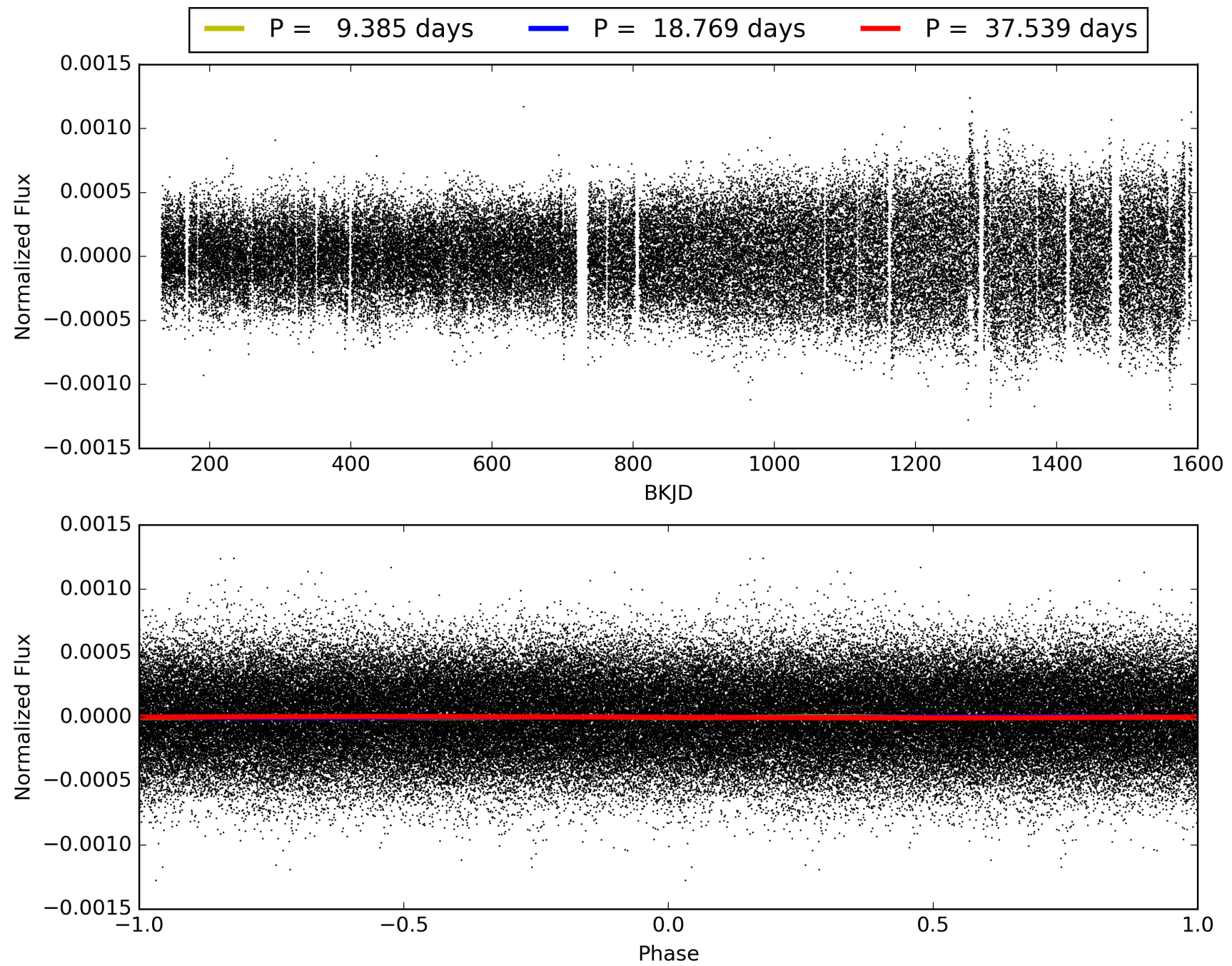
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004035667-04, PDC Light Curves

