

# KIC 010518735

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010518735-01	OBS	3612.01	19.515025	136.215266	253469.6	4.599	1510.6	1102.6	0.85	5349	61.30	28.36
010518735-02	OBS	No	19.515025	132.597530	167742.0	5.262	1185.8	910.2	0.85	5349	52.30	28.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010518735-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
010518735-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

**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.

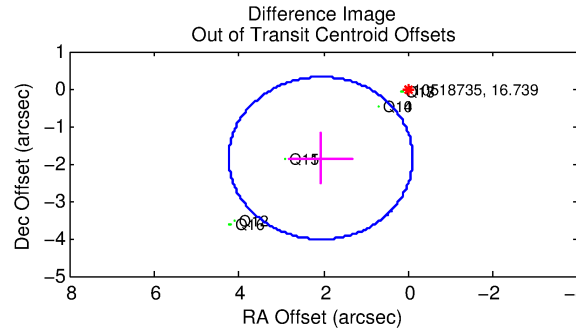
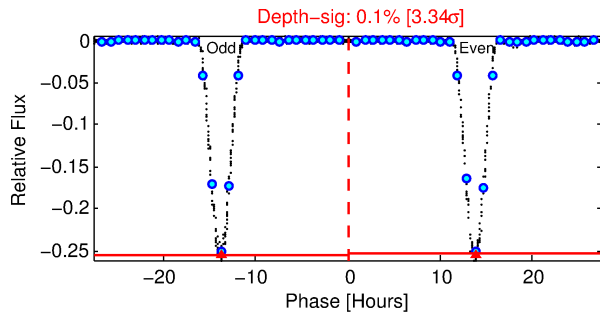
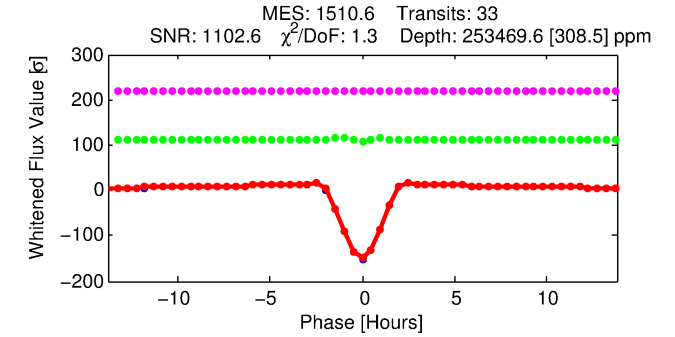
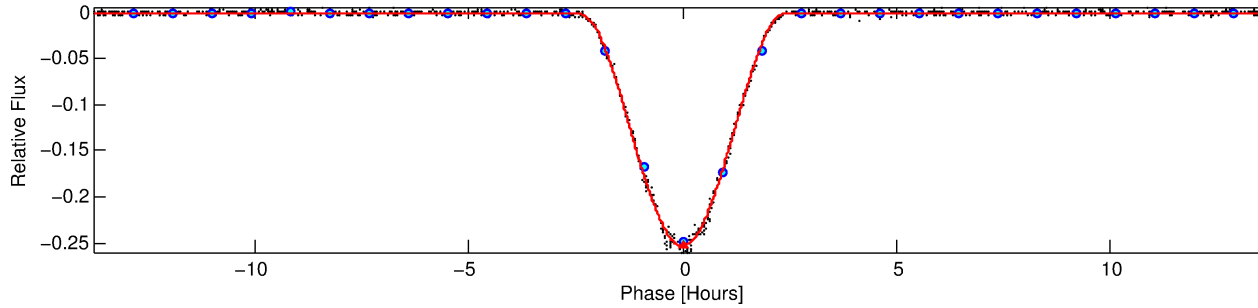
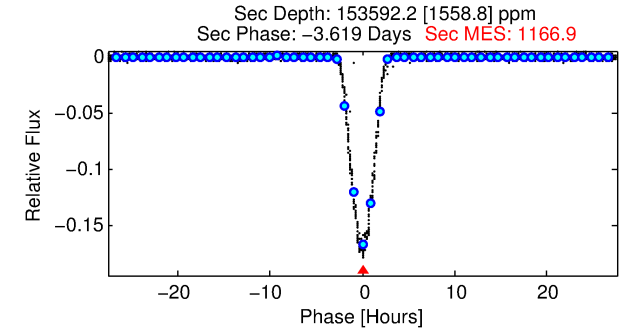
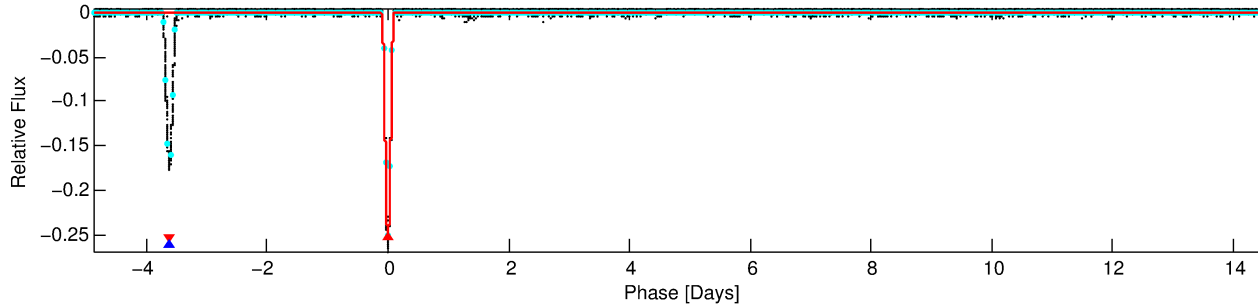
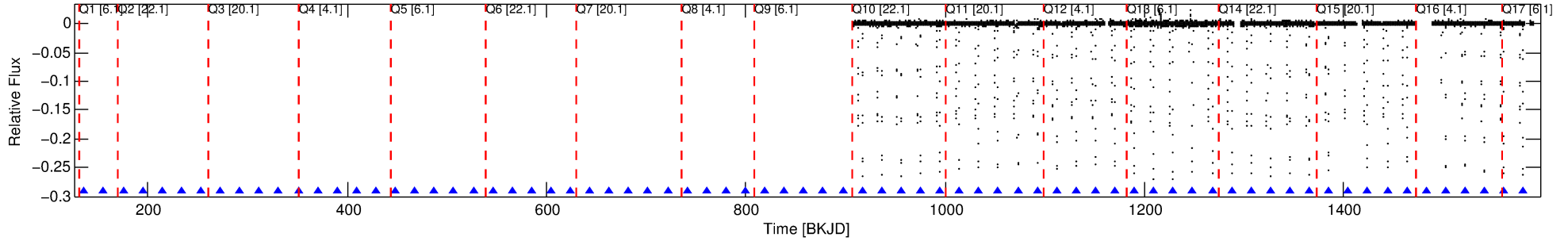
## Ephemeris Match Information For 010518735-01

No Significant Match Found

# DV One-Page Summary

KIC: 10518735 Candidate: 1 of 2 Period: 19.515 d  
KOI: K03612.01 Corr: 0.996

Kp: 16.74 R\*: 0.85 Rs Teff: 5349.0 K Logg: 4.53 Fe/H: 0.100



## DV Fit Results:

Period = 19.51502 [0.00000] d  
Epoch = 136.2153 [0.0002] BKJD  
Rp/R\* = 0.6601 [0.0278]  
a/R\* = 46.58 [0.39]  
b = 0.83 [0.04]  
Seff = 28.36 [7.91]  
Teq = 588 [41] K  
Rp = 61.30 [11.81] Re  
a = 0.1368 [0.0223] AU  
Ag = 421.08 [108.07] [3.89σ]  
Teffp = 4121 [167] K [20.51σ]

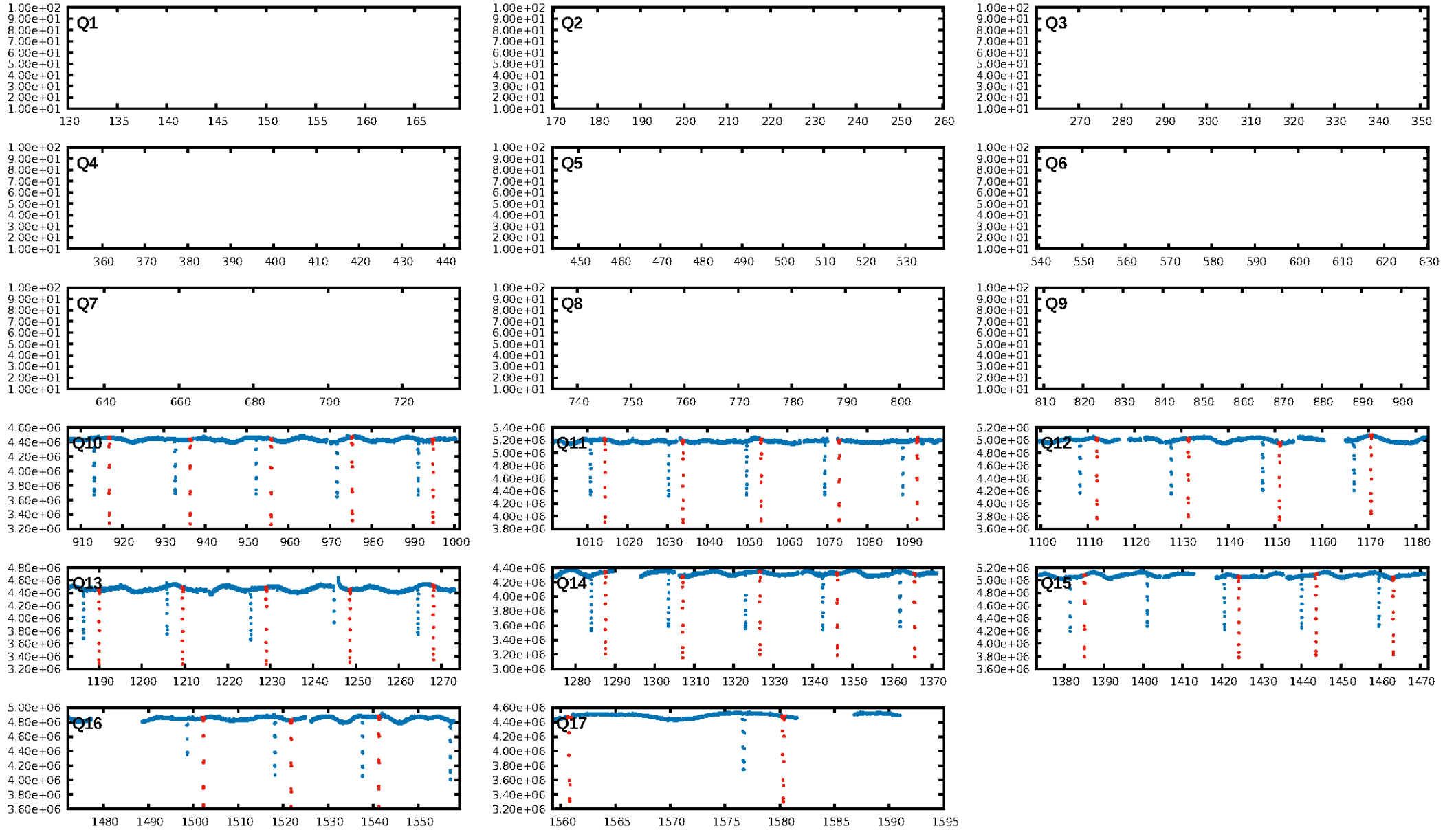
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [31/31]  
GhostDiagnostic-chr: 5.842  
Centroid-sig: 0.0%  
Centroid-so: 0.256 arcsec [54.84σ]  
OotOffset-rm: 2.774 arcsec [3.84σ]  
KicOffset-rm: 0.133 arcsec [1.80σ]  
OotOffset-st: 2/2/2/2 [8]  
KicOffset-st: 2/2/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [8/8]

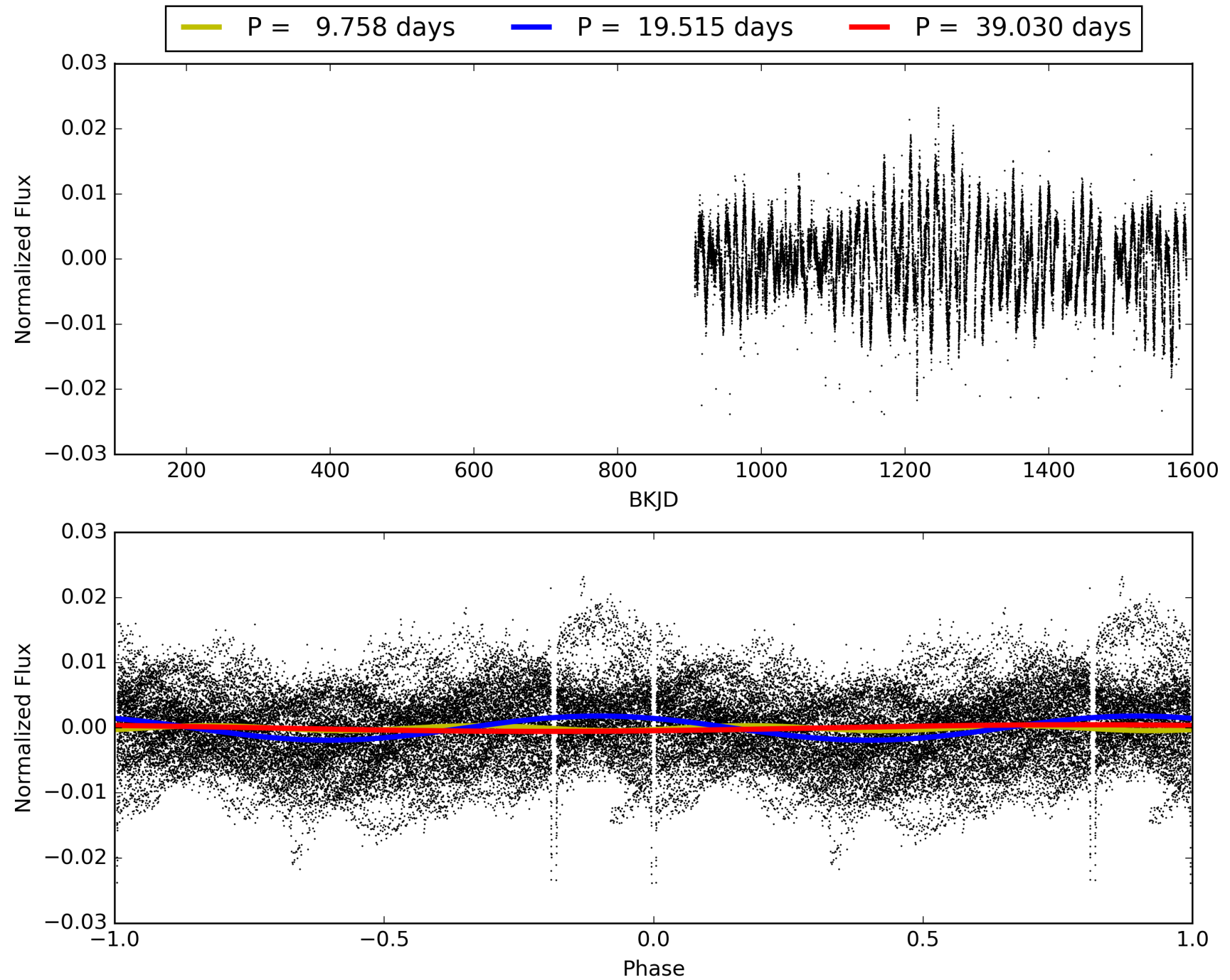
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 16:22:22 Z

