

# KIC 007541502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007541502-01	OBS	6885.01	44.827326	173.410345	234616.0	6.977	19899.5	16316.6	3.28	5160	166.59	87.35
007541502-02	OBS	No	44.827325	164.272214	23643.4	4.383	2574.7	1241.9	3.28	5160	57.26	87.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007541502-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE
007541502-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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 007541502-01

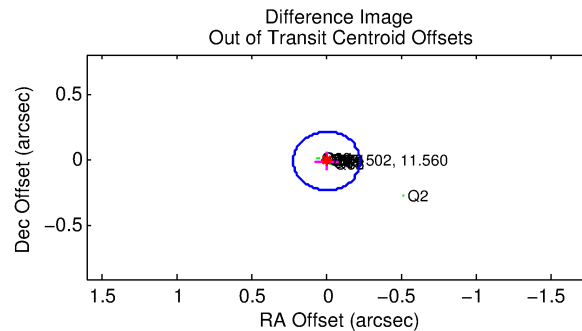
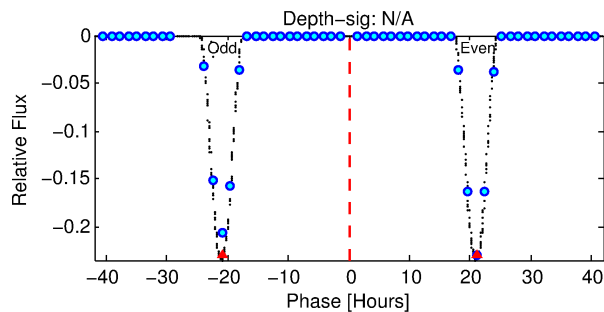
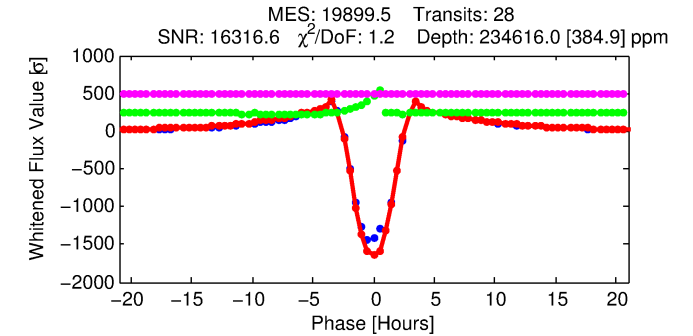
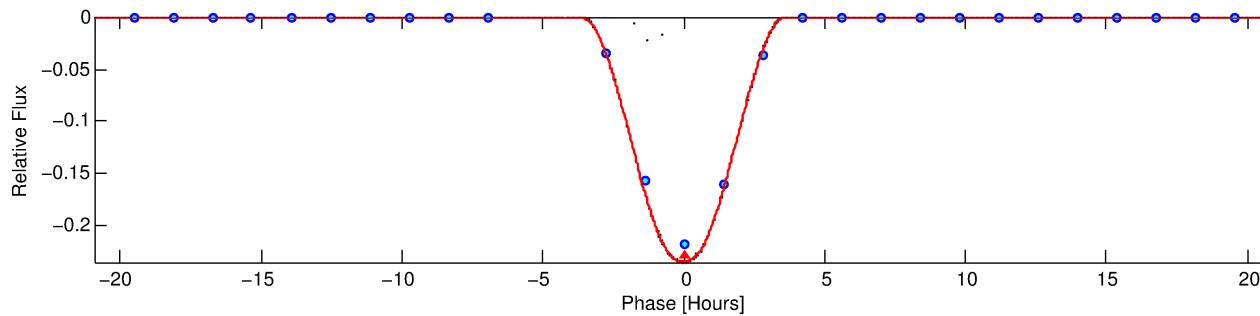
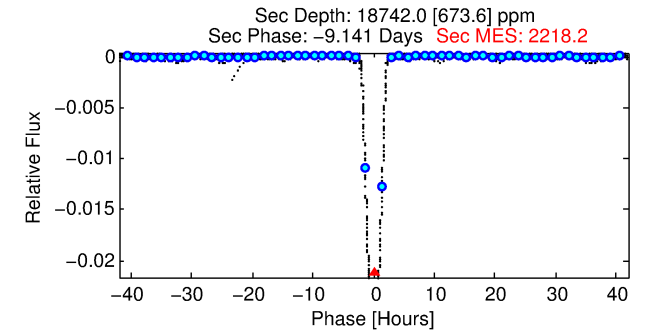
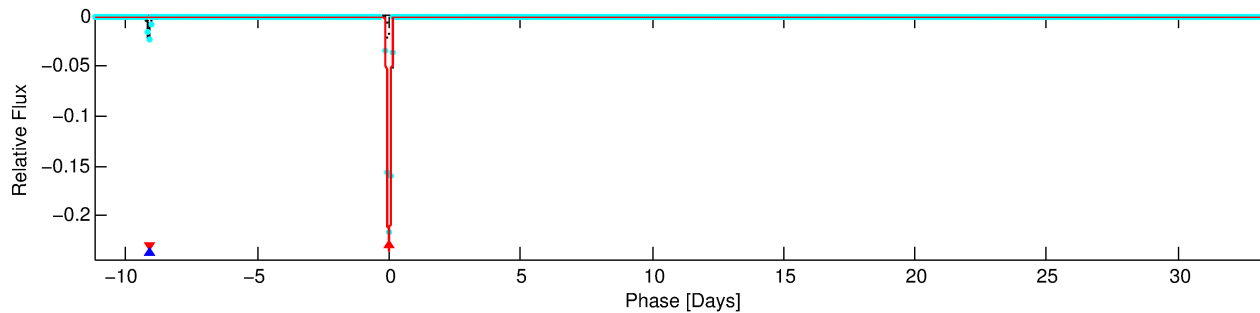
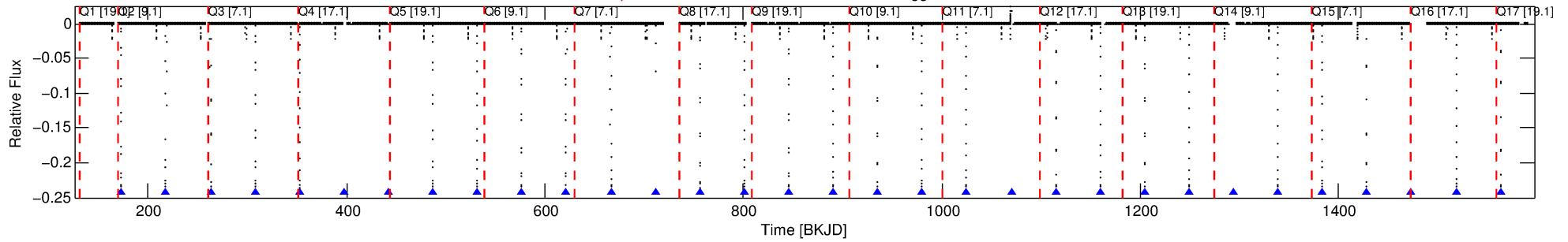
No Significant Match Found

# DV One-Page Summary

KIC: 7541502 Candidate: 1 of 2 Period: 44.827 d

KOI: K06885.01 Corr: 0.991

Kp: 11.56 R\*: 3.28 Rs Teff: 5160.0 K Logg: 3.57 Fe/H: -0.020



## DV Fit Results:

Period = 44.82733 [0.00001] d  
Epoch = 173.4103 [0.0002] BKJD  
Rp/R\* = 0.4656 [0.0007]  
a/R\* = 67.28 [0.09]  
b = 0.52 [0.00]  
Seff = 87.35 [130.04]  
Teq = 780 [290] K  
Rp = 166.59 [120.00] Re  
a = 0.2796 [0.2374] AU  
Ag = 29.05 [43.01] [0.65σ]  
Teffp = 2798 [115] K [6.47σ]

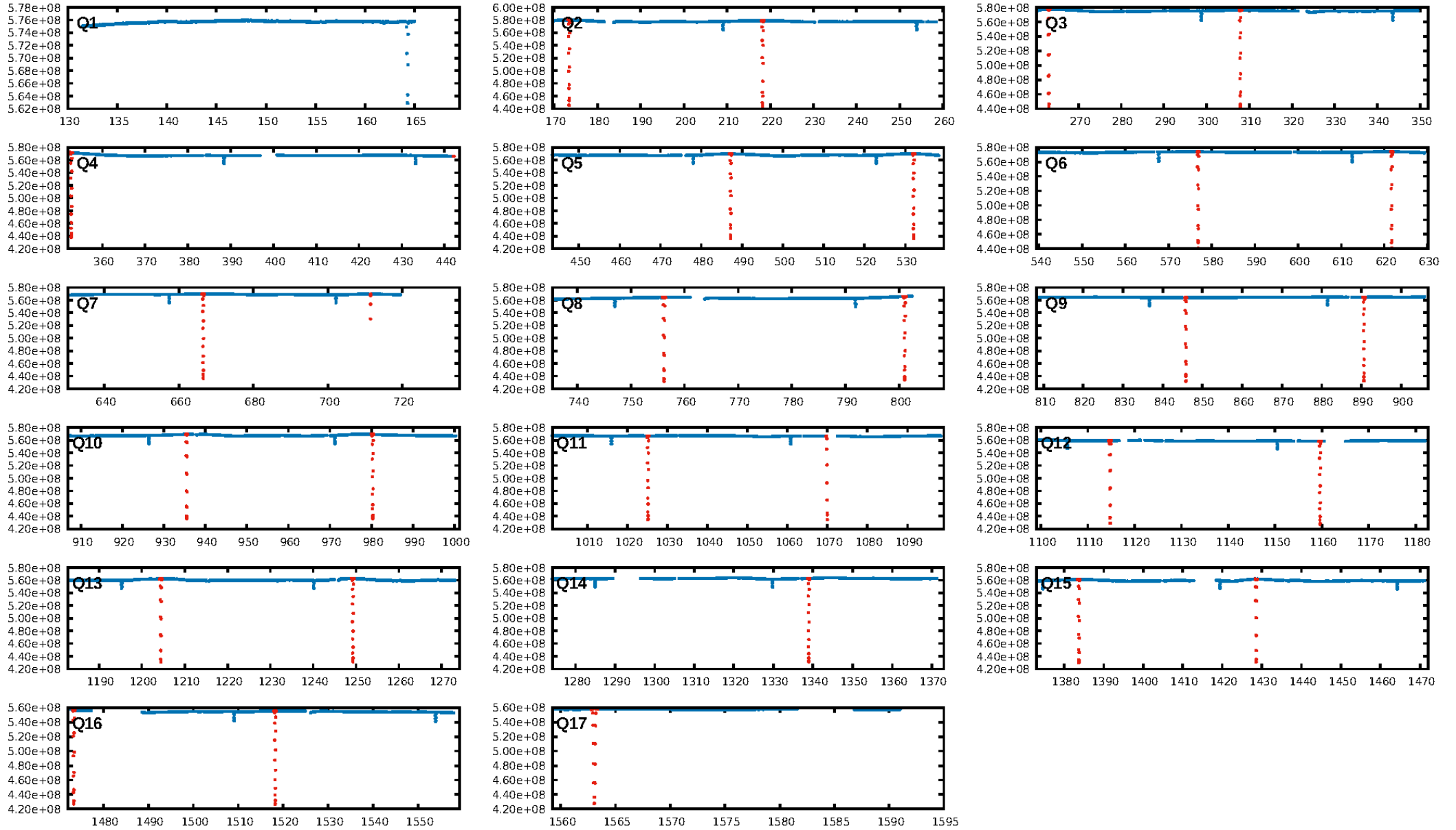
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00e]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [27/27]  
GhostDiagnostic-chr: 14.39  
Centroid-sig: 0.0%  
Centroid-so: 0.306 arcsec [1115.35σ]  
OotOffset-rm: 0.010 arcsec [0.13σ]  
KicOffset-rm: 0.228 arcsec [3.27σ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [15/15]

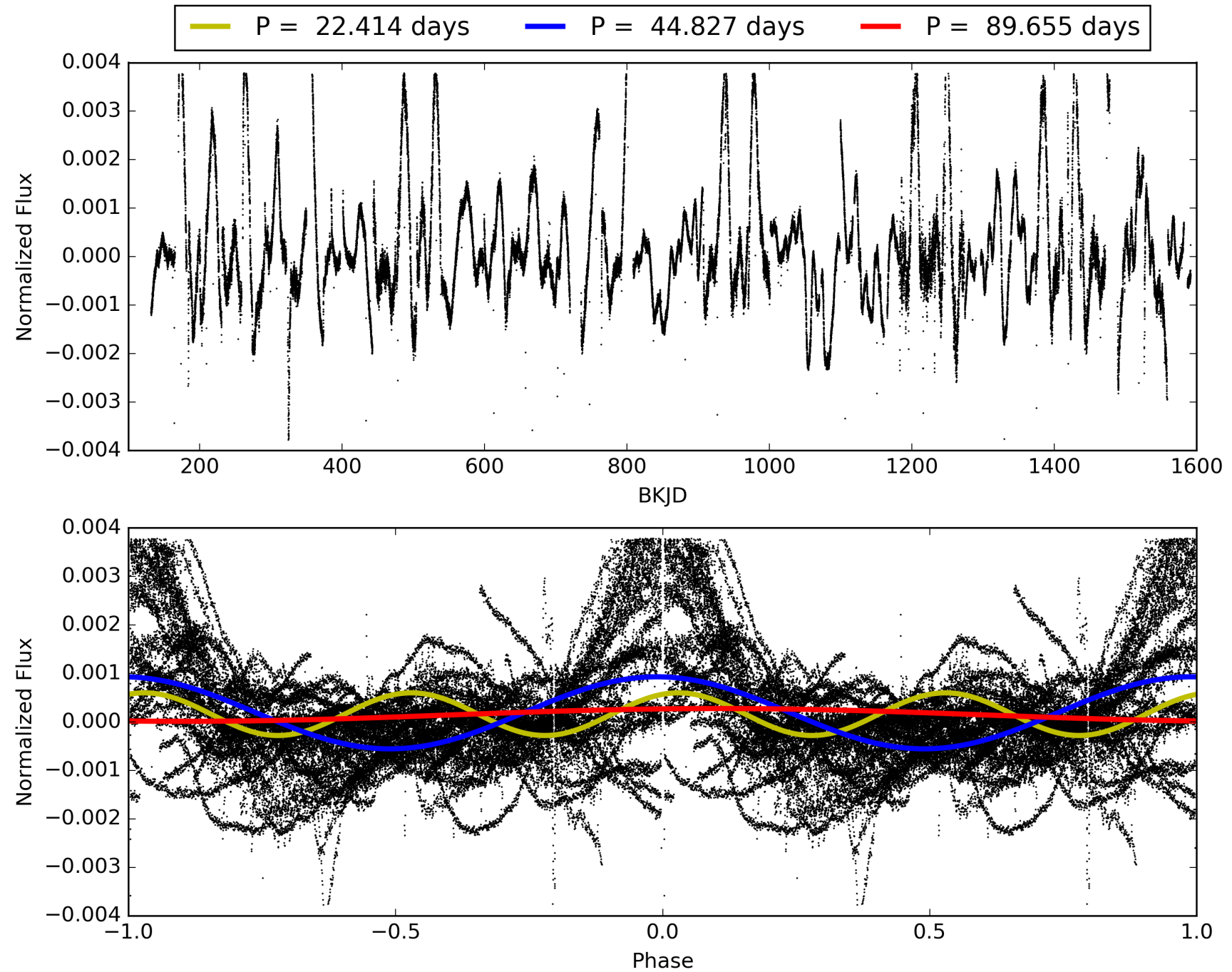
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 07:41:30 Z