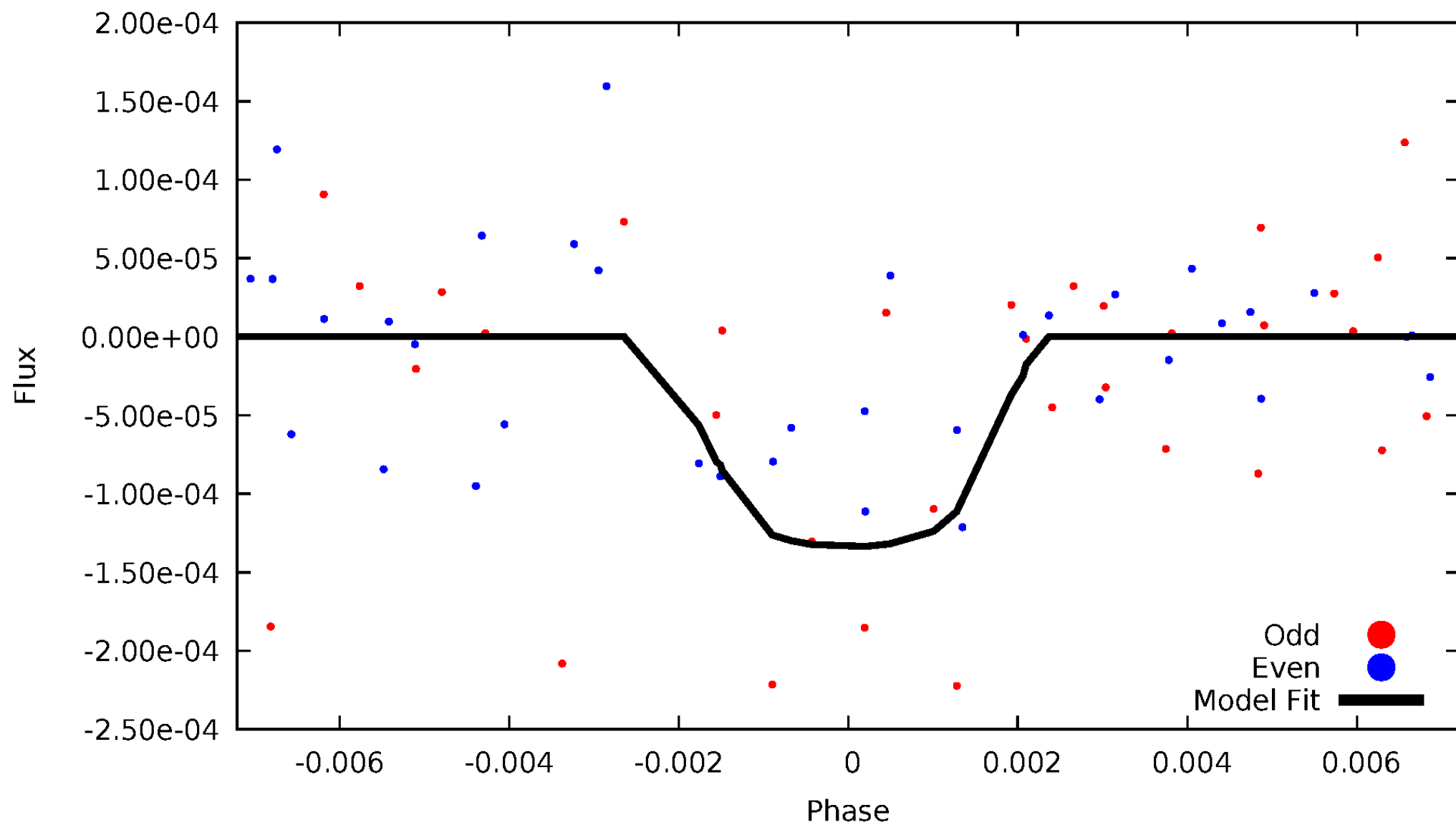


TCE 004035667-04



# DV Odd/Even

TCE 004035667-04





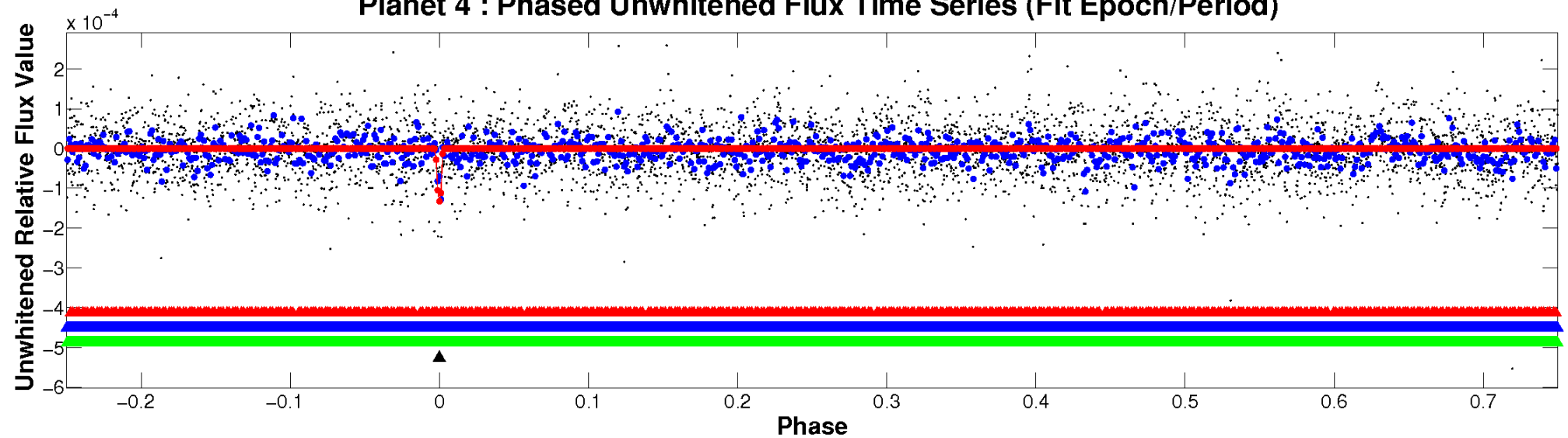
ALT Odd/Even

This plot does not exist for this TCE.