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

# TCE 010518735-01, PDC Light Curves

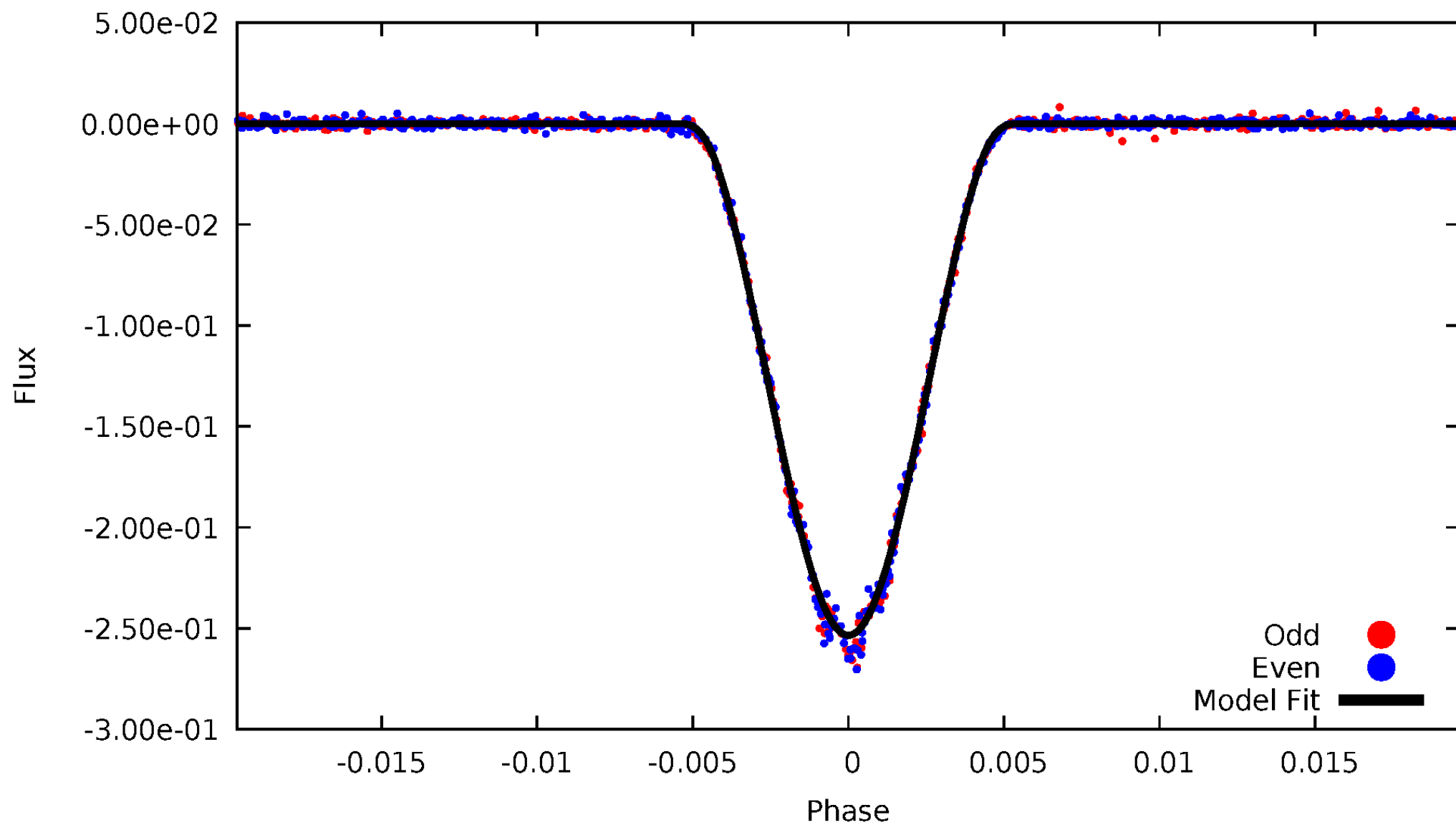


TCE 010518735-01



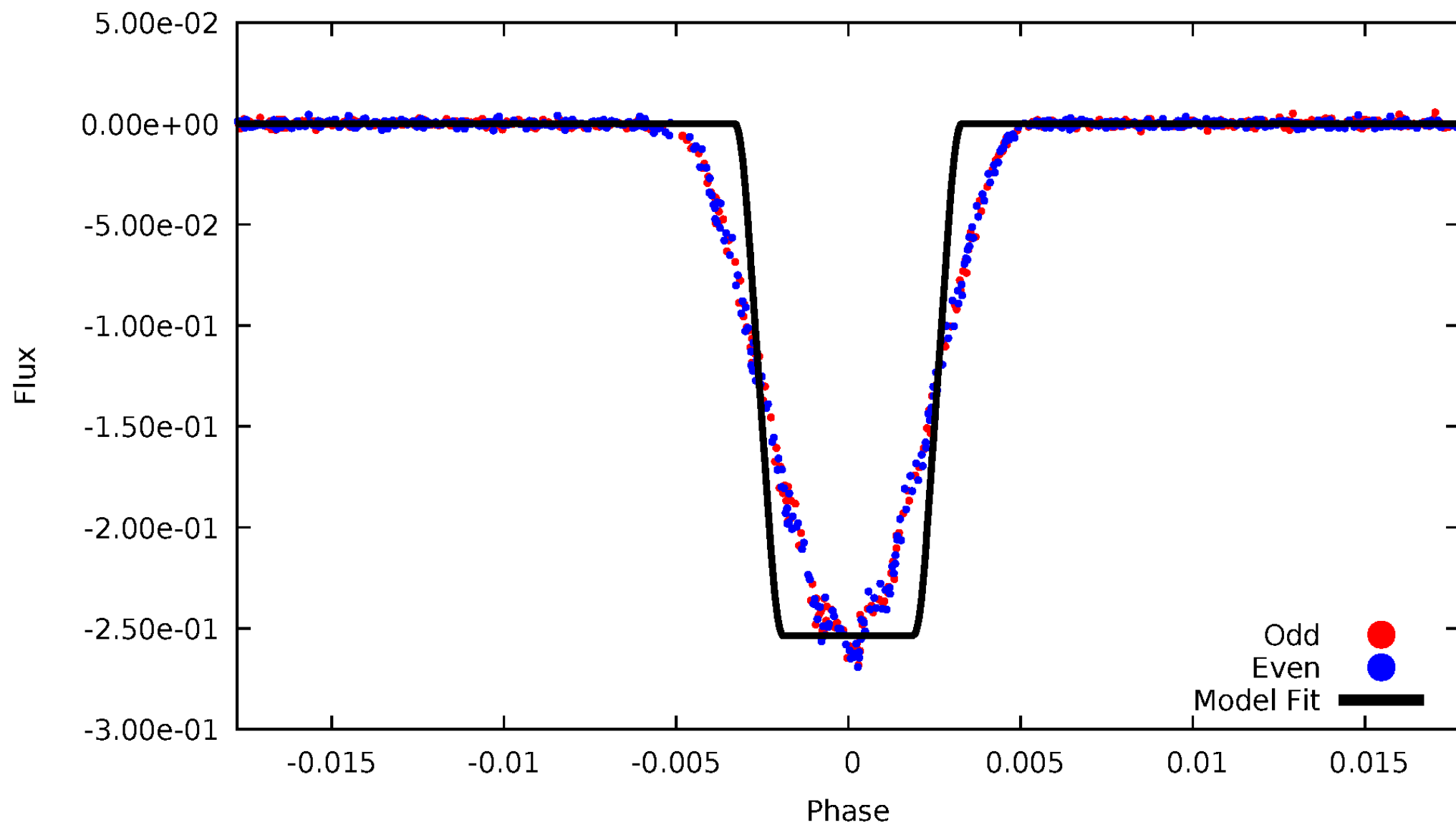
# DV Odd/Even

TCE 010518735-01



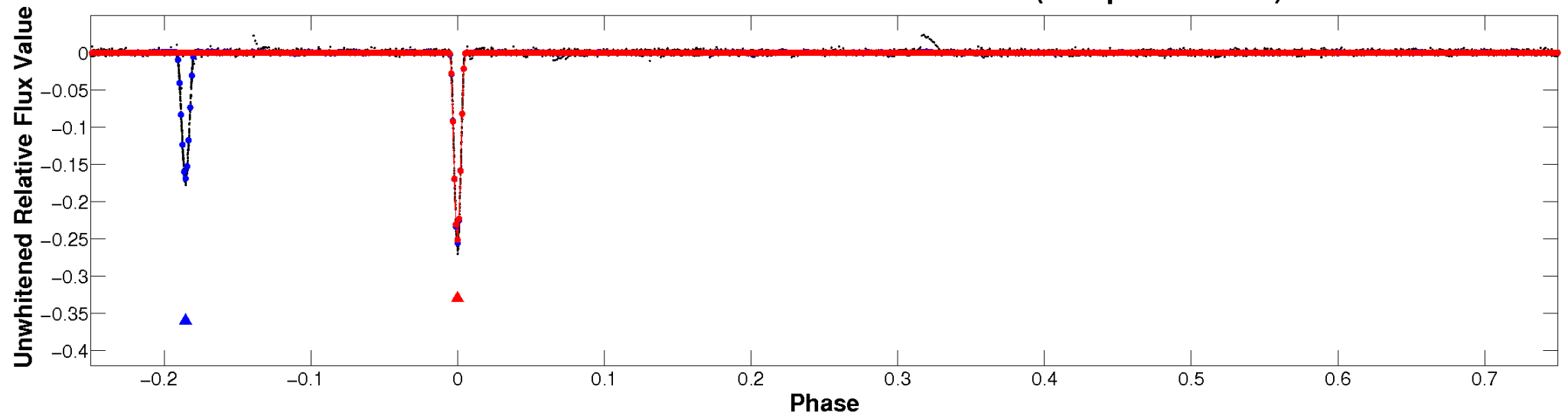
# ALT Odd/Even

TCE 010518735-01

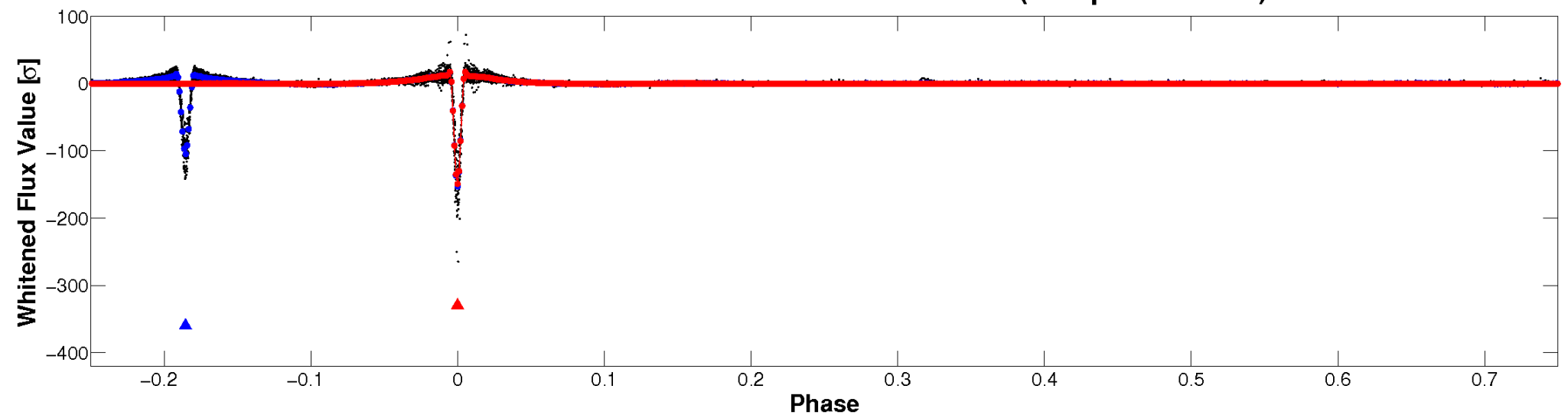


# Non-Whitened Vs. Whitened Light Curve

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

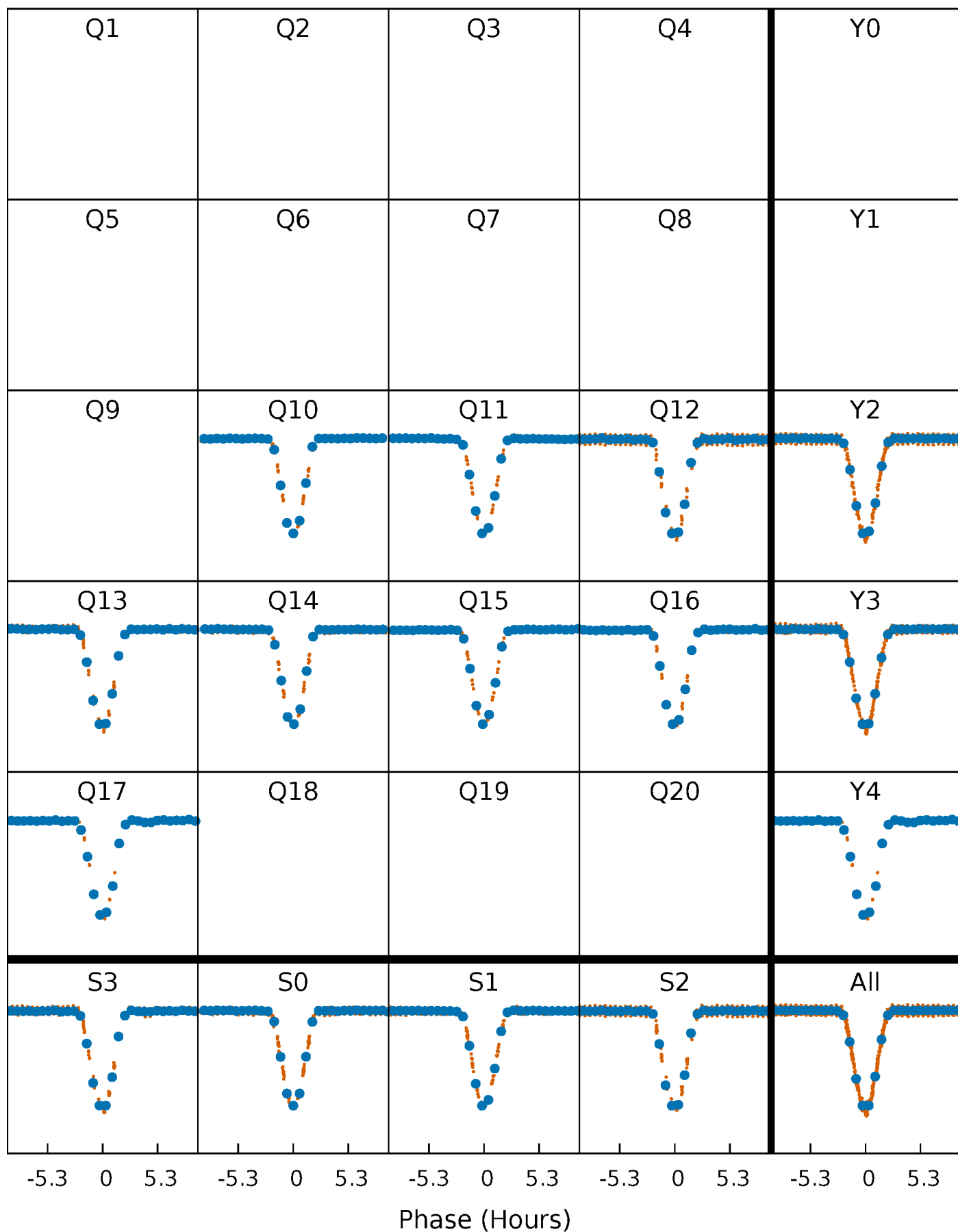


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

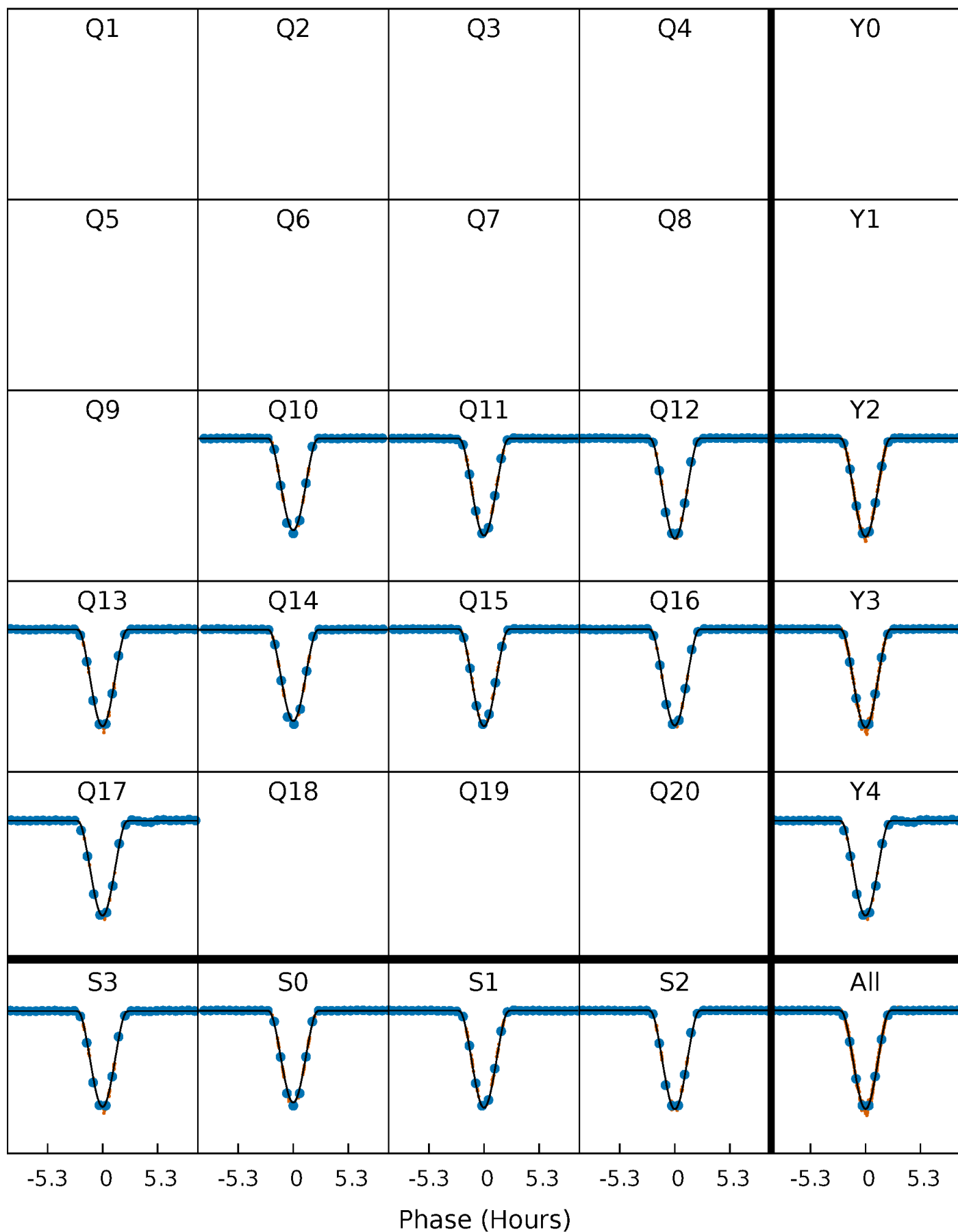
TCE 010518735-01 P= 19.515025 Days  $T_0=136.215265$  (BKJD)