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

# TCE 007541502-01, PDC Light Curves

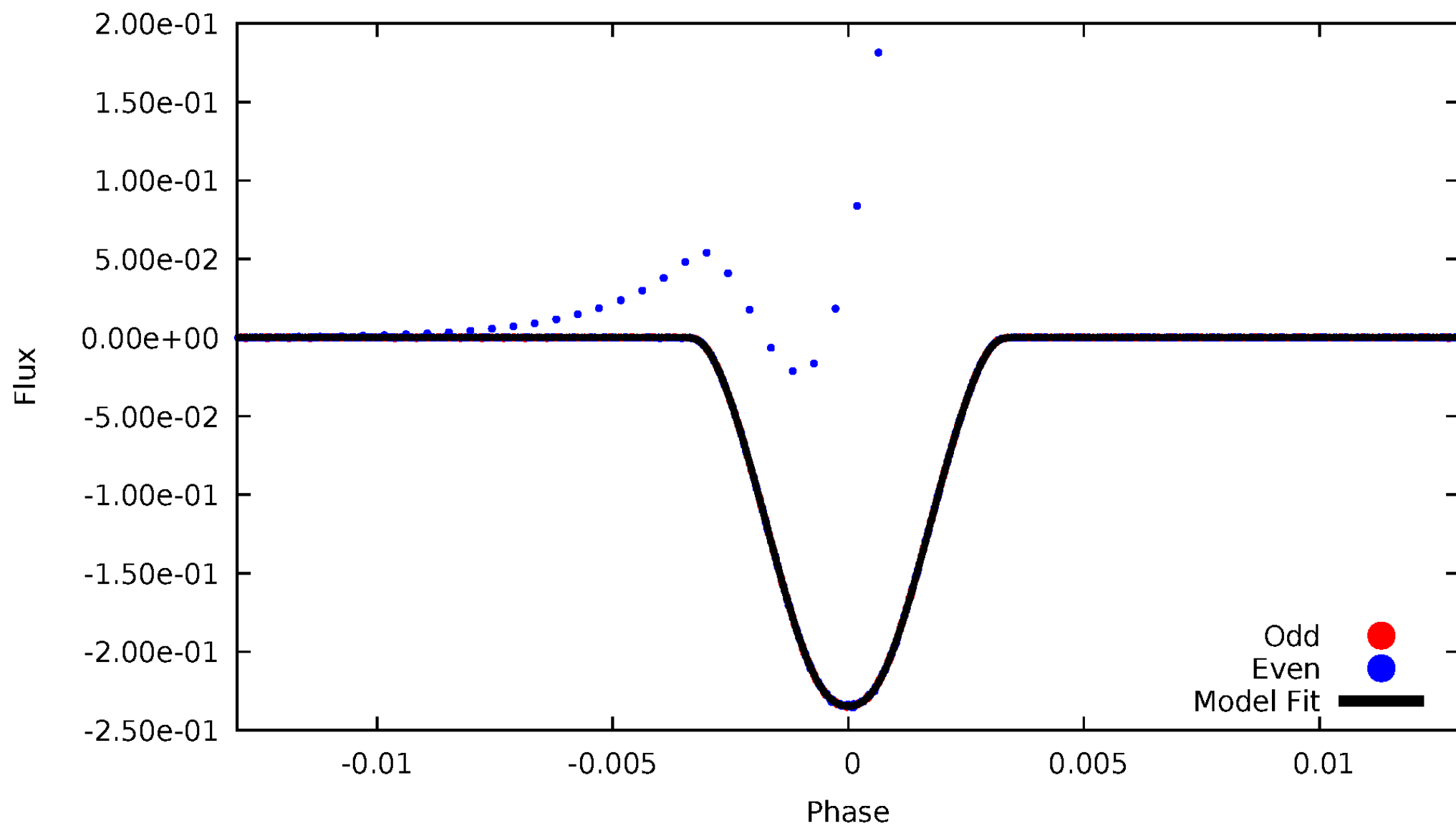


TCE 007541502-01



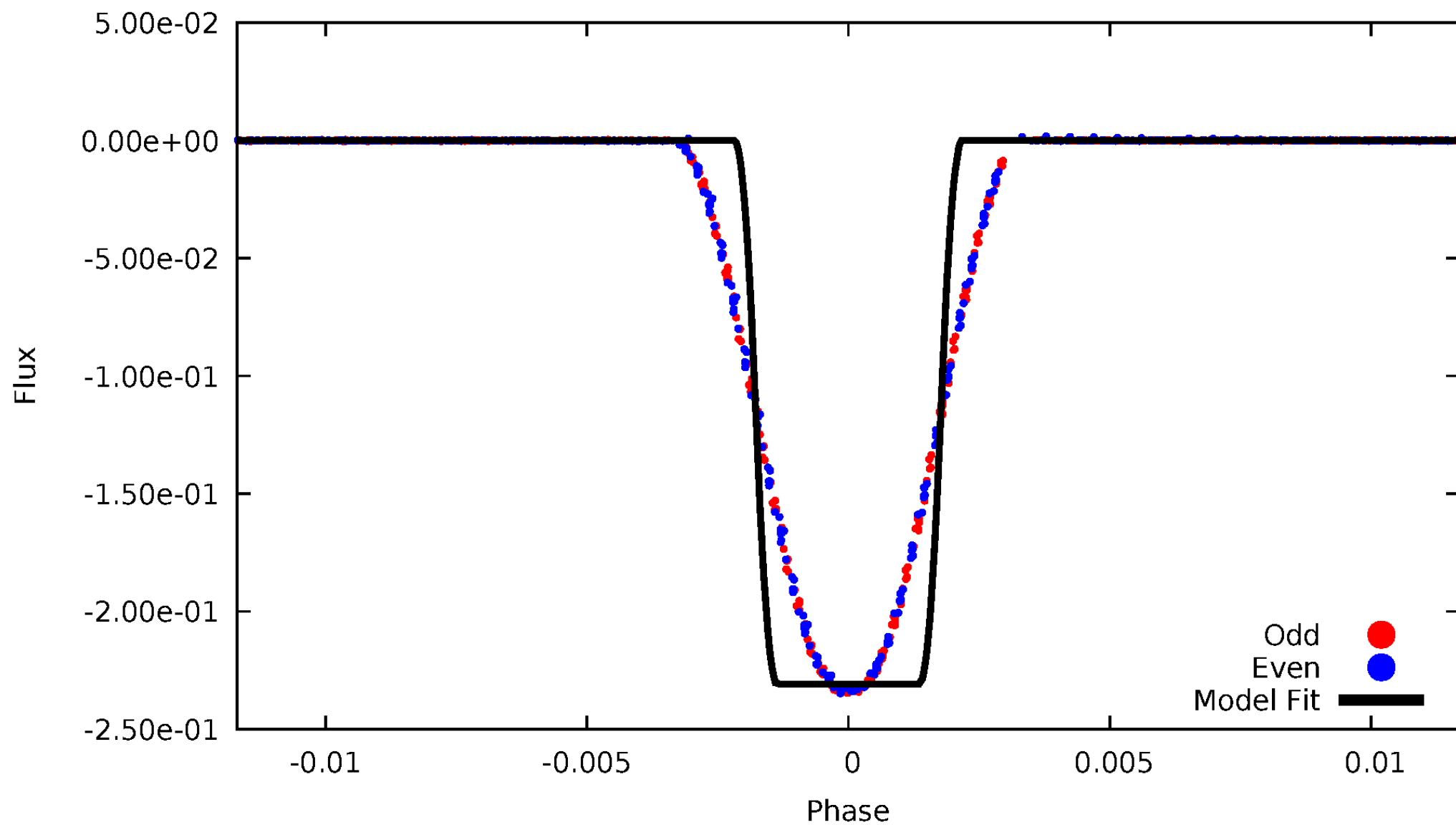
# DV Odd/Even

TCE 007541502-01



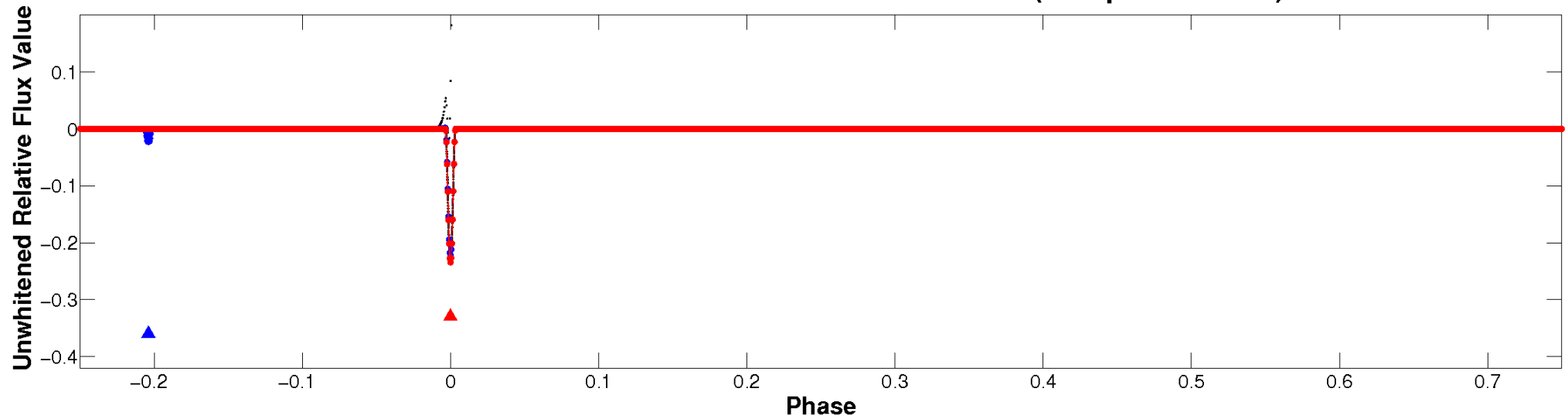
# ALT Odd/Even

TCE 007541502-01

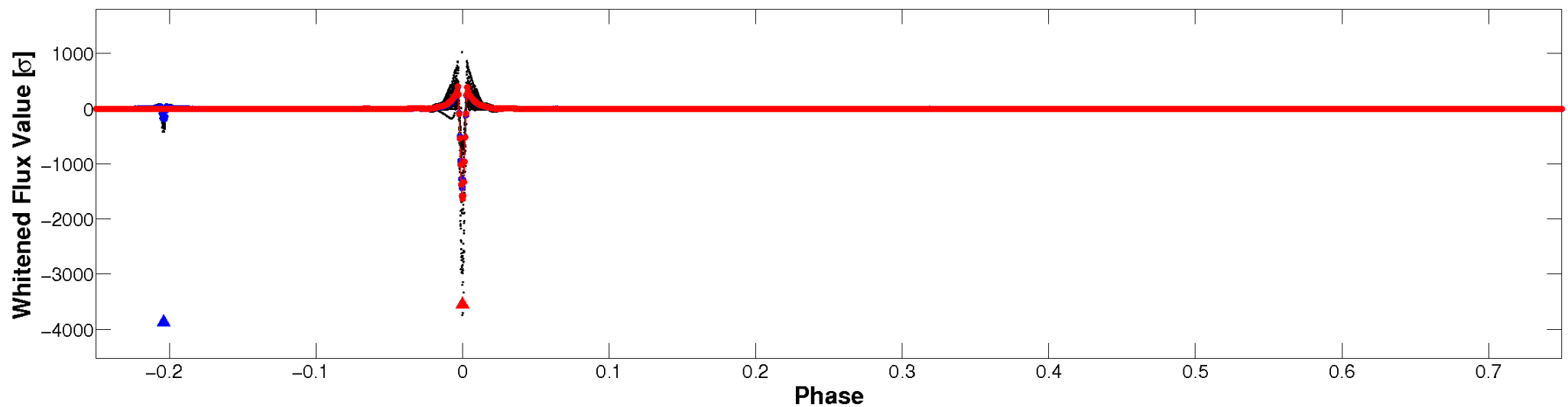


# Non-Whitened Vs. Whitened Light Curve

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

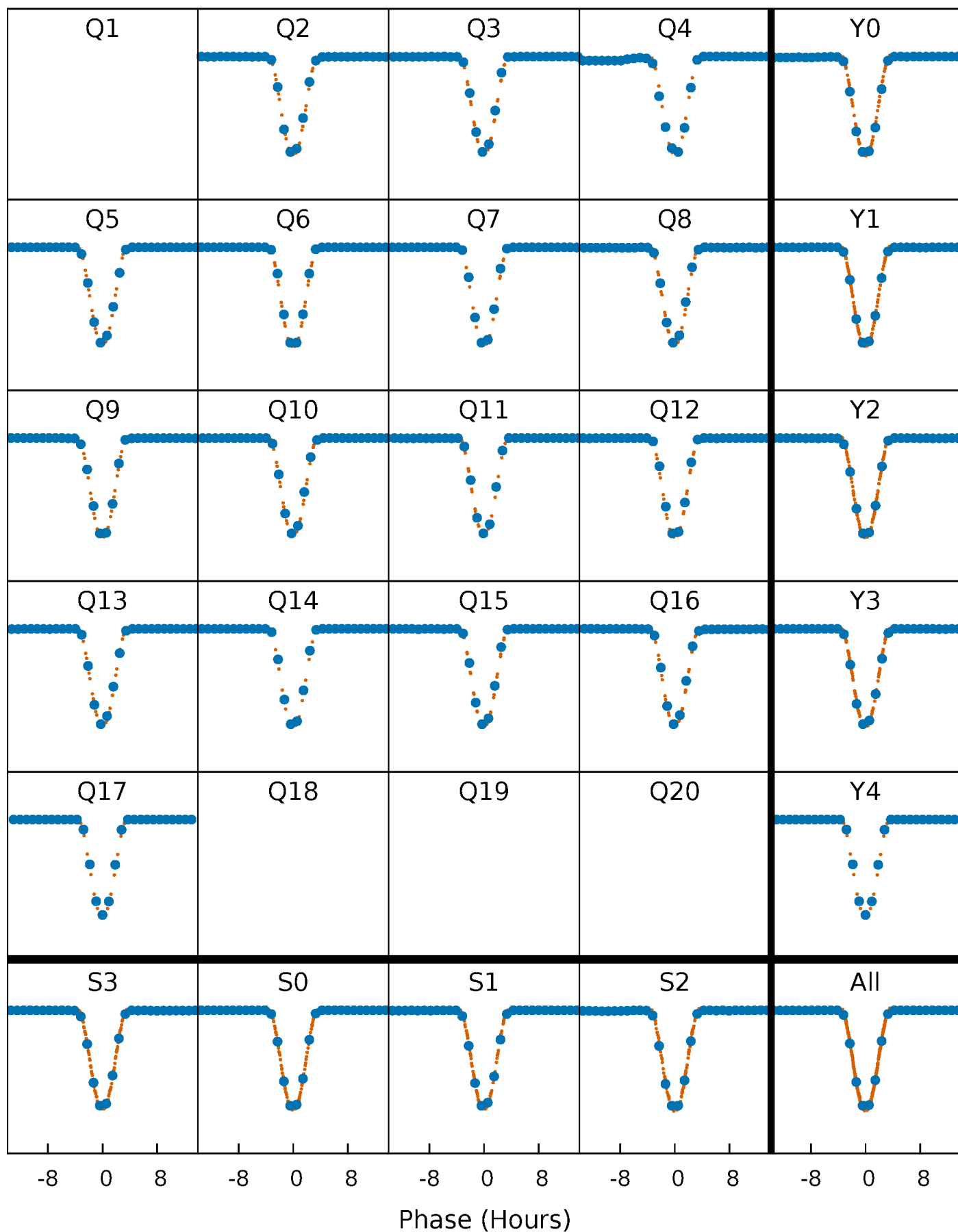


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

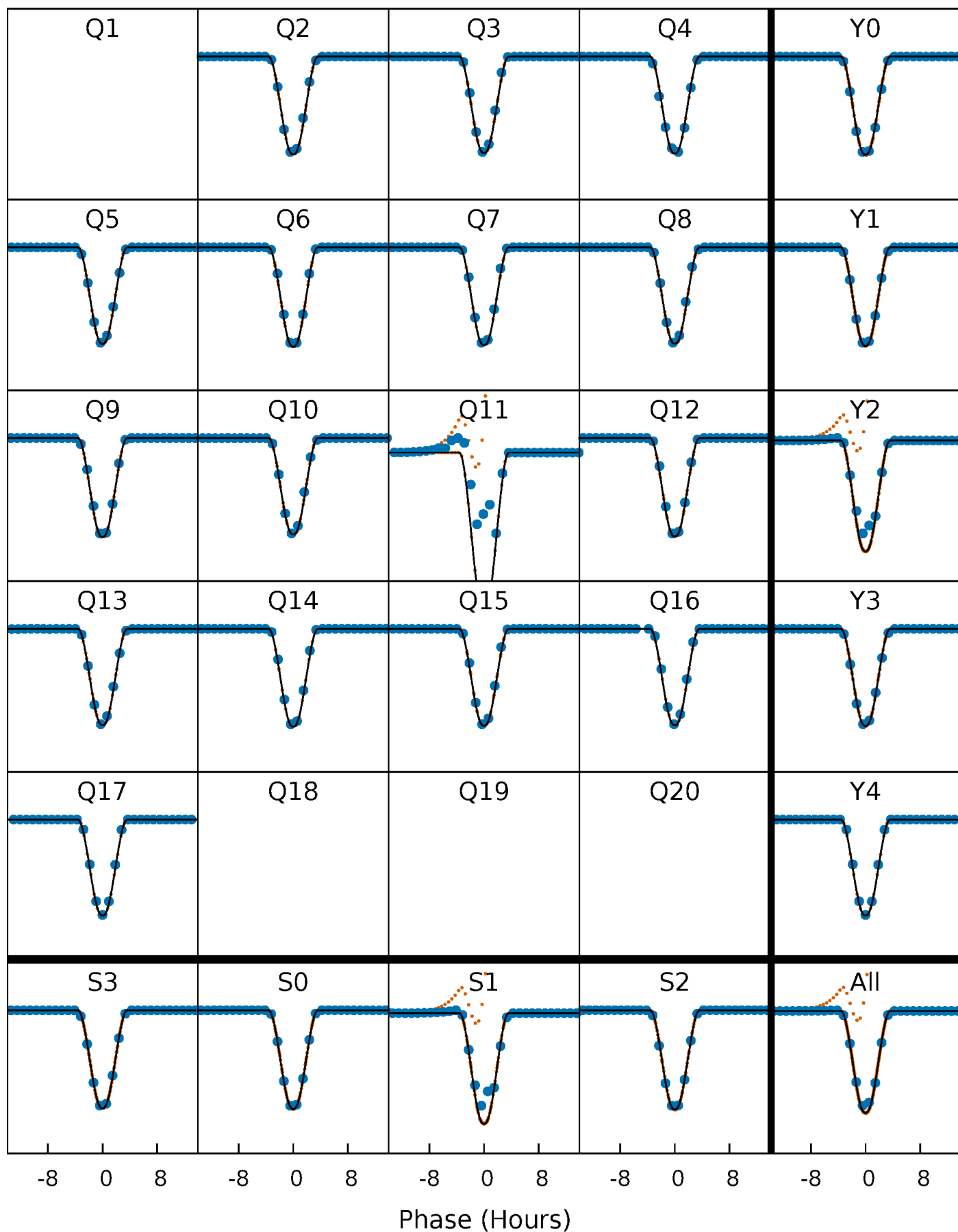
TCE 007541502-01 P= 44.827326 Days  $T_0=173.410345$  (BKJD)





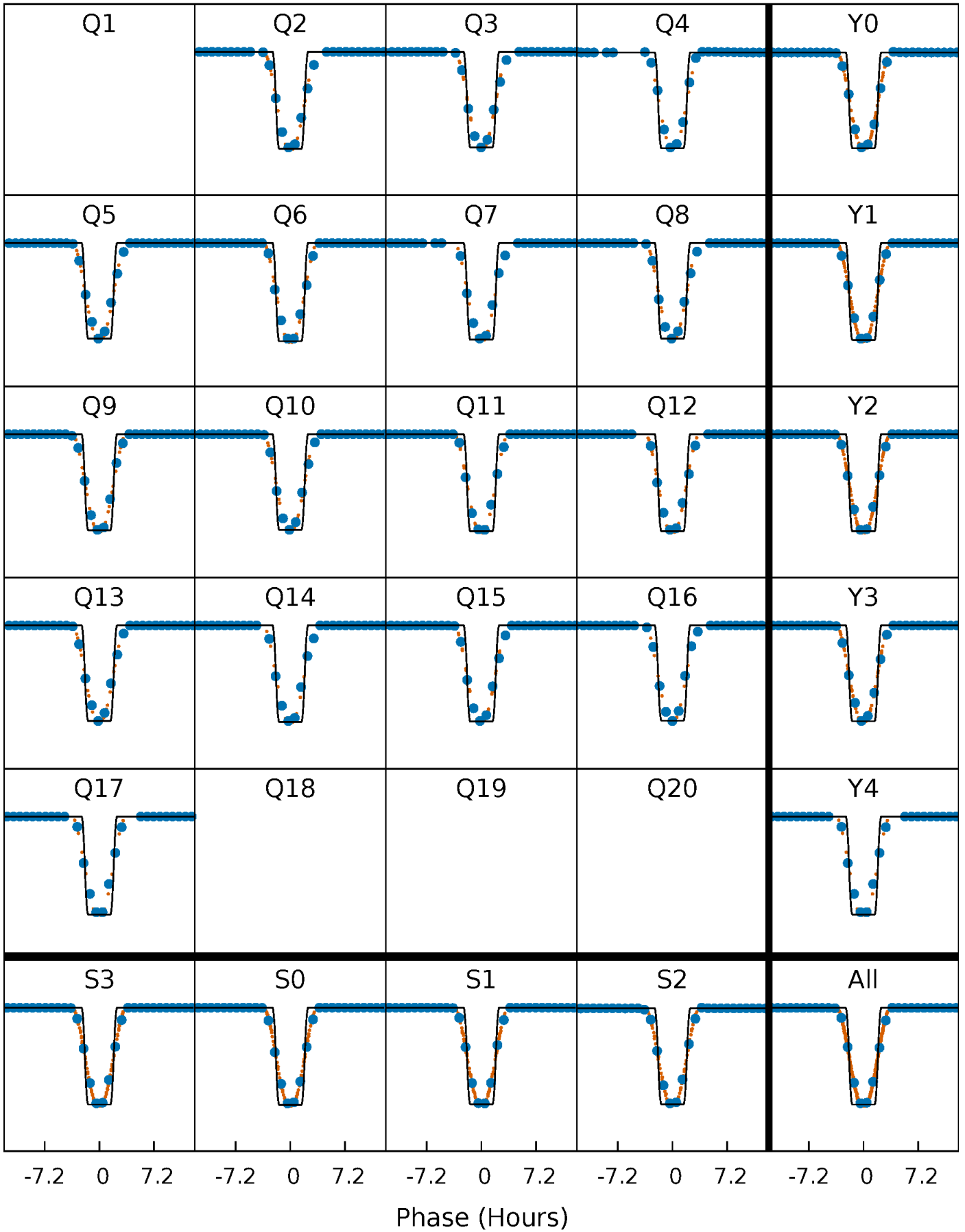
# DV Quarter-Phased Transit Curves

TCE 007541502-01 P= 44.827326 Days  $T_0=173.410345$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