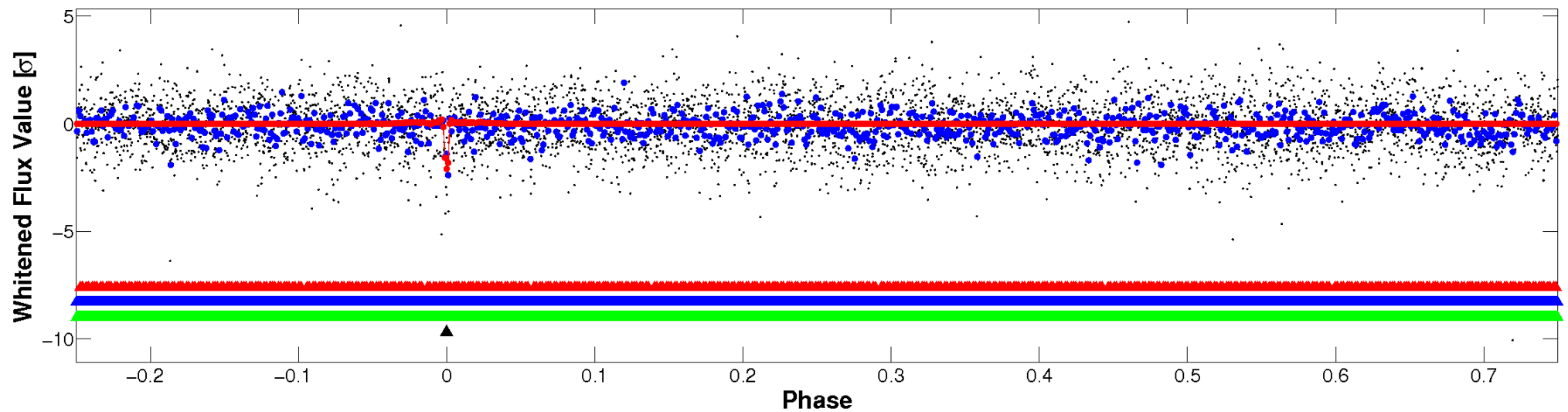


# Non-Whitened Vs. Whitened Light Curve

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

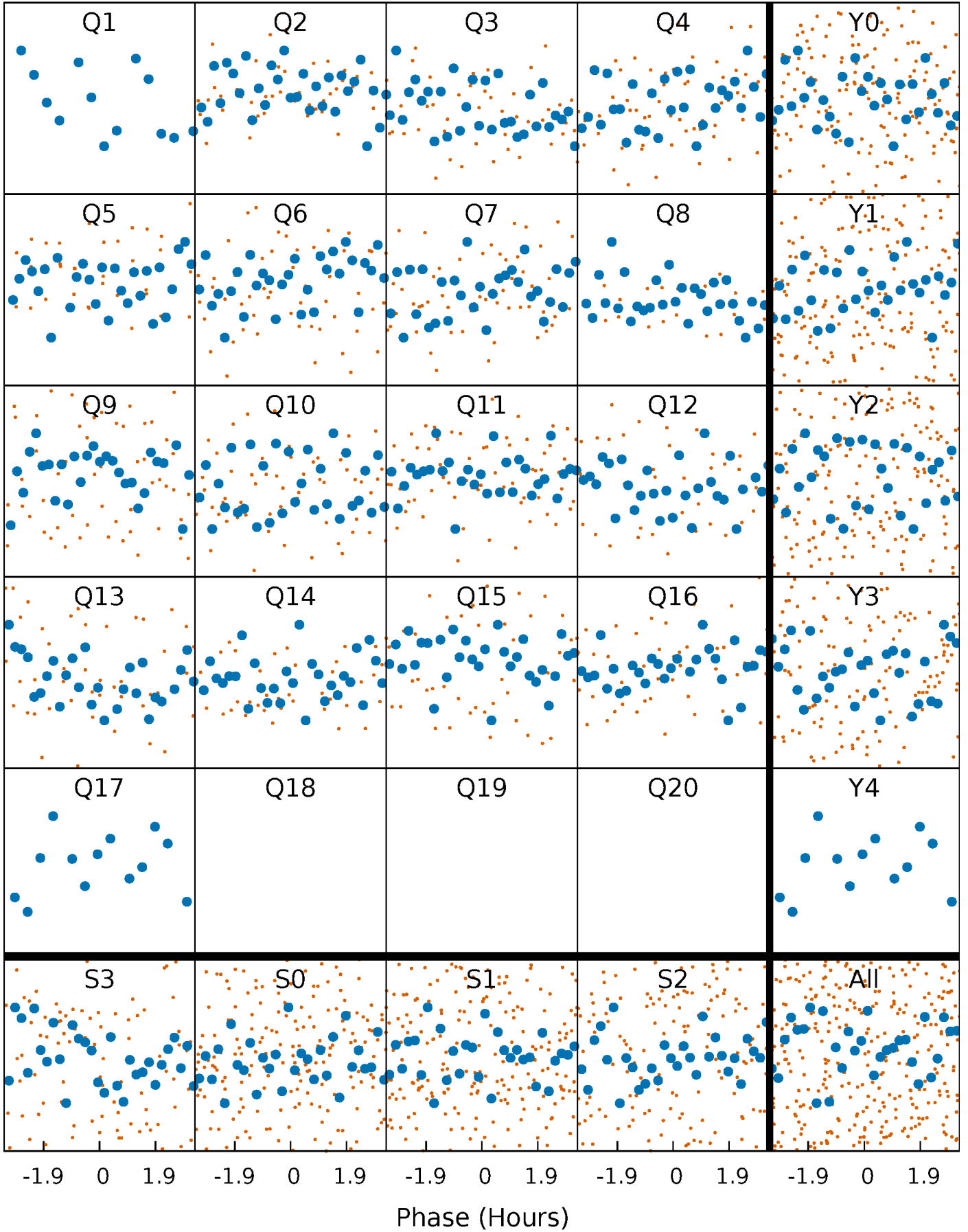


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