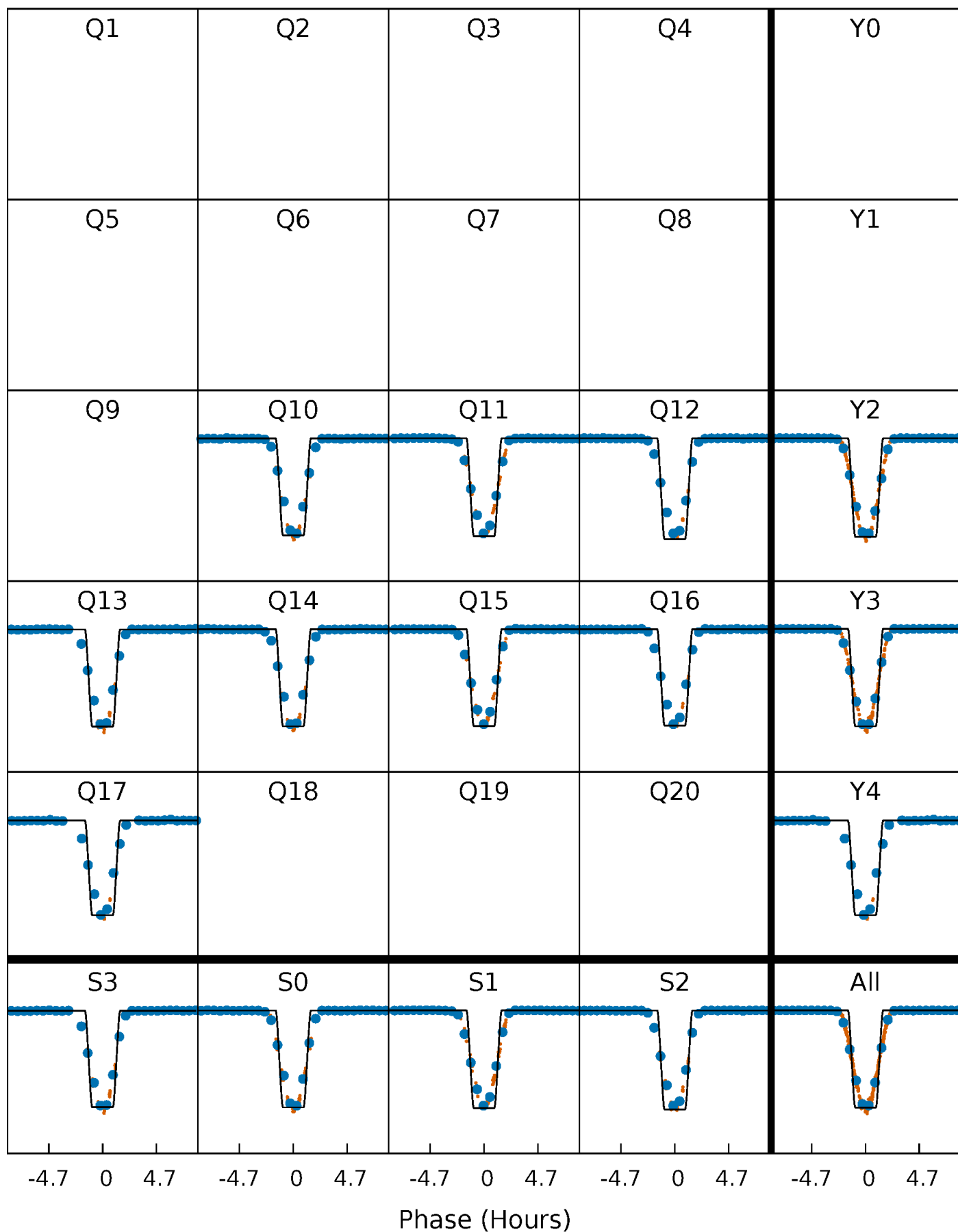
# DV Quarter-Phased Transit Curves

TCE 010518735-01 P= 19.515025 Days  $T_0=136.215265$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

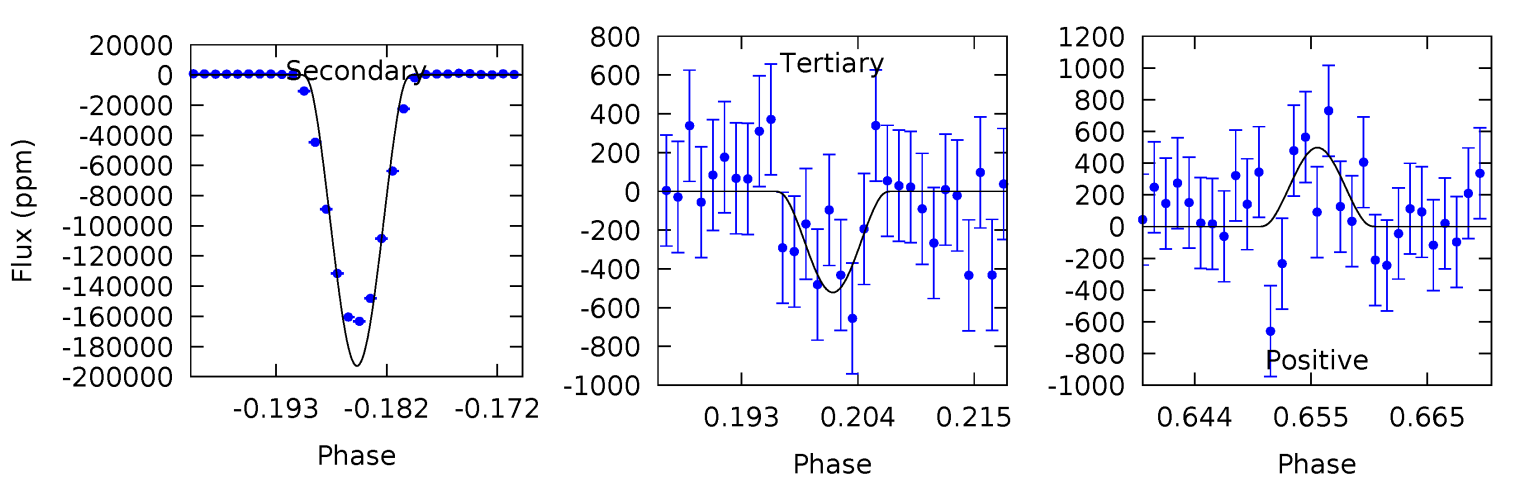
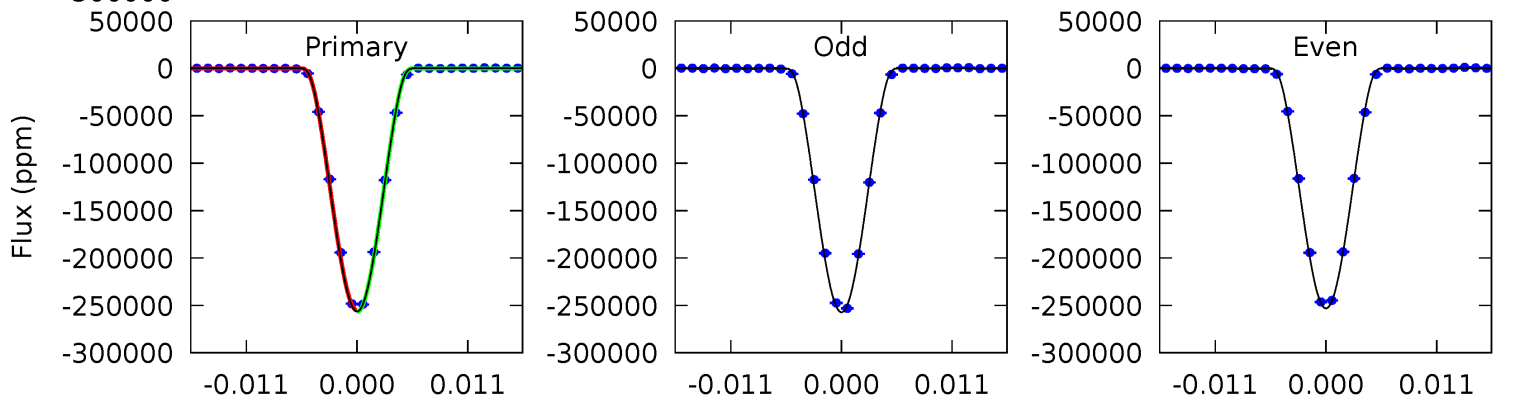
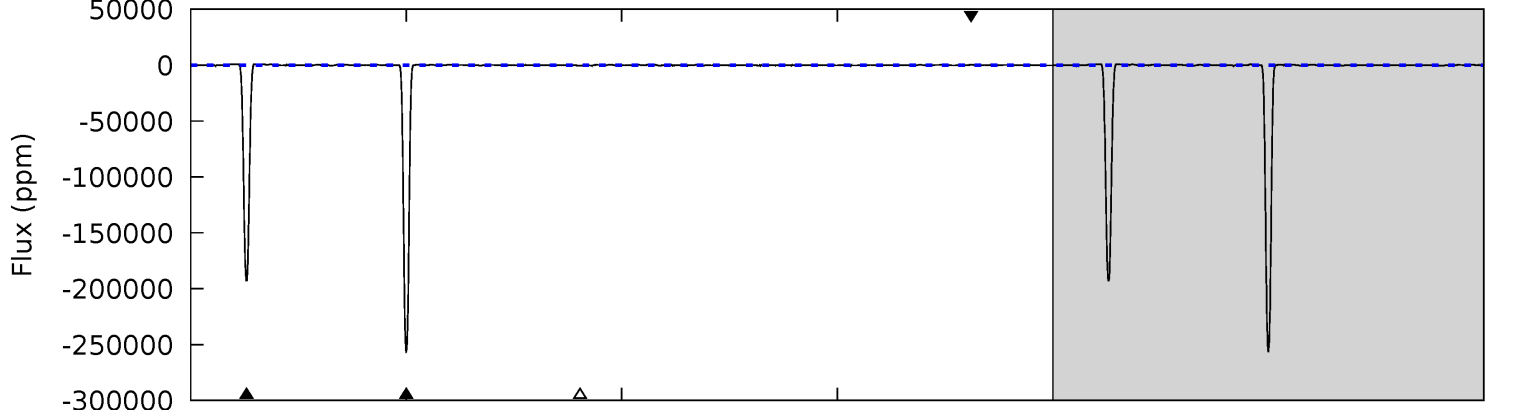
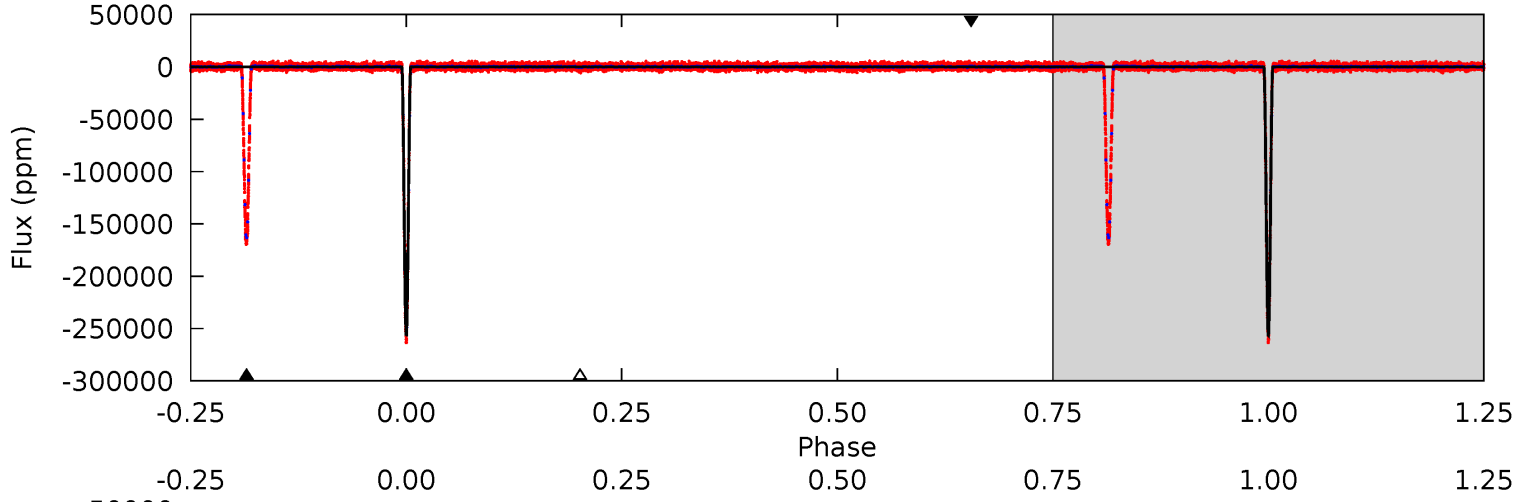
TCE 010518735-01 P= 19.515131 Days  $T_0=136.209243$  (BKJD)



# DV Model-Shift Uniqueness Test

010518735-01, P = 19.515025 Days, E = 136.215265 Days

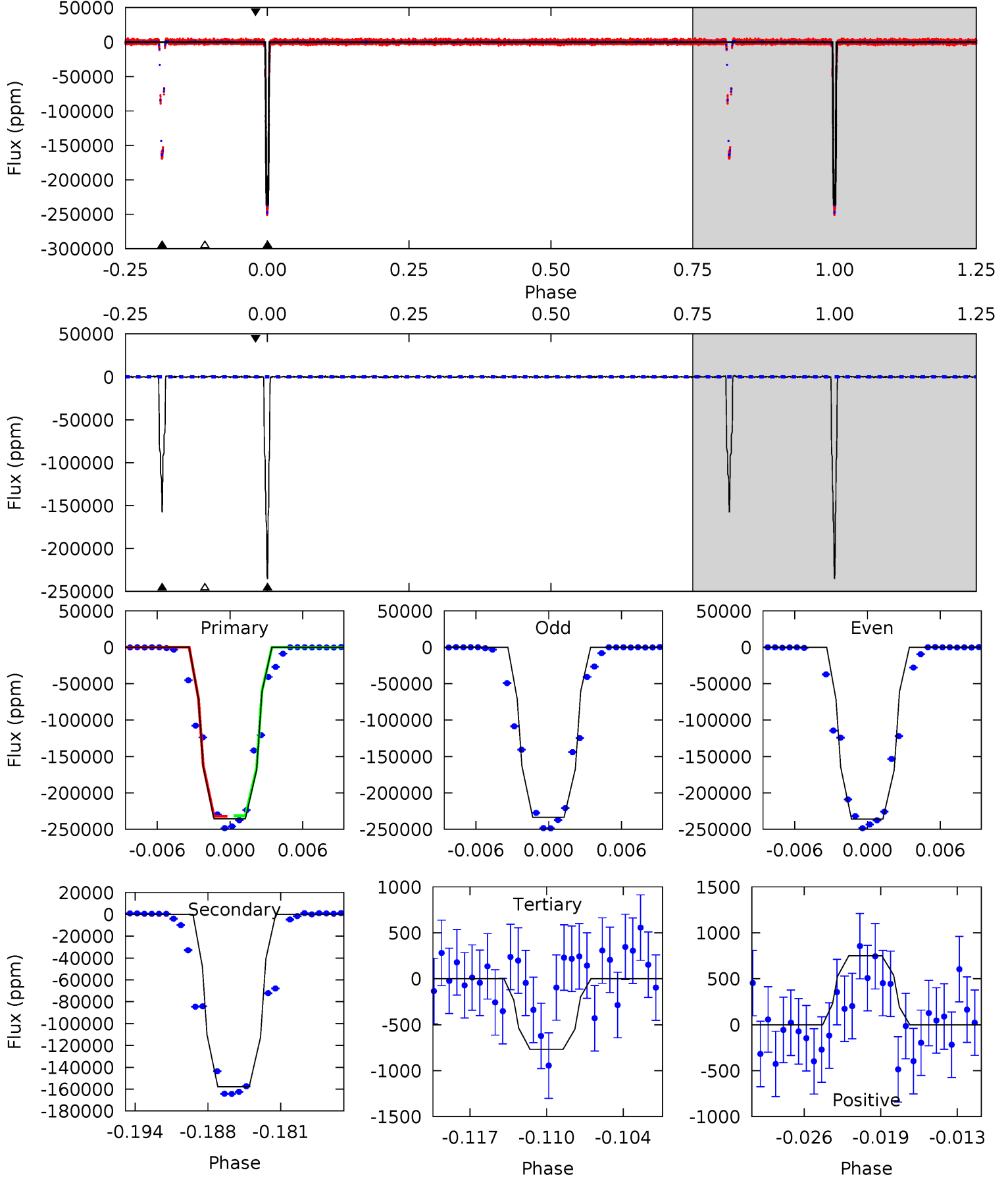
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3052	2296	6.21	5.93	5.01	2.55	2.65	3046	3046	2290	2290	24.6	0.99	0.00	0