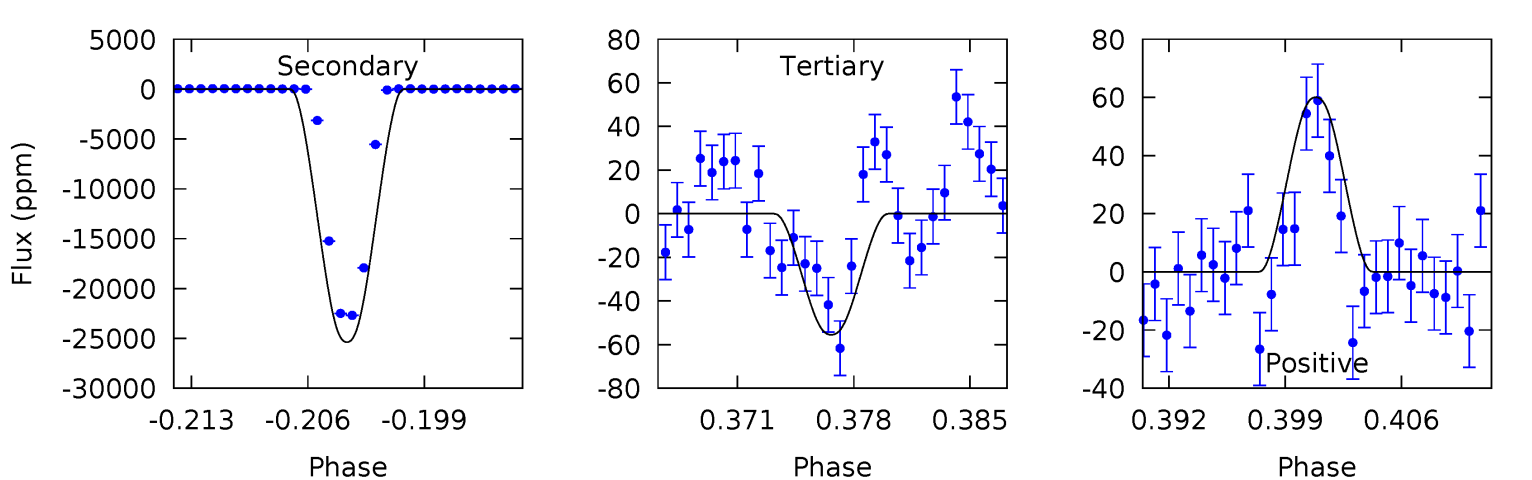
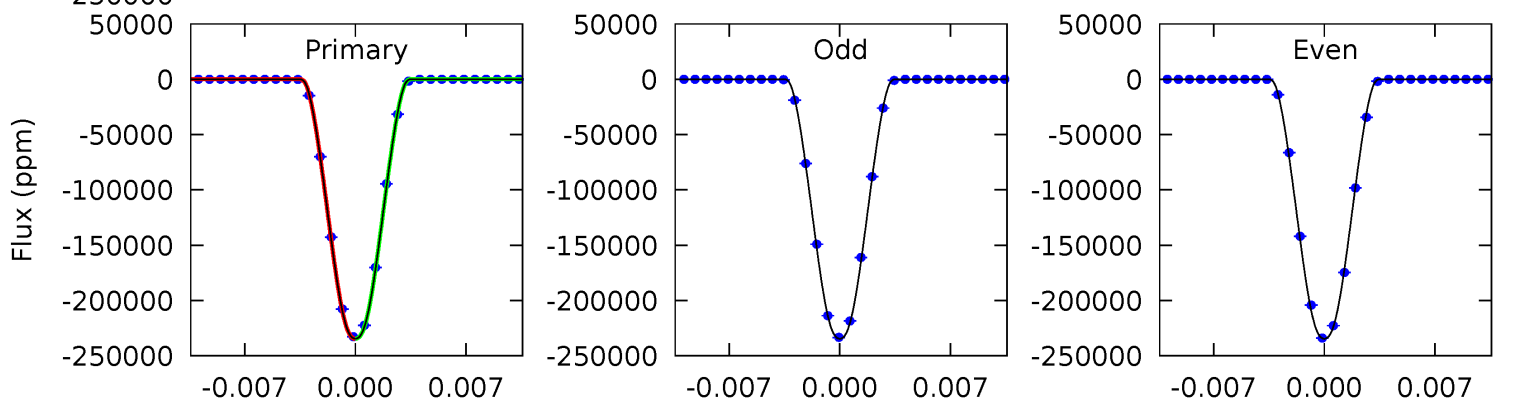
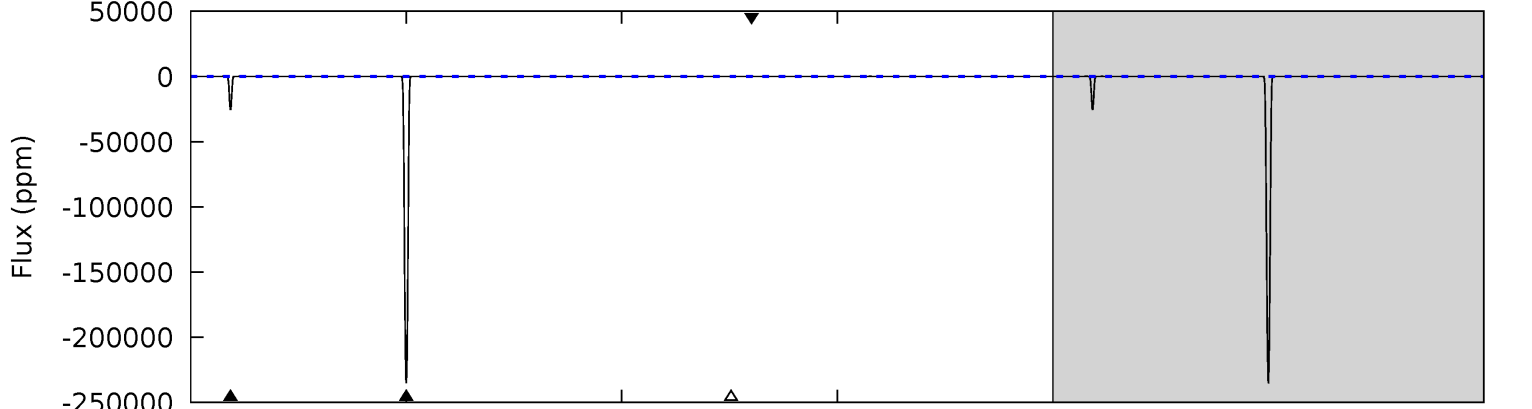
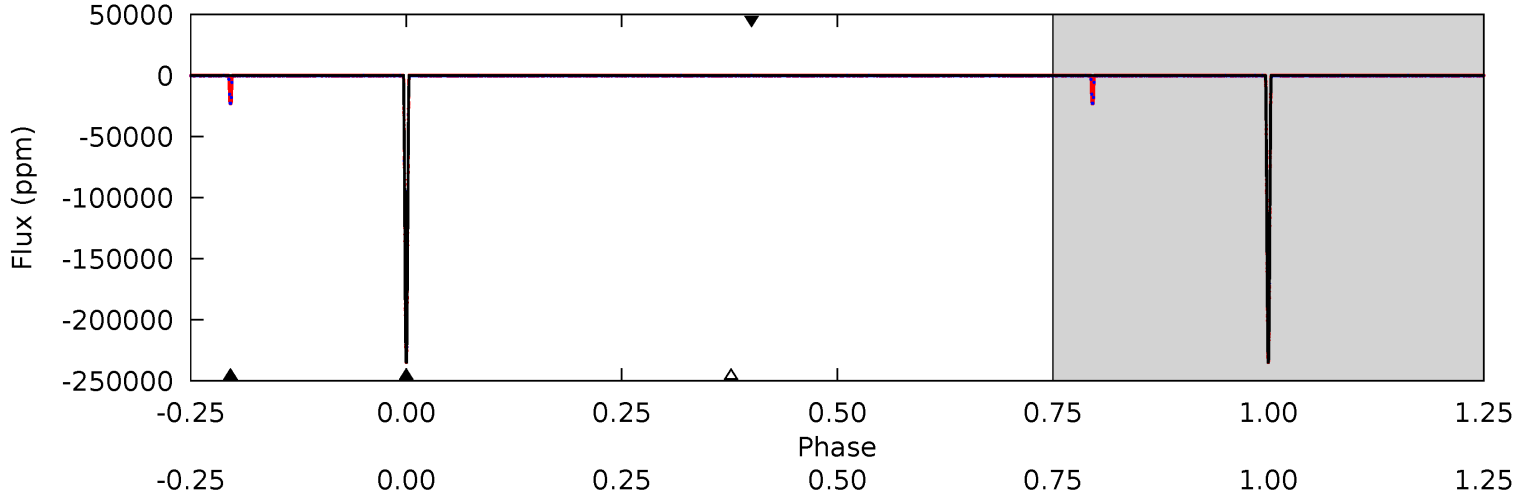
TCE 007541502-01 P= 44.827449 Days  $T_0=173.408290$  (BKJD)



# DV Model-Shift Uniqueness Test

007541502-01, P = 44.827326 Days, E = 128.583019 Days

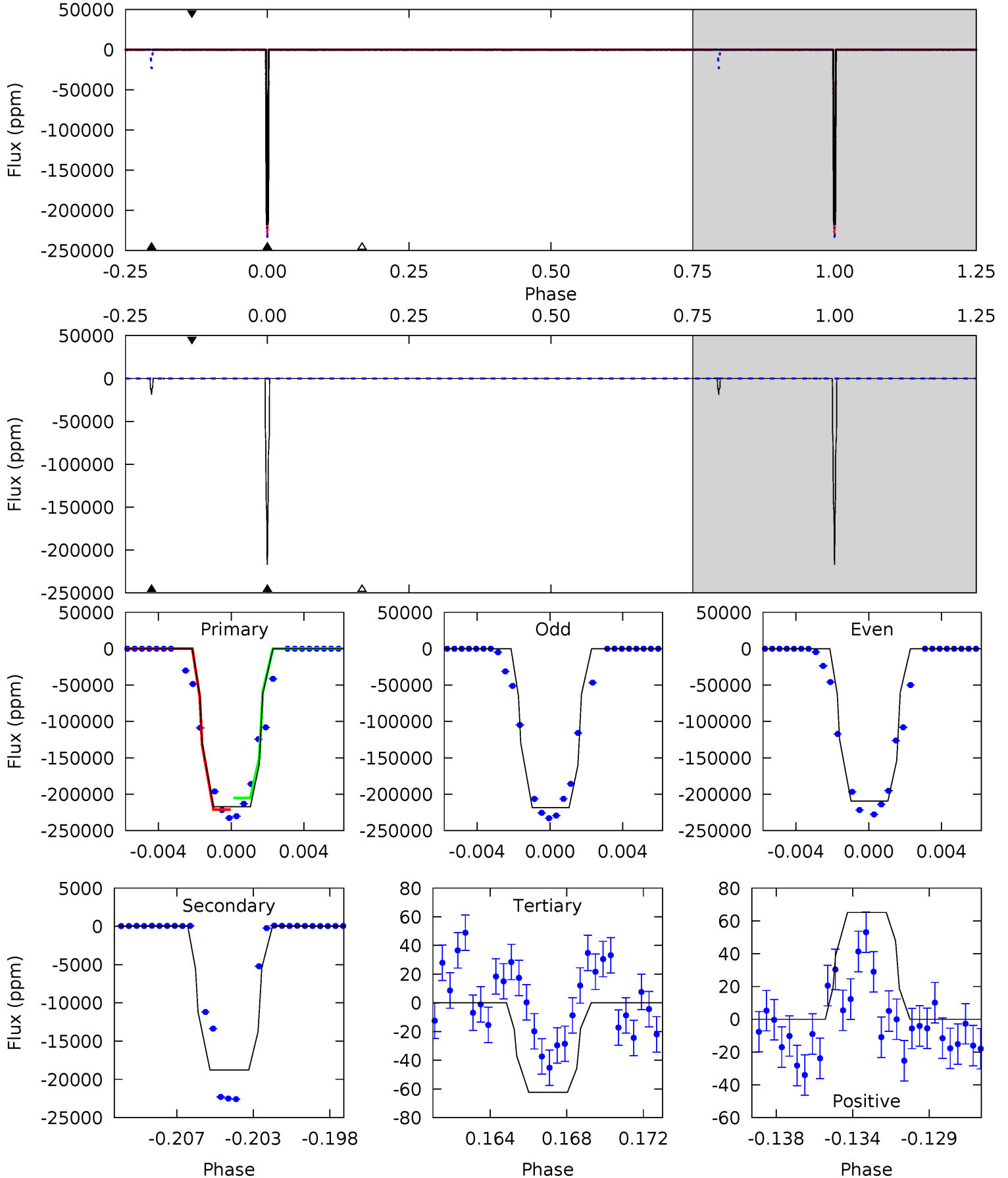
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39002	4220	9.23	9.98	5.10	2.70	3.11	38993	38992	4211	4210	0.44	0.96	0.00	0



# Alt Model-Shift Uniqueness Test

007541502-01, P = 44.827449 Days, E = 128.580841 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
15147	1309	4.34	4.54	5.19	2.85	1.27	15143	15143	1305	1305	414.9	1.00	0.00	0



### Stellar Parameters For KIC 007541502

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$5160^{+207}_{-165}$	$3.568^{+0.912}_{-0.228}$	$-0.020^{+0.300}_{-0.300}$	$3.279^{+1.012}_{-2.362}$	$1.450^{+0.226}_{-0.565}$	$0.058^{+1.718}_{-0.036}$
	+4%/-3%	+26%/-6%	+1500%/-1500%	+31%/-72%	+16%/-39%	+2965%/-62%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 007541502-01 / KOI 6885.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-25383 \pm 6$	$167.49^{+31.36}_{-67.04}$	$1077^{+130}_{-215}$	$3486^{+106}_{-80}$	$42^{+59}_{-13}$
Alt.	$-18771 \pm 14$	$168.11^{+35.38}_{-63.79}$	$1069^{+122}_{-199}$	$3288^{+94}_{-69}$	$29^{+39}_{-9}$

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

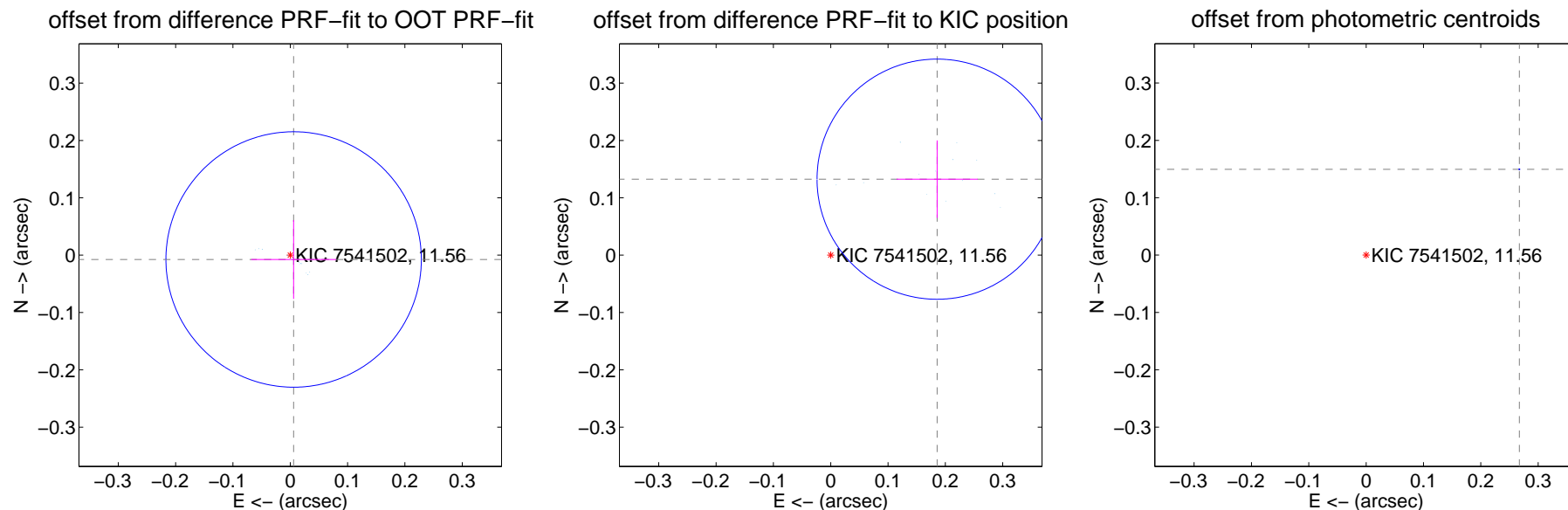
## DV Centroid Data

Supplemental centroid analysis for 007541502-01. **Kepler magnitude: 11.56.** Transit SNR 16316.63

There are 15 quarters with good PRF difference image offsets

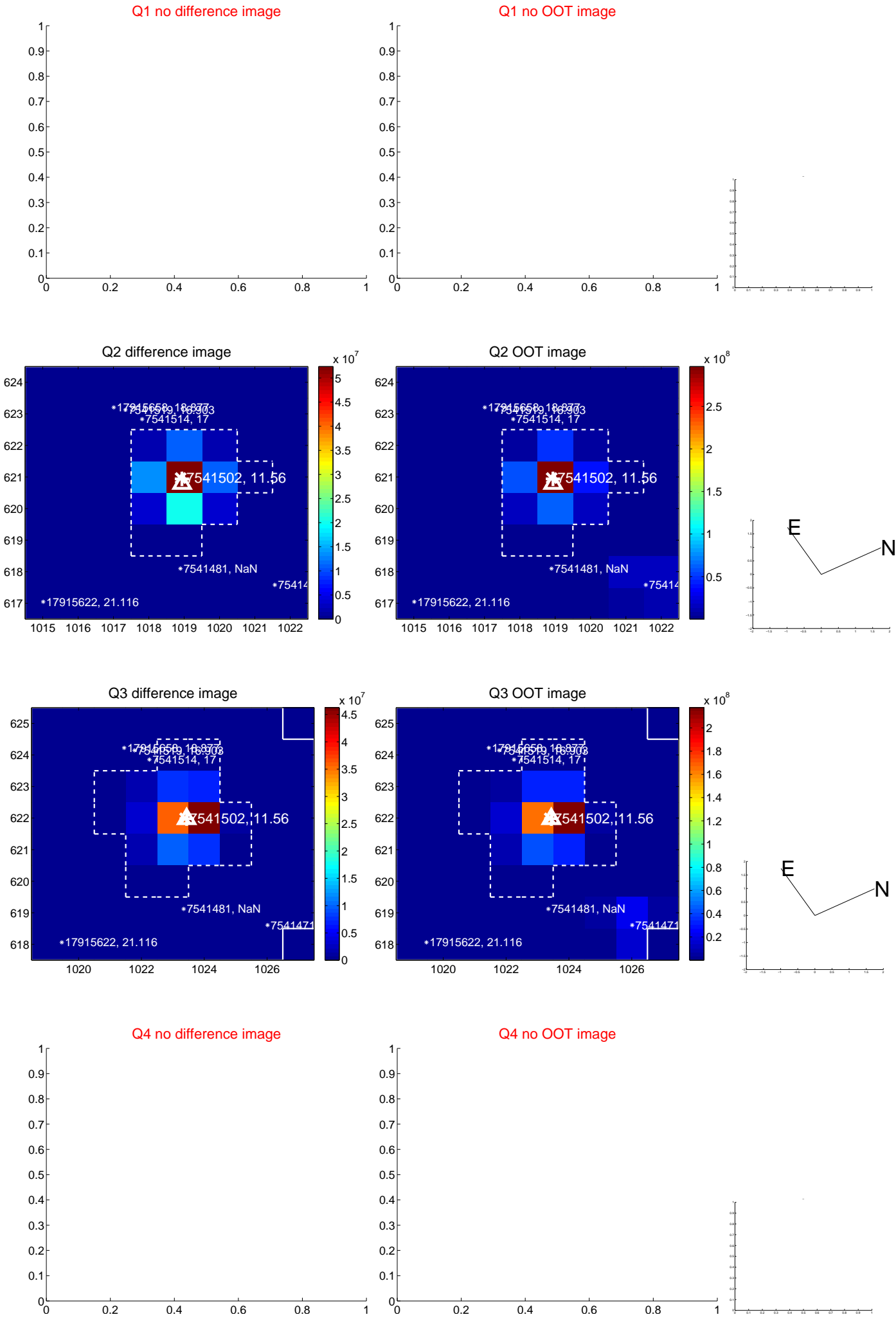
The direct PRF centroid is offset from the target star catalog position by about 0.31 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.010 \pm 0.074$	0.13	$-0.006 \pm 0.074$	$-0.008 \pm 0.069$
PRF-fit source offset from KIC position	<b><math>0.228 \pm 0.070</math></b>	<b>3.27</b>	$-0.186 \pm 0.071$	$0.132 \pm 0.068$
photometric centroid source offset	<b><math>0.31 \pm 0.00</math></b>	<b>1115.35</b>	$-0.27 \pm 0.00$	$0.15 \pm 0.00$