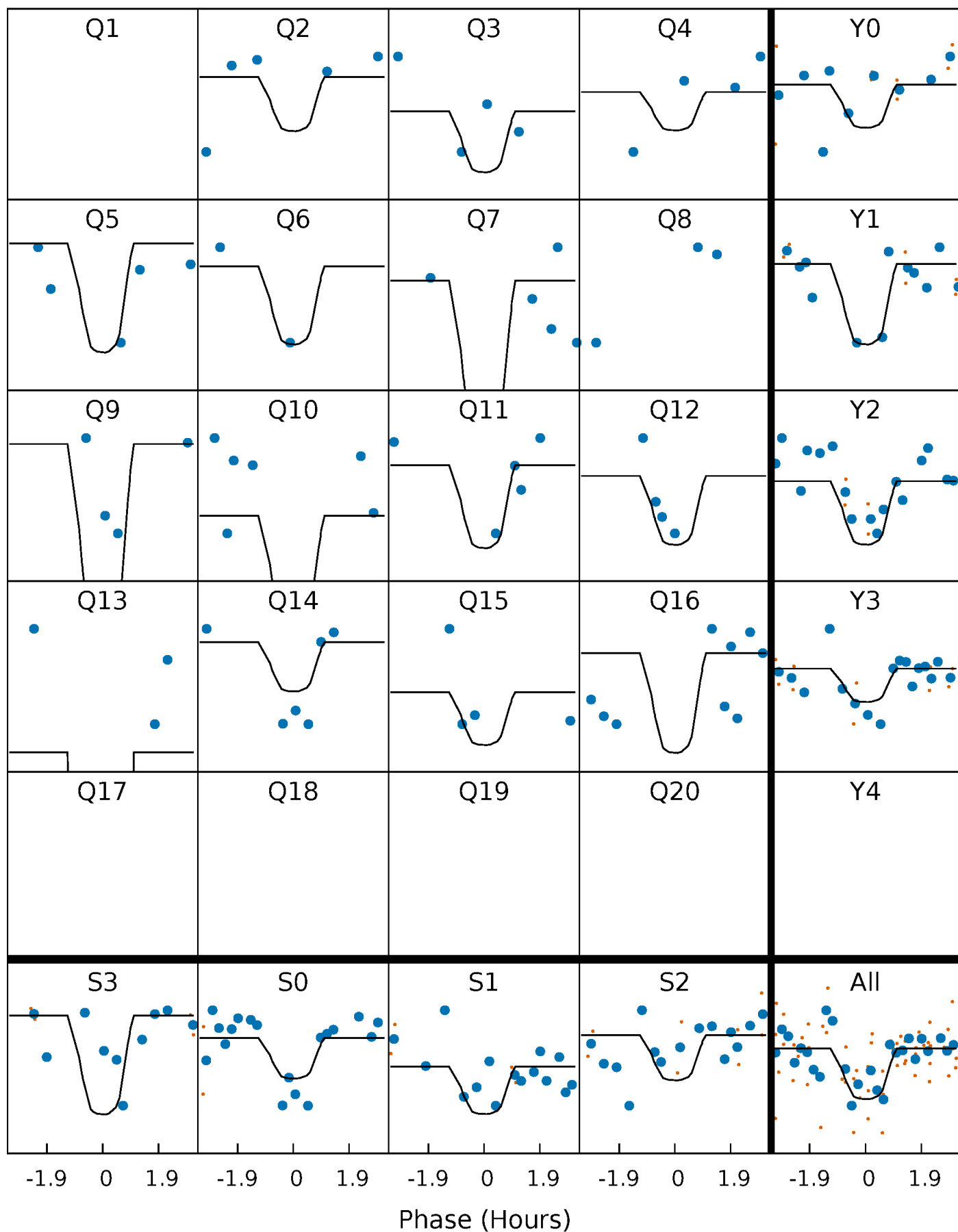
# PDC Quarter-Phased Transit Curves

TCE 004035667-04   P= 18.769420 Days    $T_0=147.423994$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 004035667-04     $P = 18.769420$  Days     $T_0 = 147.423994$  (BKJD)