# Alt Model-Shift Uniqueness Test

010518735-01, P = 19.515131 Days, E = 136.209243 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
1502	1006	4.90	4.79	5.11	2.72	1.49	1497	1497	1001	1001	7.94	1.00	0.00	0



### Stellar Parameters For KIC 010518735

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5349^{+185}_{-185}$	$4.531^{+0.045}_{-0.135}$	$0.100^{+0.250}_{-0.300}$	$0.851^{+0.160}_{-0.074}$	$0.897^{+0.082}_{-0.082}$	$2.050^{+0.464}_{-0.772}$
	+3%/-3%	+1%/-3%	+250%/-300%	+19%/-9%	+9%/-9%	+23%/-38%
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 010518735-01 / KOI 3612.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-192885 \pm 84$	$62.59^{+6.93}_{-4.77}$	$836^{+44}_{-39}$	$4716^{+178}_{-167}$	$624^{+95}_{-109}$
Alt.	$-157758 \pm 157$	$48.02^{+5.34}_{-4.34}$	$834^{+44}_{-36}$	$5004^{+195}_{-184}$	$829^{+155}_{-145}$

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

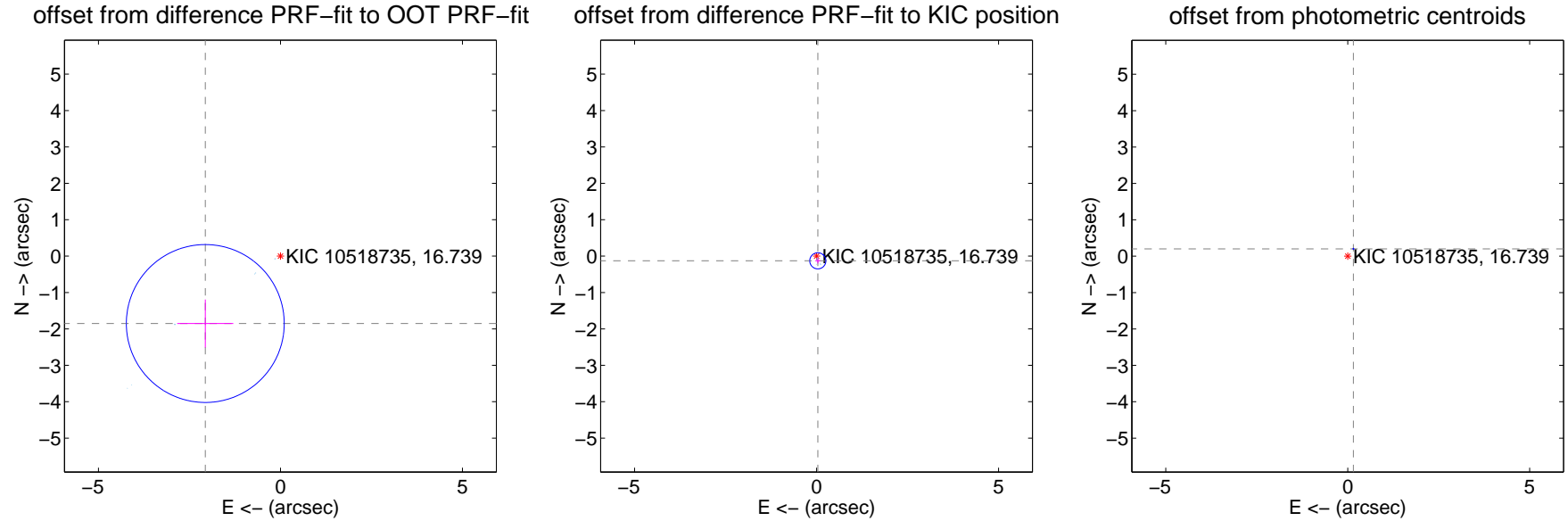
## DV Centroid Data

Supplemental centroid analysis for 010518735-01. Kepler magnitude: 16.74. Transit SNR 1102.63

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.774 \pm 0.723$	3.84	$2.066 \pm 0.770$	$-1.852 \pm 0.659$
PRF-fit source offset from KIC position	$0.133 \pm 0.074$	1.80	$-0.034 \pm 0.069$	$-0.129 \pm 0.074$
photometric centroid source offset	$0.26 \pm 0.00$	54.84	$-0.16 \pm 0.01$	$0.20 \pm 0.00$



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.

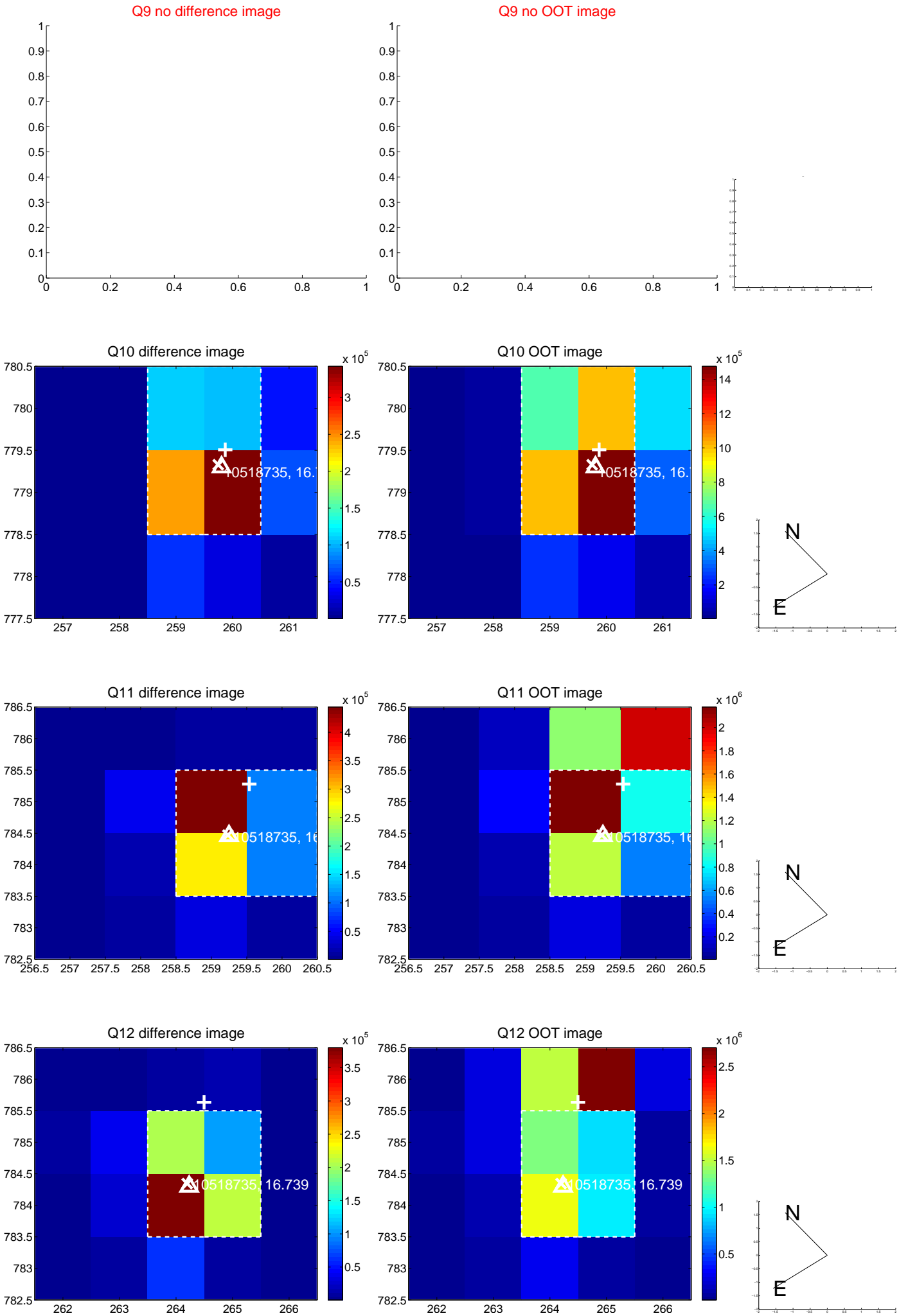


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



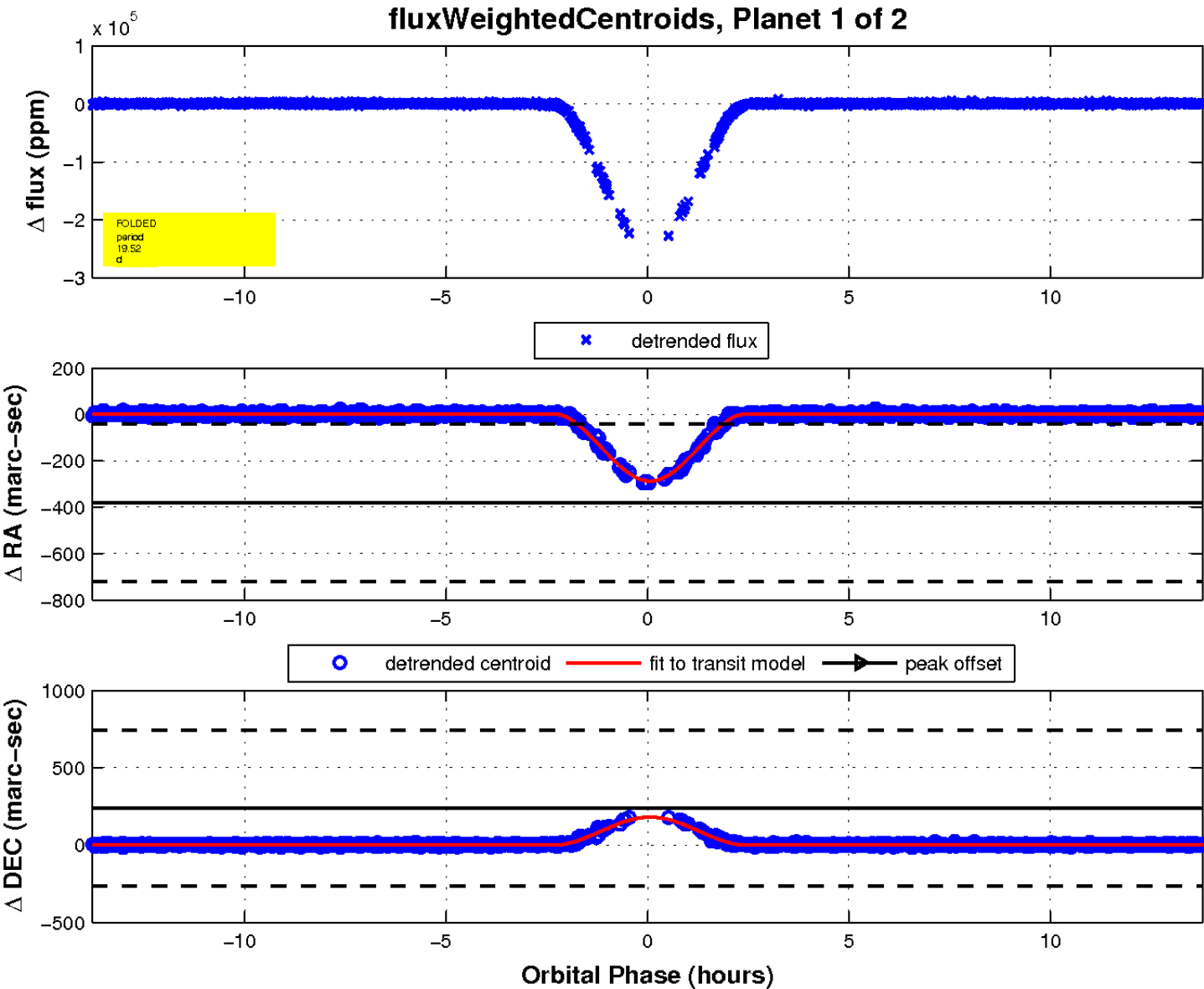
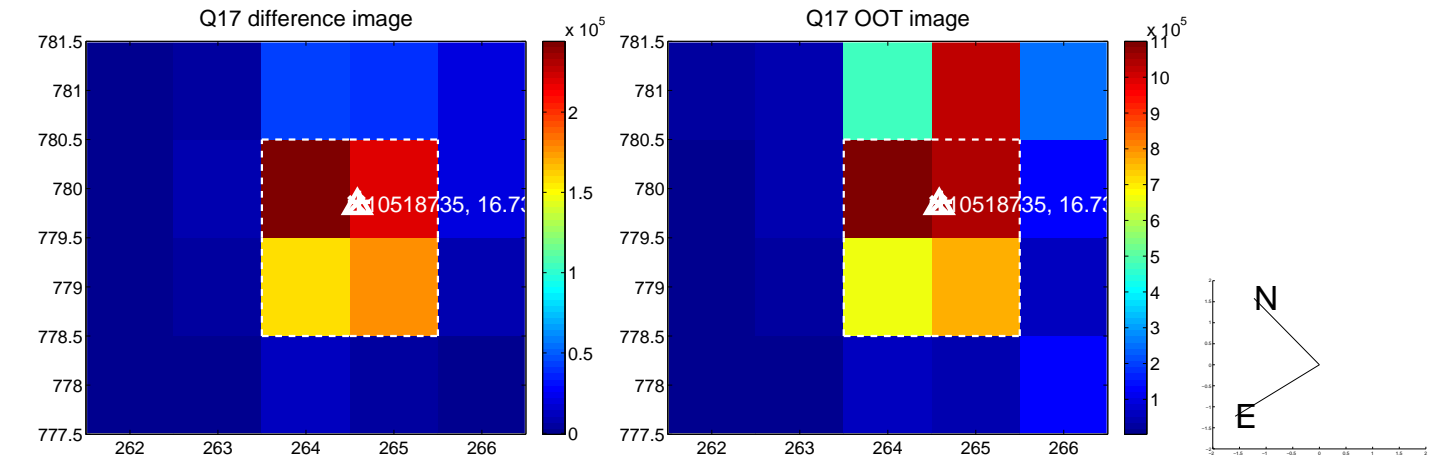


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



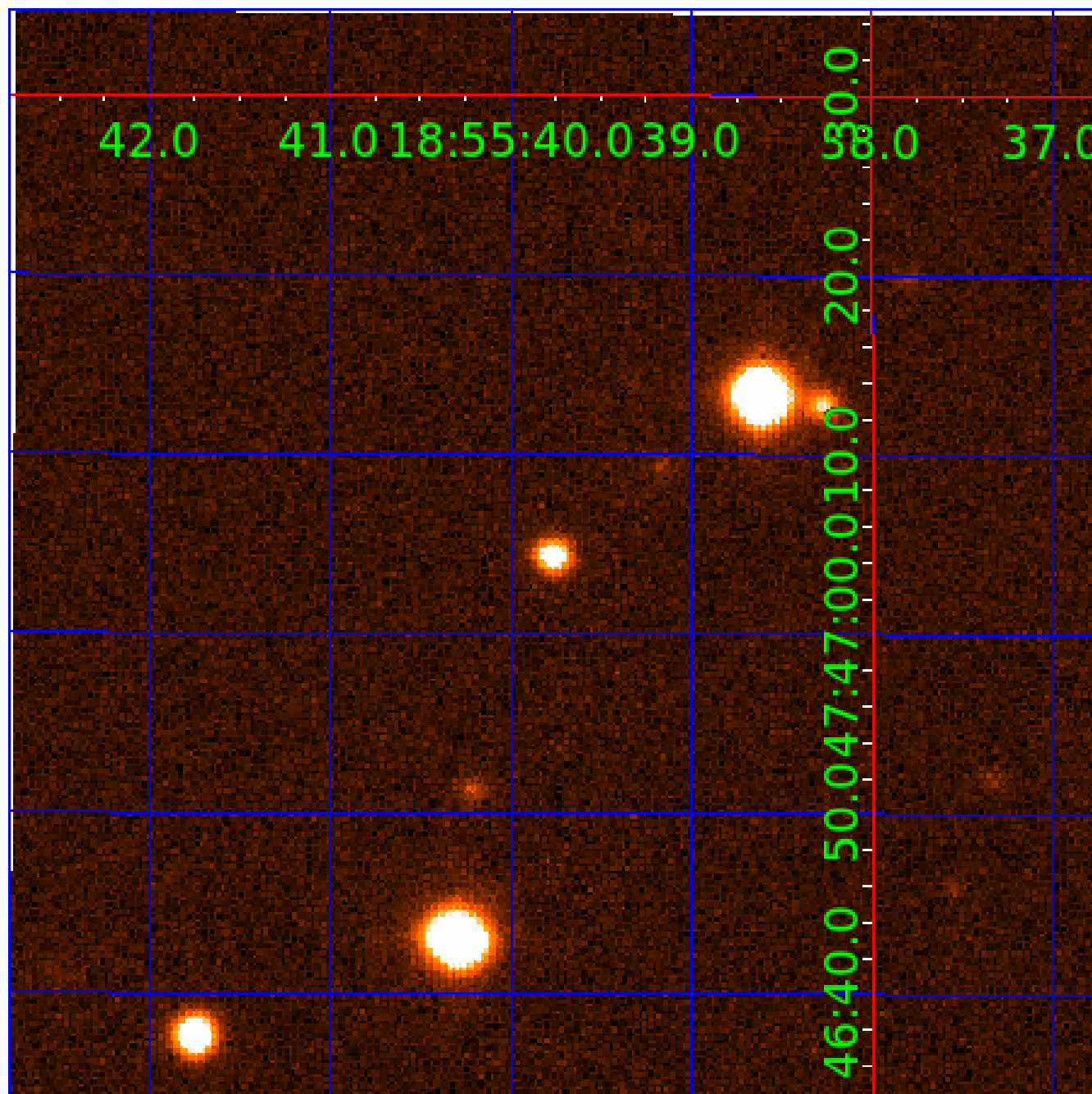


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010518735

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010518735-01	OBS	3612.01	19.515025	136.215266	253469.6	4.599	1510.6	1102.6	0.85	5349	61.30	28.36
010518735-02	OBS	No	19.515025	132.597530	167742.0	5.262	1185.8	910.2	0.85	5349	52.30	28.36