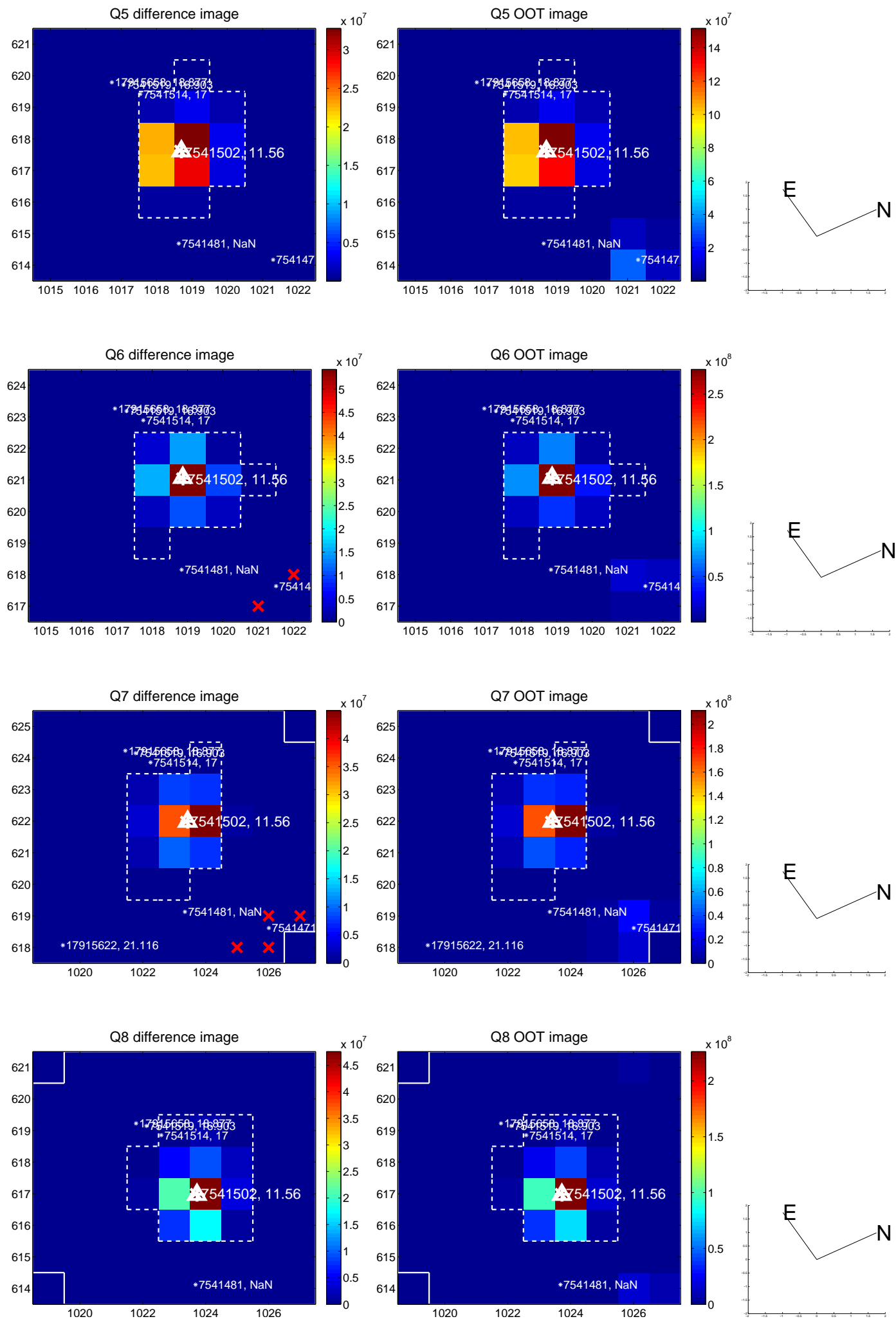


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

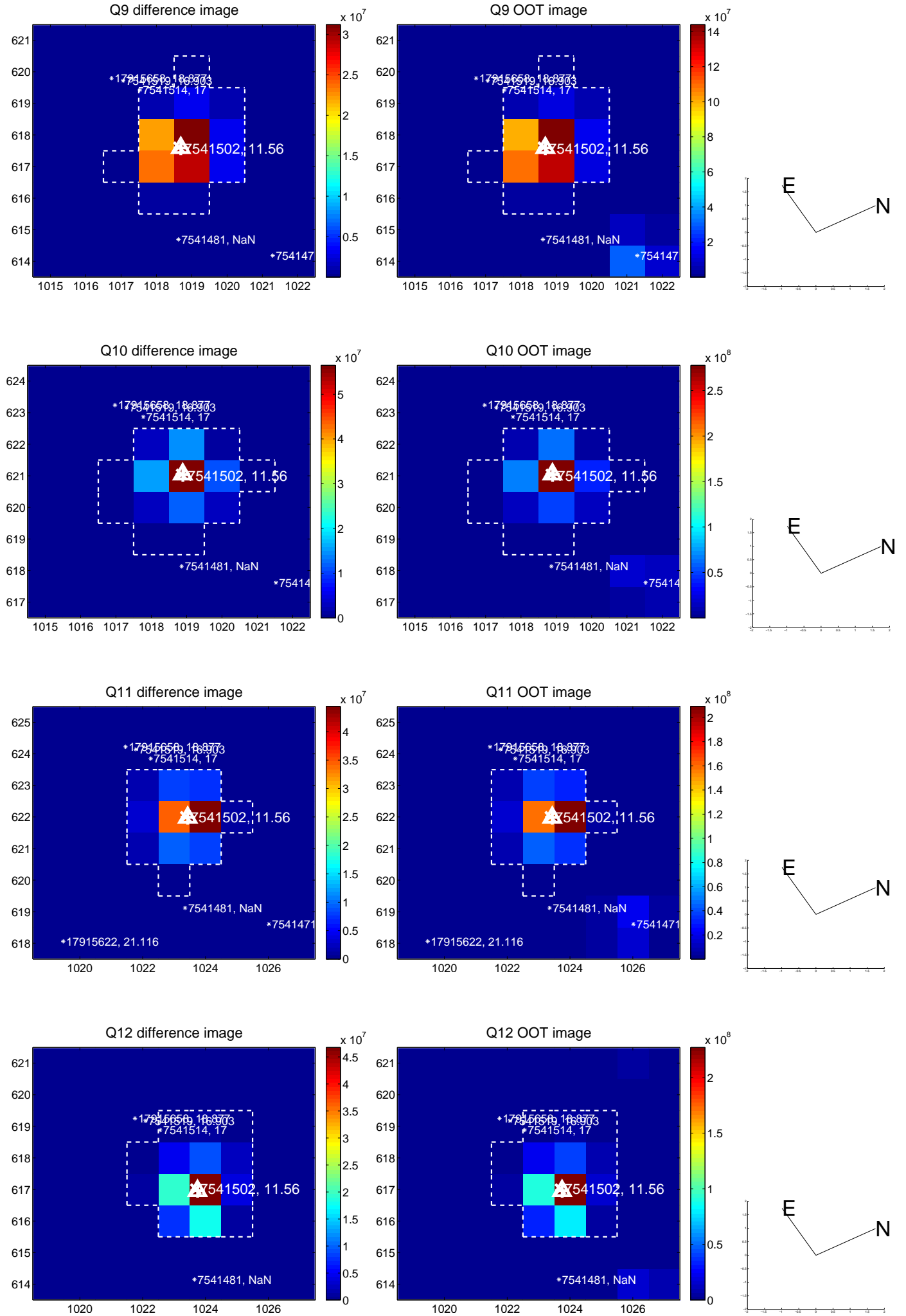


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

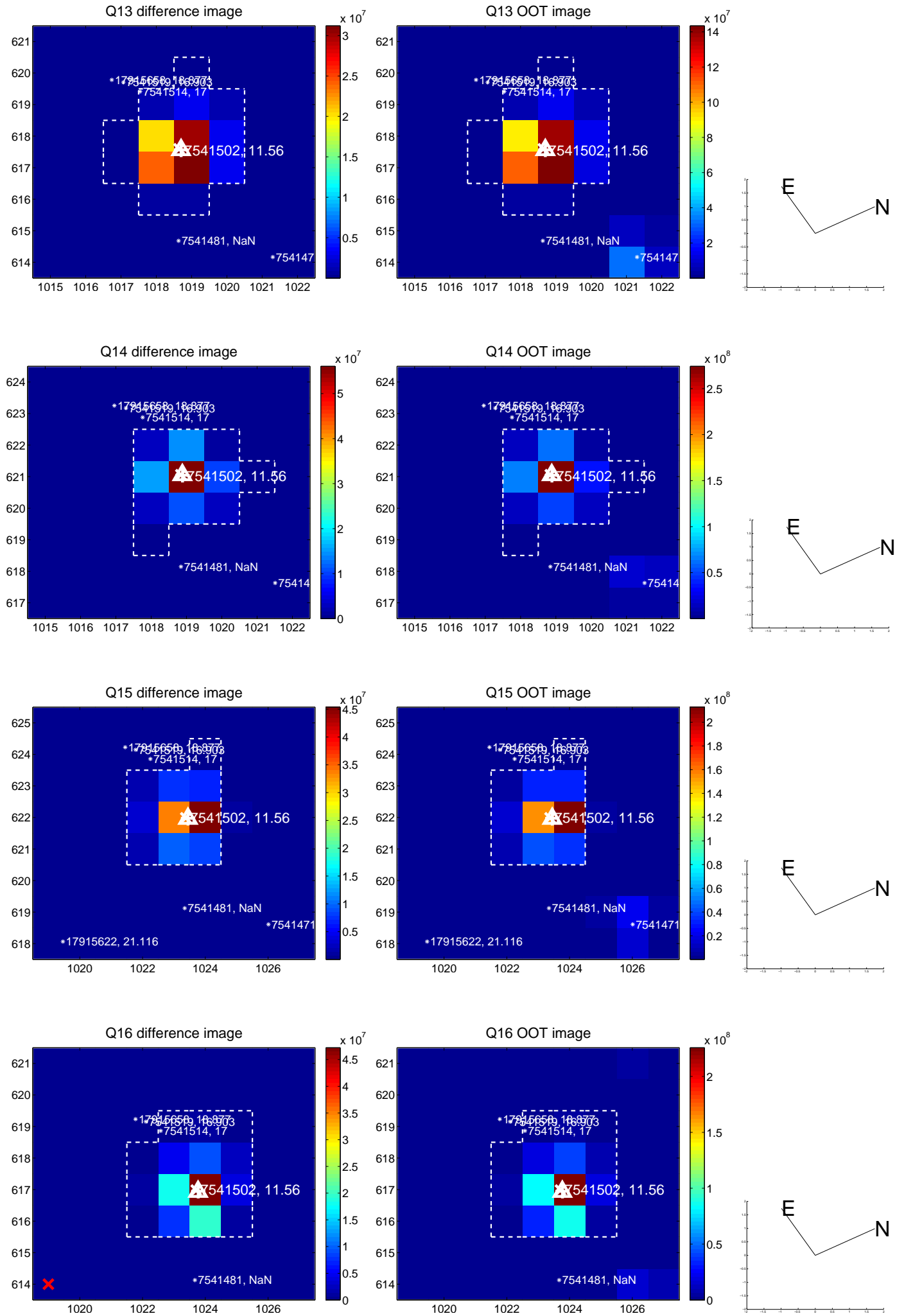




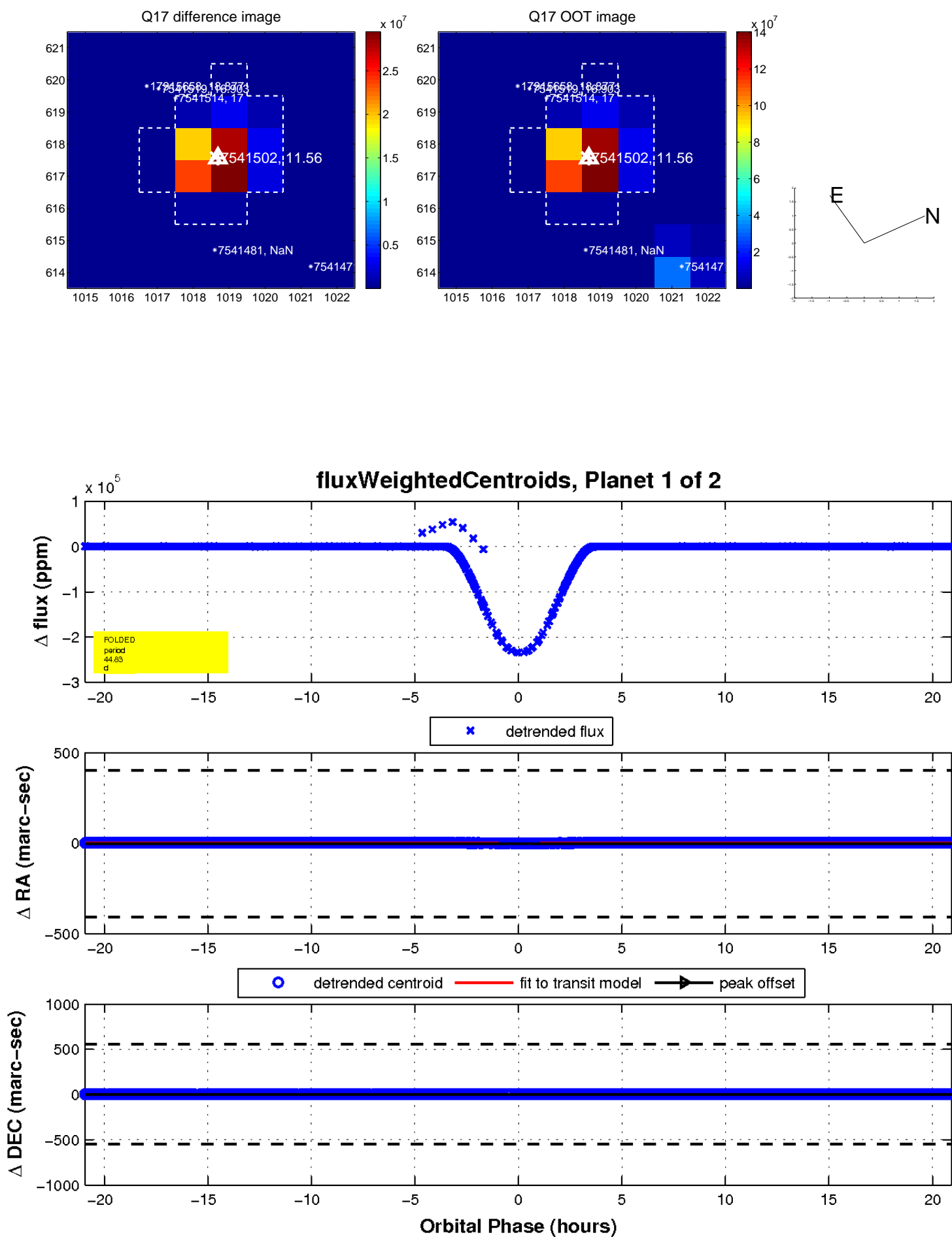
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



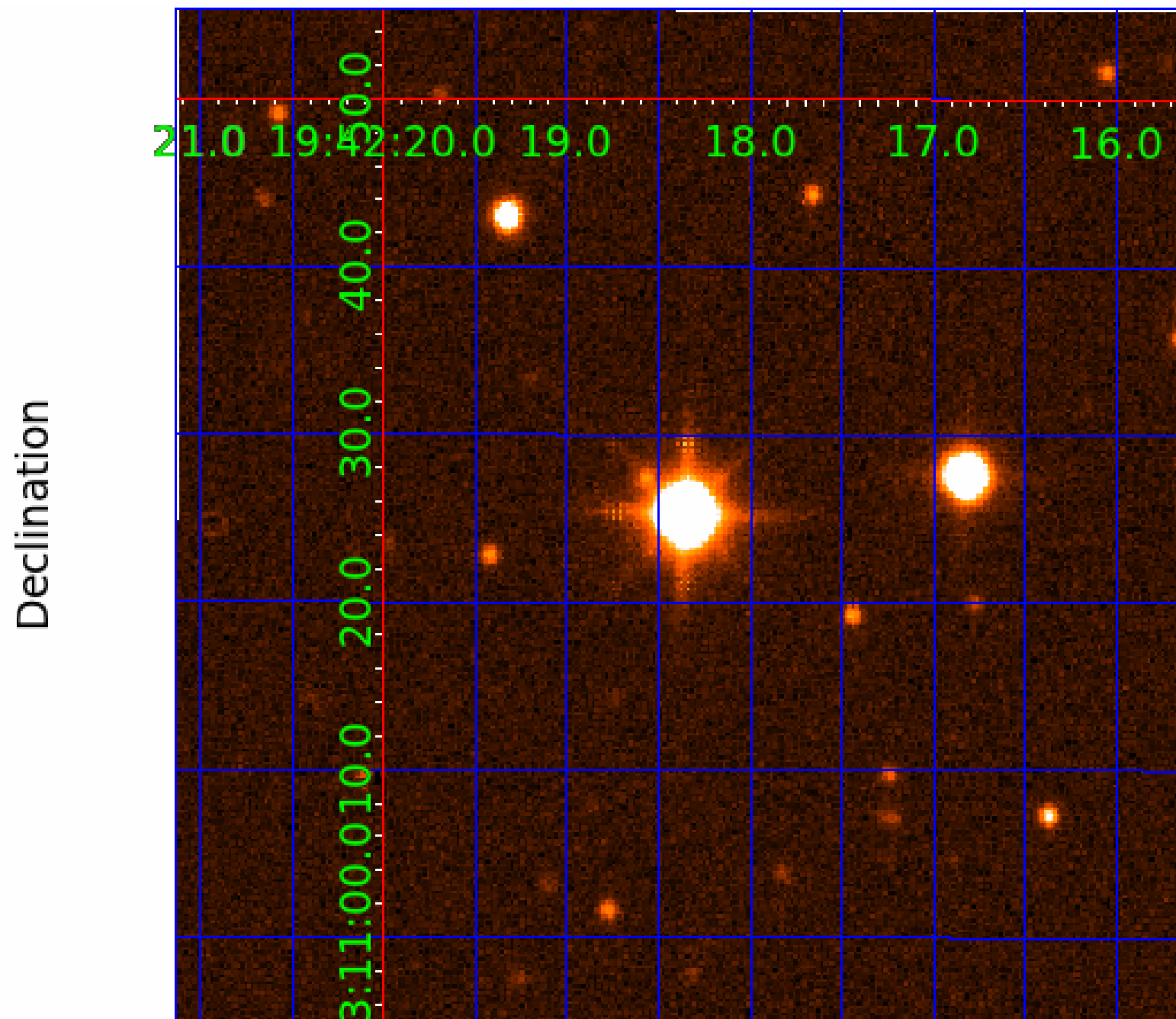
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 007541502

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007541502-01	OBS	6885.01	44.827326	173.410345	234616.0	6.977	19899.5	16316.6	3.28	5160	166.59	87.35
007541502-02	OBS	No	44.827325	164.272214	23643.4	4.383	2574.7	1241.9	3.28	5160	57.26	87.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007541502-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE
007541502-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE

**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.

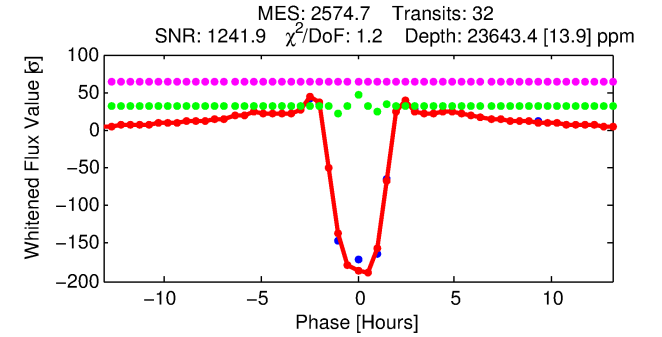
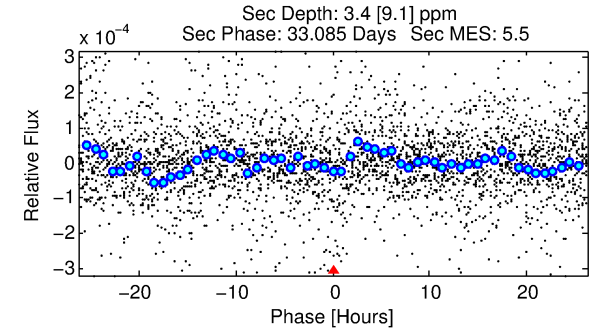
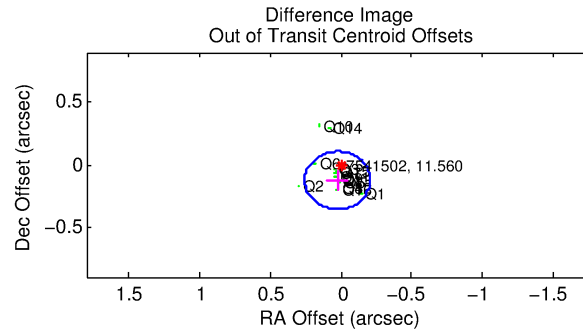
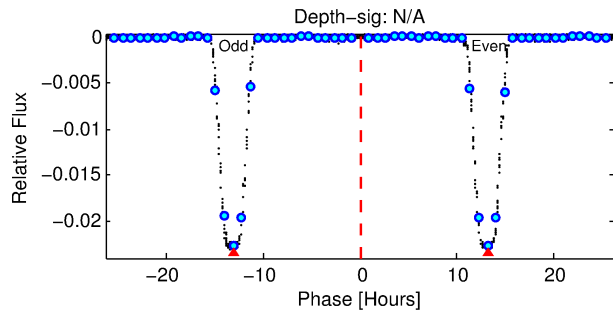
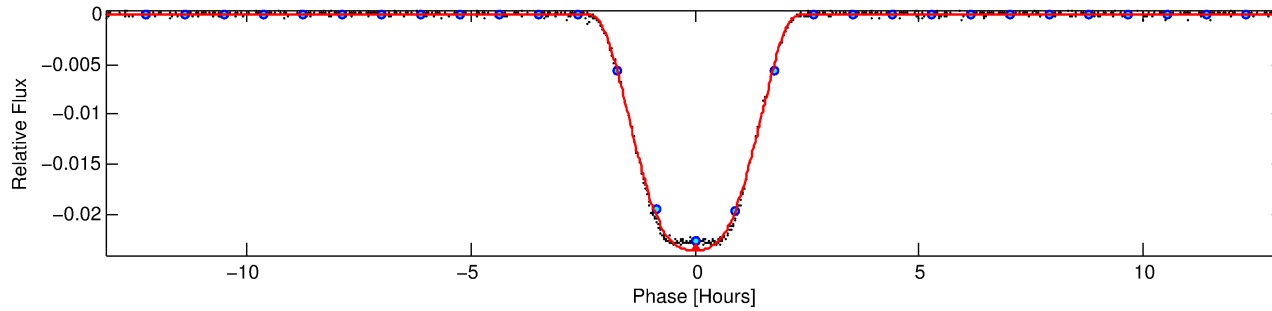
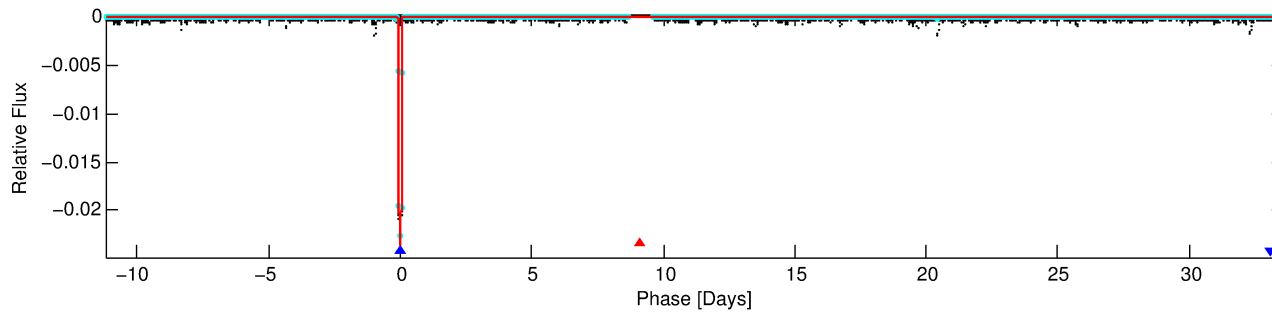
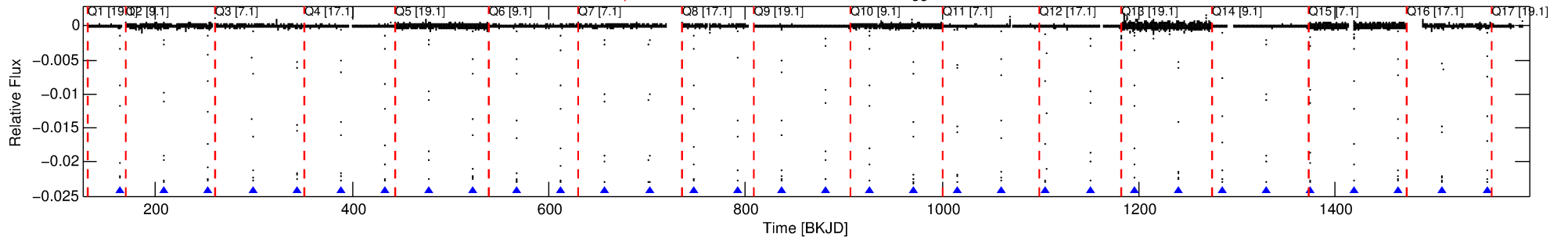
## Ephemeris Match Information For 007541502-02

No Significant Match Found

# DV One-Page Summary

KIC: 7541502 Candidate: 2 of 2 Period: 44.827 d  
KOI: K06885 Corr: No Ephemeris Match

Kp: 11.56 R\*: 3.28 Rs Teff: 5160.0 K Logg: 3.57 Fe/H: -0.020



## DV Fit Results:

Period = 44.82732 [0.00000] d  
Epoch = 164.2722 [0.0000] BKJD  
Rp/R\* = 0.1600 [0.0001]  
a/R\* = 65.09 [0.05]  
b = 0.81 [0.00]  
Seff = 87.35 [130.04]  
Teff = 780 [290] K  
Rp = 57.26 [41.25] Re  
a = 0.2796 [0.2374] AU  
Ag = 0.04 [0.14] [-7.04σ]  
Teffp = 552 [374] K [-0.48σ]

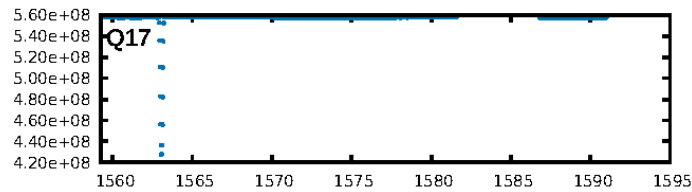
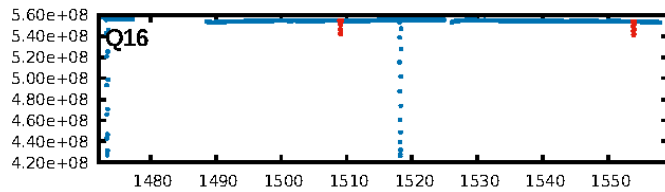
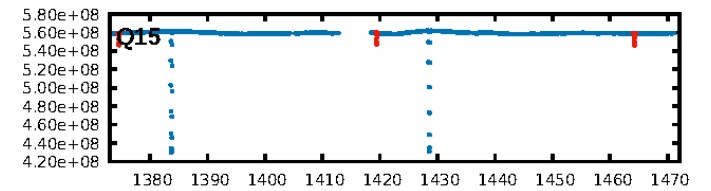
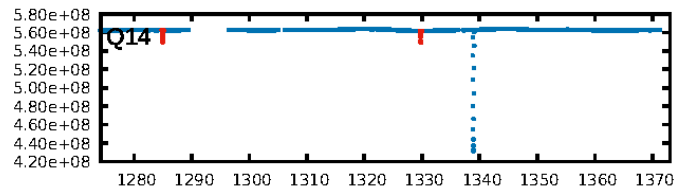
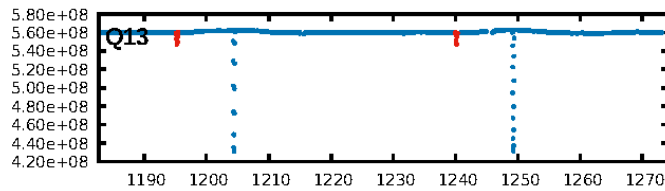
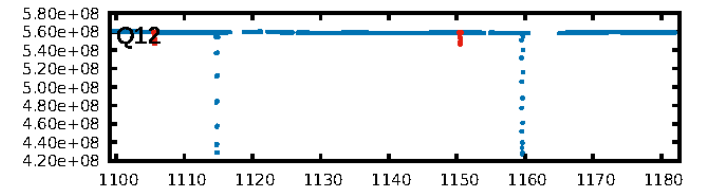
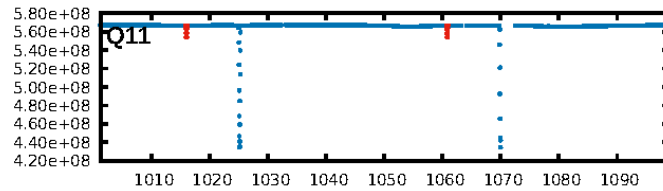
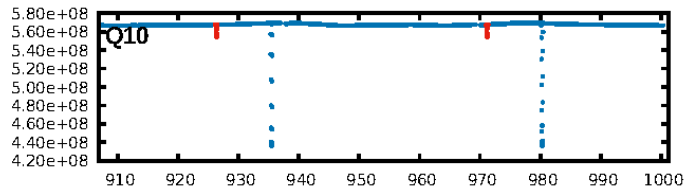
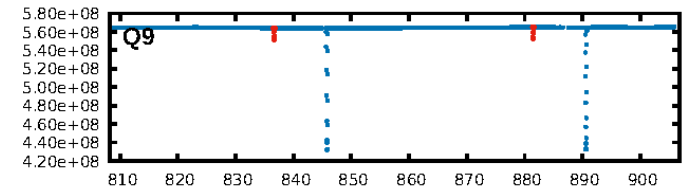
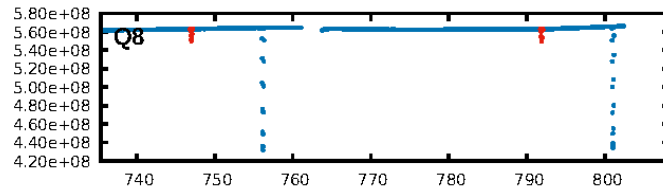
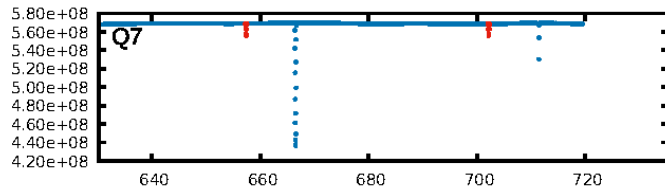
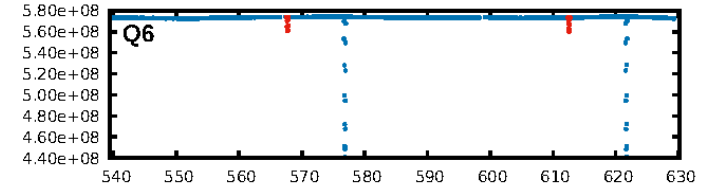
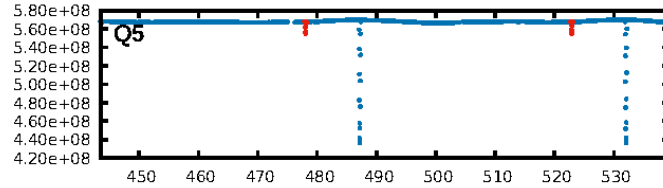
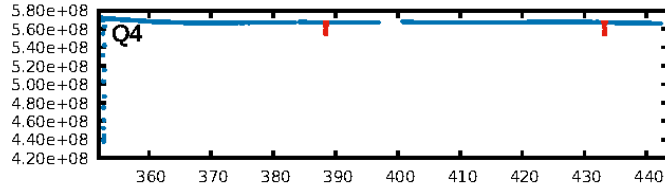
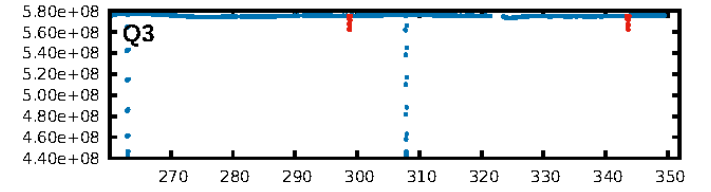
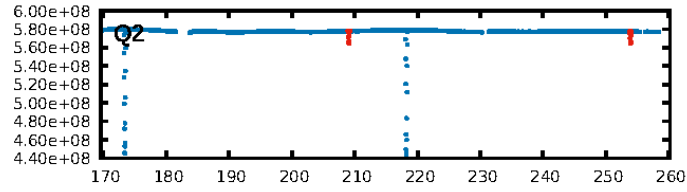
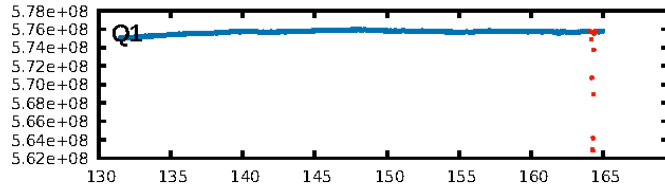
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 1.5%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [31/31]  
GhostDiagnostic-chr: 7.724  
Centroid-sig: 0.0%  
Centroid-so: 0.257 arcsec [106.83σ]  
OotOffset-rm: 0.128 arcsec [1.66σ]  
KicOffset-rm: 0.172 arcsec [2.32σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
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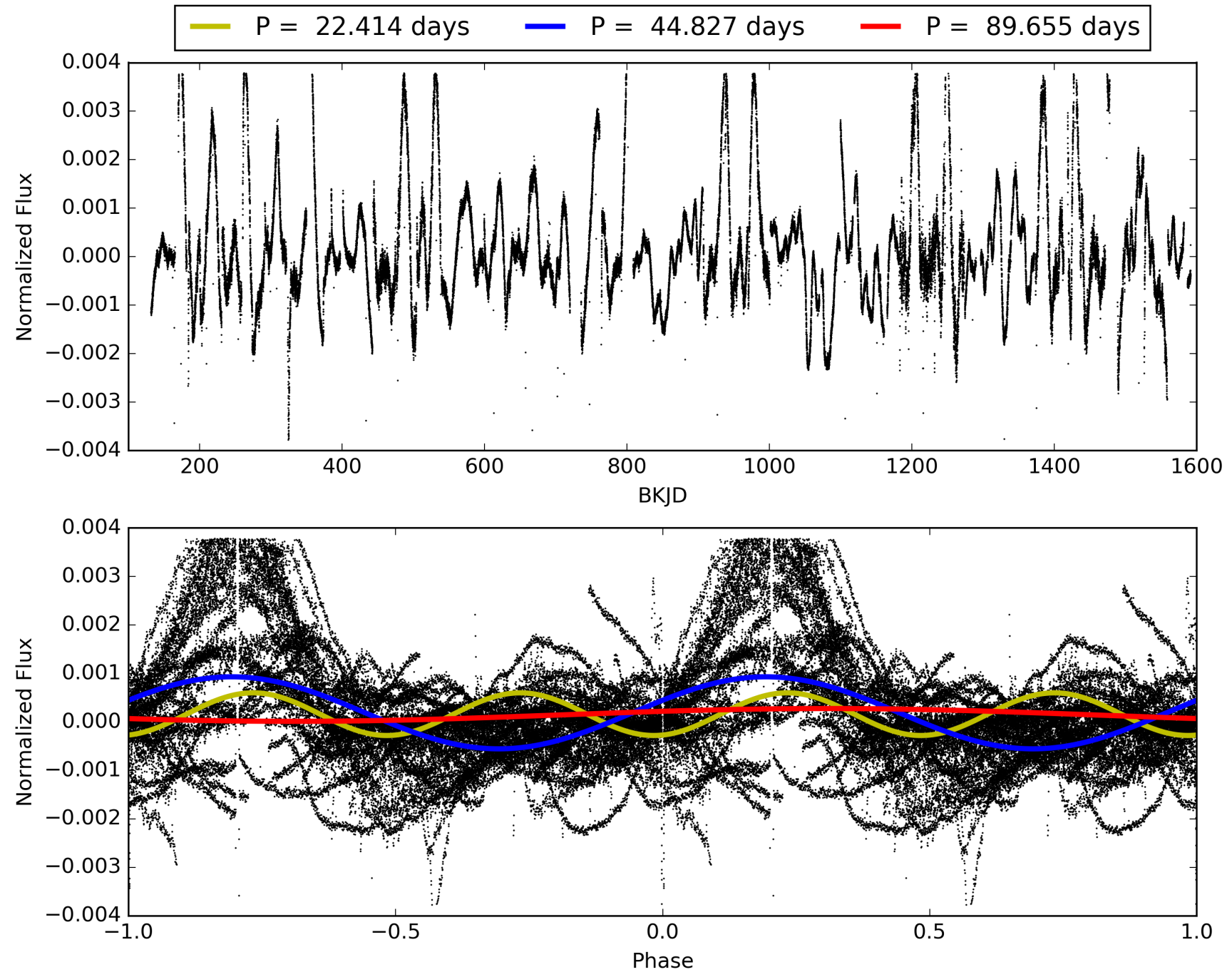
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 07:41:34 Z