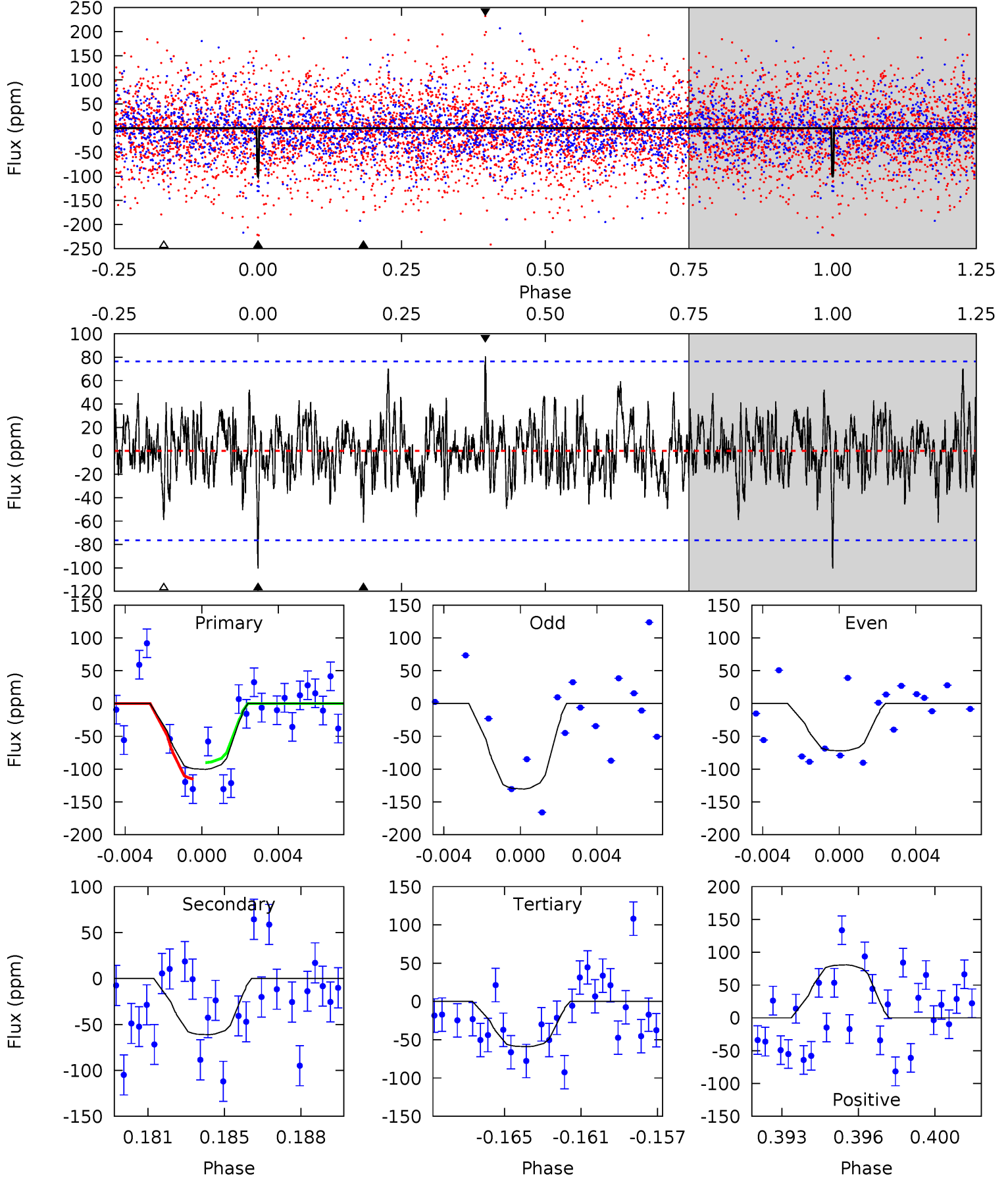


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

004035667-04, P = 18.769420 Days, E = 128.654574 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
6.84	4.17	4.02	5.50	5.20	2.88	1.35	2.81	1.34	0.14	-1.33	1.99	1.17	0.45	0.81





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 004035667

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$8173^{+226}_{-340}$	$3.744^{+0.416}_{-0.104}$	$-0.140^{+0.200}_{-0.350}$	$3.169^{+0.654}_{-1.526}$	$2.032^{+0.333}_{-0.499}$	$0.090^{+0.363}_{-0.029}$
	+3%/-4%	+11%/-3%	+143%/-250%	+21%/-48%	+16%/-25%	+404%/-33%
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 004035667-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	-61±15	$5.86^{+5.62}_{-3.77}$	$2080^{+150}_{-239}$	$5135^{+3828}_{-1196}$	$30^{+198}_{-22}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

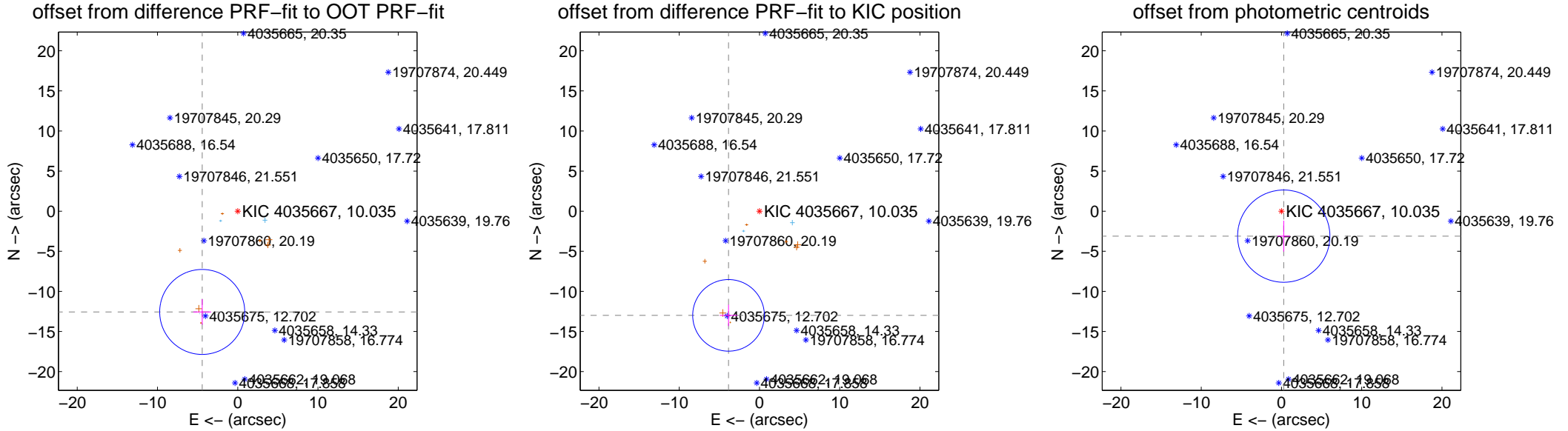
## DV Centroid Data

Supplemental centroid analysis for 004035667-04. **Kepler magnitude: 10.04.** Transit SNR 7.20