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010518735-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_KIC_POS
010518735-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_KIC_POS

**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.

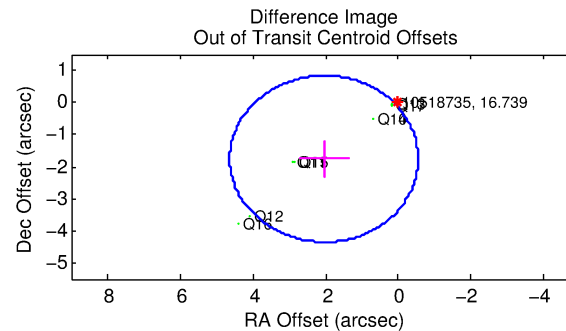
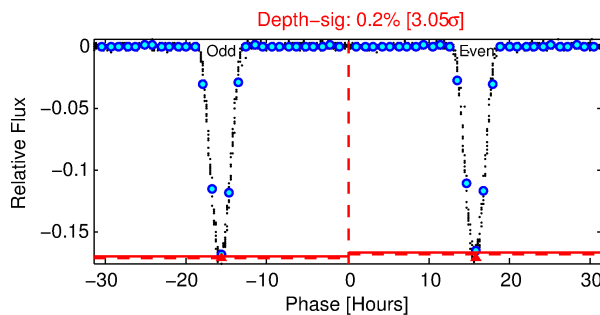
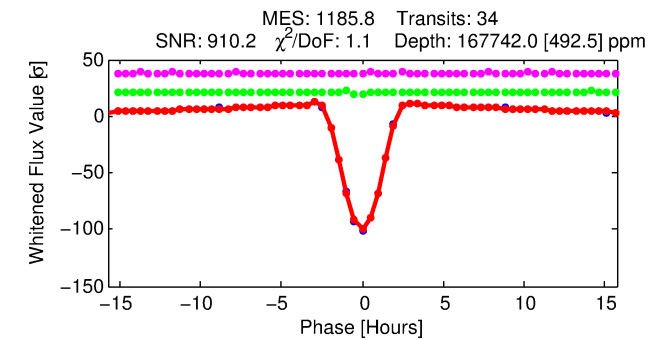
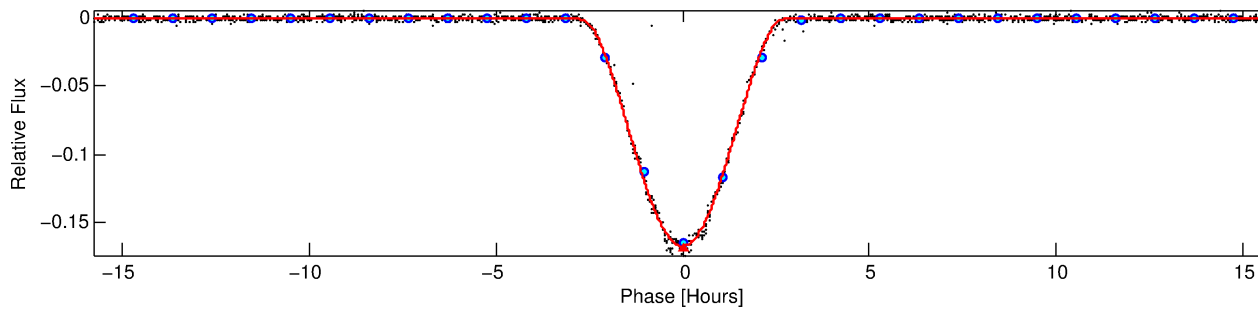
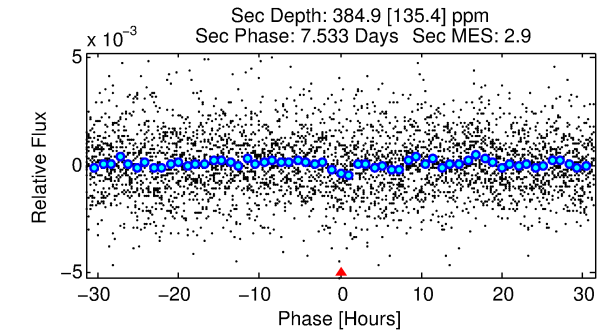
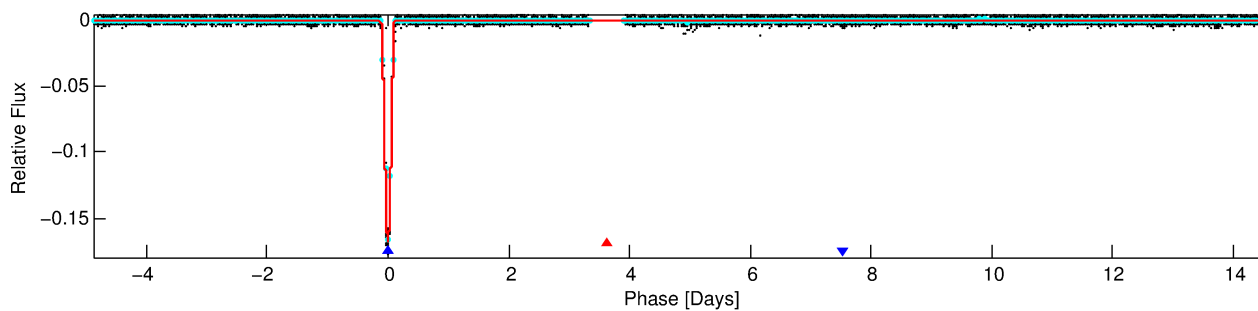
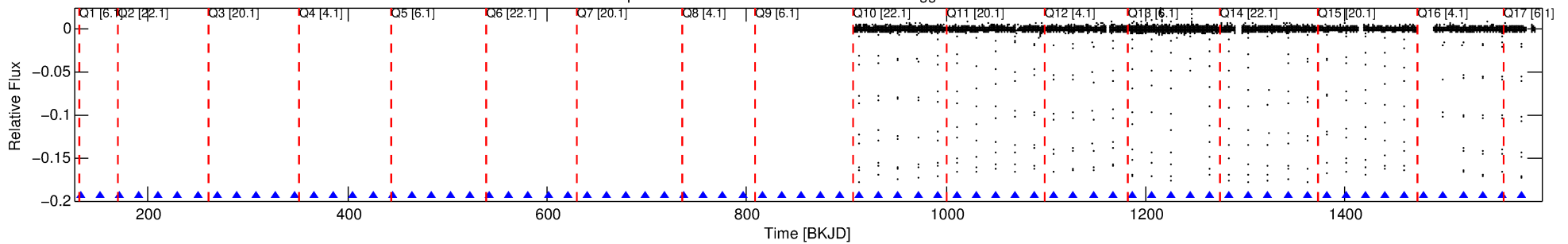
## Ephemeris Match Information For 010518735-02

No Significant Match Found

# DV One-Page Summary

KIC: 10518735 Candidate: 2 of 2 Period: 19.515 d  
KOI: K03612 Corr: No Ephemeris Match

Kp: 16.74 R\*: 0.85 Rs Teff: 5349.0 K Logg: 4.53 Fe/H: 0.100



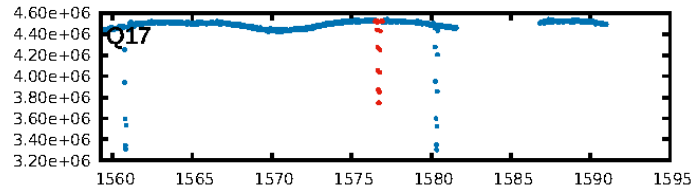
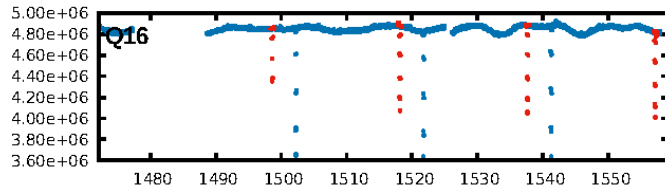
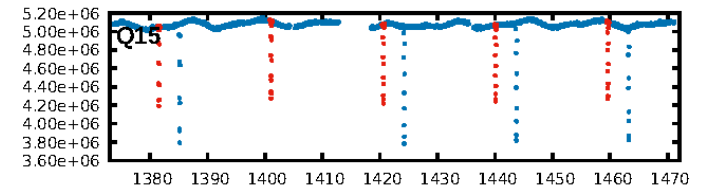
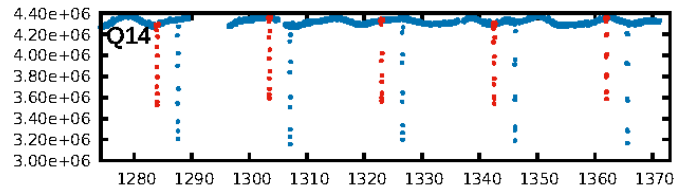
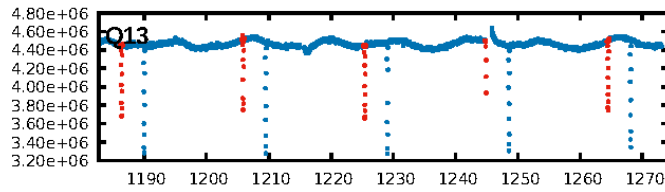
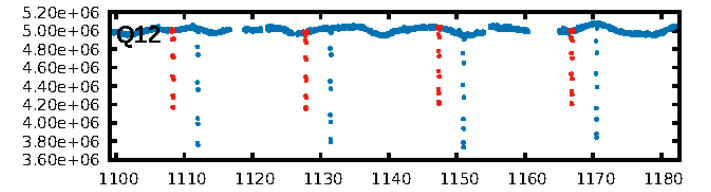
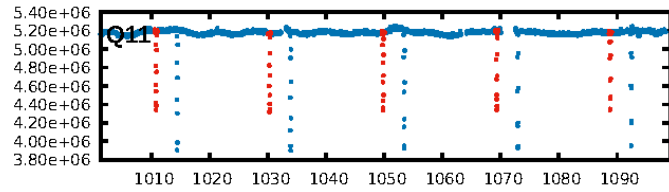
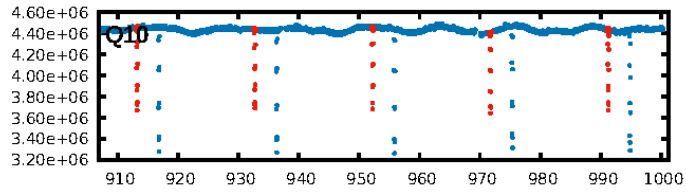
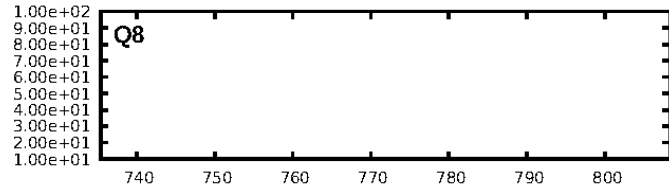
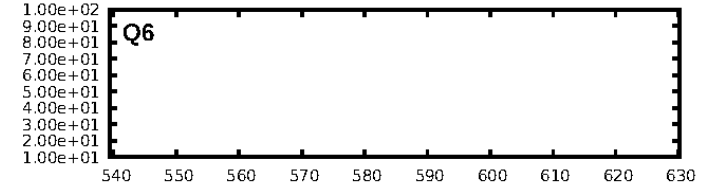
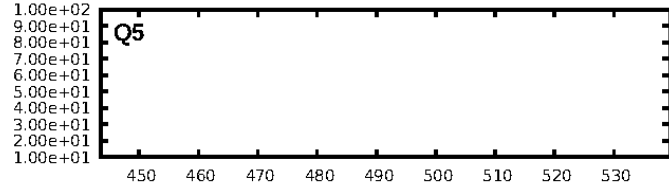
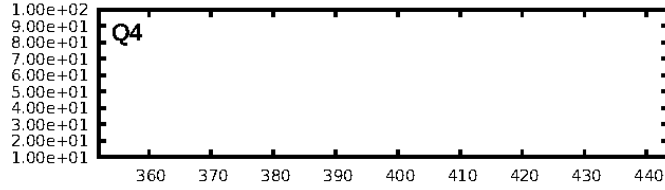
## DV Fit Results:

Period = 19.51502 [0.00001] d  
Epoch = 132.5975 [0.0003] BKJD  
Rp/R\* = 0.5632 [0.0889]  
a/R\* = 36.26 [0.74]  
b = 0.90 [0.12]  
Seff = 28.36 [7.91]  
Teq = 588 [41] K  
Rp = 52.31 [12.84] Re  
a = 0.1368 [0.0223] AU  
Ag = 1.45 [0.77] [0.58σ]  
Teffp = 998 [123] K [3.16σ]

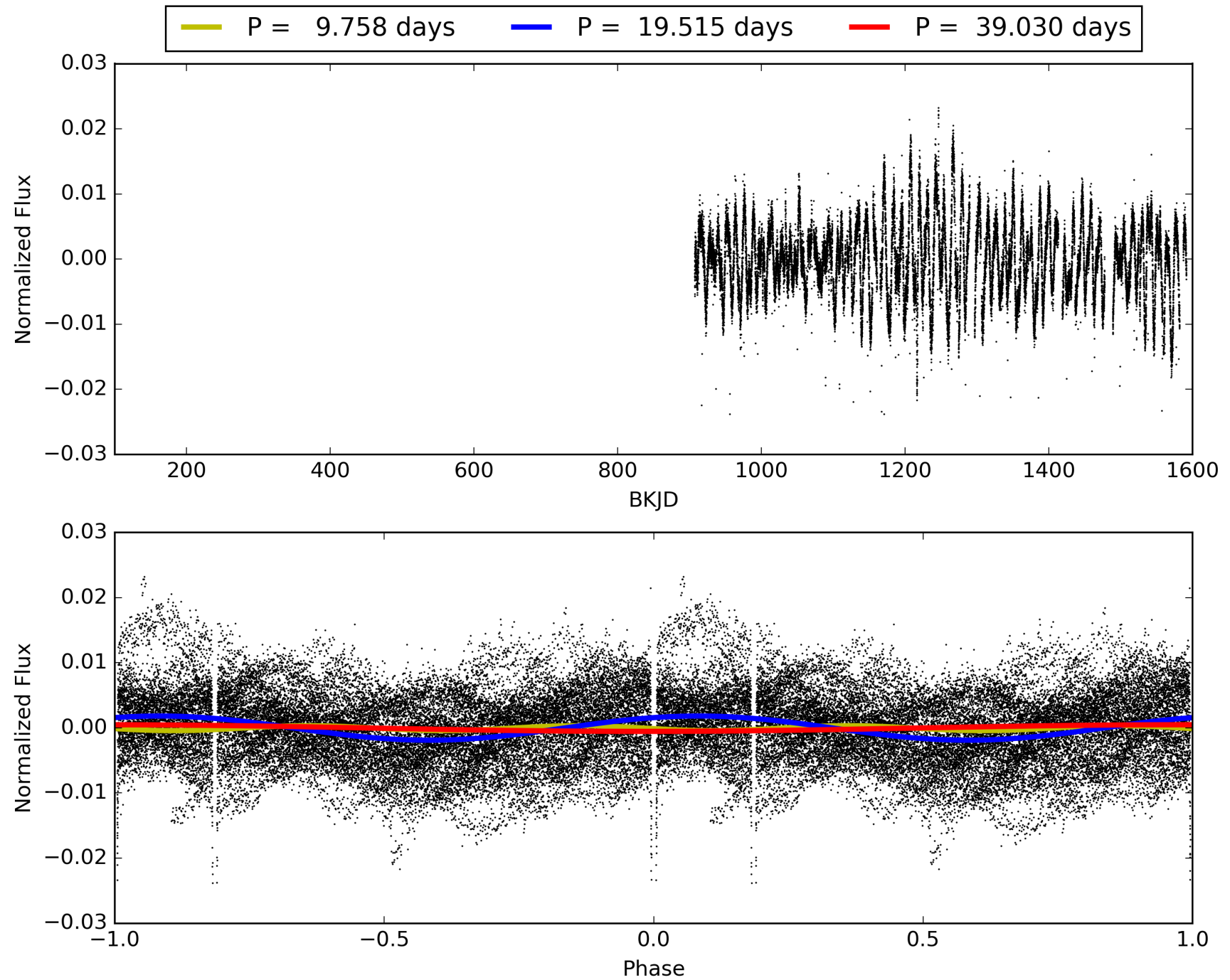
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [33/33]  
GhostDiagnostic-chr: 6.018  
Centroid-sig: 0.0%  
Centroid-so: 0.301 arcsec [44.19σ]  
OotOffset-rm: 2.695 arcsec [3.12σ]  
OotOffset-st: 2/2/2/2 [8]  
KicOffset-rm: 0.123 arcsec [1.72σ]  
KicOffset-st: 2/2/2/2 [8]  
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DiffImageOverlap-fno: 1.00 [8/8]