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

# TCE 007541502-02, PDC Light Curves



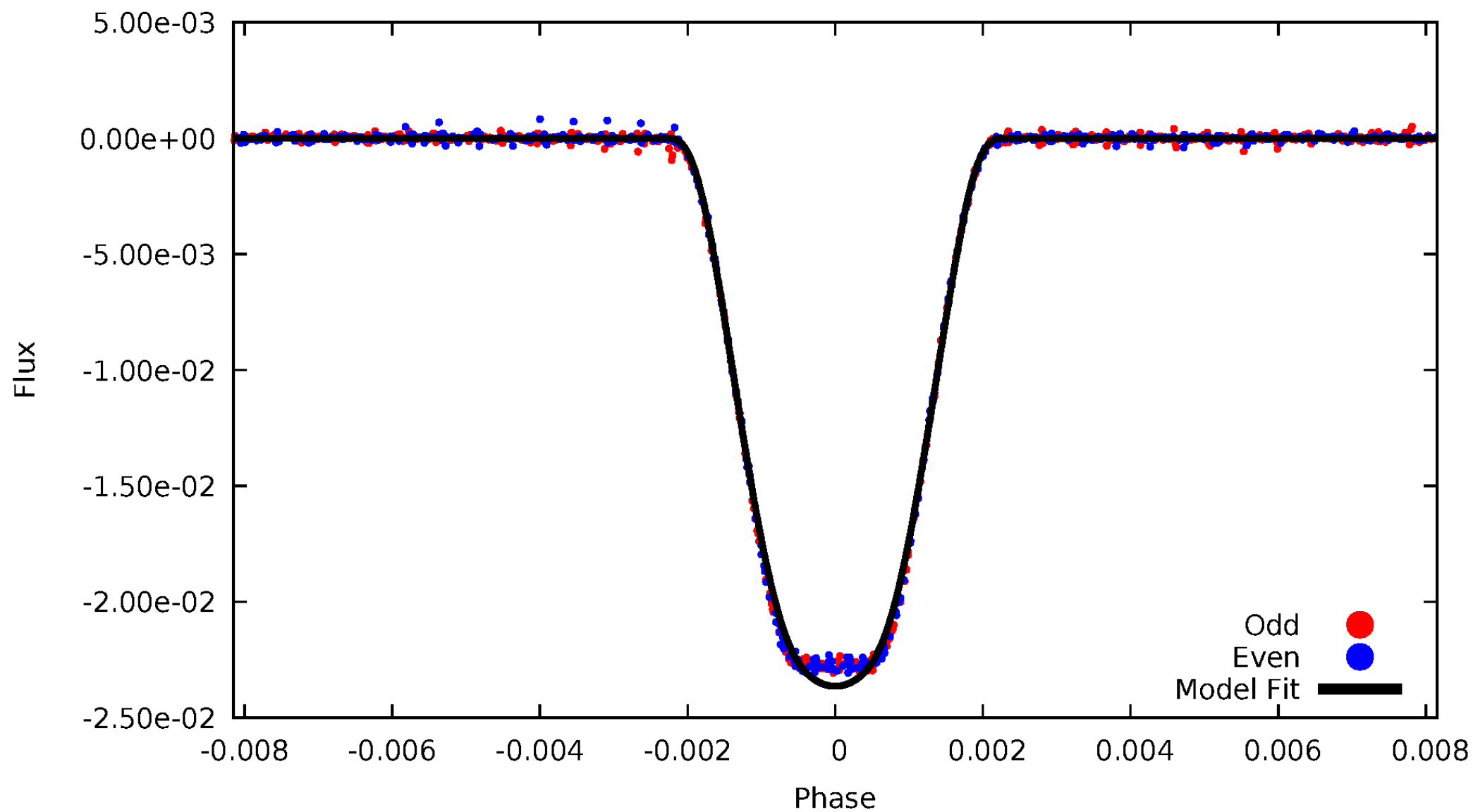
TCE 007541502-02





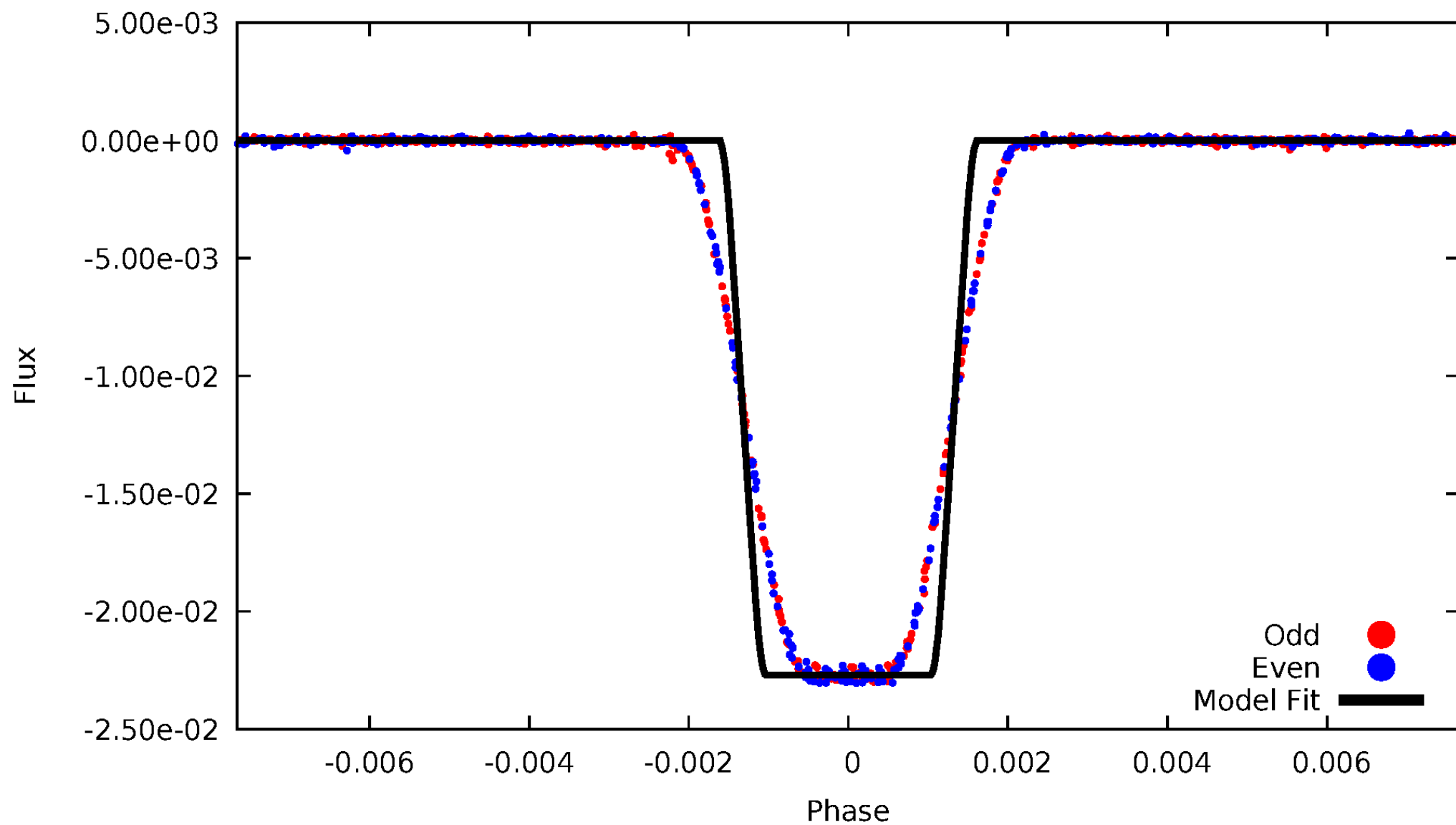
# DV Odd/Even

TCE 007541502-02



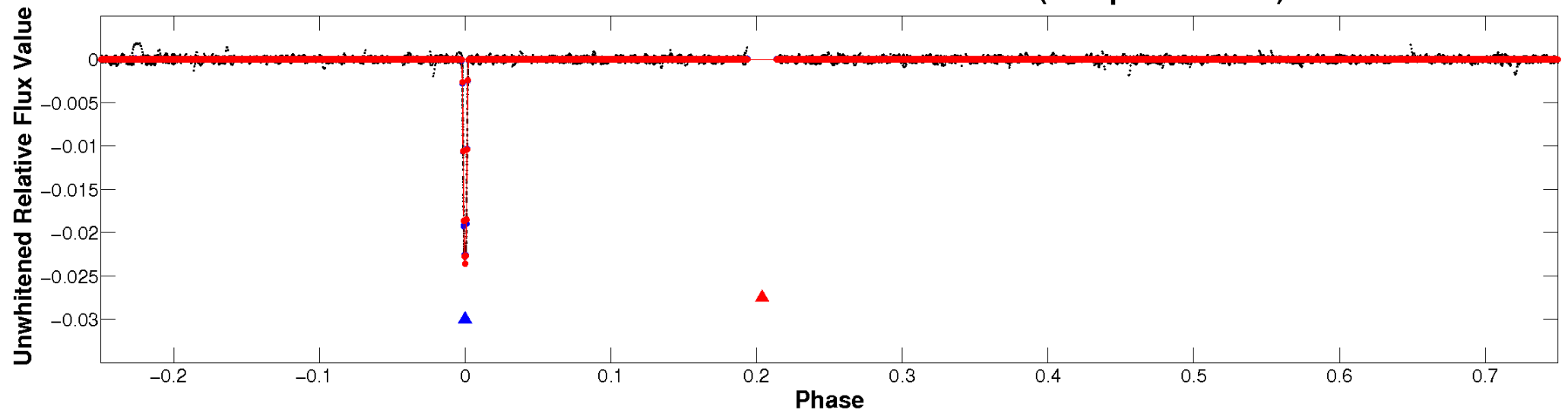
# ALT Odd/Even

TCE 007541502-02

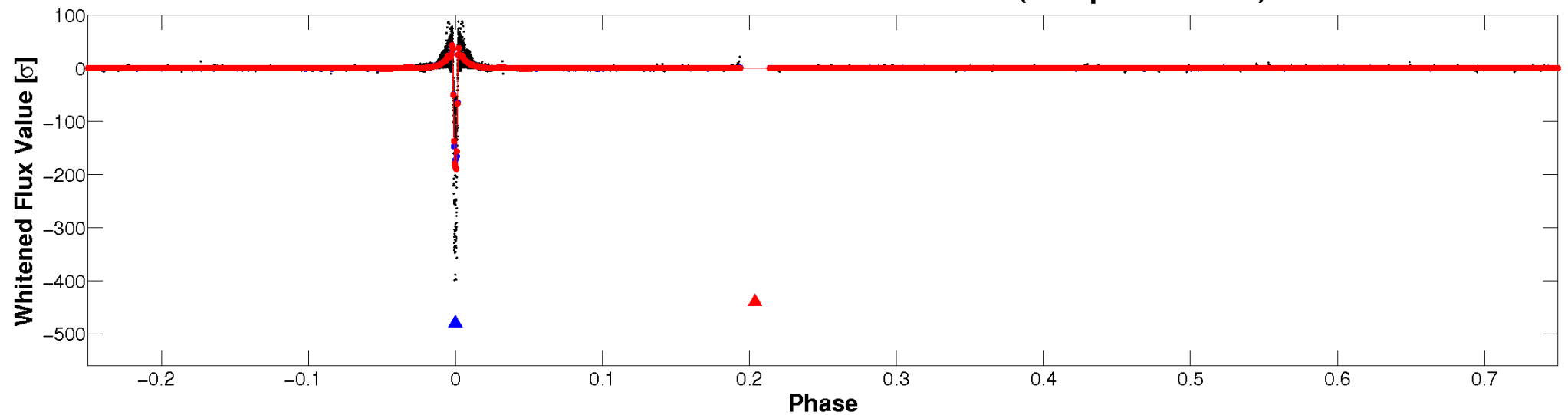


# Non-Whitened Vs. Whitened Light Curve

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

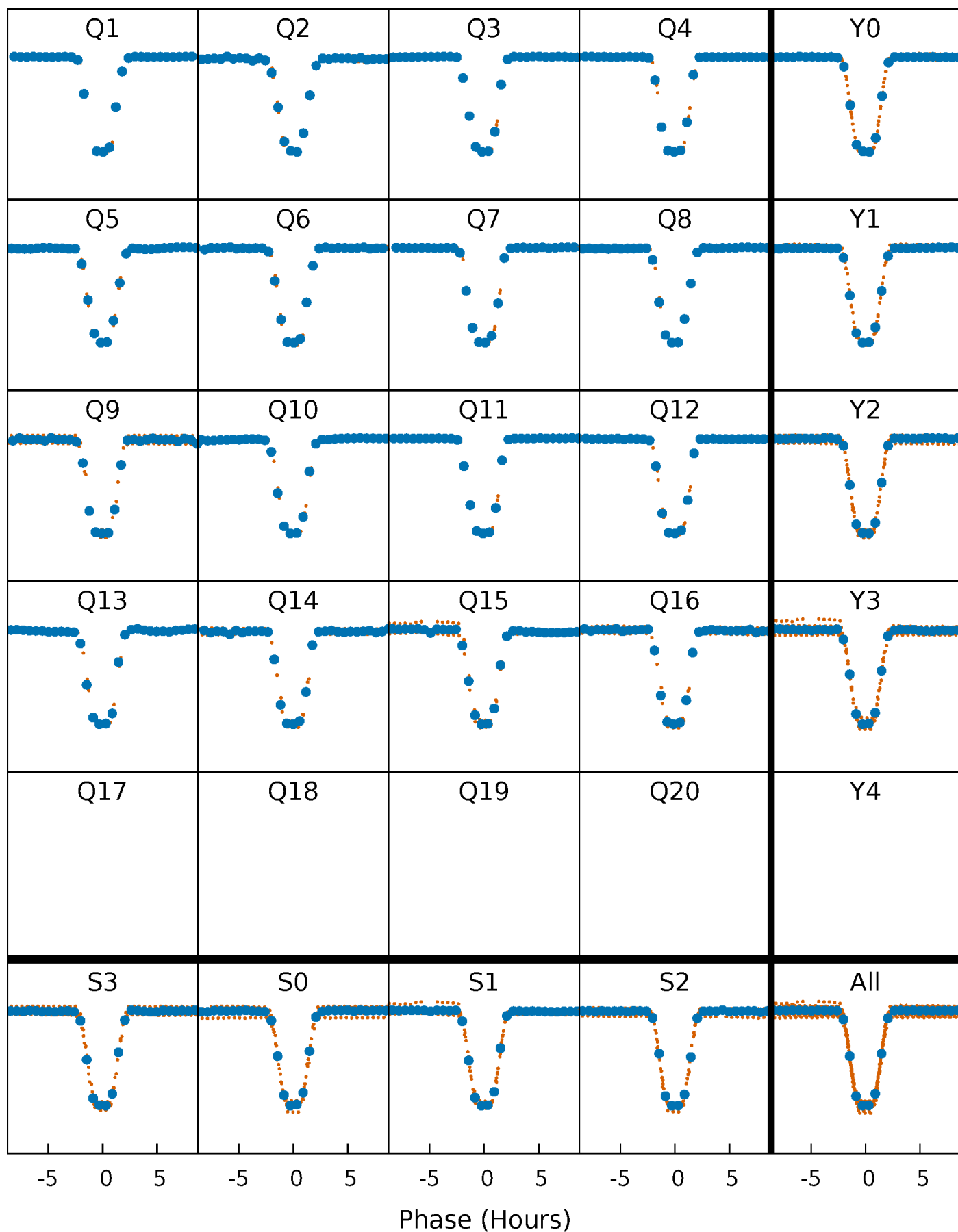


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



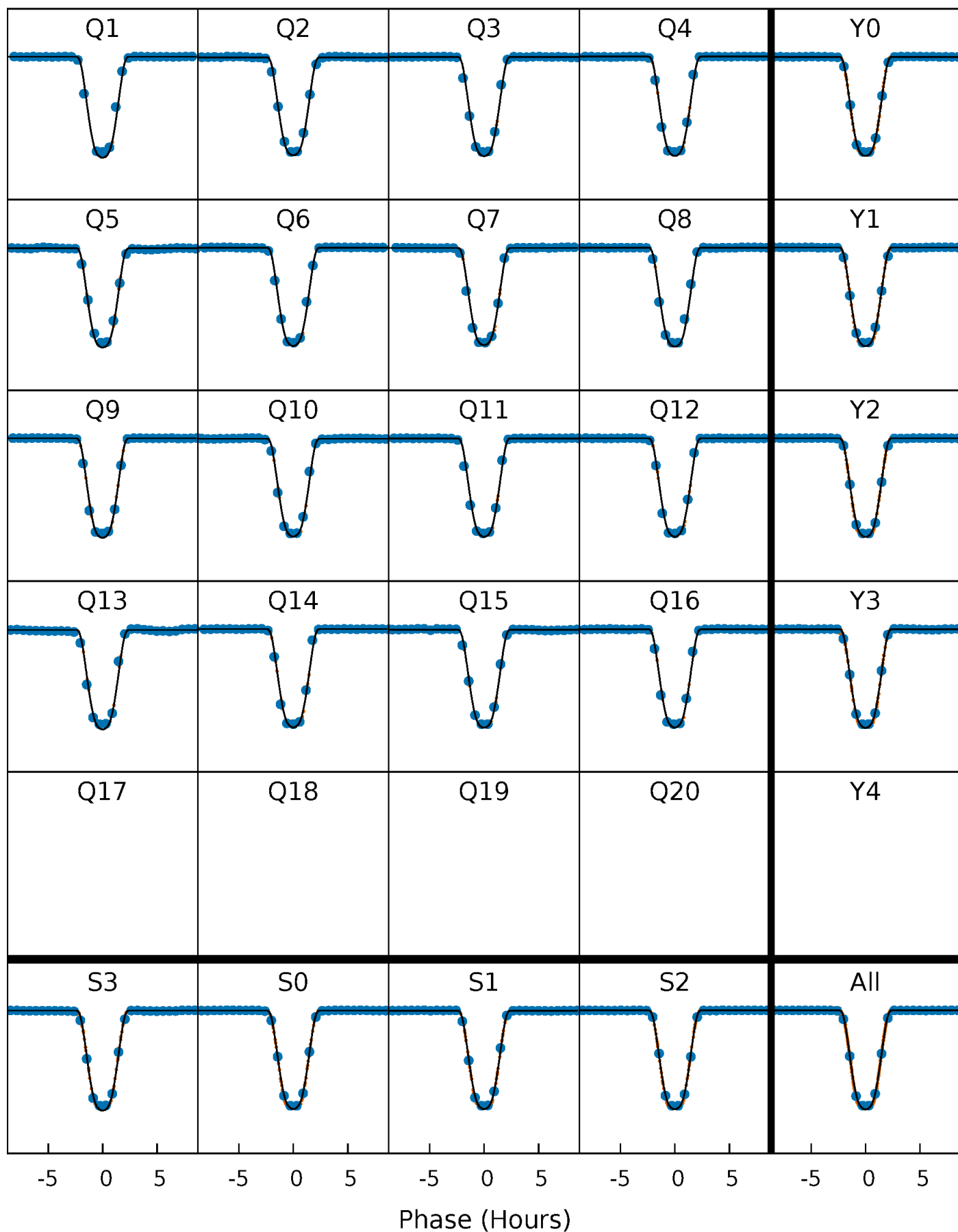
# PDC Quarter-Phased Transit Curves

TCE 007541502-02     $P = 44.827325$  Days     $T_0 = 164.272214$  (BKJD)



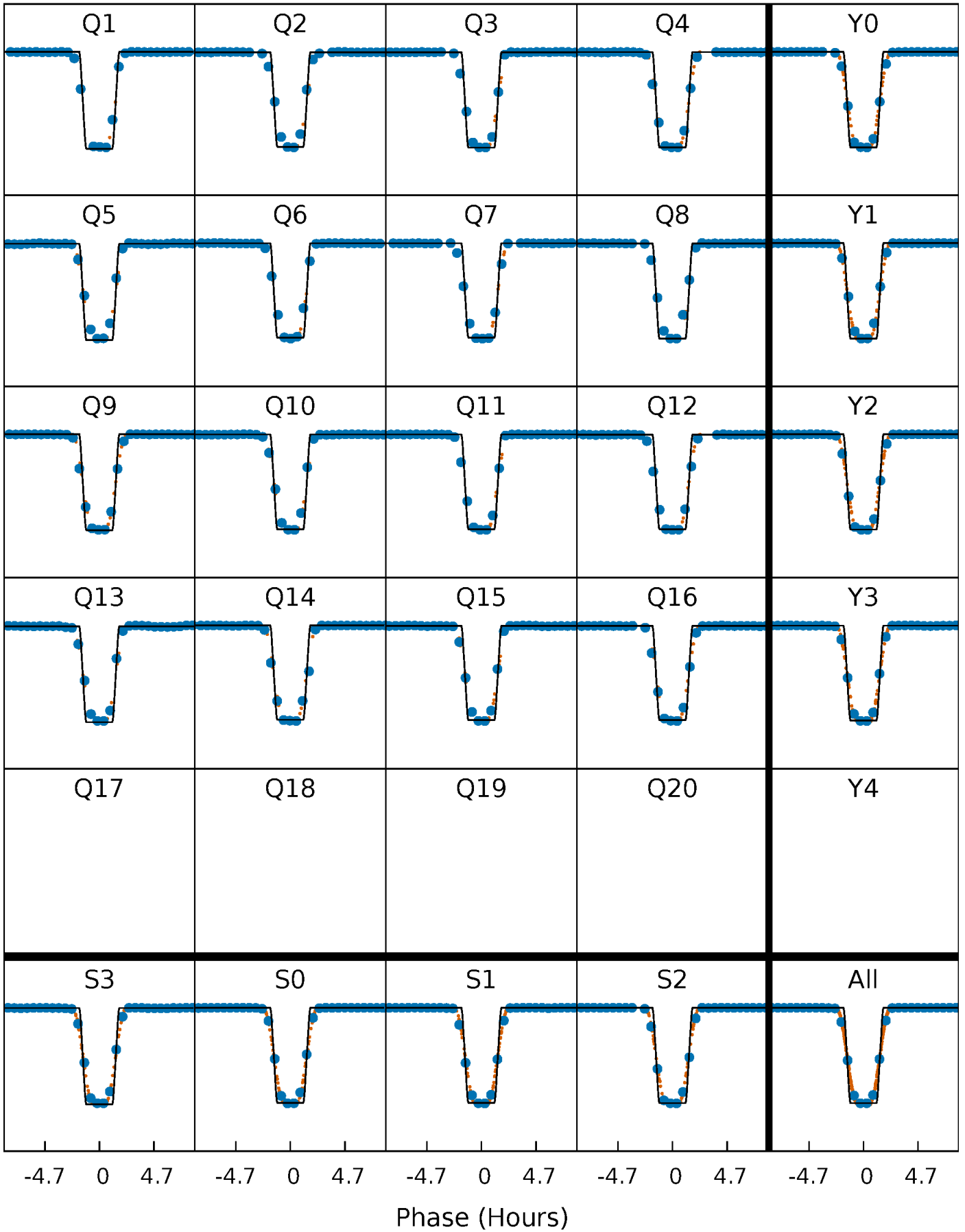
# DV Quarter-Phased Transit Curves

TCE 007541502-02    P= 44.827325 Days     $T_0=164.272214$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