There are 4 quarters with good PRF difference image offsets

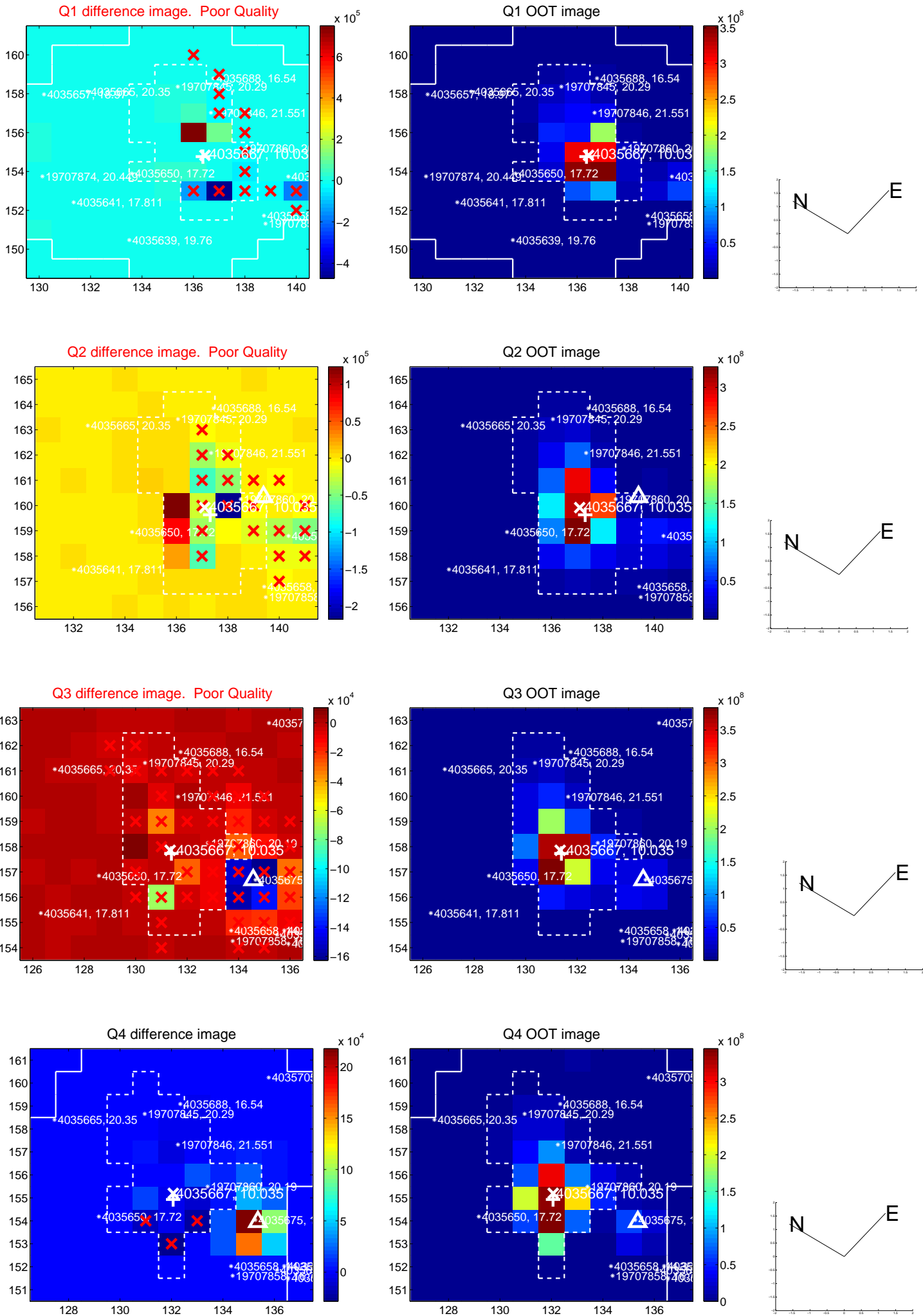
The direct PRF centroid is offset from the target star catalog position by about 0.96 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>13.320 <math>\pm</math> 1.766</b>	<b>7.54</b>	4.427 $\pm$ 1.112	-12.563 $\pm$ 1.593
PRF-fit source offset from KIC position	<b>13.550 <math>\pm</math> 1.488</b>	<b>9.11</b>	3.854 $\pm$ 1.094	-12.991 $\pm$ 1.330
photometric centroid source offset	3.12 $\pm$ 1.92	1.63	-0.28 $\pm$ 0.79	-3.11 $\pm$ 1.92