# TCE 010518735-02, PDC Light Curves



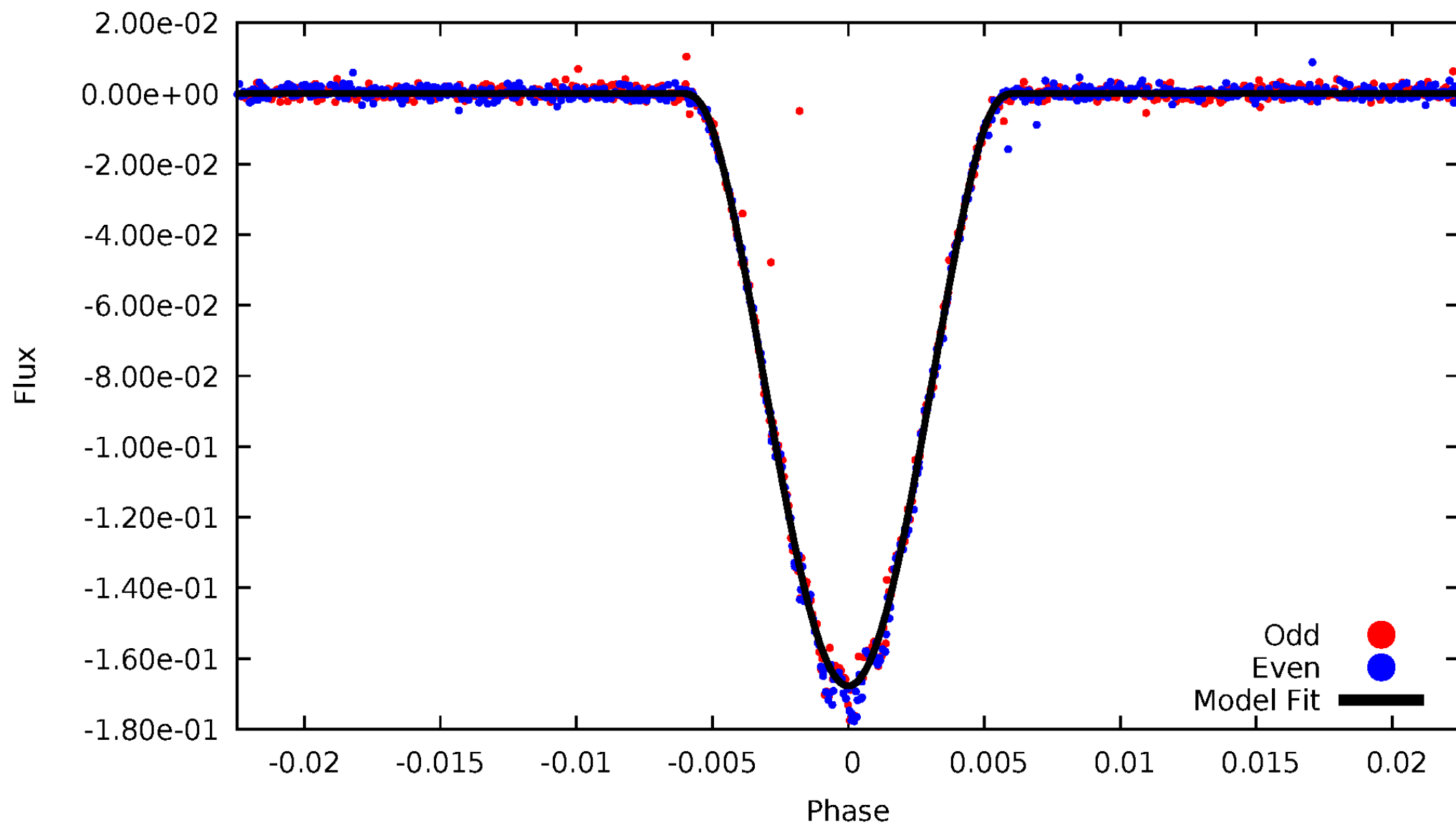
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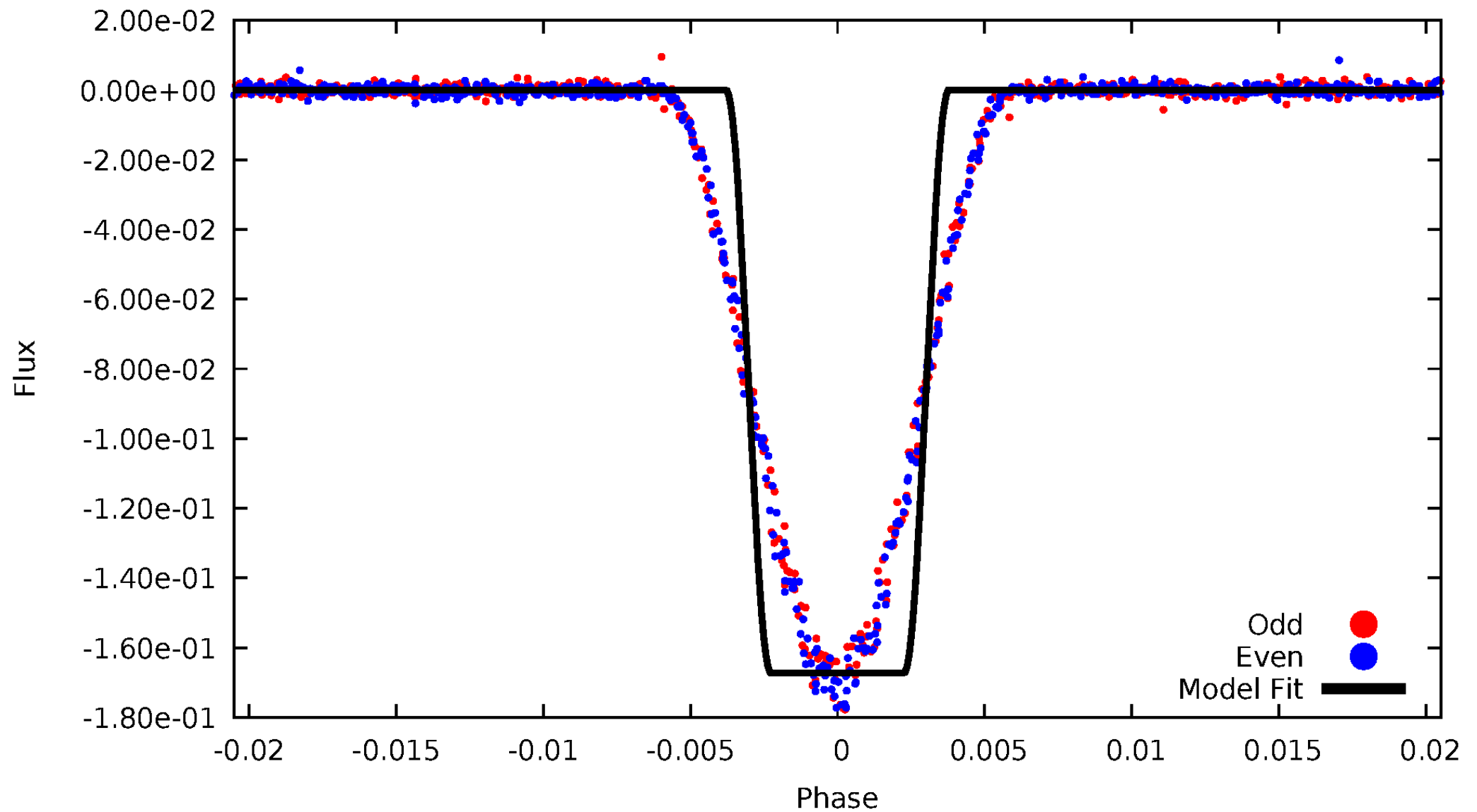
DV Odd/Even

