

# KIC 005809890

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005809890-01	OBS	1050.01	1.269095	132.073063	299.3	1.524	38.5	61.0	0.77	5041	1.62	744.37
005809890-02	OBS	1050.02	2.853133	133.797234	261.1	1.509	29.5	34.2	0.77	5041	1.53	252.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005809890-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005809890-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

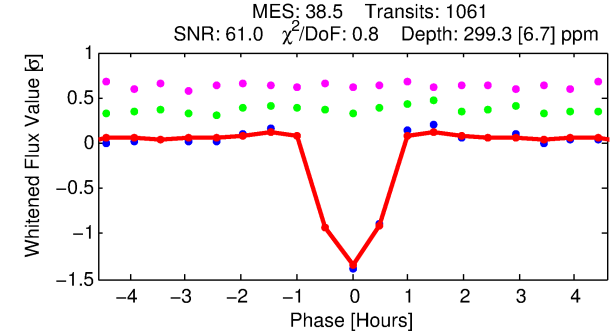
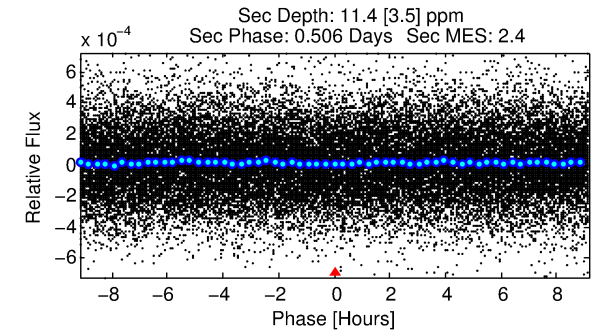
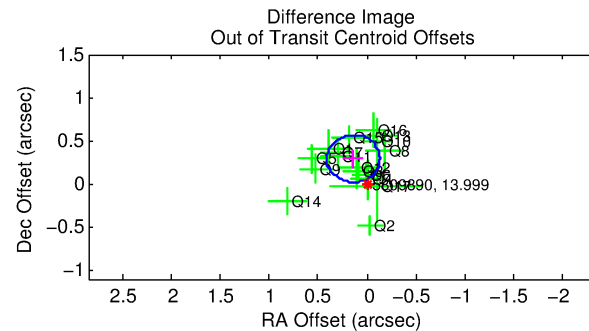
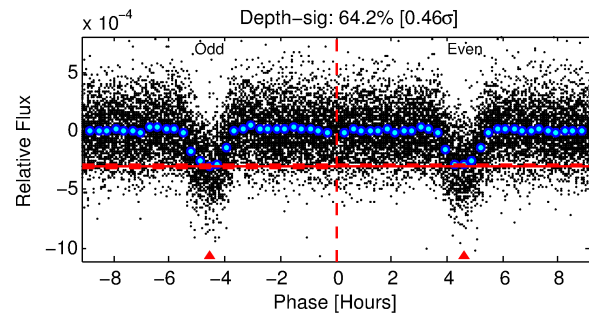
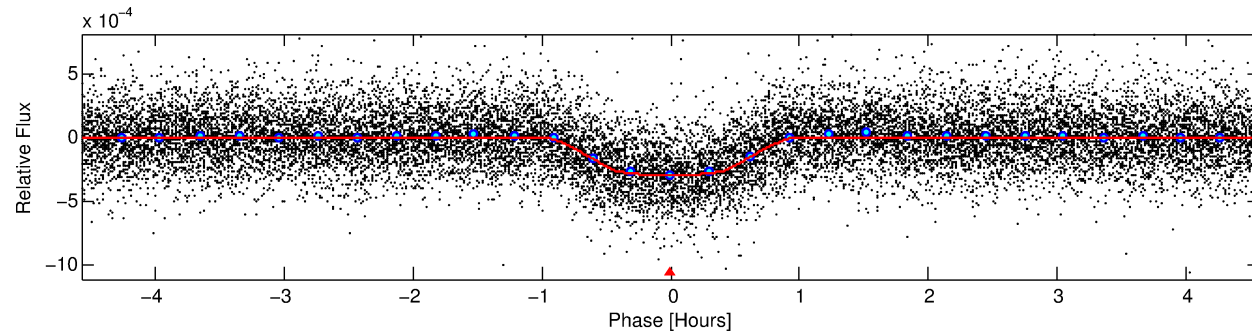
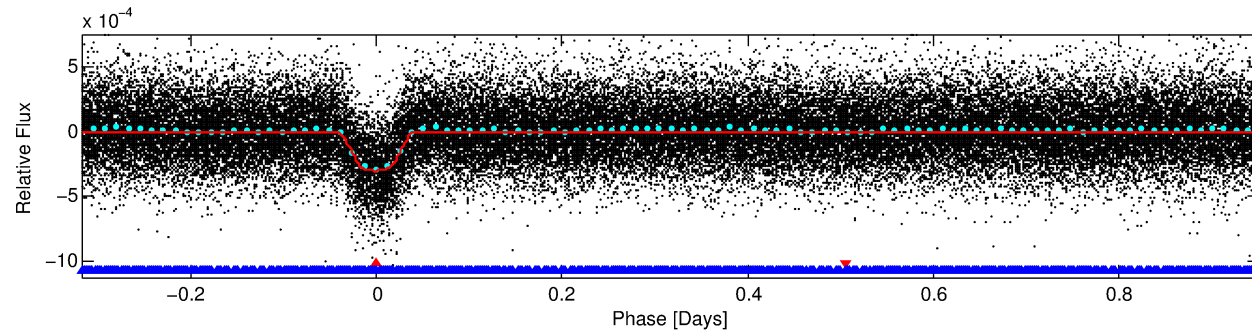
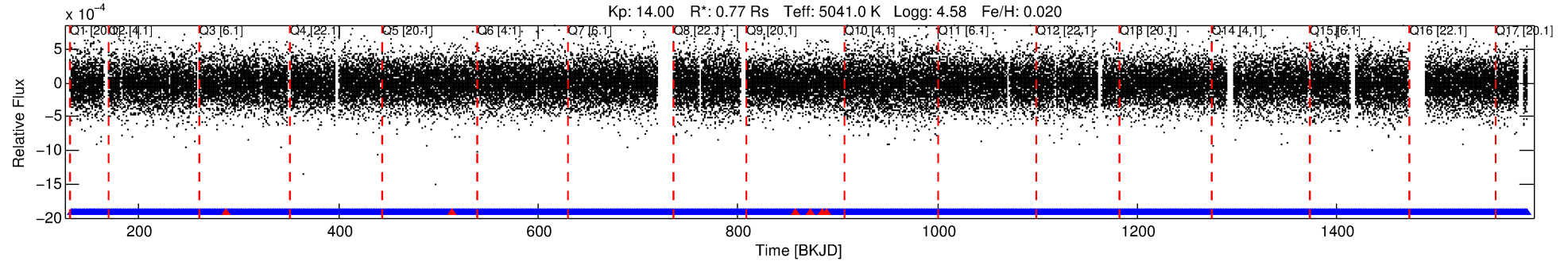
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005809890-01

No Significant Match Found

# DV One-Page Summary

KIC: 5809890 Candidate: 1 of 2 Period: 1.269 d  
KOI: K01050.01 Corr: 0.974



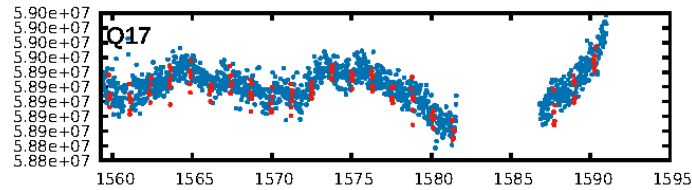
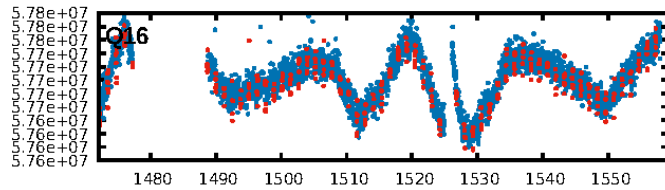
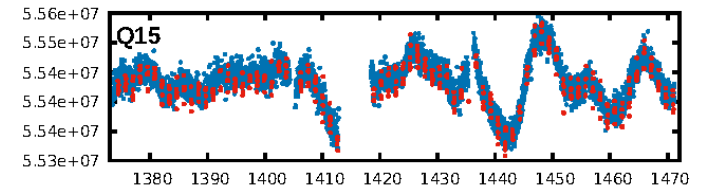
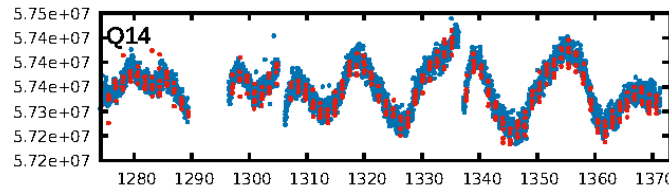
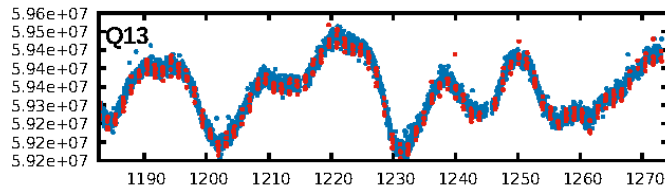
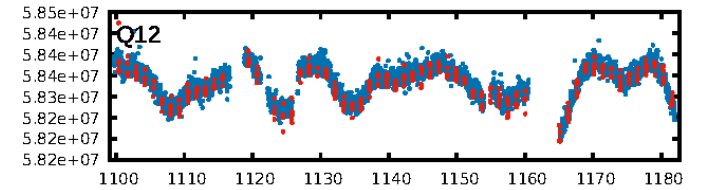
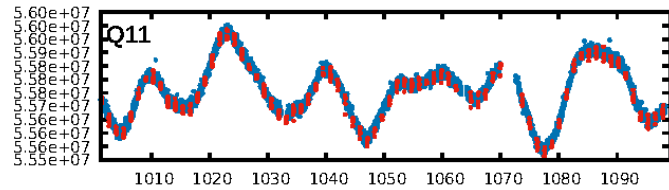
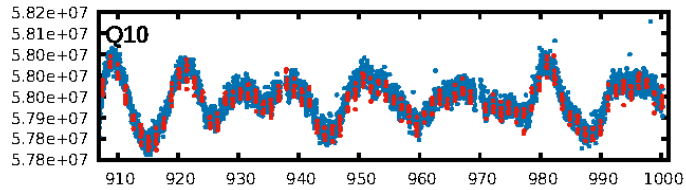
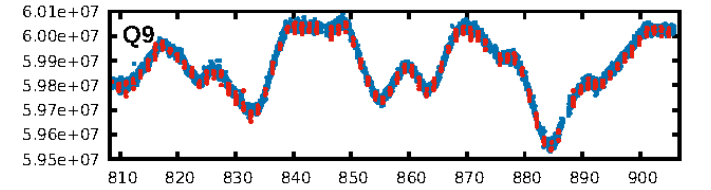
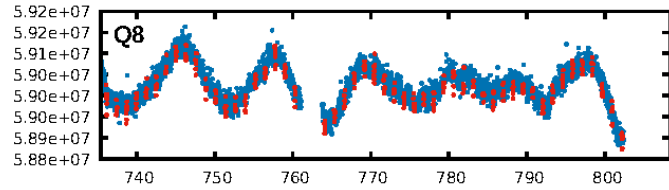
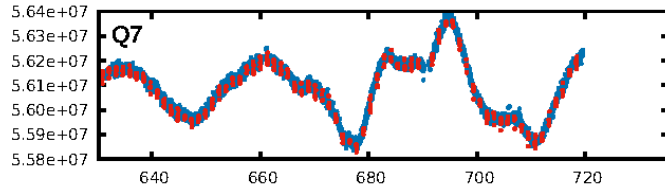
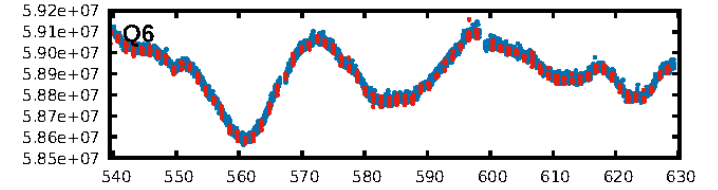
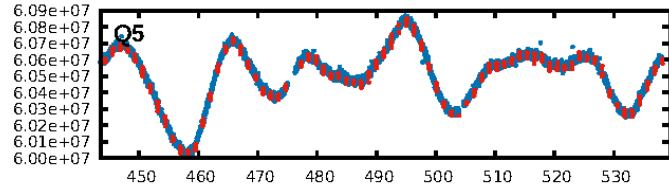
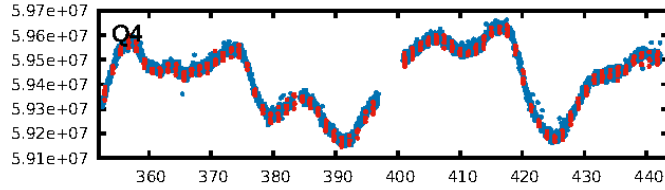
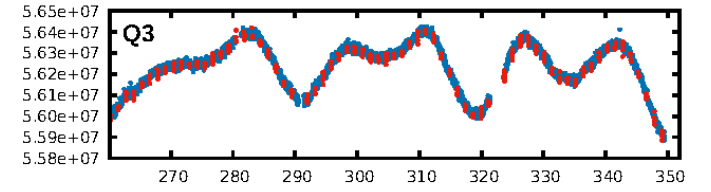
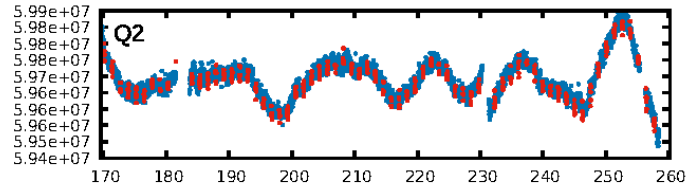
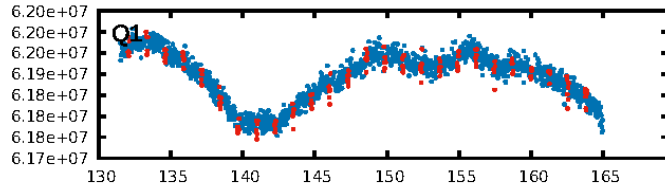
## DV Fit Results:

Period = 1.26910 [0.00000] d  
Epoch = 132.0731 [0.0003] BKJD  
Rp/R\* = 0.0194 [0.0028]  
a/R\* = 3.19 [1.61]  
b = 0.90 [0.12]  
Seff = 744.37 [87.11]  
Teff = 1332 [39] K  
Rp = 1.62 [0.25] Re  
a = 0.0214 [0.0012] AU  
Ag = 1.09 [0.46] [0.19 $\sigma$ ]  
Teffp = 2102 [224] K [3.39 $\sigma$ ]

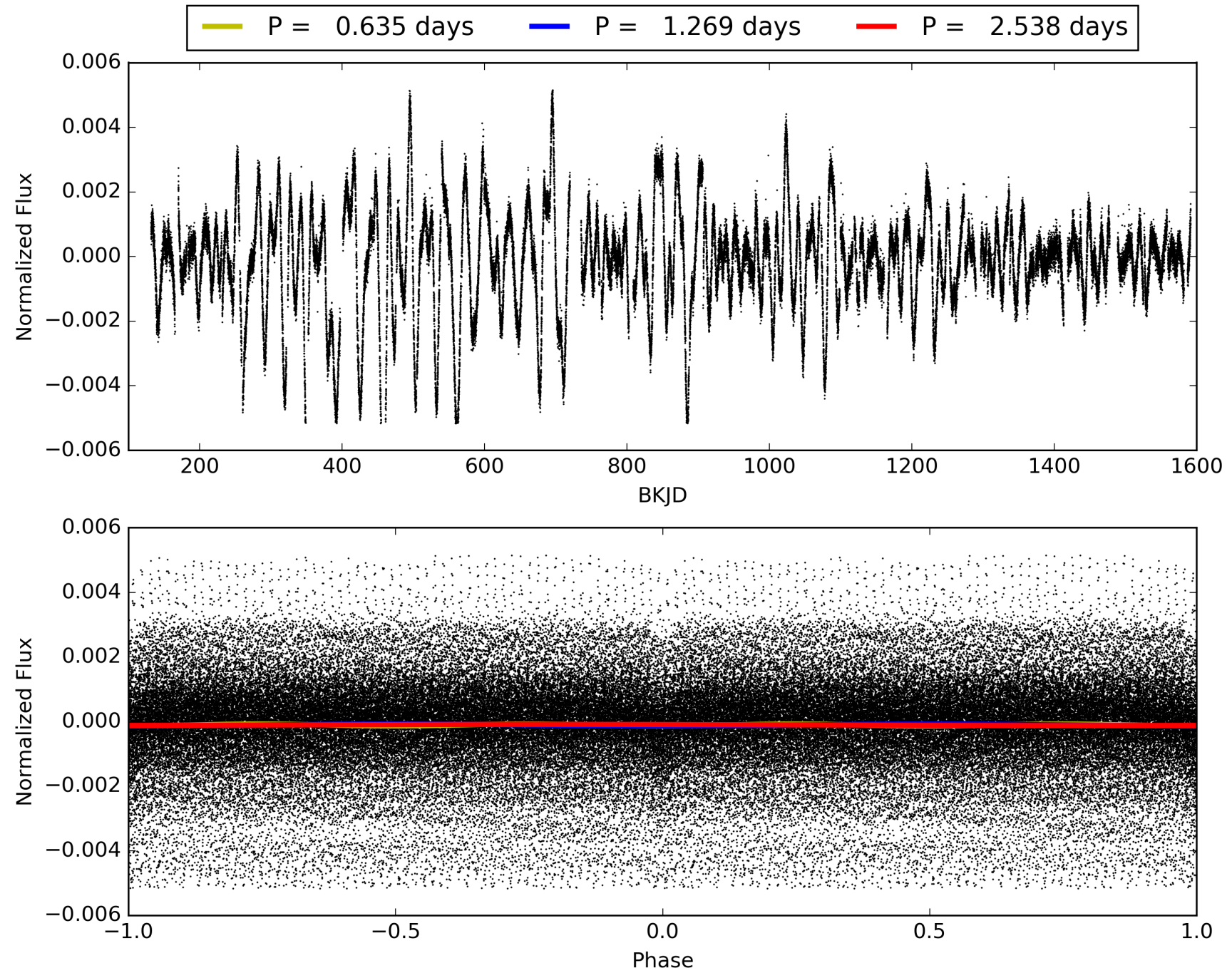
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [17.73 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.28e-300  
RollingBand-fgt: 0.99 [1008/1014]  
GhostDiagnostic-chr: 5.095  
Centroid-sig: 0.0%  
Centroid-so: 0.799 arcsec [4.27 $\sigma$ ]  
OotOffset-rm: 0.325 arcsec [3.57 $\sigma$ ]  
KicOffset-rm: 0.184 arcsec [1.97 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005809890-01, PDC Light Curves