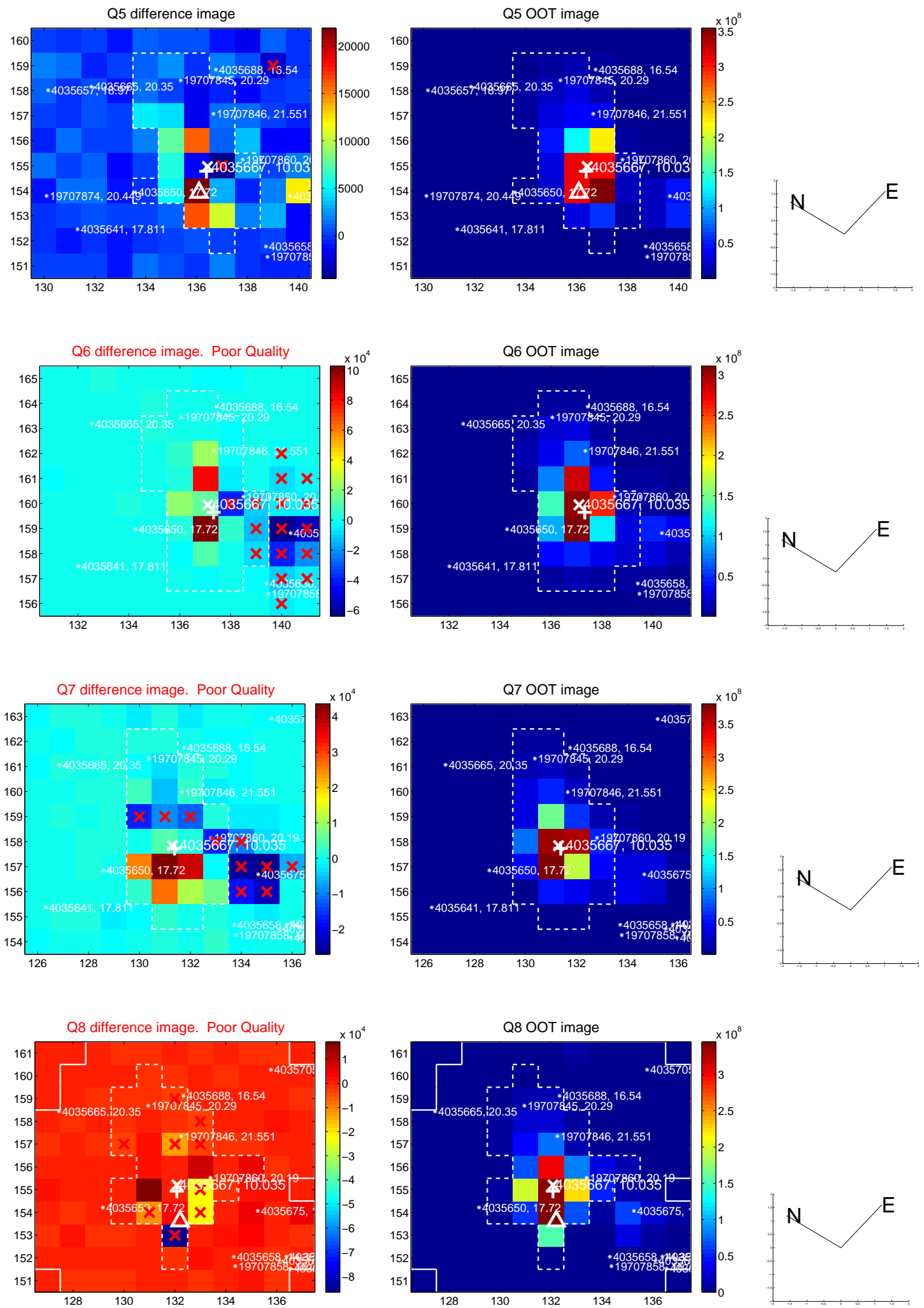


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



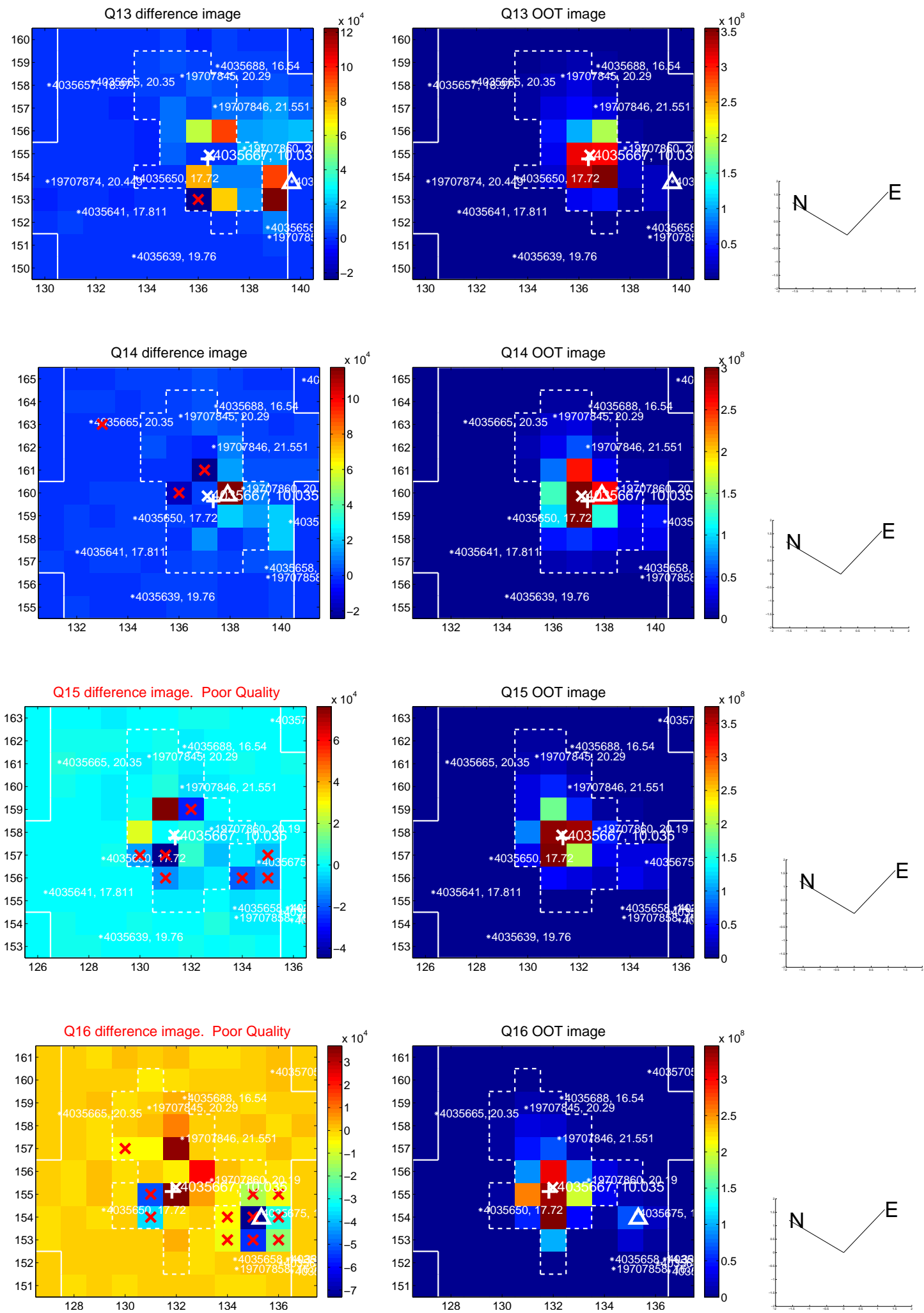
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