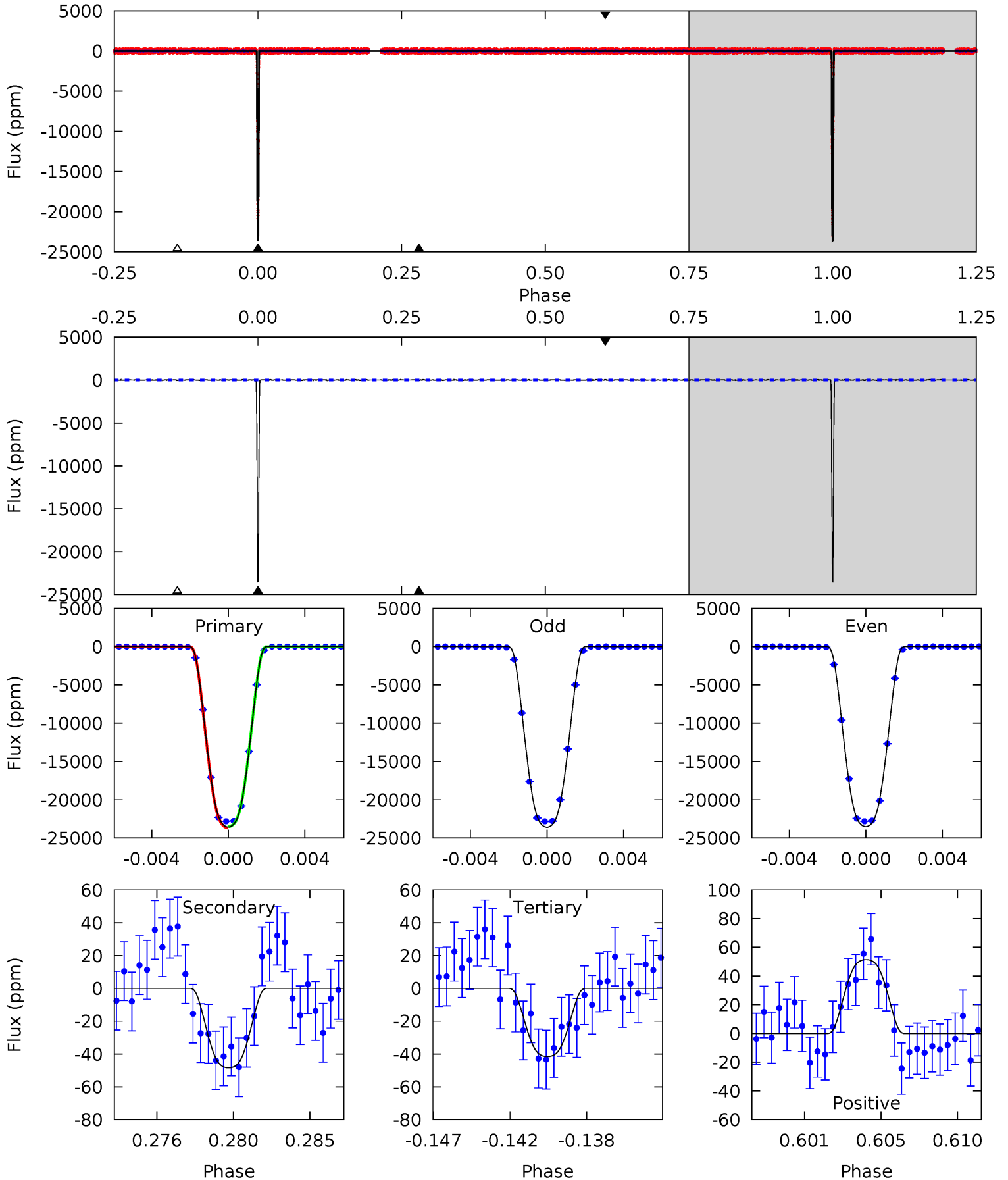
TCE 007541502-02     $P = 44.827351$  Days     $T_0 = 164.271661$  (BKJD)



# DV Model-Shift Uniqueness Test

007541502-02, P = 44.827325 Days, E = 119.444889 Days

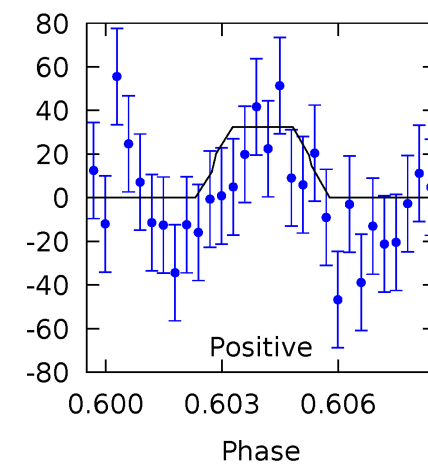
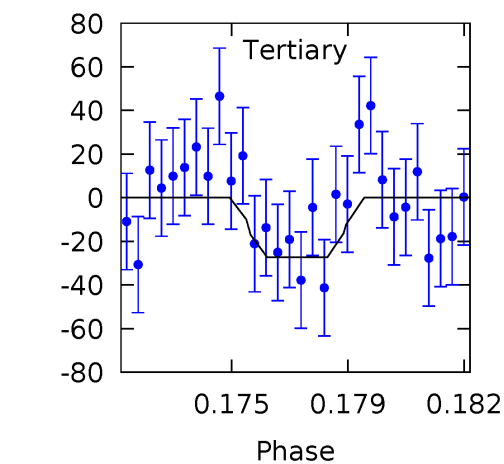
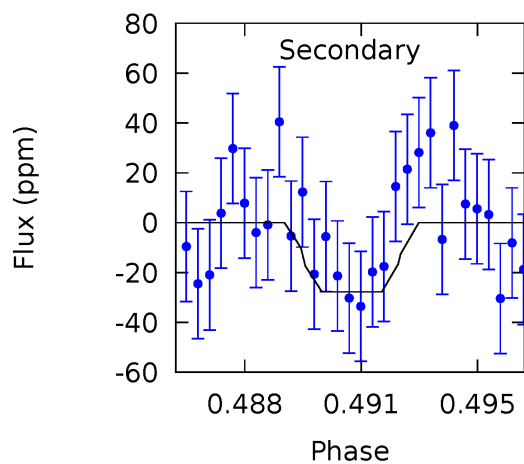
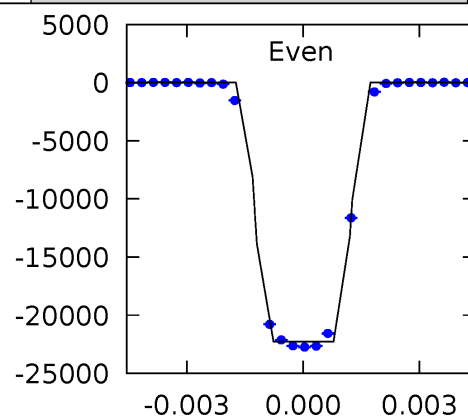
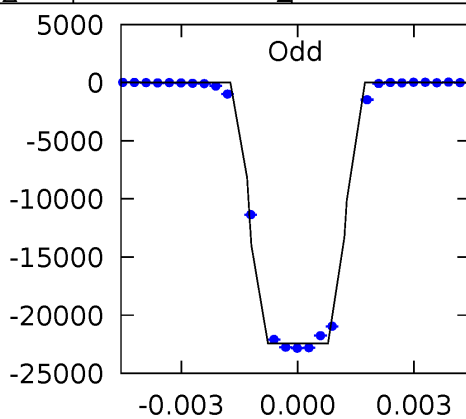
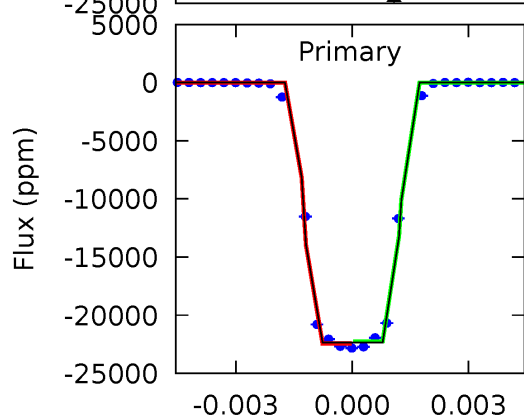
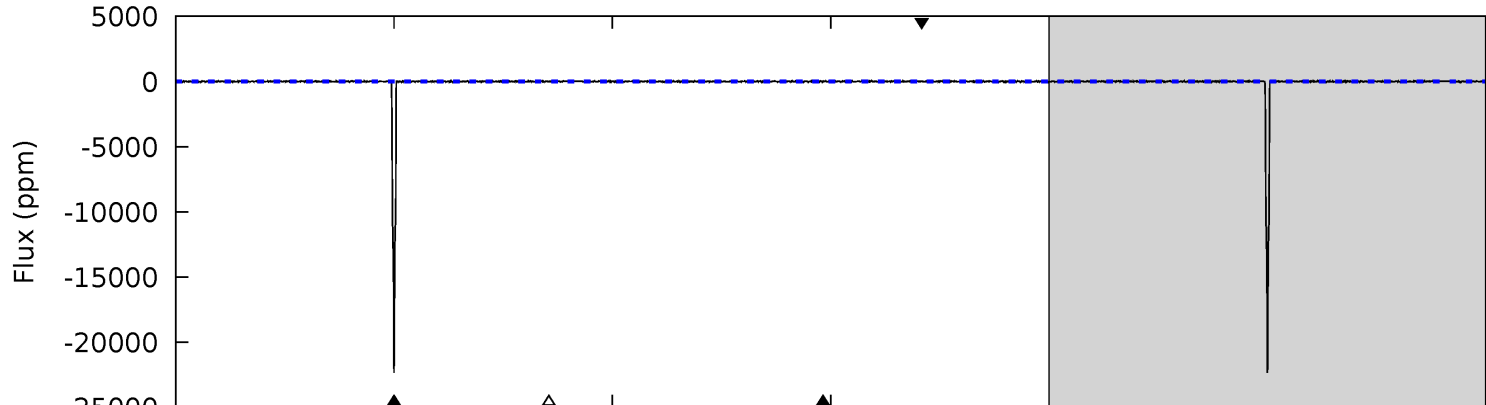
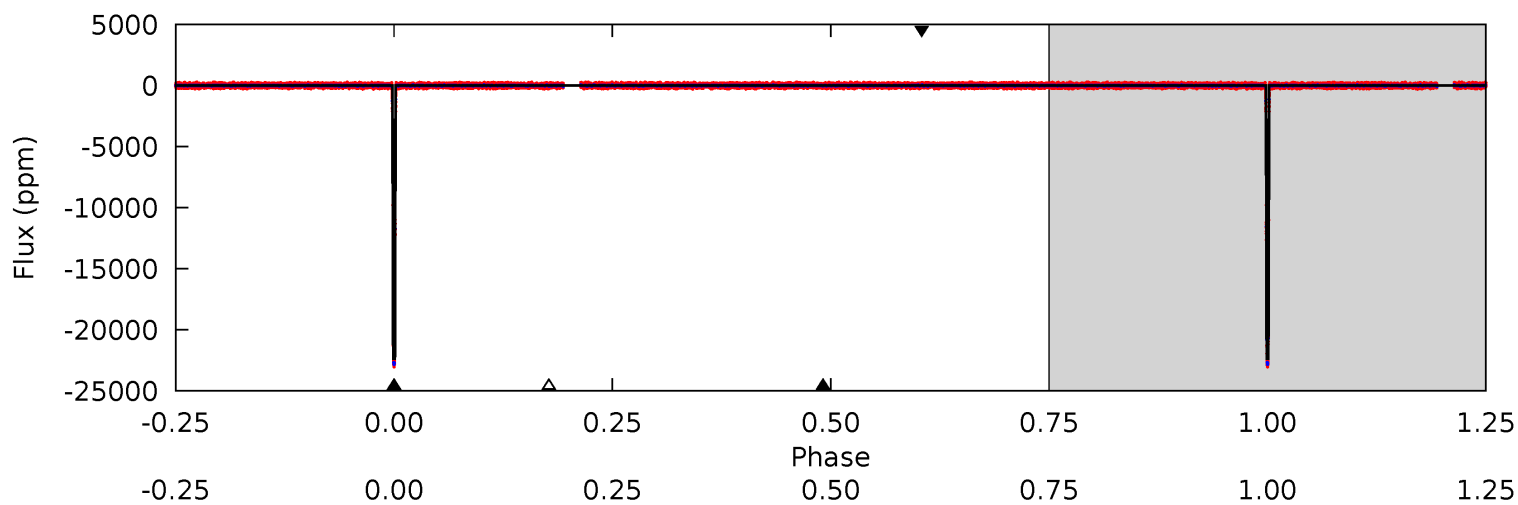
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3811	7.84	6.73	8.33	5.18	2.84	2.50	3804	3802	1.12	-0.49	6.63	1.00	0.00	13.1



# Alt Model-Shift Uniqueness Test

007541502-02, P = 44.827351 Days, E = 119.444310 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
3096	3.85	3.79	4.50	5.24	2.95	1.35	3093	3092	0.06	-0.65	10.2	1.00	0.00	11.9





### Stellar Parameters For KIC 007541502

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5160^{+207}_{-165}$	$3.568^{+0.912}_{-0.228}$	$-0.020^{+0.300}_{-0.300}$	$3.279^{+1.012}_{-2.362}$	$1.450^{+0.226}_{-0.565}$	$0.058^{+1.718}_{-0.036}$
	+4%/-3%	+26%/-6%	+1500%/-1500%	+31%/-72%	+16%/-39%	+2965%/-62%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 007541502-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-48 \pm 6$	$55.15^{+11.55}_{-21.00}$	$1067^{+121}_{-208}$	$1941^{+89}_{-111}$	$0.695^{+0.959}_{-0.234}$
Alt.	$-28 \pm 7$	$53.57^{+10.89}_{-21.45}$	$1074^{+122}_{-209}$	$1764^{+155}_{-3404}$	$0.446^{+0.571}_{-0.191}$

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

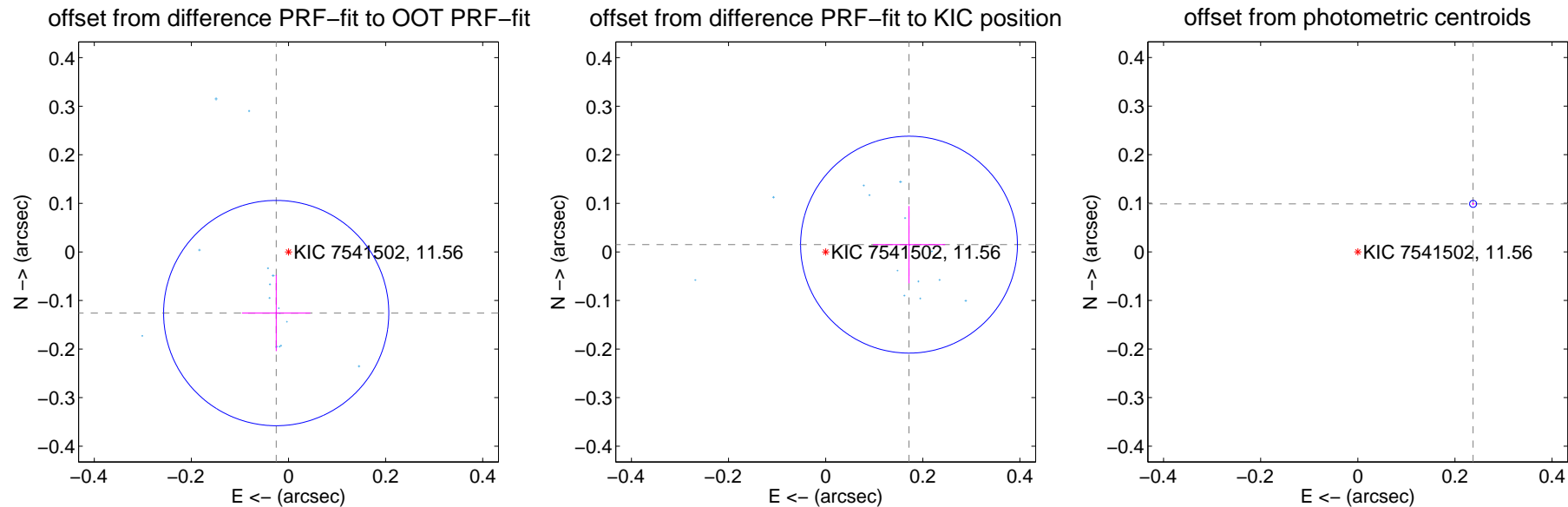
## DV Centroid Data

Supplemental centroid analysis for 007541502-02. **Kepler magnitude: 11.56.** Transit SNR 1241.85