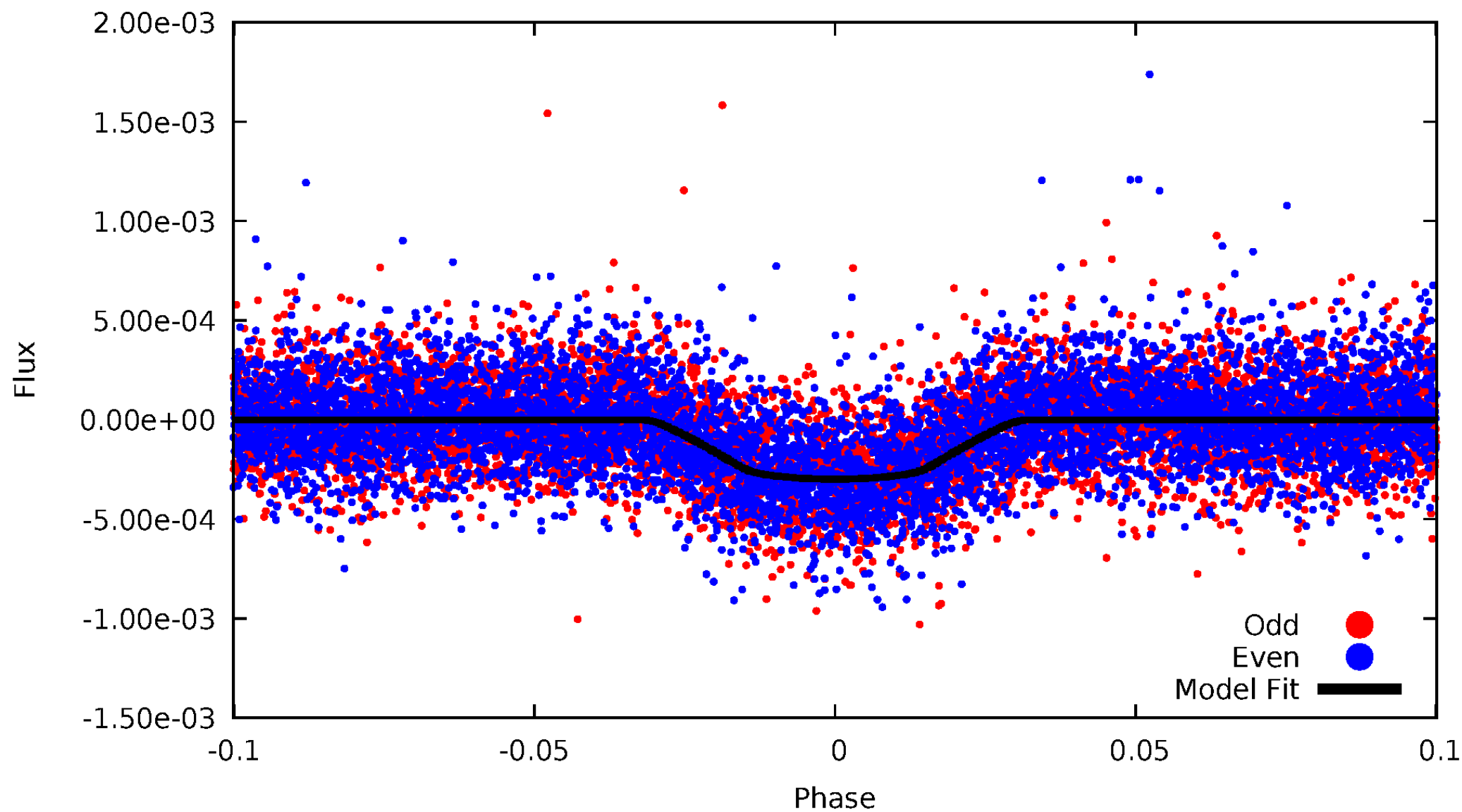


TCE 005809890-01



# DV Odd/Even

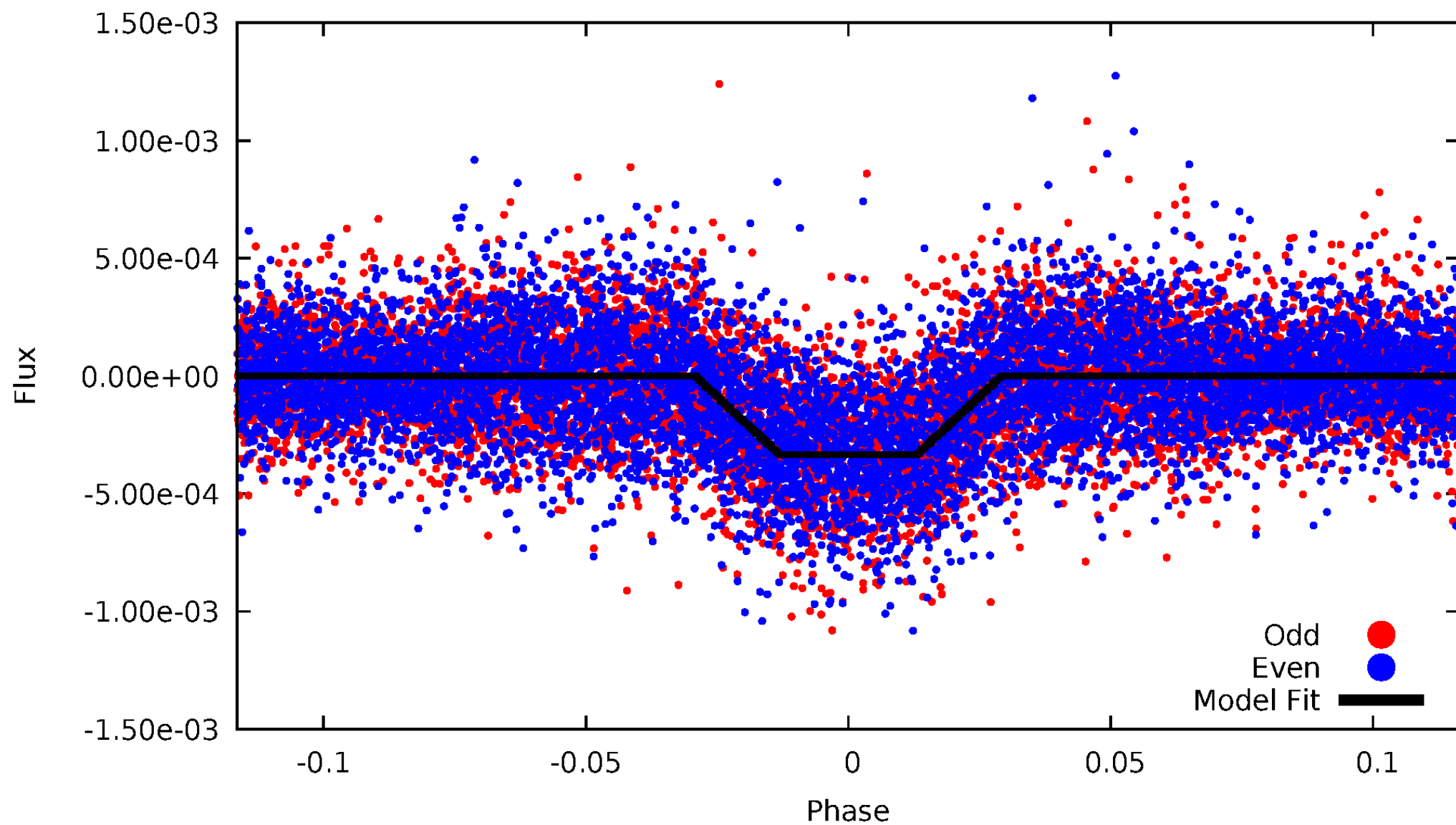
TCE 005809890-01



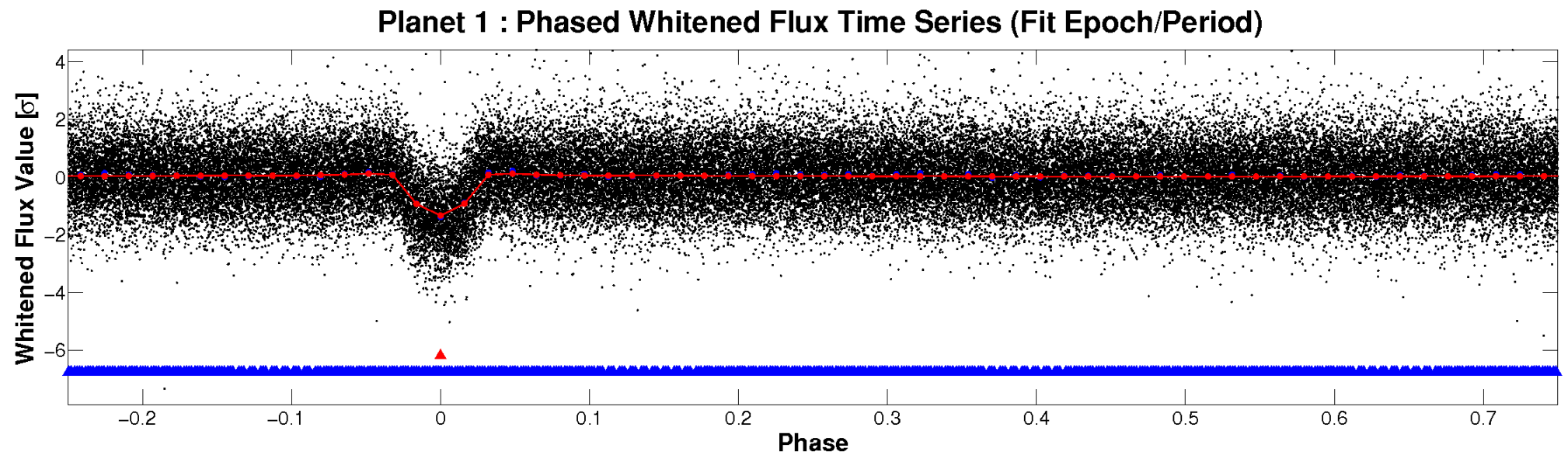
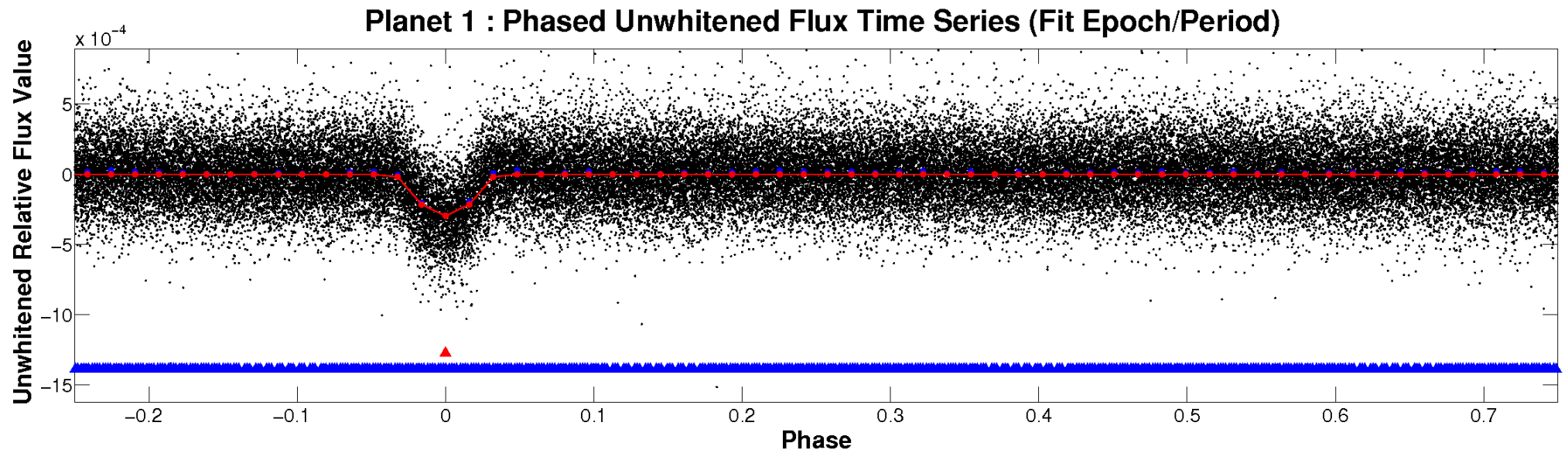


# ALT Odd/Even

TCE 005809890-01

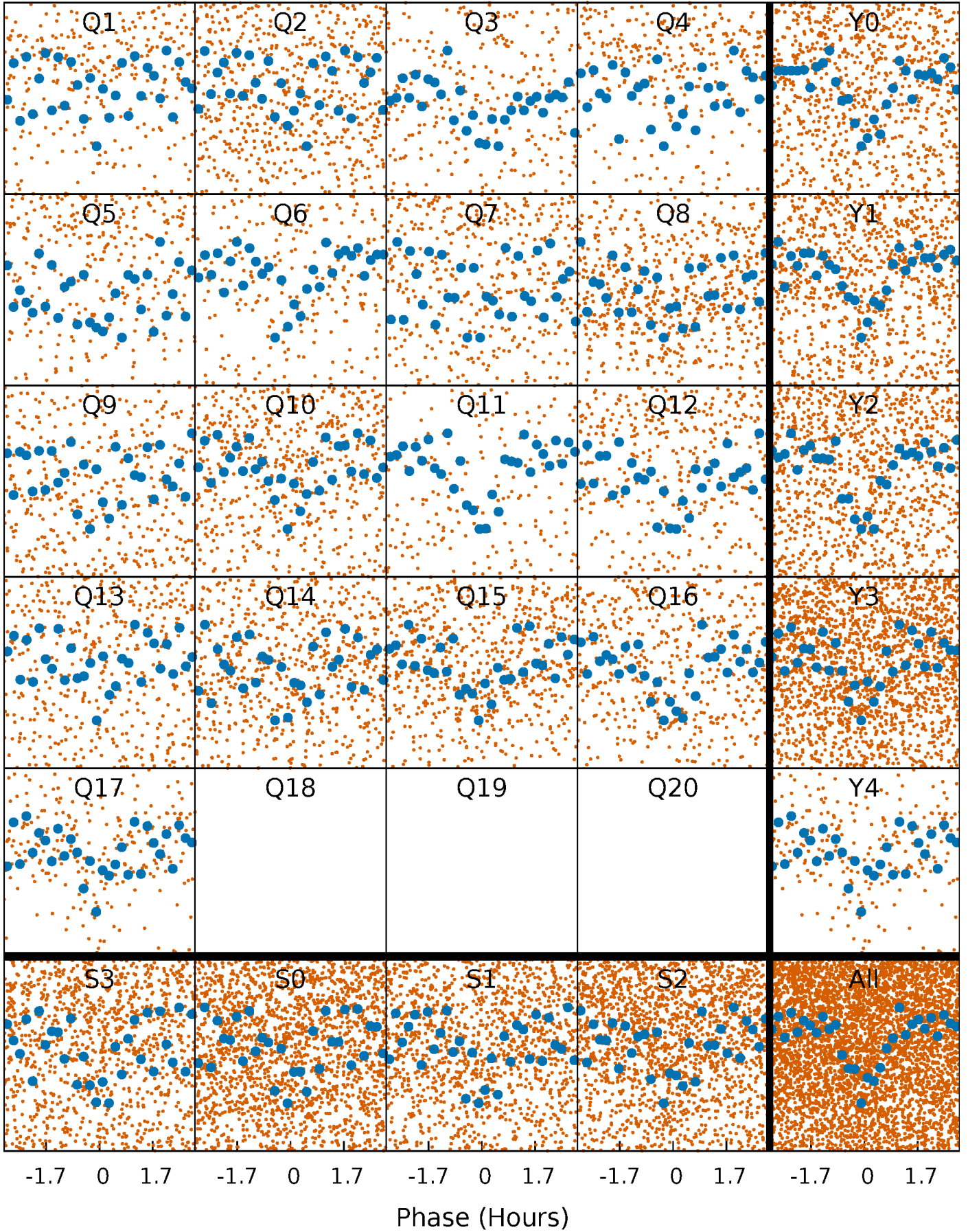


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

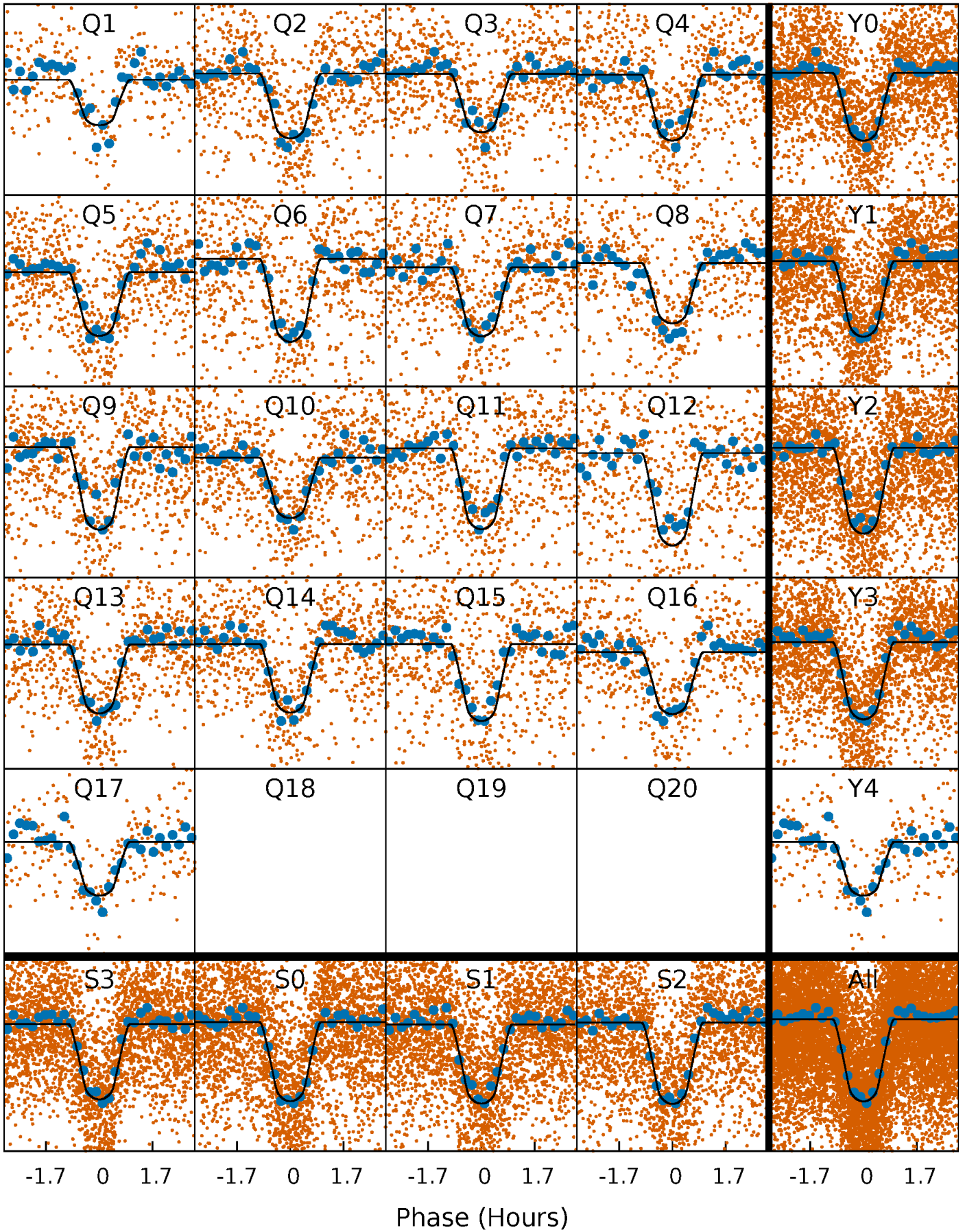
TCE 005809890-01   P= 1.269095 Days    $T_0=132.073063$  (BKJD)