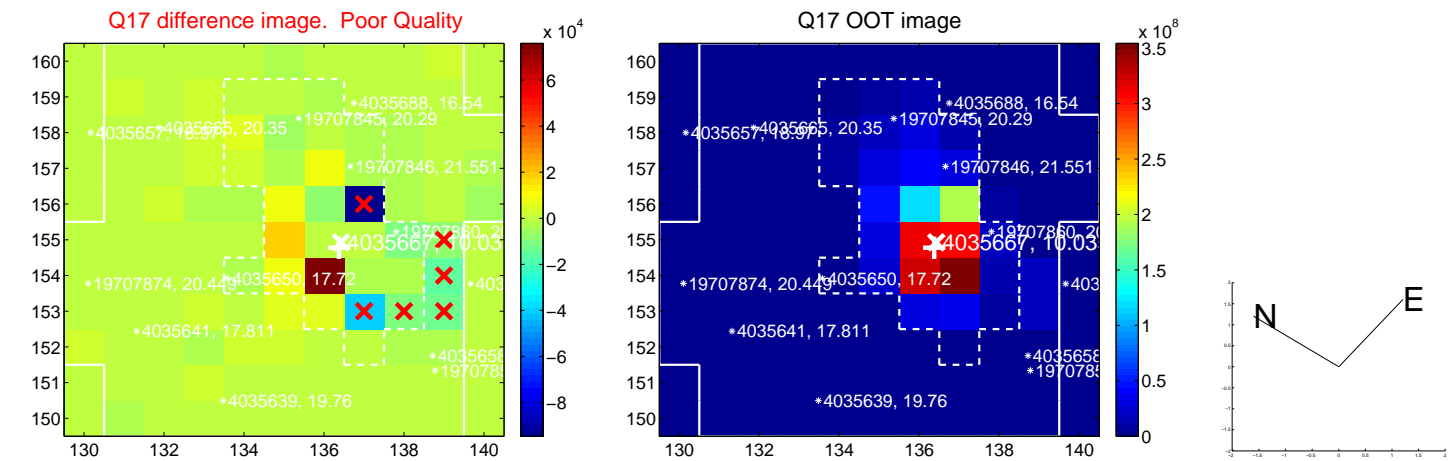




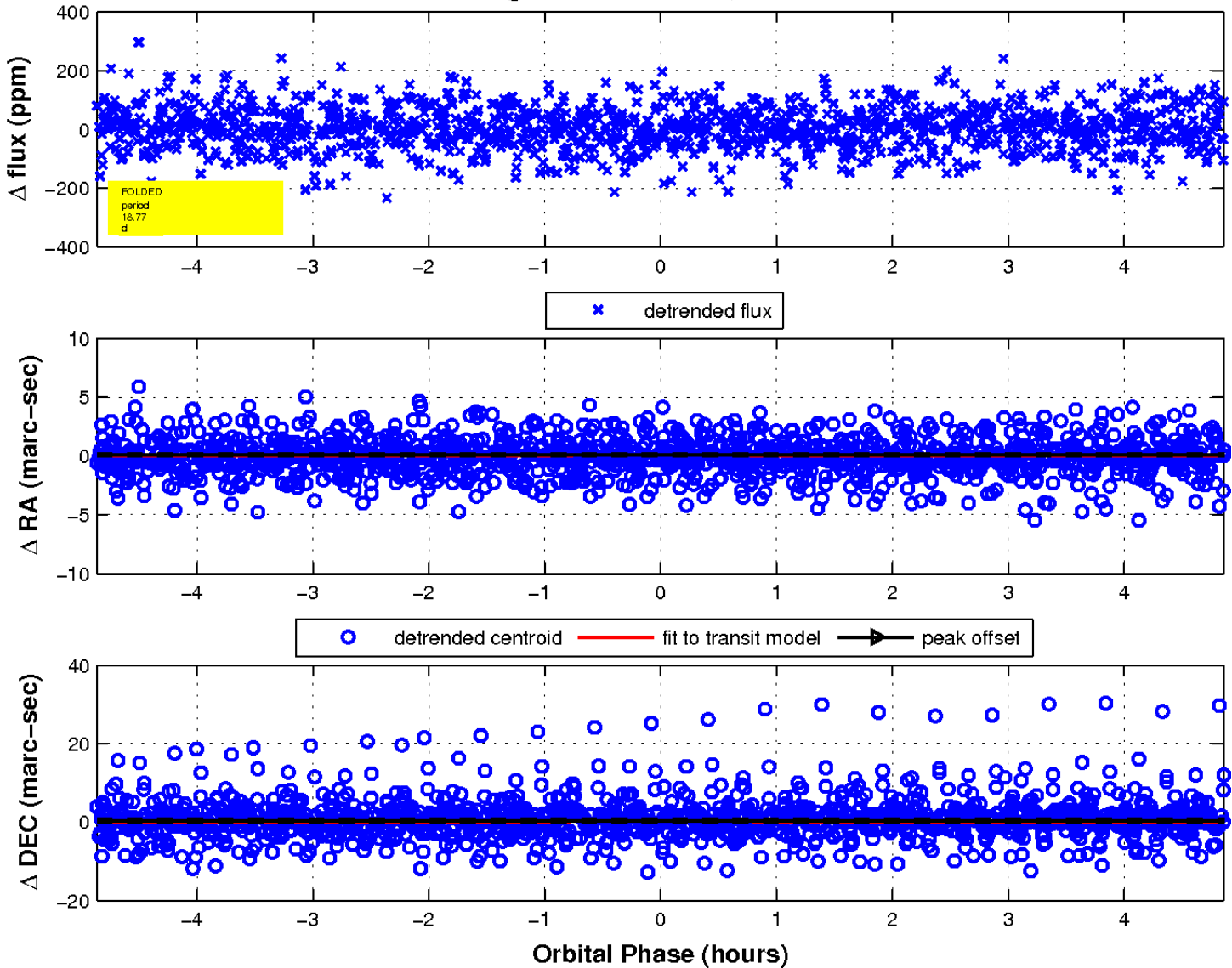
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