TCE 010518735-02



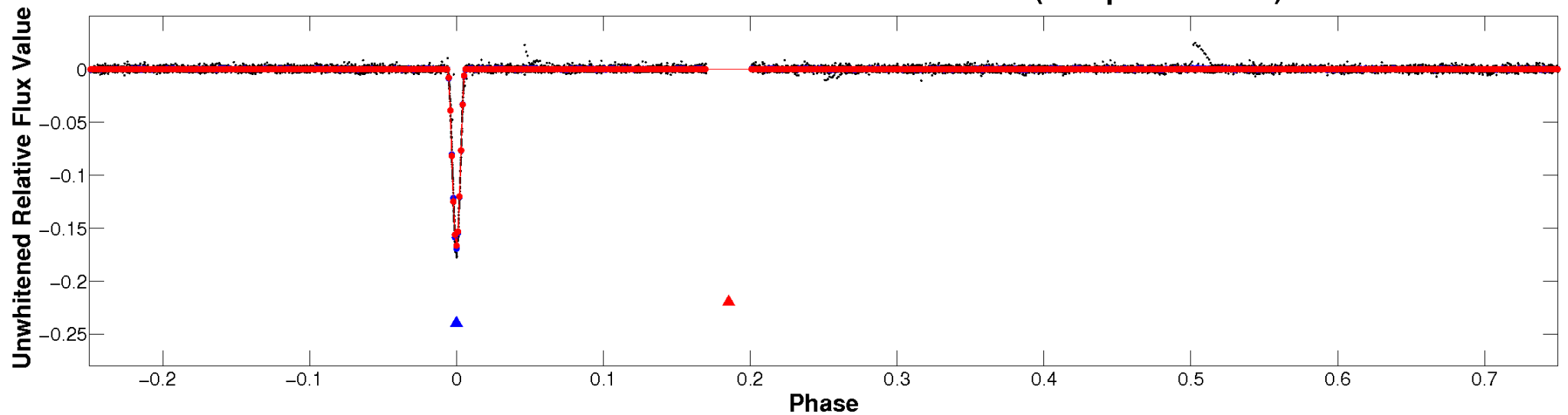
# ALT Odd/Even

TCE 010518735-02

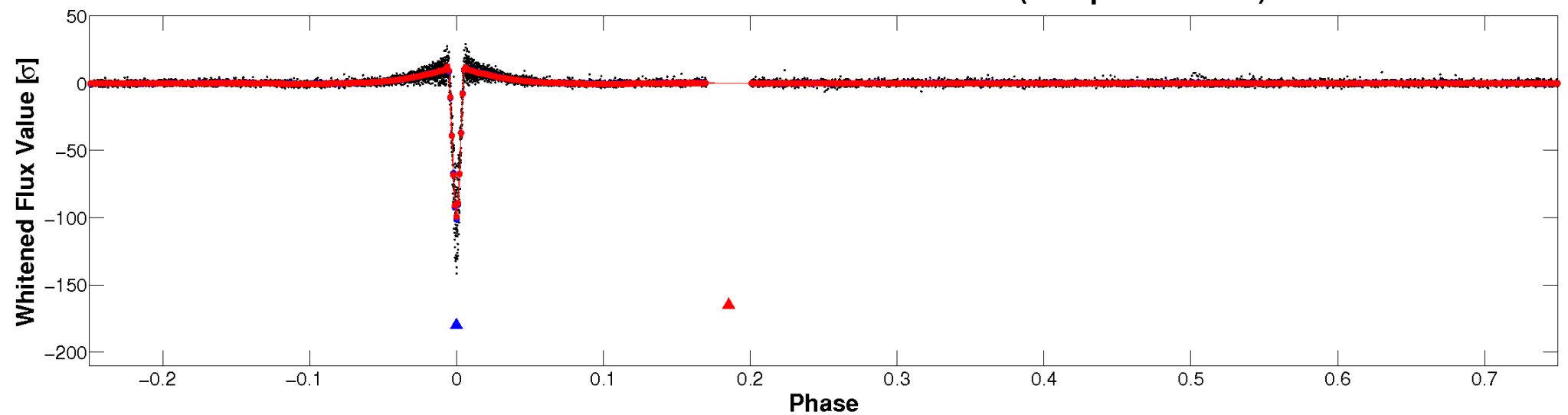


# Non-Whitened Vs. Whitened Light Curve

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

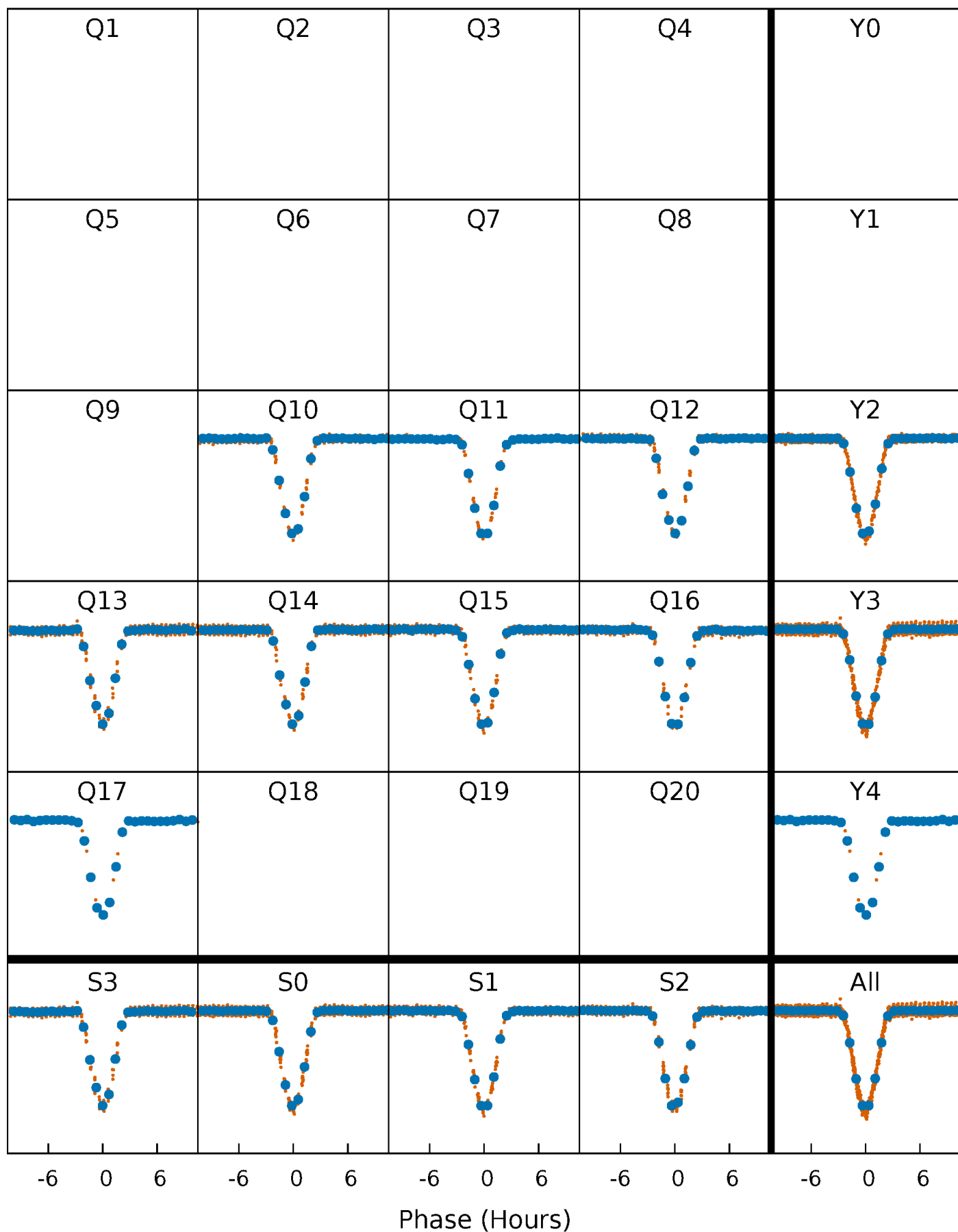


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



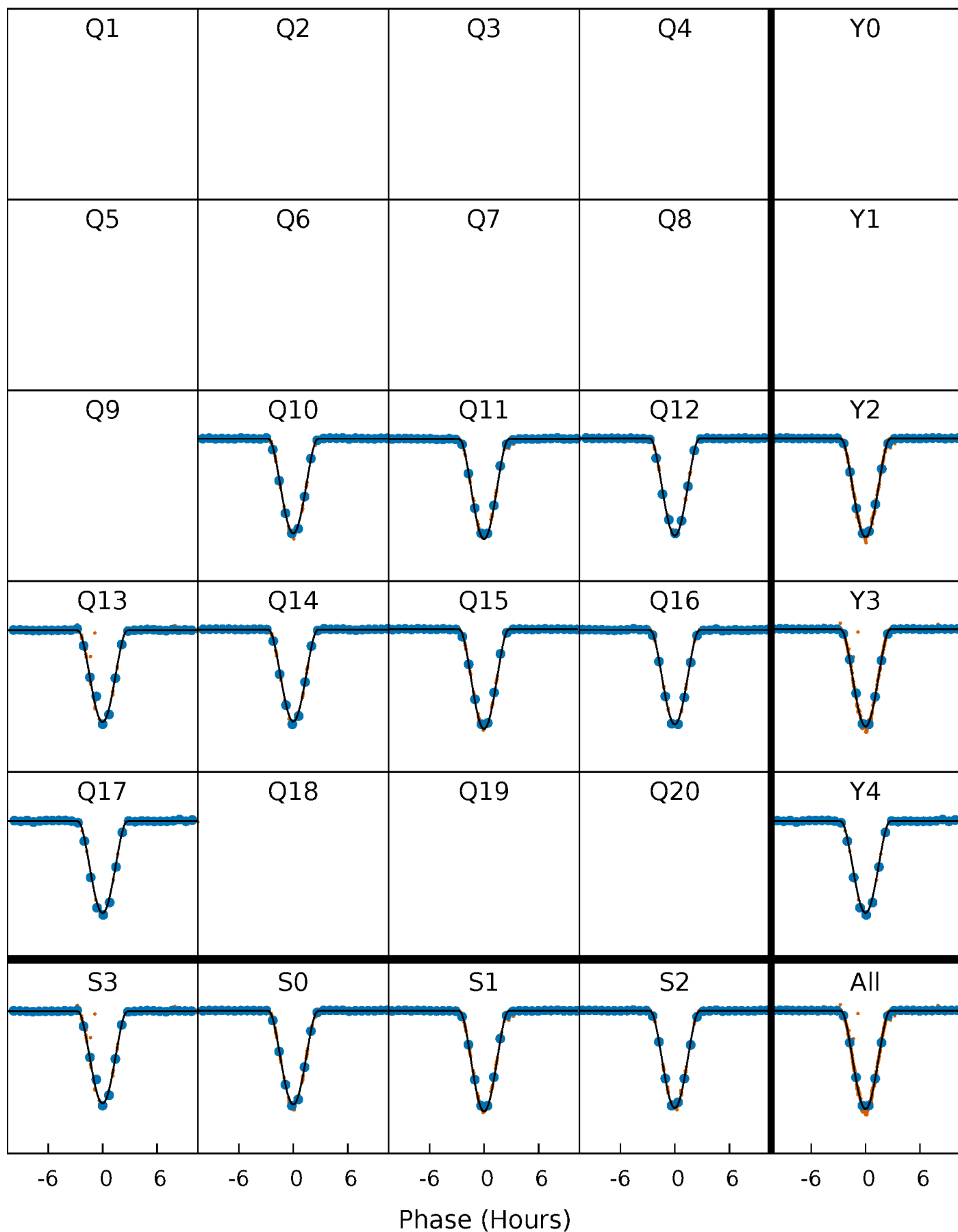
# PDC Quarter-Phased Transit Curves

TCE 010518735-02 P= 19.515025 Days  $T_0=132.597530$  (BKJD)



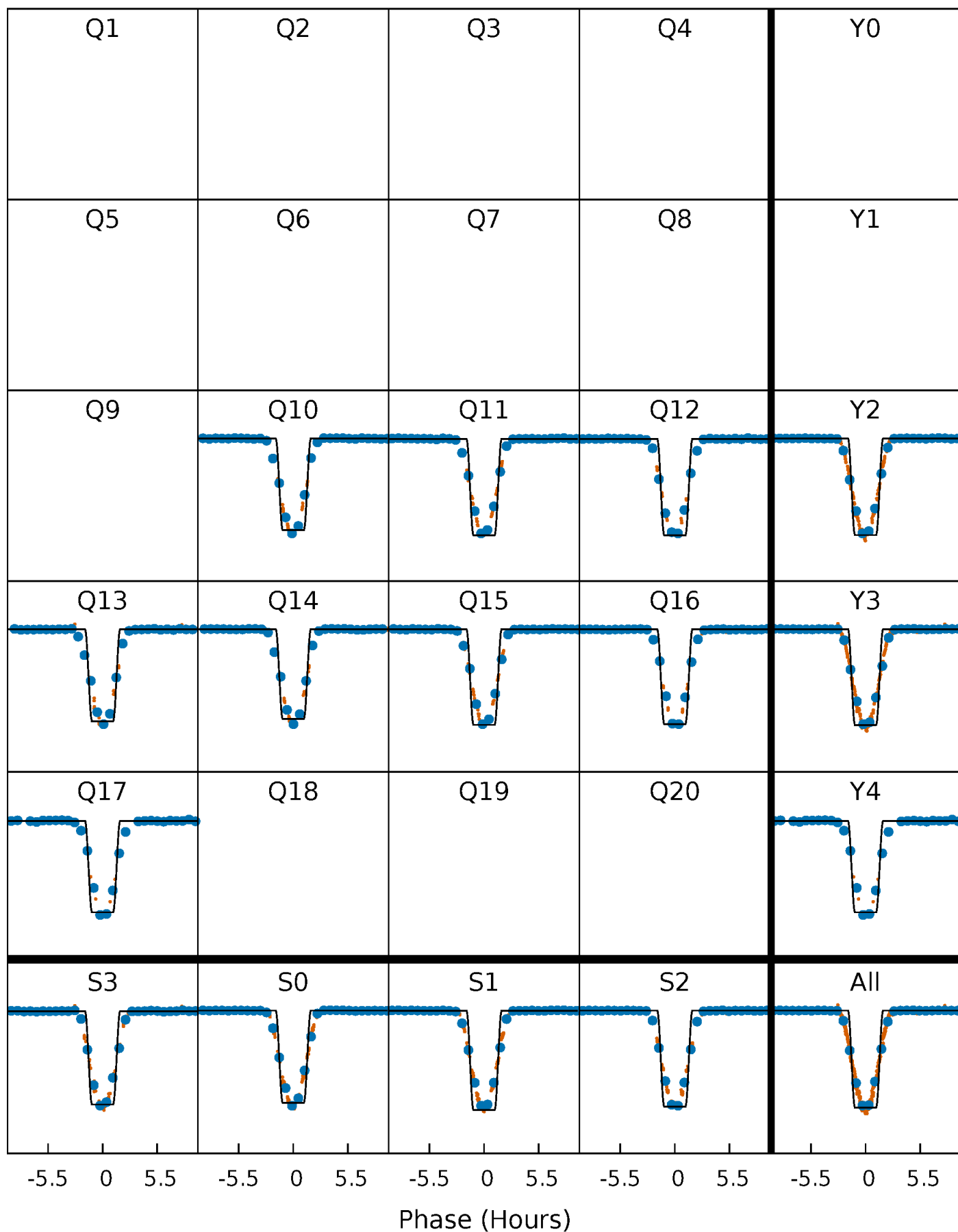
# DV Quarter-Phased Transit Curves

TCE 010518735-02   P= 19.515025 Days    $T_0=132.597530$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

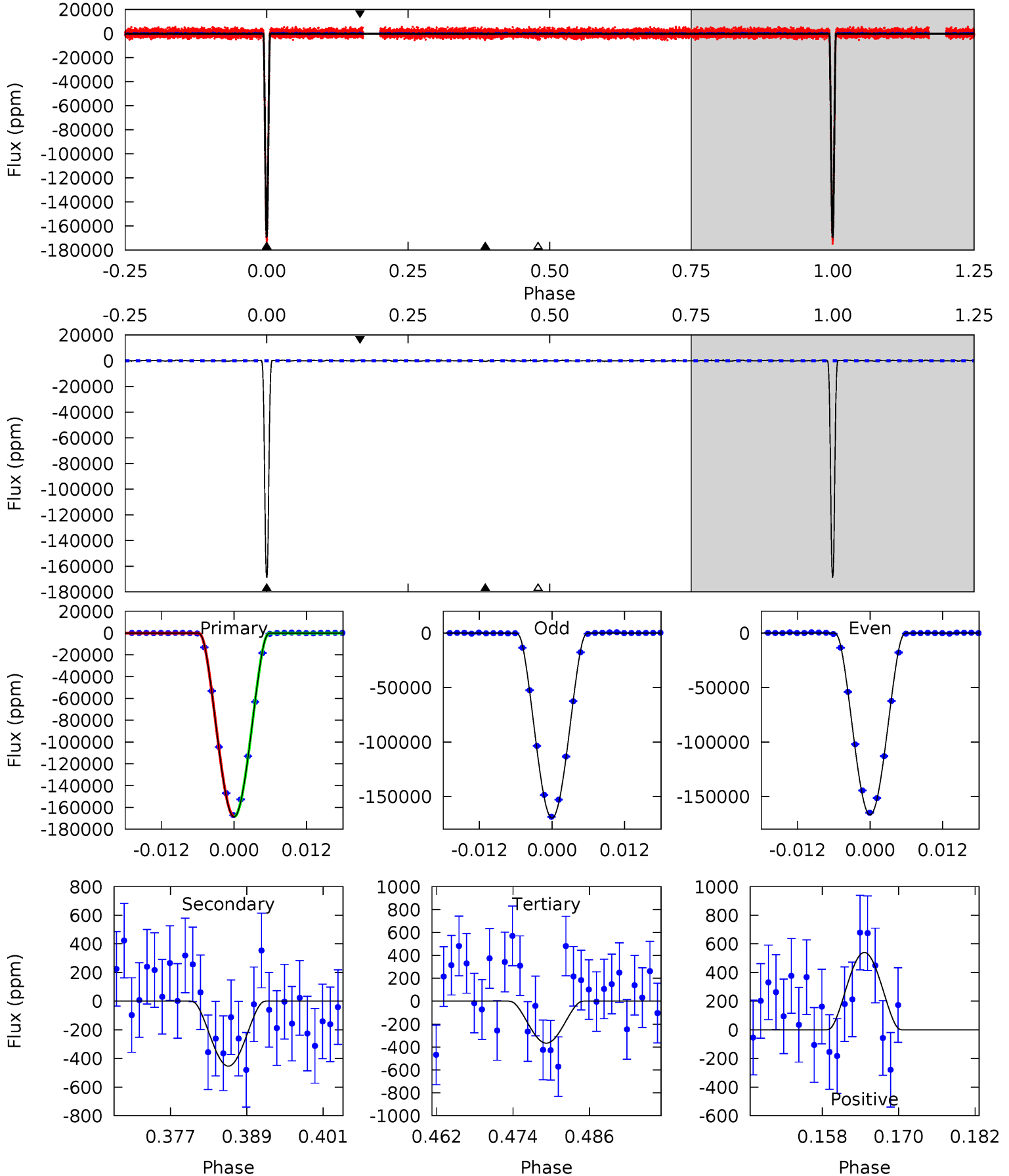
TCE 010518735-02 P= 19.514857 Days  $T_0=132.607214$  (BKJD)



# DV Model-Shift Uniqueness Test

010518735-02, P = 19.515025 Days, E = 132.597530 Days

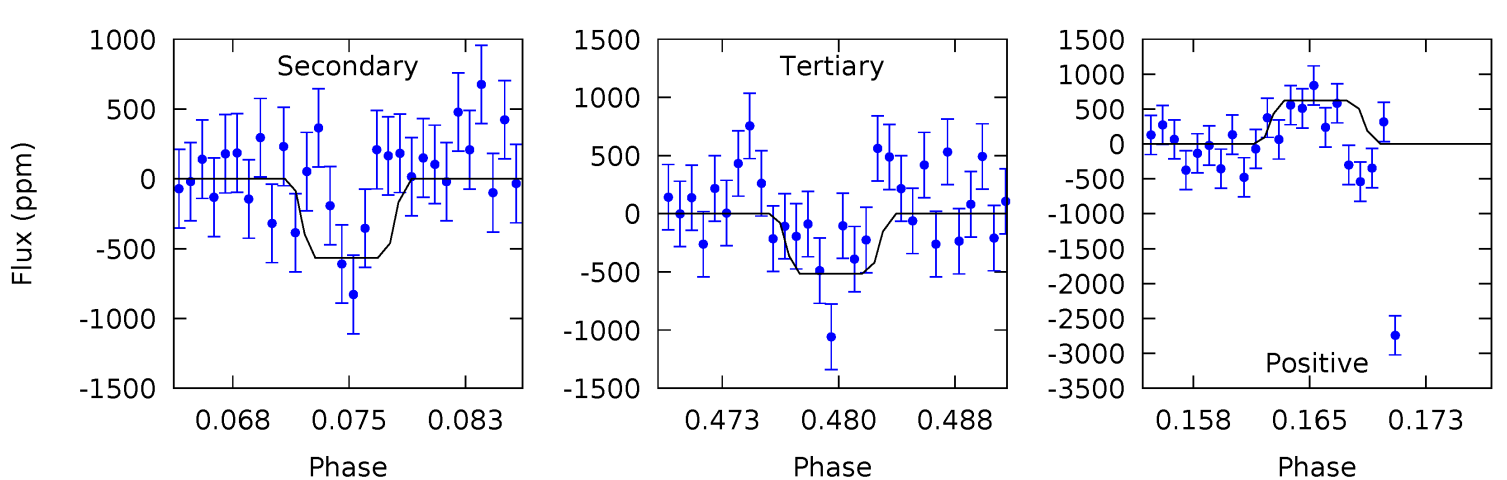
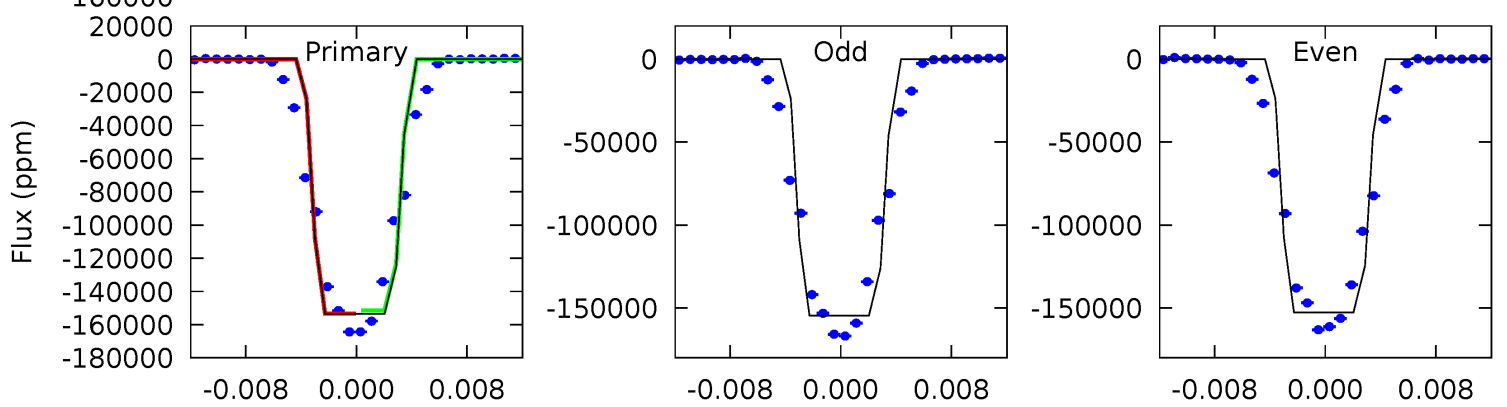
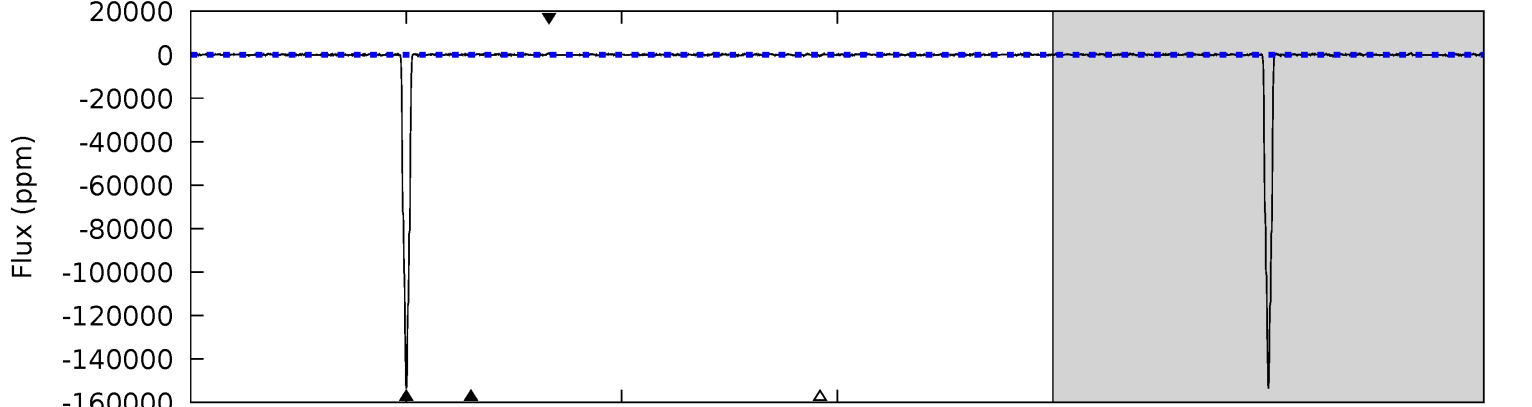
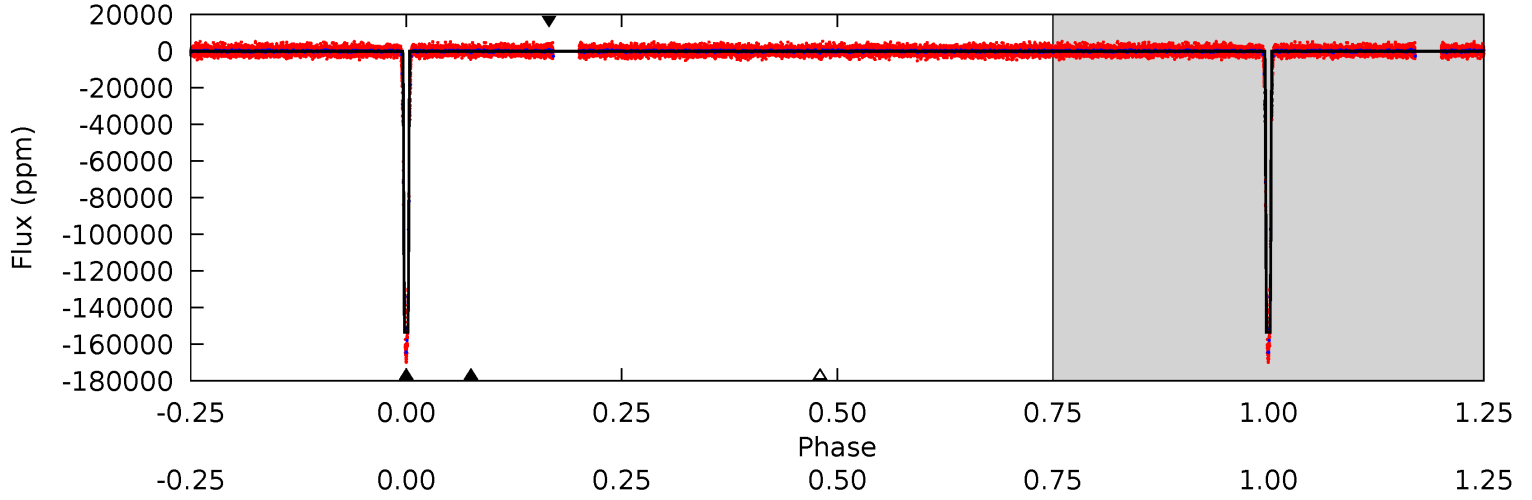
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2222	5.98	4.83	7.12	4.99	2.51	2.17	2217	2215	1.15	-1.14	19.0	0.98	0.00	2.84