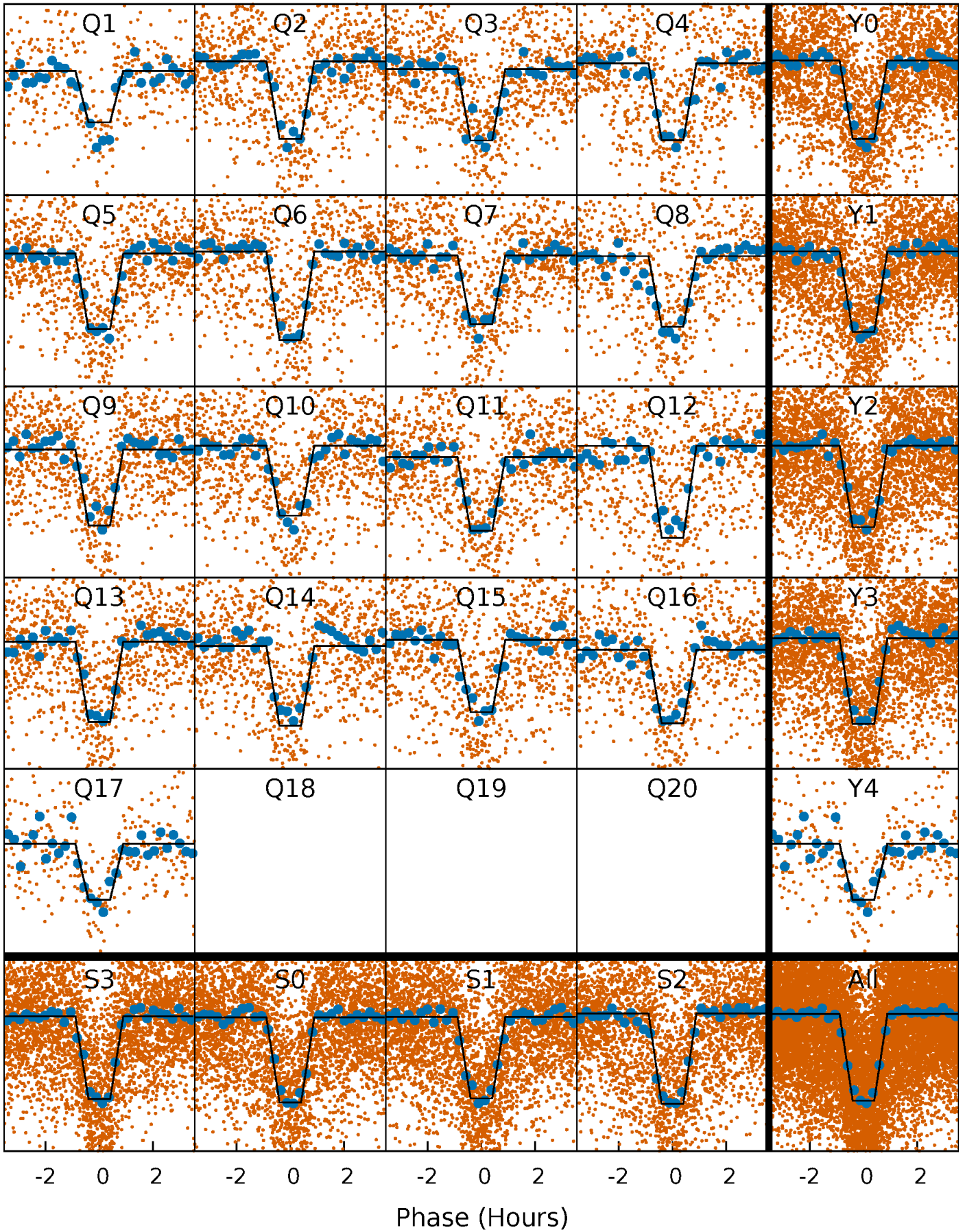
# DV Quarter-Phased Transit Curves

TCE 005809890-01   P= 1.269095 Days    $T_0=132.073063$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

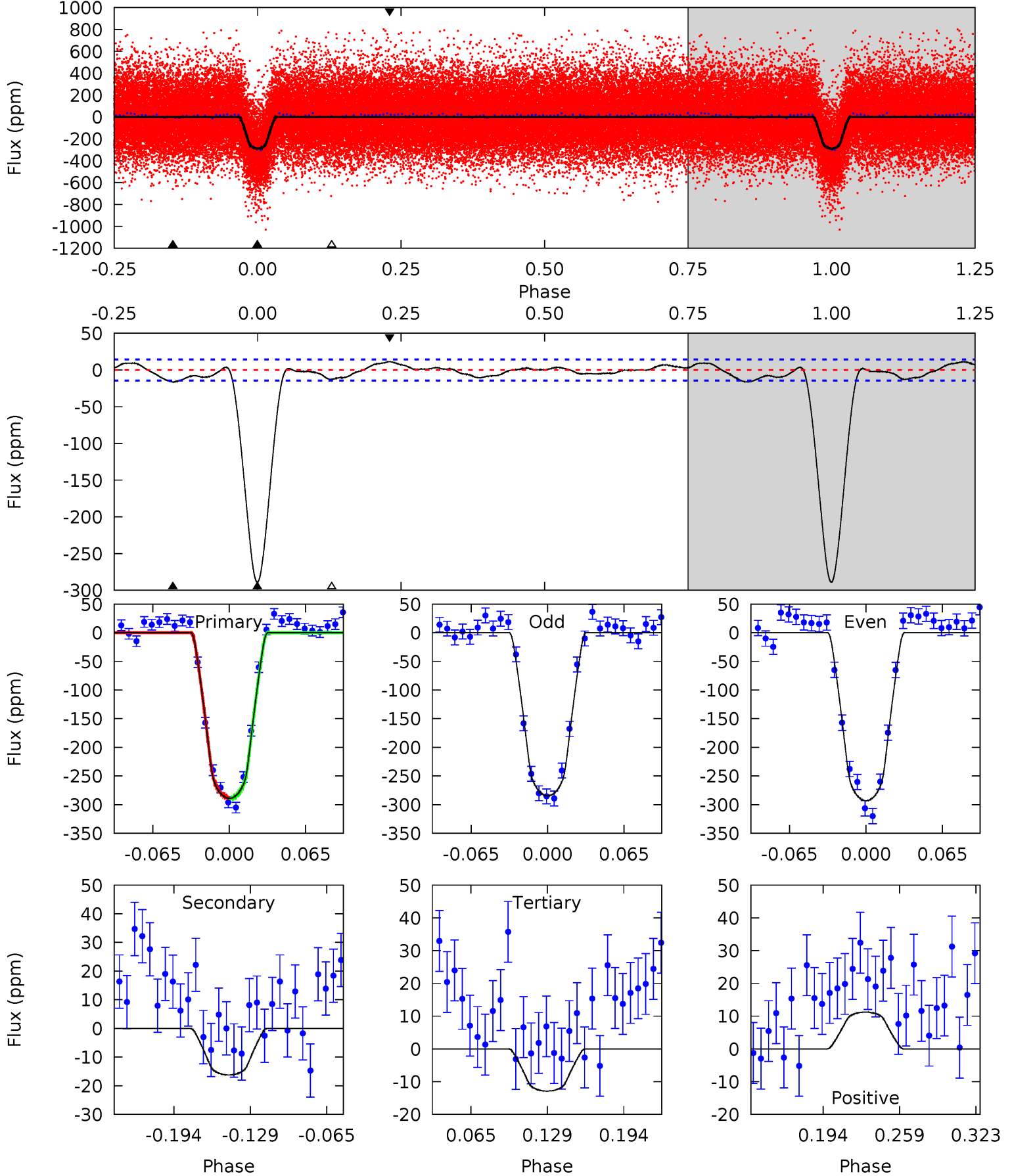
TCE 005809890-01 P= 1.269094 Days  $T_0=132.073105$  (BKJD)



# DV Model-Shift Uniqueness Test

005809890-01, P = 1.269095 Days, E = 130.803968 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
93.9	5.28	4.19	3.65	4.66	1.85	1.82	89.7	90.3	1.09	1.63	1.40	1.01	0.04	0.35

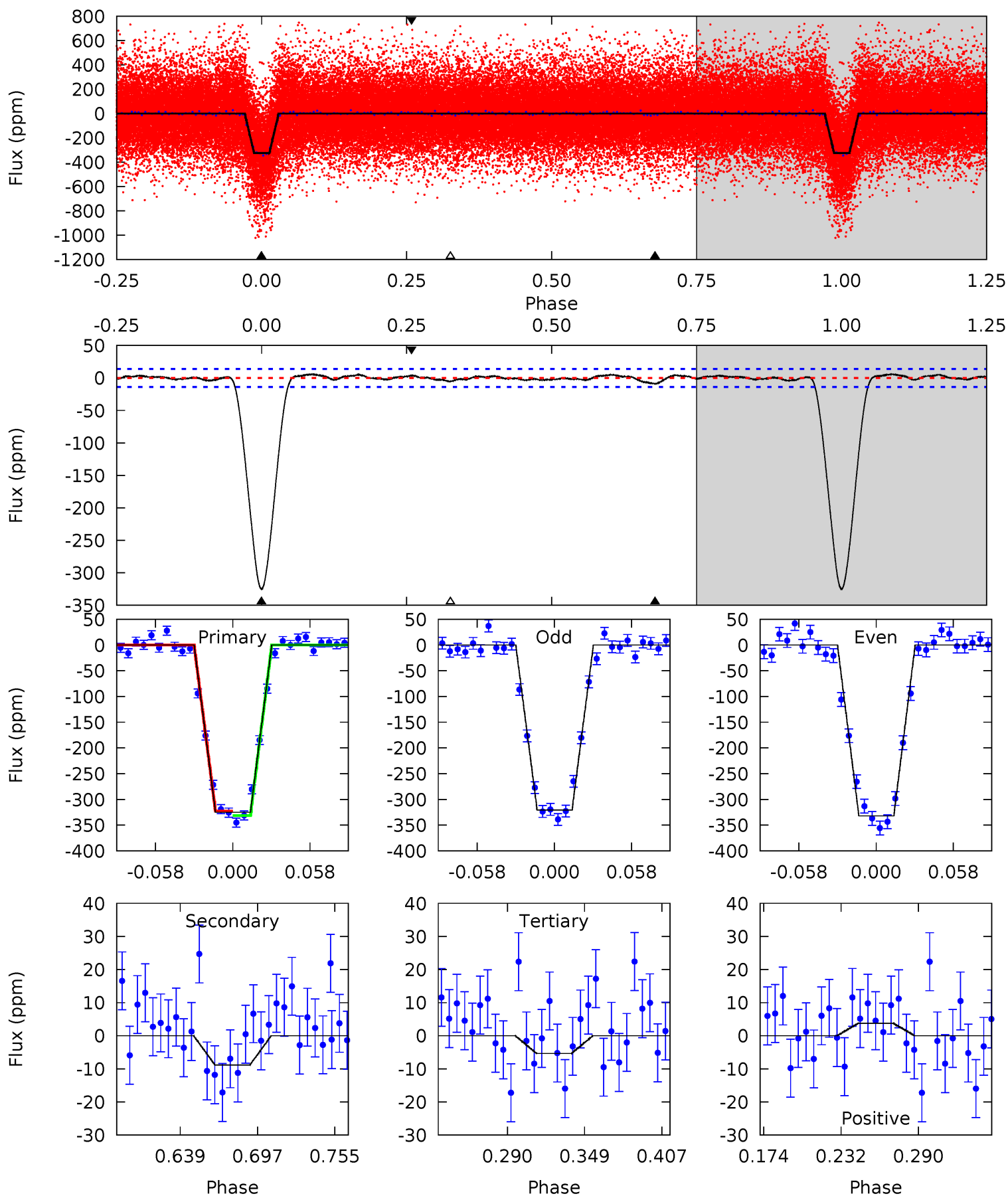




# Alt Model-Shift Uniqueness Test

005809890-01, P = 1.269094 Days, E = 130.804011 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
109.5	2.97	1.80	1.27	4.68	1.90	0.84	107.7	108.3	1.17	1.70	1.93	1.03	0.02	1.45