There are 16 quarters with good PRF difference image offsets

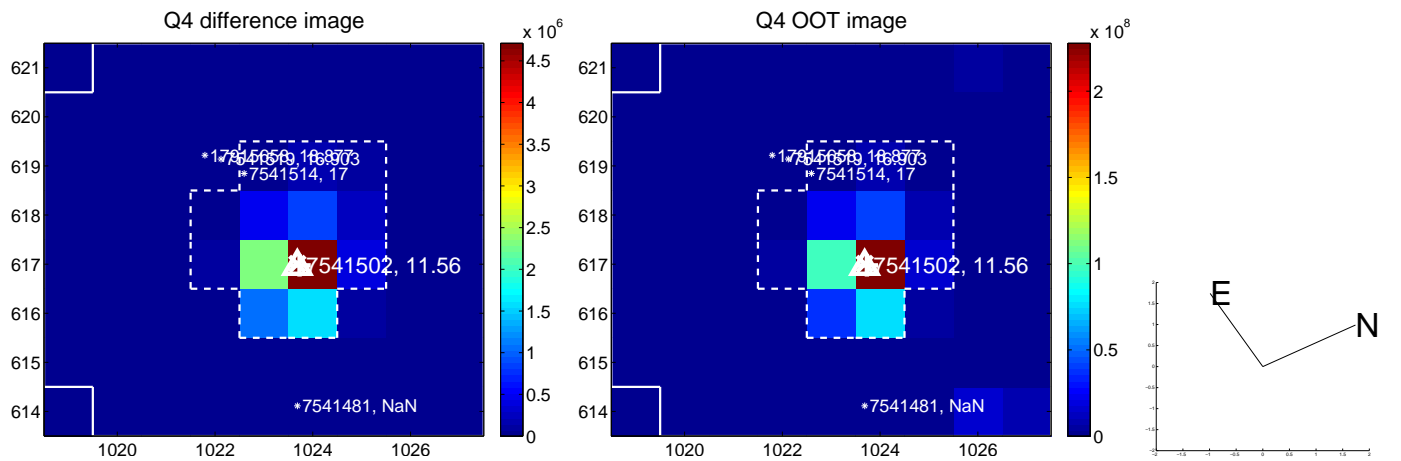
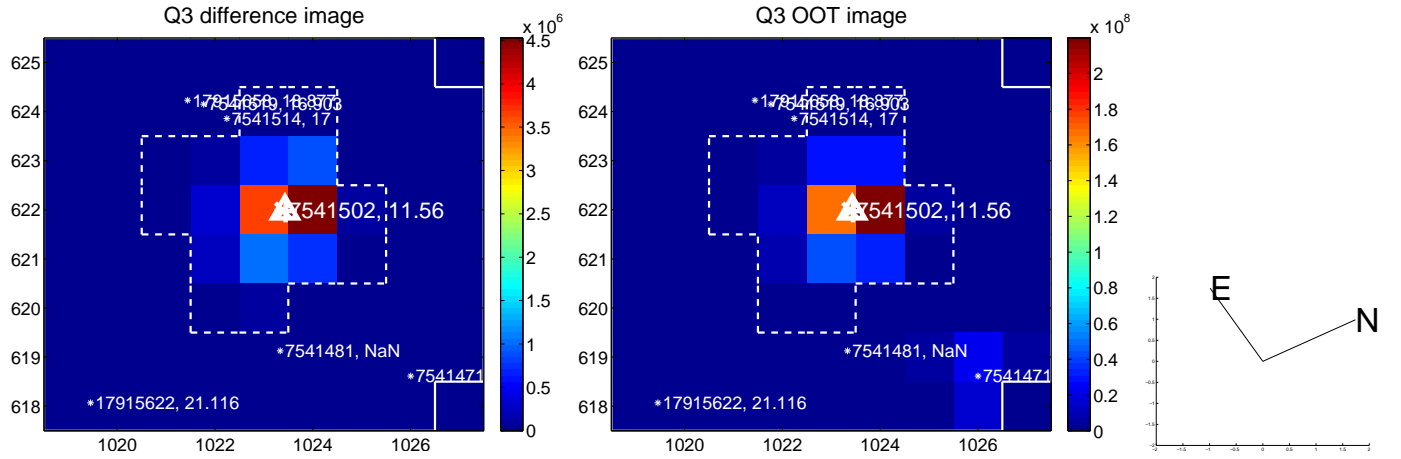
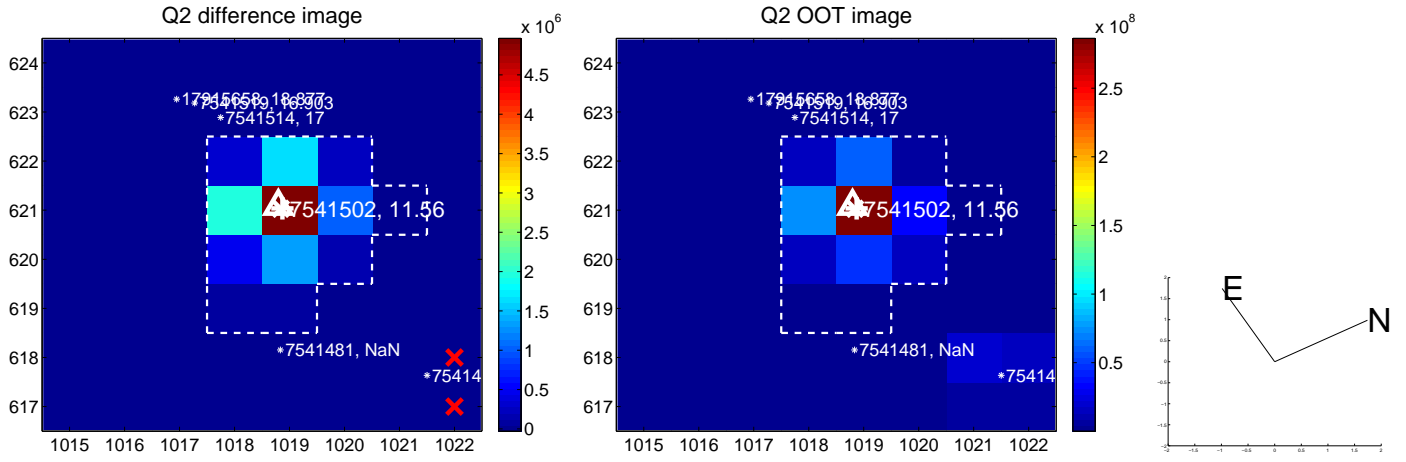
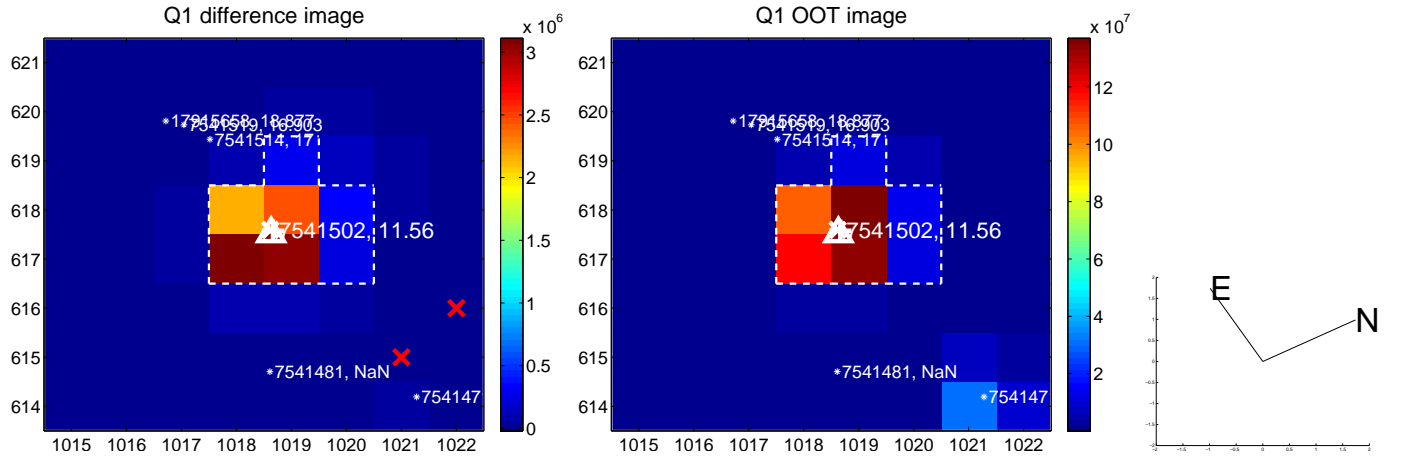
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.128 \pm 0.077$	1.66	$0.025 \pm 0.070$	$-0.126 \pm 0.078$
PRF-fit source offset from KIC position	$0.172 \pm 0.074$	2.32	$-0.172 \pm 0.074$	$0.015 \pm 0.080$
photometric centroid source offset	<b><math>0.26 \pm 0.00</math></b>	<b>106.83</b>	$-0.24 \pm 0.00$	$0.10 \pm 0.00$

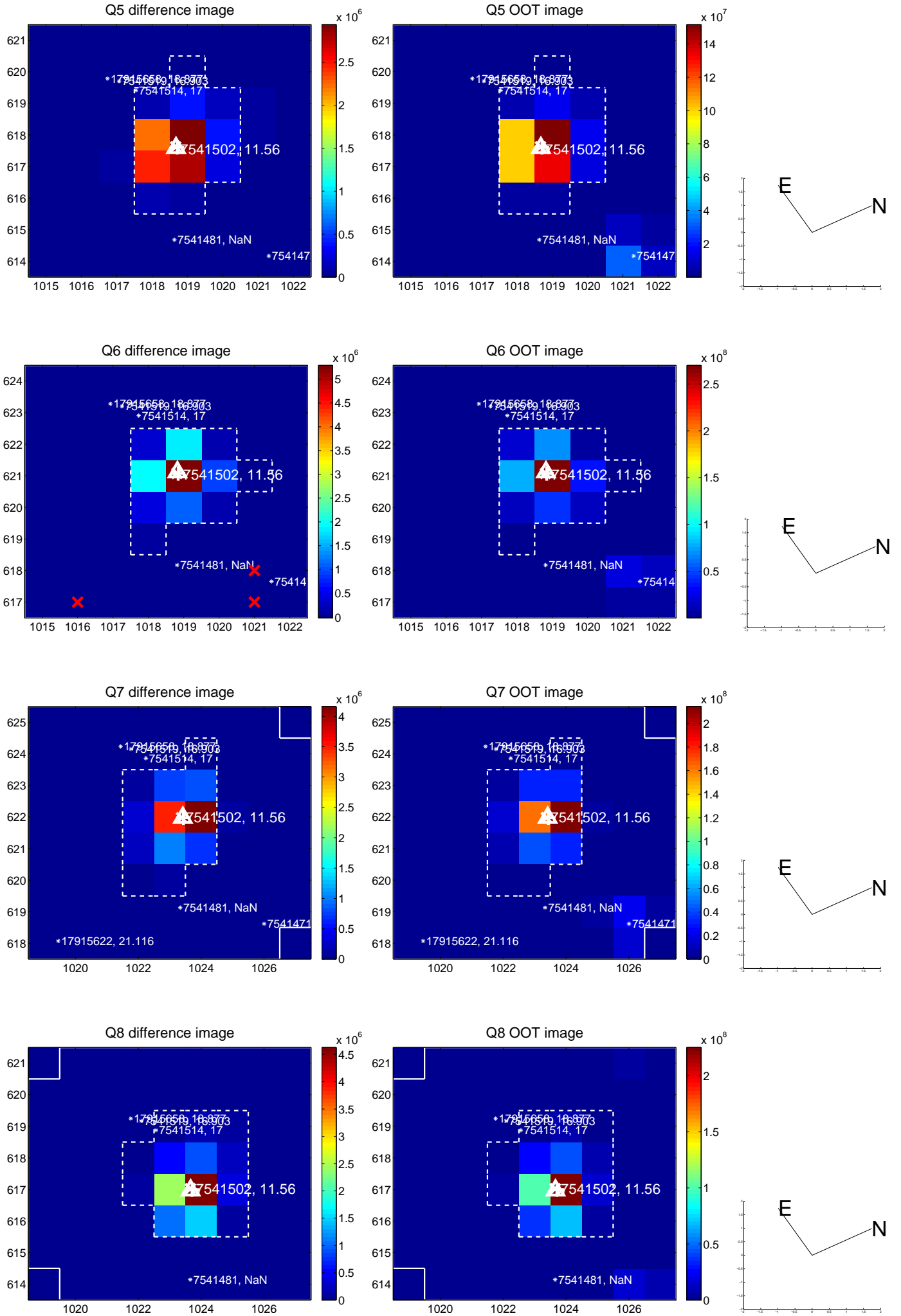


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

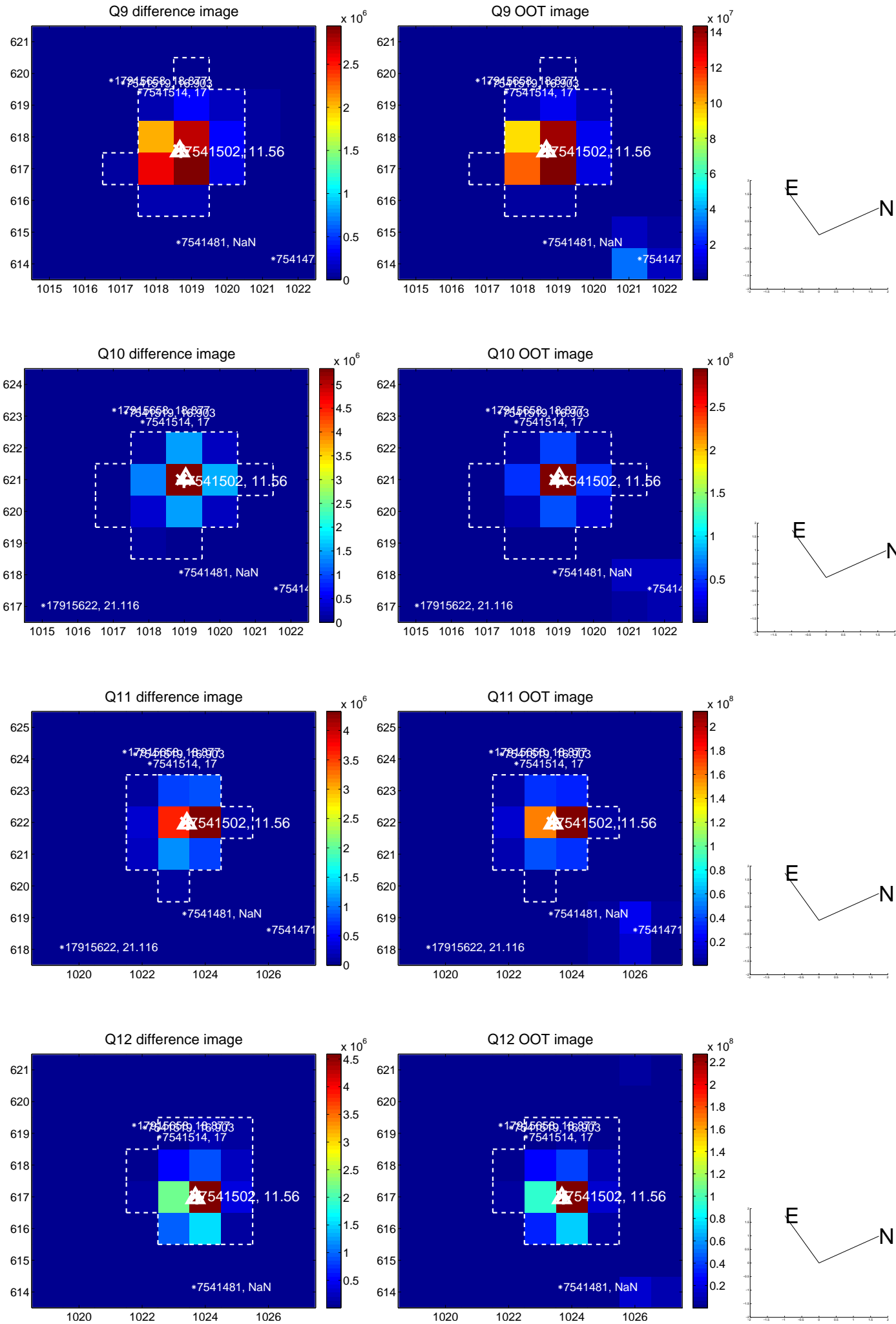
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



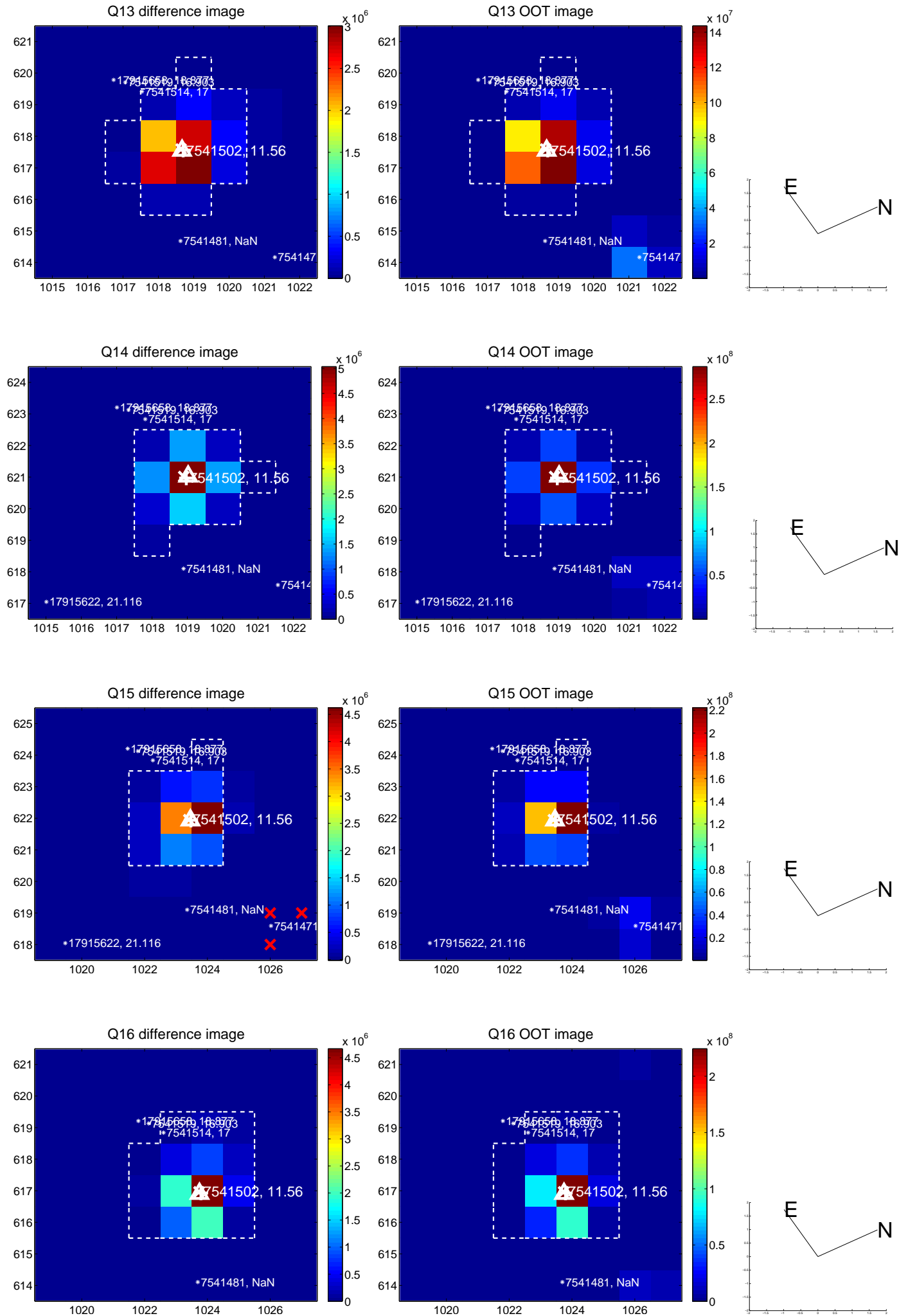
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



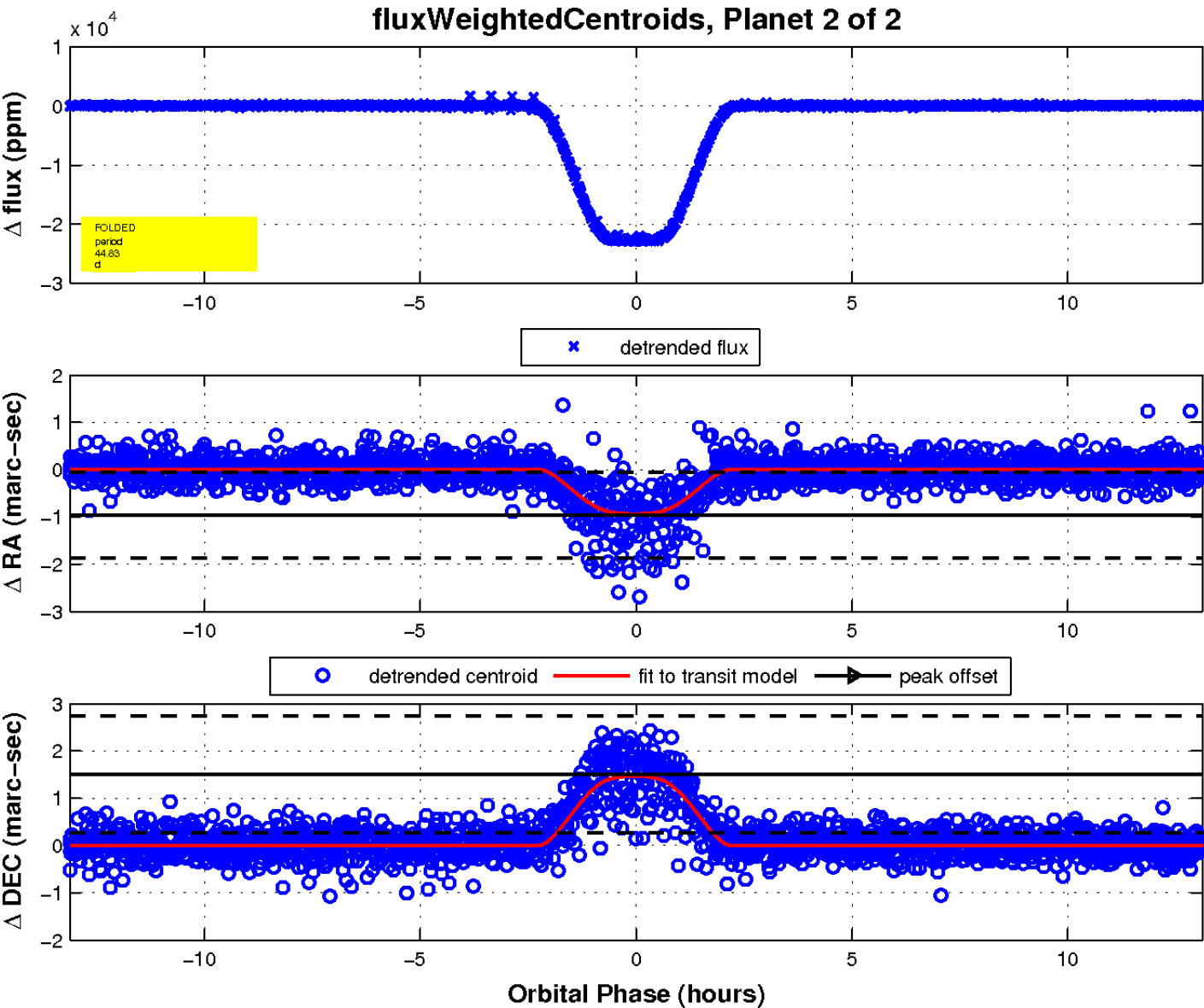
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