# Alt Model-Shift Uniqueness Test

010518735-02, P = 19.514857 Days, E = 132.607214 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
1239	4.57	4.16	5.00	5.08	2.67	1.18	1235	1234	0.41	-0.43	7.08	1.00	0.00	0





### Stellar Parameters For KIC 010518735

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$5349^{+185}_{-185}$	$4.531^{+0.045}_{-0.135}$	$0.100^{+0.250}_{-0.300}$	$0.851^{+0.160}_{-0.074}$	$0.897^{+0.082}_{-0.082}$	$2.050^{+0.464}_{-0.772}$
	+3%/-3%	+1%/-3%	+250%/-300%	+19%/-9%	+9%/-9%	+23%/-38%
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 010518735-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-454 \pm 76$	$54.16^{+10.27}_{-8.73}$	$834^{+44}_{-39}$	$1981^{+94}_{-97}$	$1.573^{+0.740}_{-0.507}$
Alt.	$-566 \pm 124$	$39.45^{+8.86}_{-9.26}$	$834^{+42}_{-37}$	$2203^{+142}_{-132}$	$3.727^{+2.626}_{-1.434}$

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

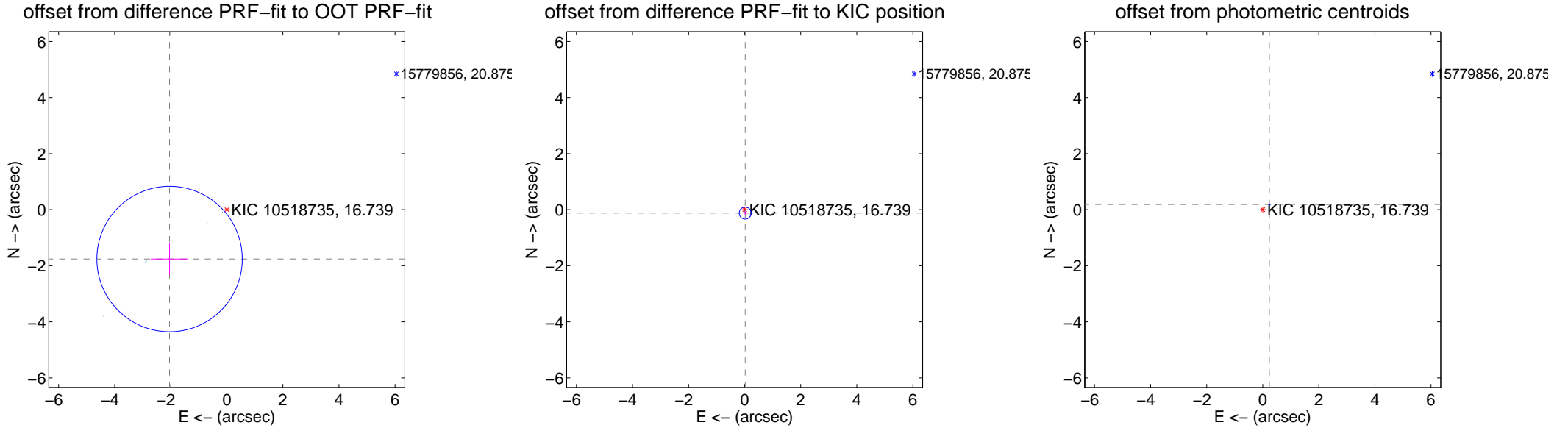
## DV Centroid Data

Supplemental centroid analysis for 010518735-02. Kepler magnitude: 16.74. Transit SNR 910.17

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.695 \pm 0.864$	3.12	$2.043 \pm 0.668$	$-1.759 \pm 0.557$
PRF-fit source offset from KIC position	$0.123 \pm 0.071$	1.72	$-0.020 \pm 0.068$	$-0.121 \pm 0.071$
photometric centroid source offset	$0.30 \pm 0.01$	44.19	$-0.24 \pm 0.01$	$0.18 \pm 0.01$



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.

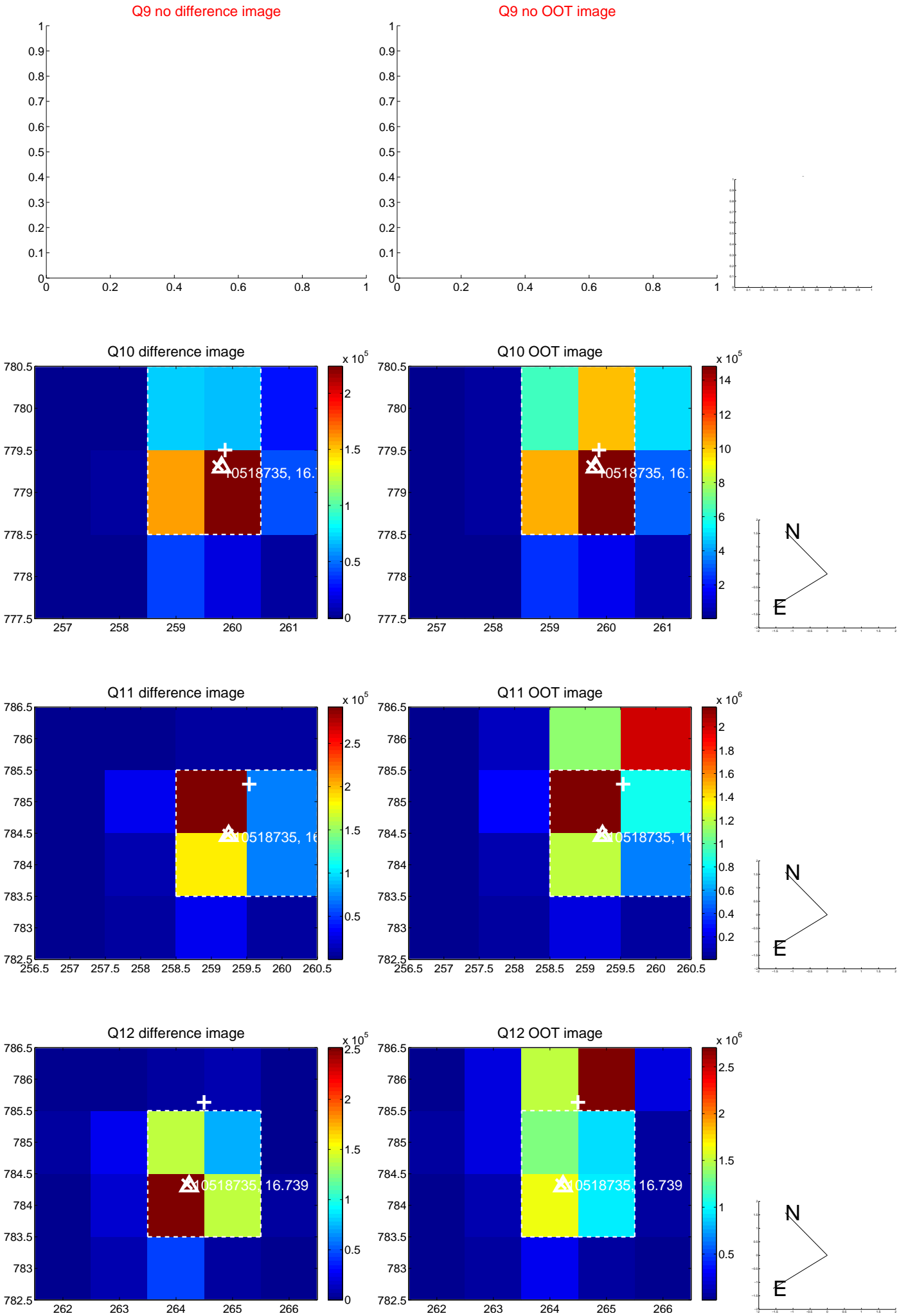
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



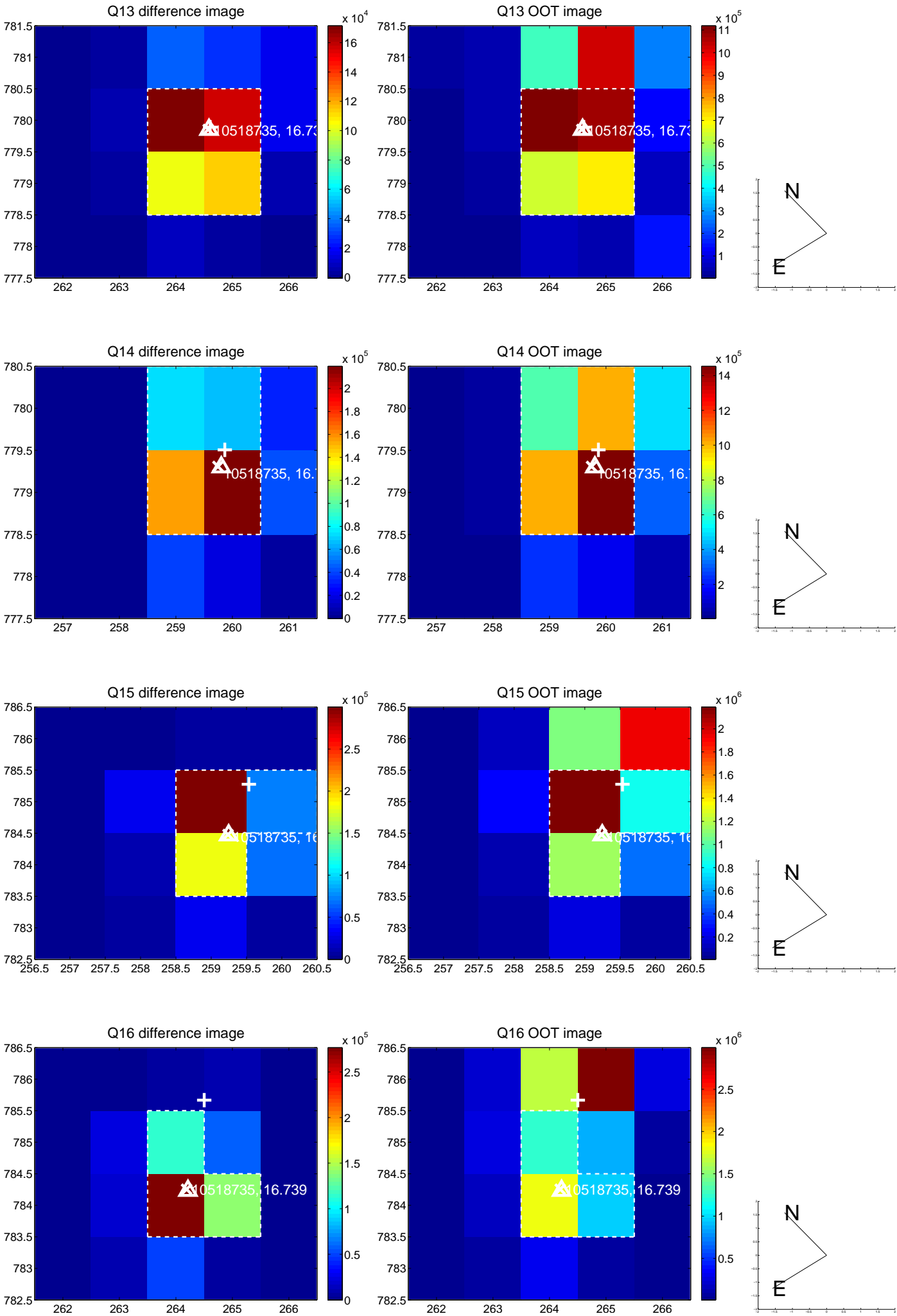
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



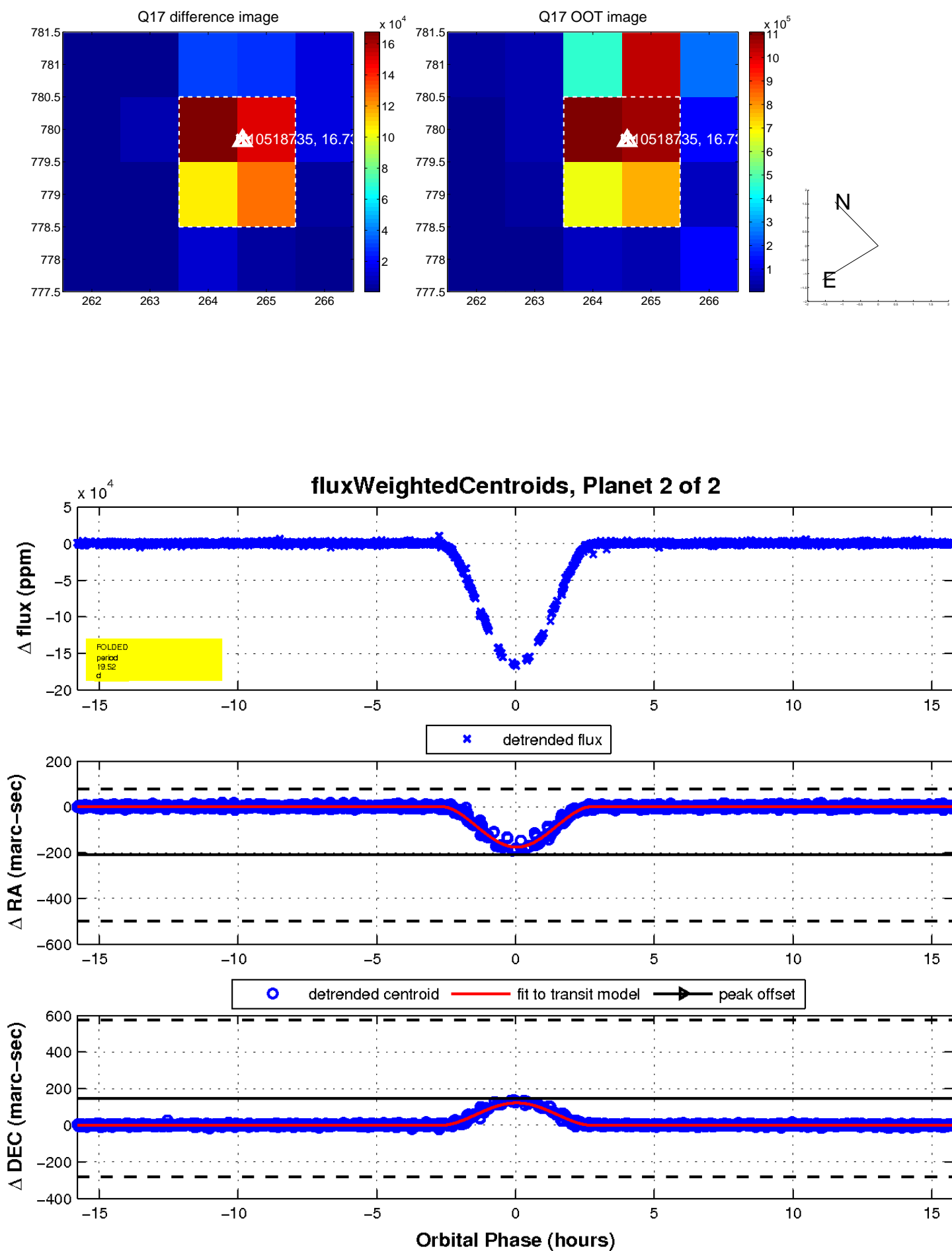
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