### Stellar Parameters For KIC 005809890

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5041^{+100}_{-100}$	$4.576^{+0.028}_{-0.048}$	$0.020^{+0.150}_{-0.150}$	$0.766^{+0.051}_{-0.037}$	$0.807^{+0.043}_{-0.043}$	$2.528^{+0.296}_{-0.387}$
	+2%/-2%	+1%/-1%	+750%/-750%	+7%/-5%	+5%/-5%	+12%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005809890-01 / KOI 1050.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-16 \pm 3$	$1.64^{+0.22}_{-0.24}$	$1866^{+47}_{-41}$	$2861^{+180}_{-160}$	$1.528^{+0.618}_{-0.439}$
Alt.	$-9 \pm 3$	$1.53^{+0.25}_{-0.22}$	$1867^{+46}_{-43}$	$2612^{+212}_{-274}$	$0.898^{+0.493}_{-0.355}$

$T_{\text{max}}$  = 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

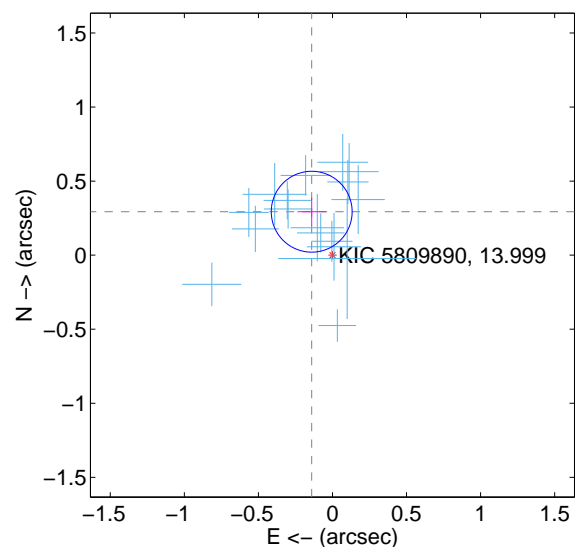
Supplemental centroid analysis for 005809890-01. Kepler magnitude: 14.00. Transit SNR 61.04

There are 17 quarters with good PRF difference image offsets

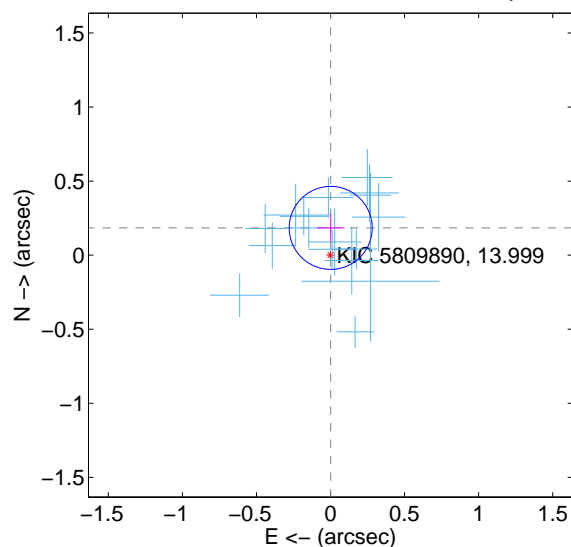
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.325 \pm 0.091$	$3.57$	$0.140 \pm 0.096$	$0.293 \pm 0.095$
PRF-fit source offset from KIC position	$0.184 \pm 0.093$	$1.97$	$-0.001 \pm 0.093$	$0.184 \pm 0.093$
photometric centroid source offset	$0.80 \pm 0.19$	$4.27$	$-0.21 \pm 0.20$	$0.77 \pm 0.19$

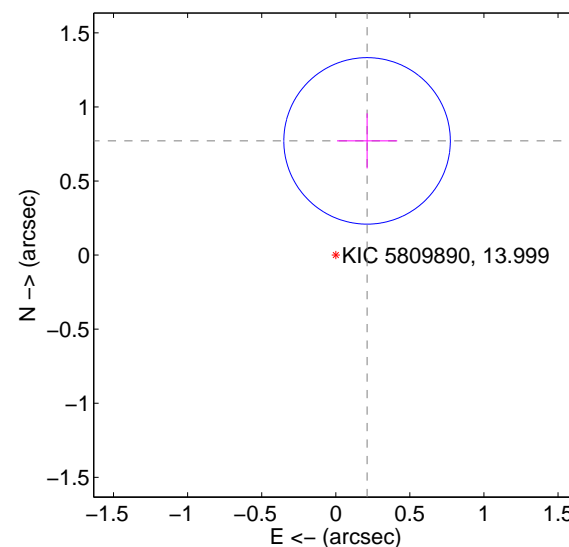
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

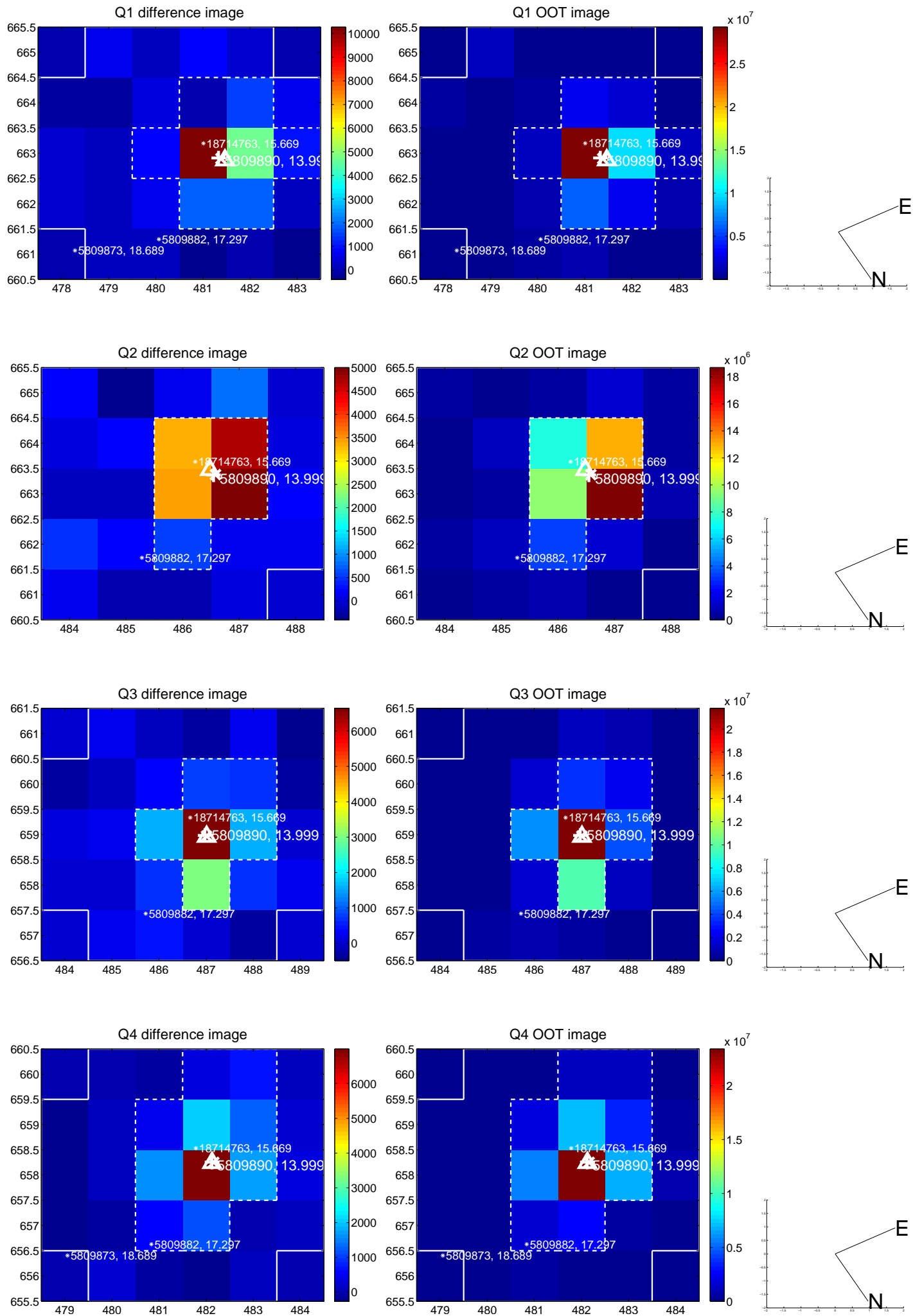


offset from photometric centroids

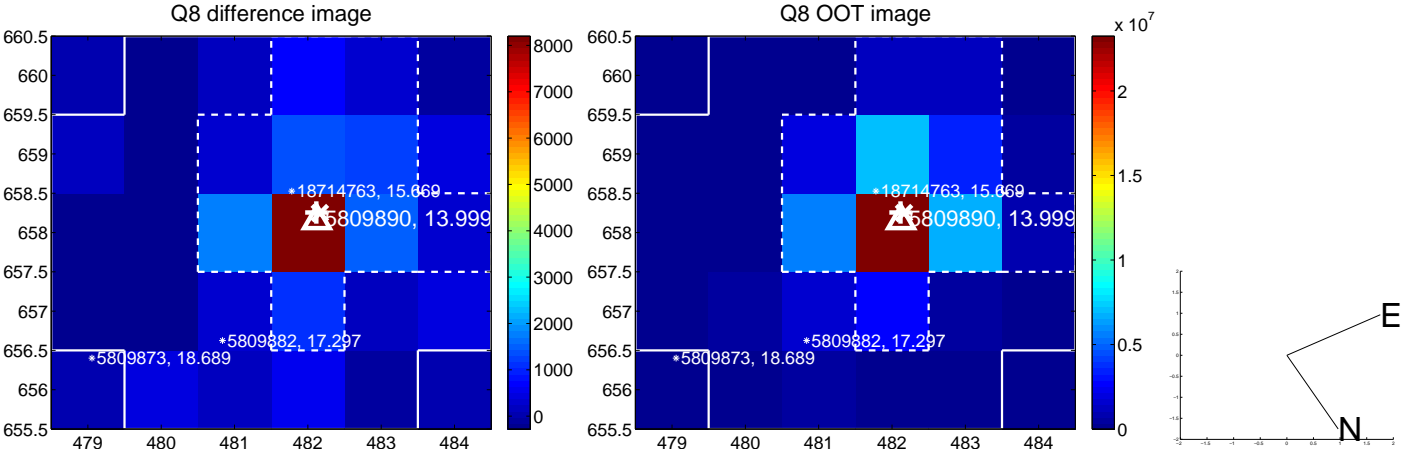
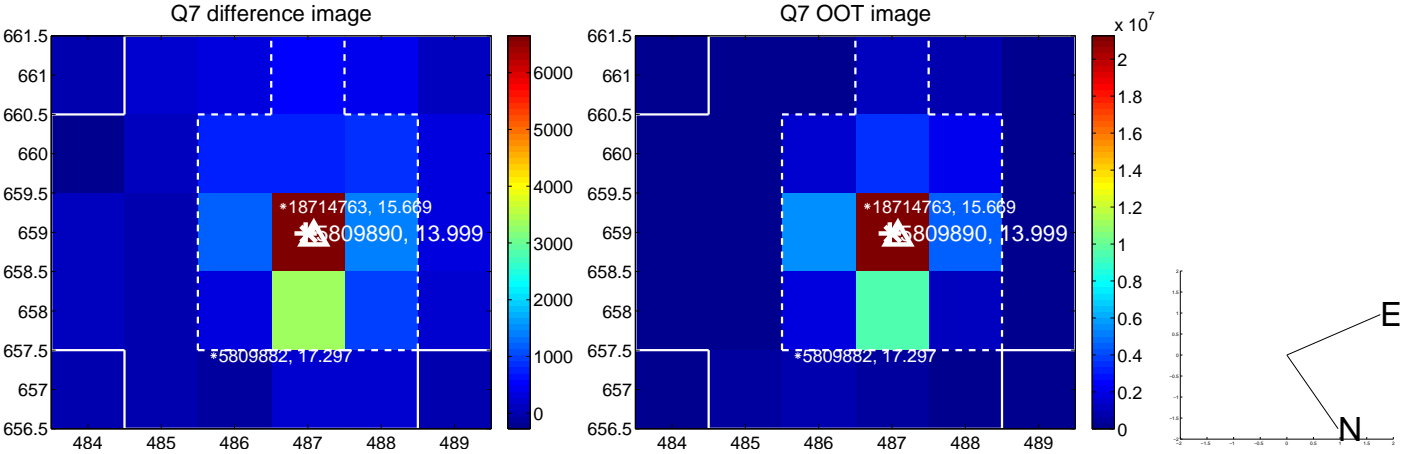
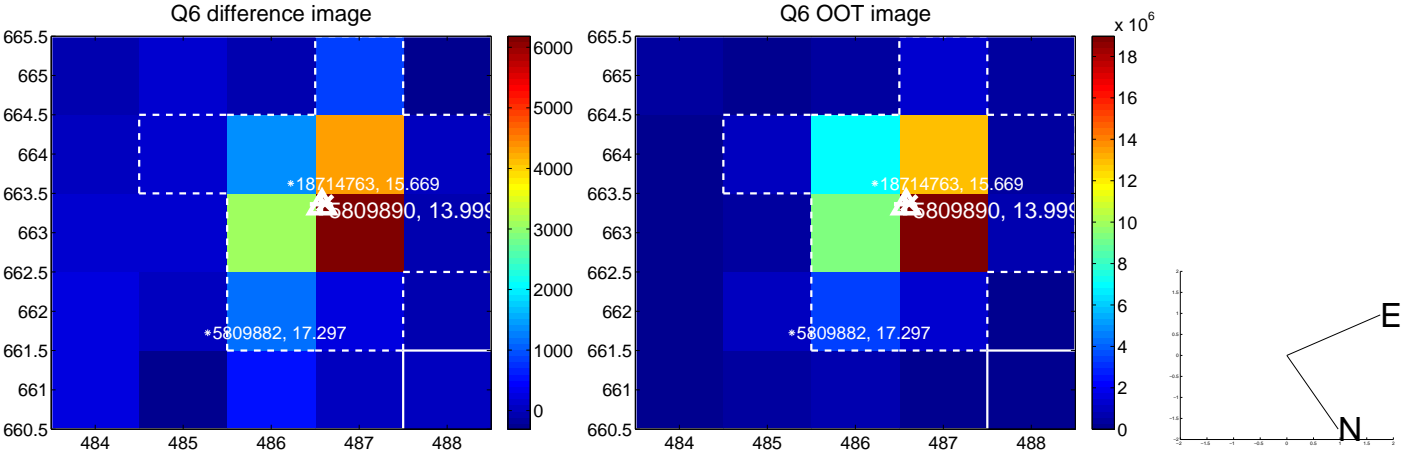
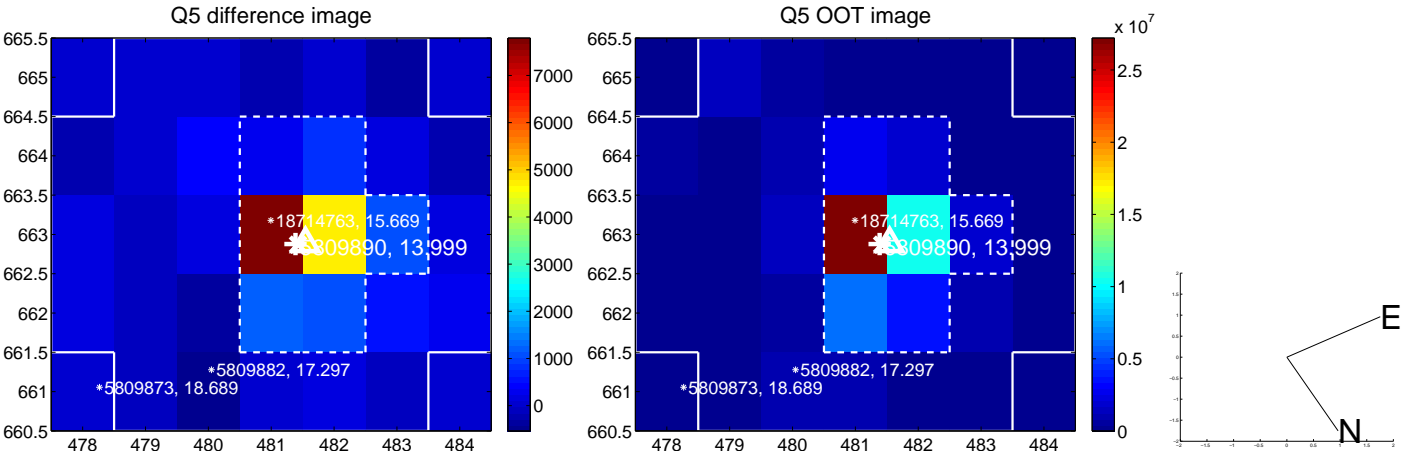


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

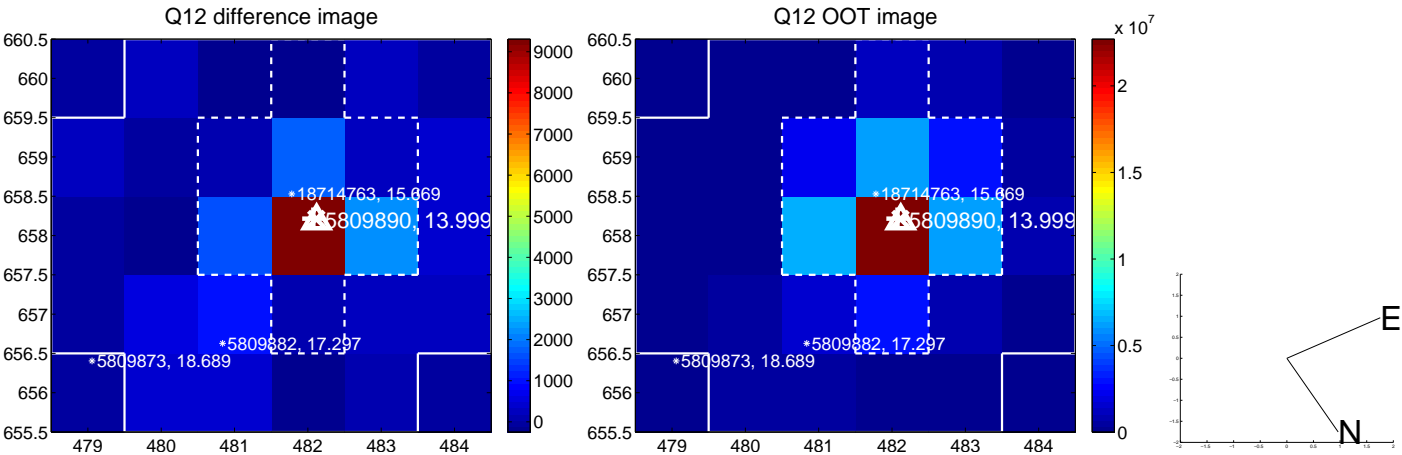
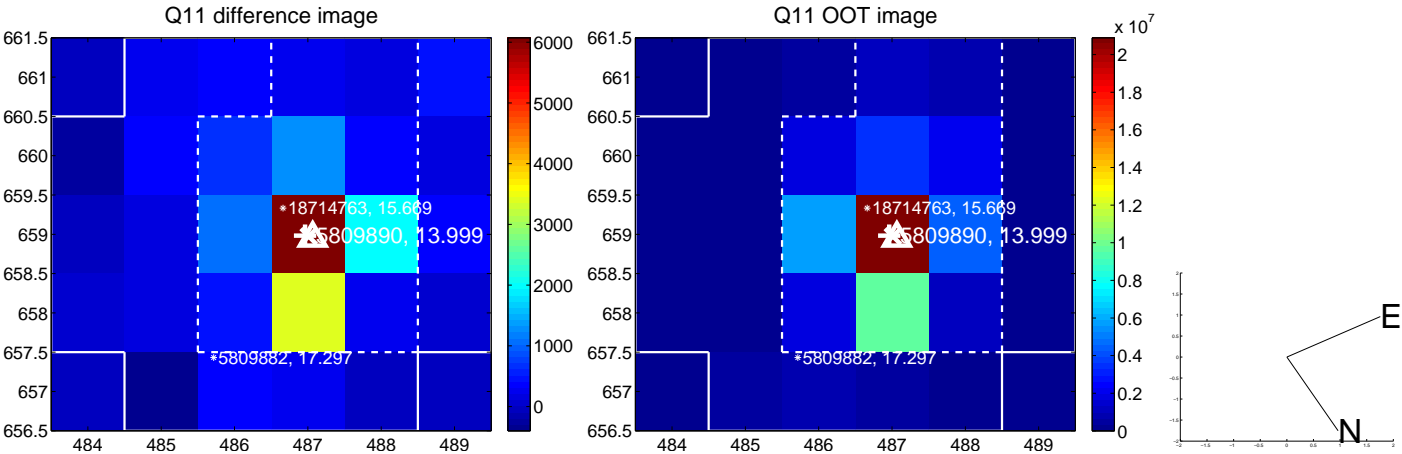
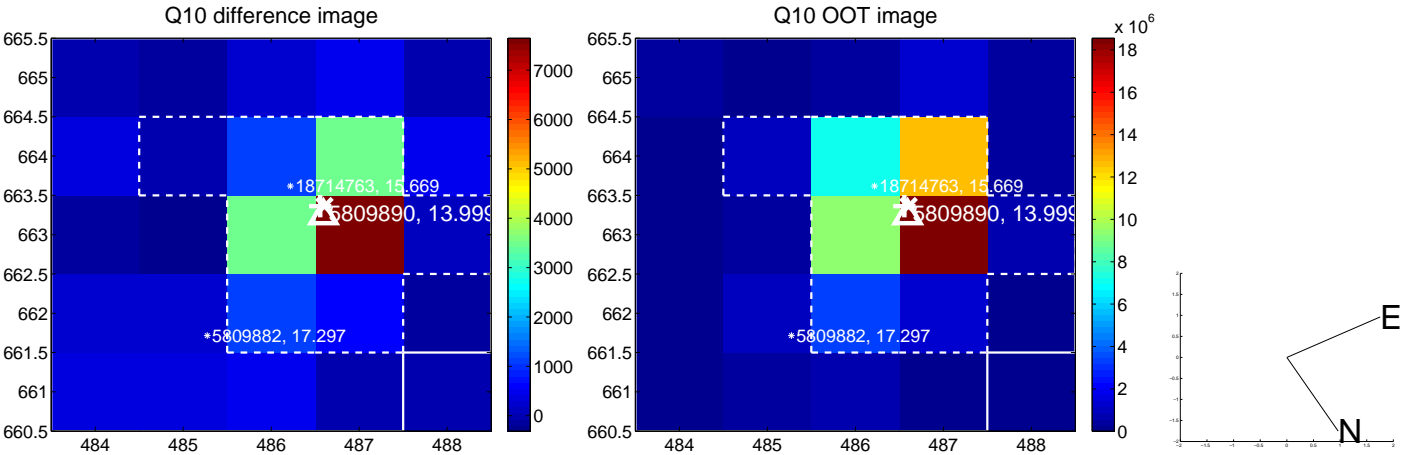
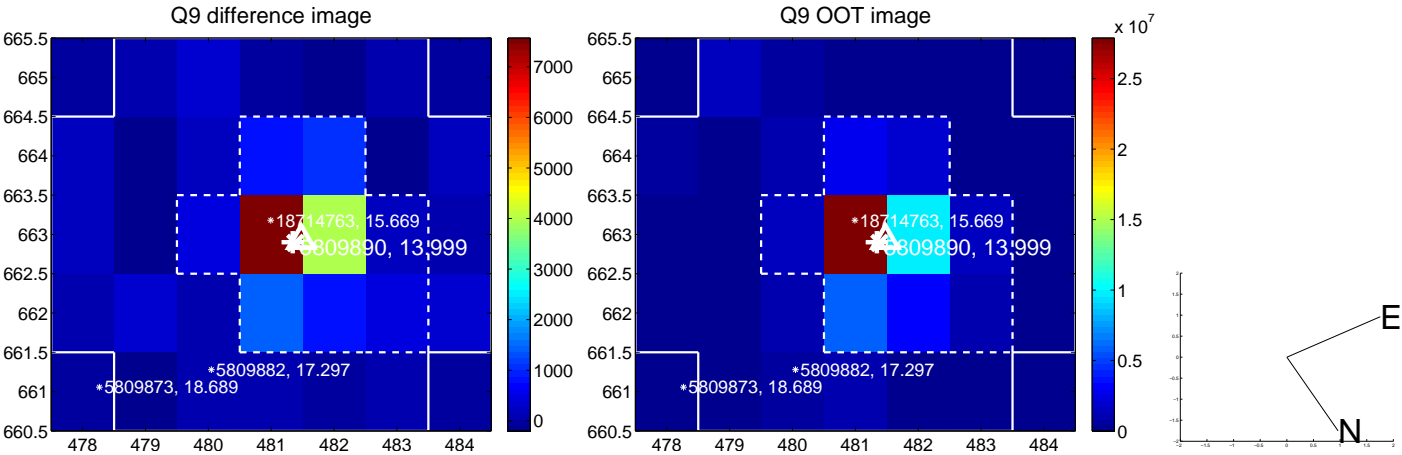
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



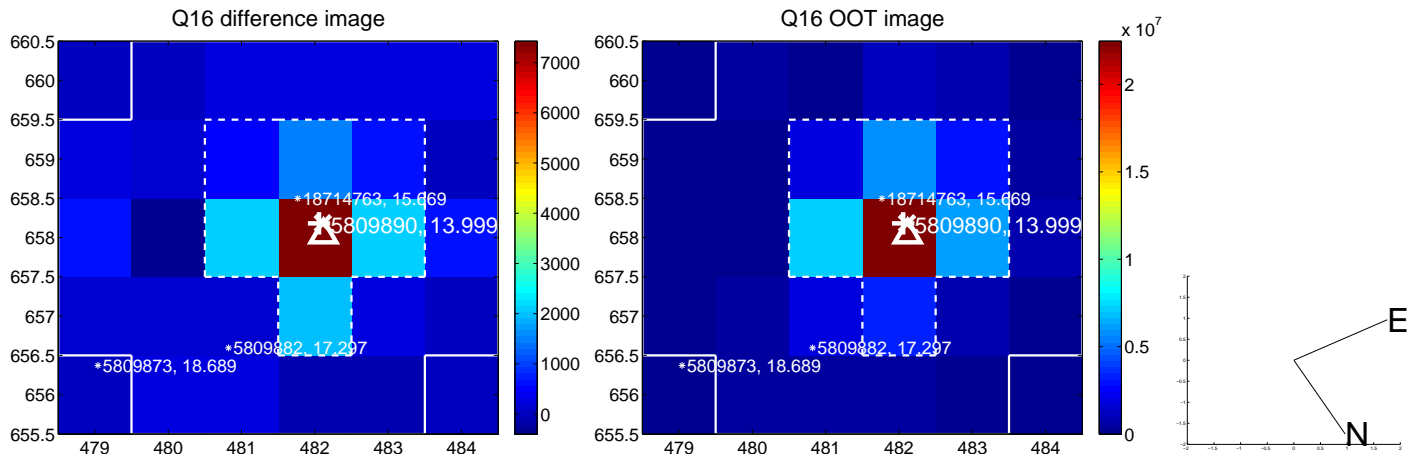
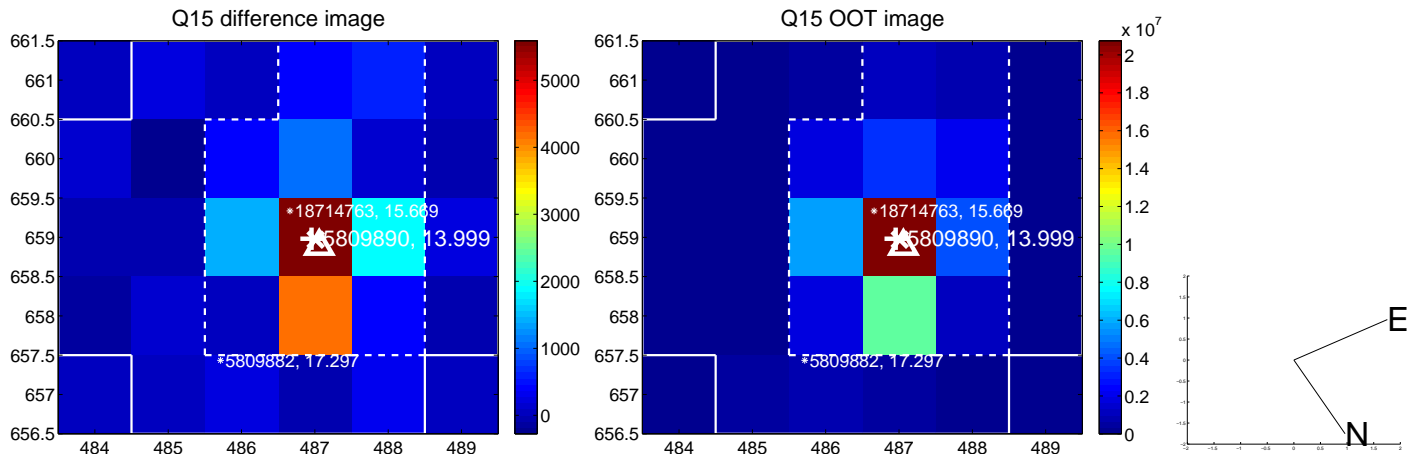
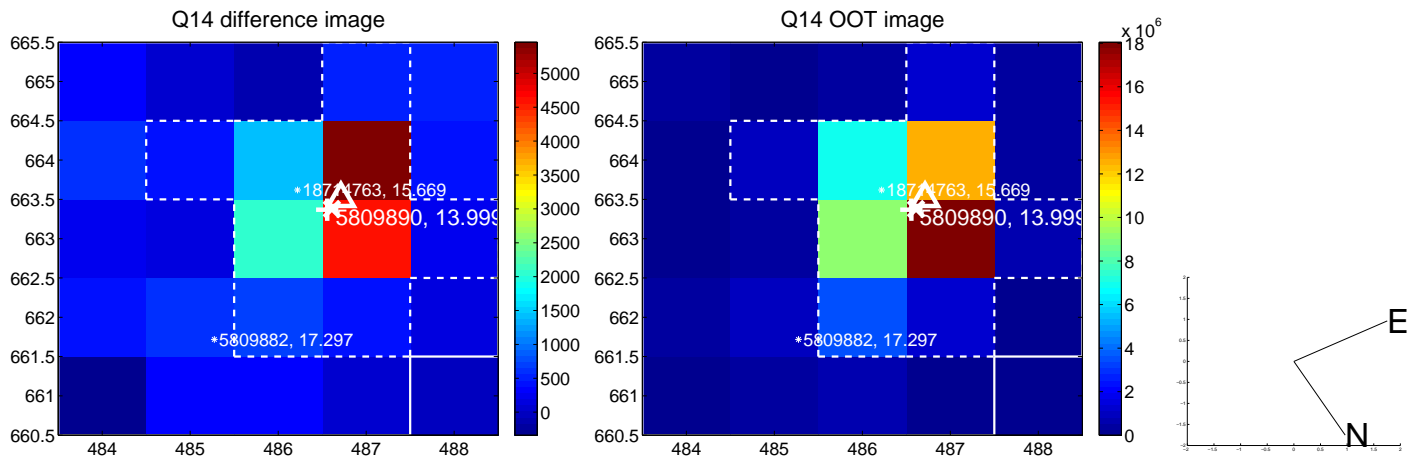
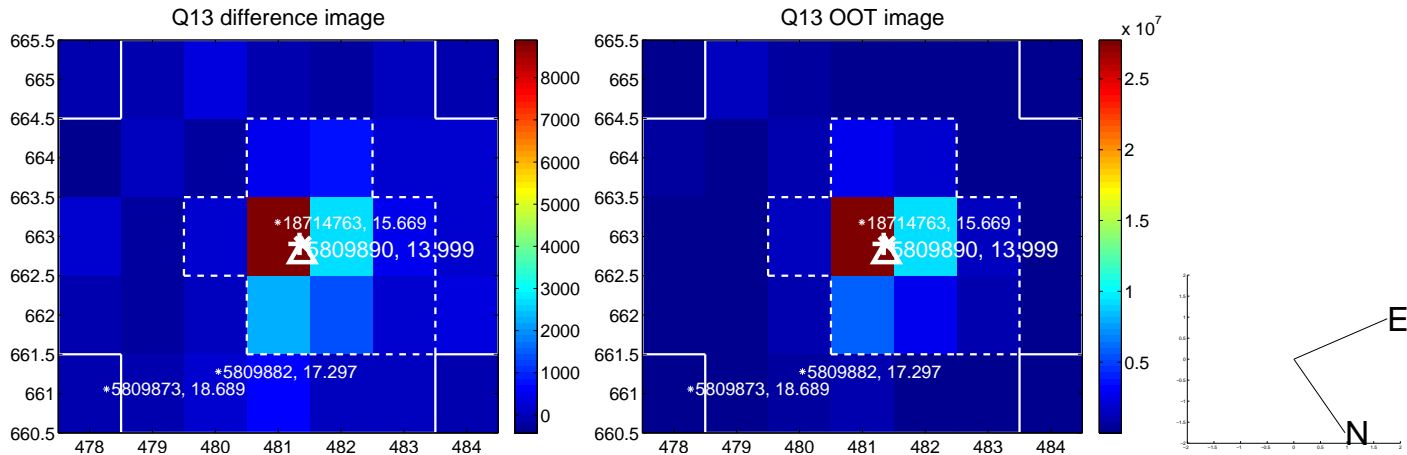
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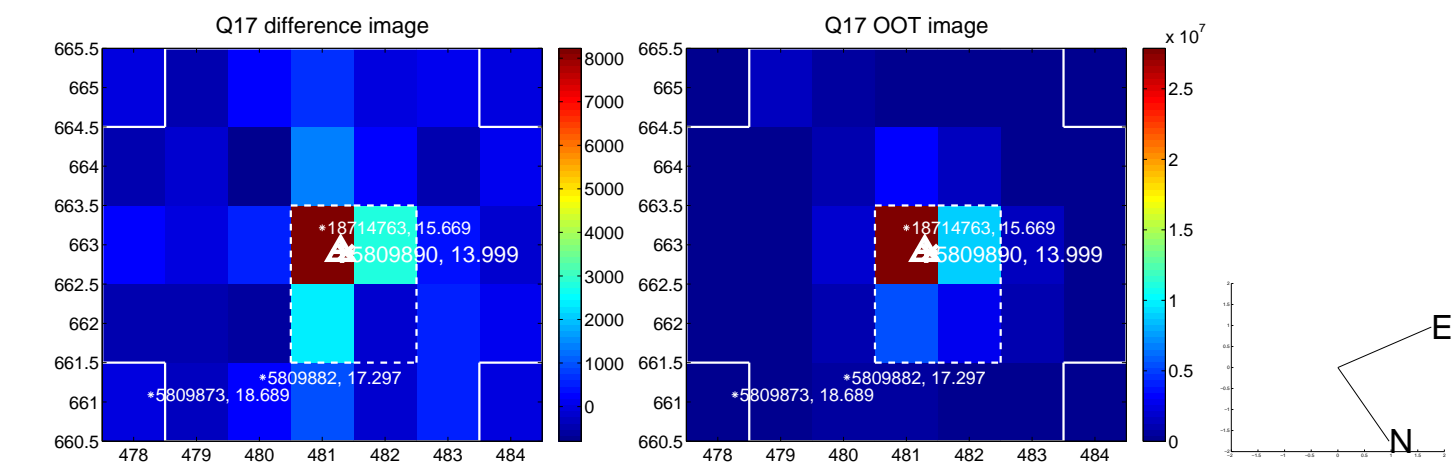


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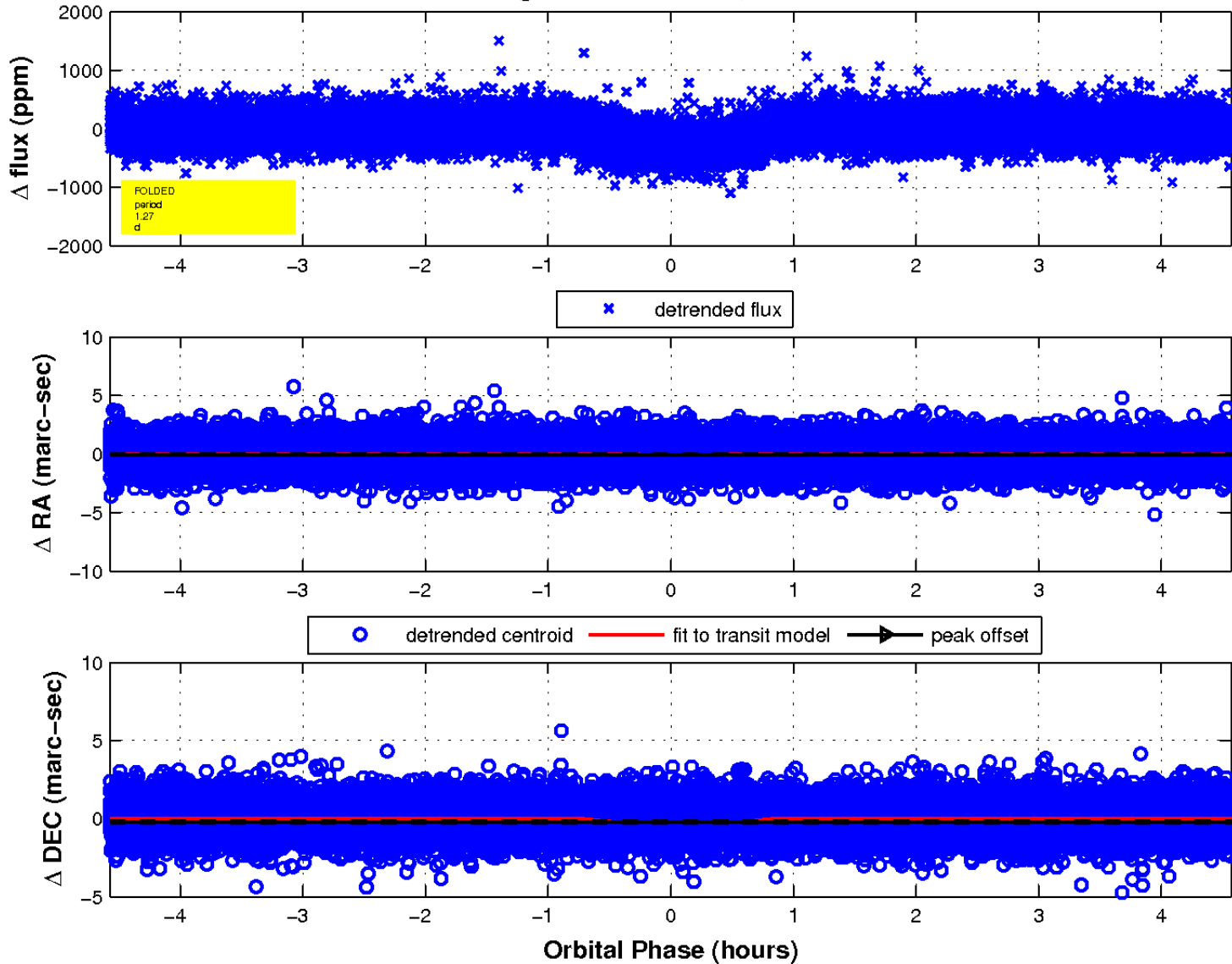




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

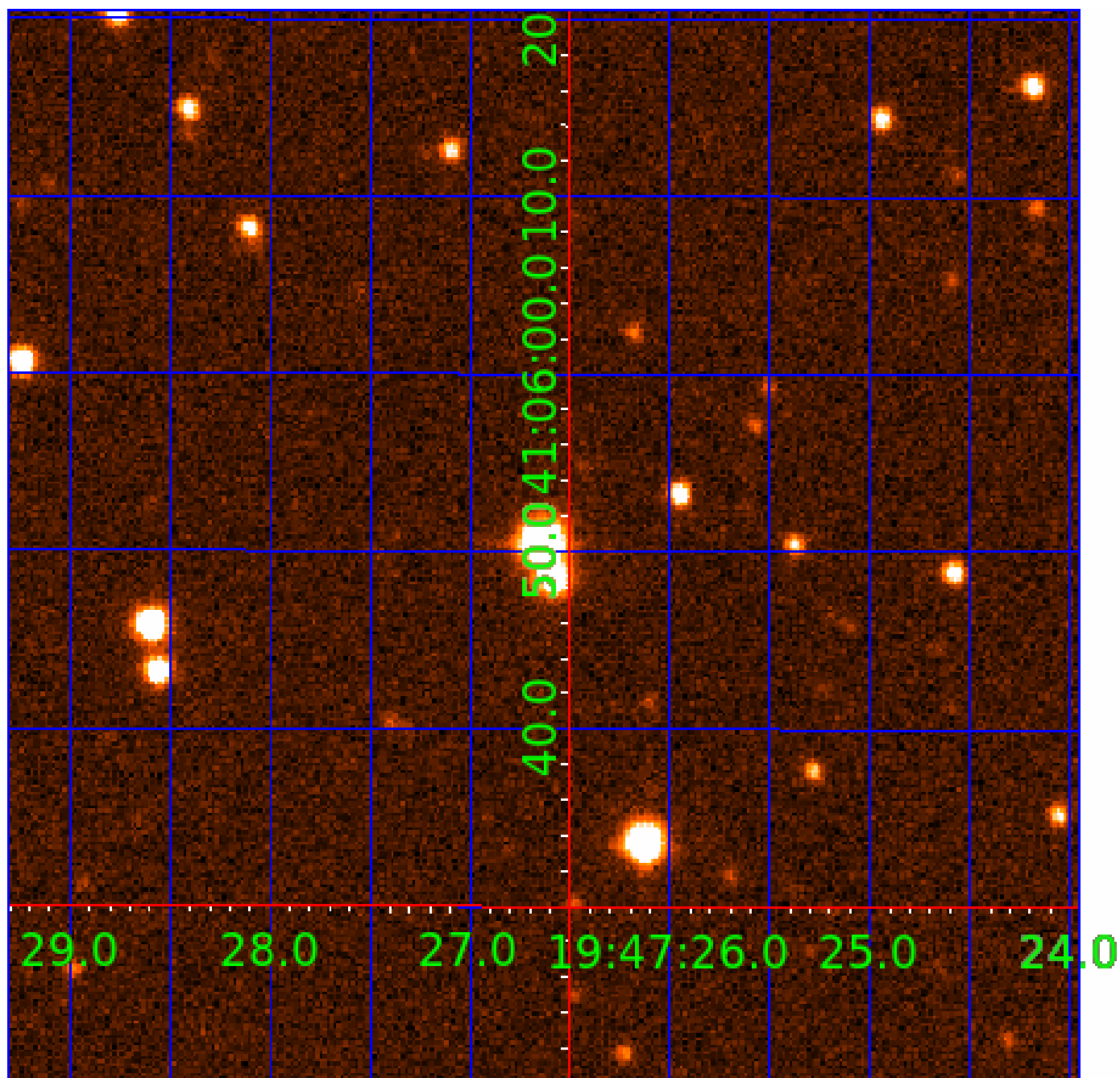


### fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 005809890

## 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
005809890-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005809890-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

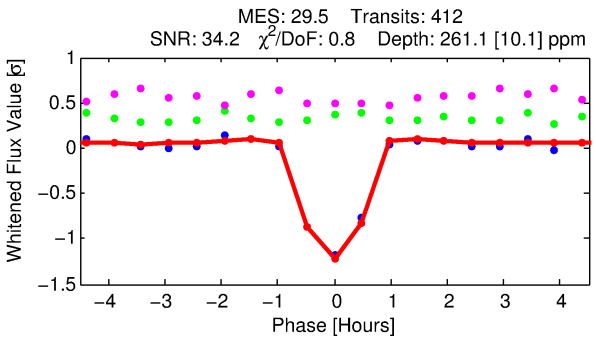
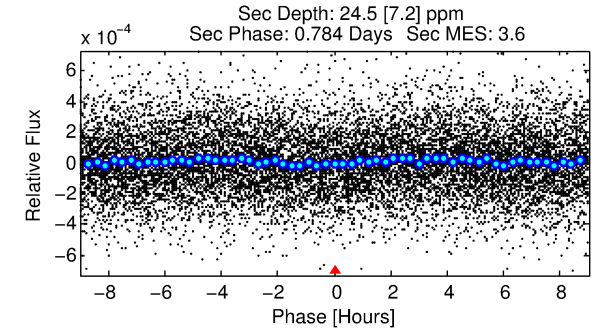
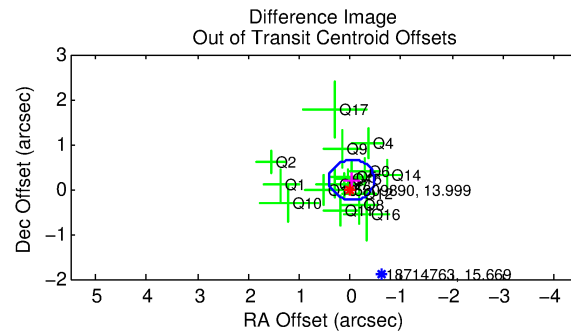
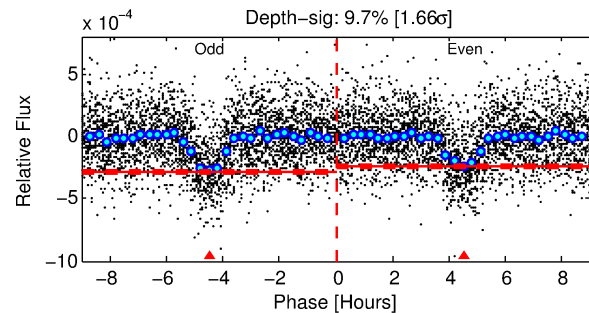
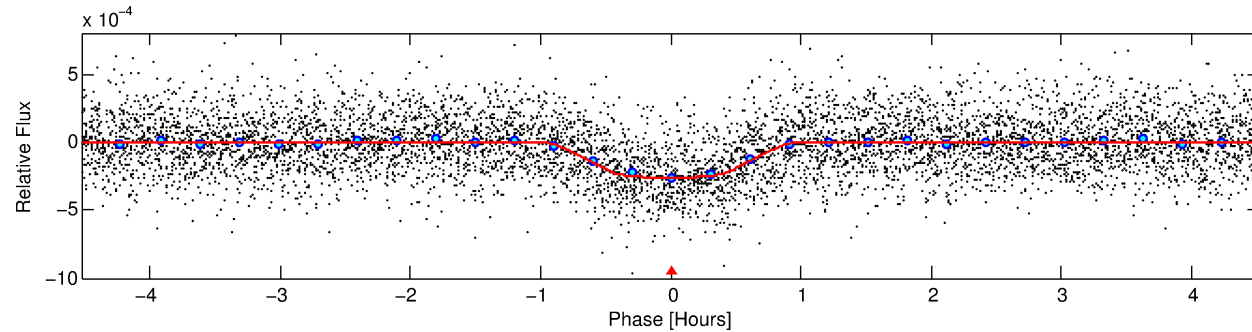
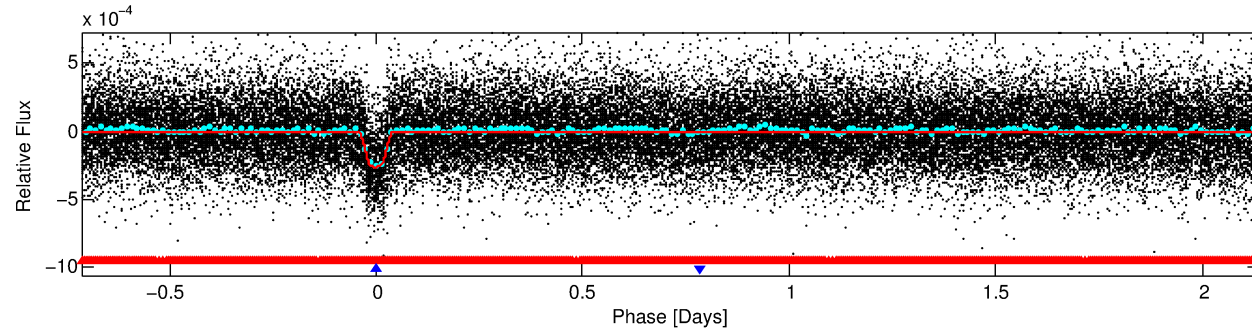
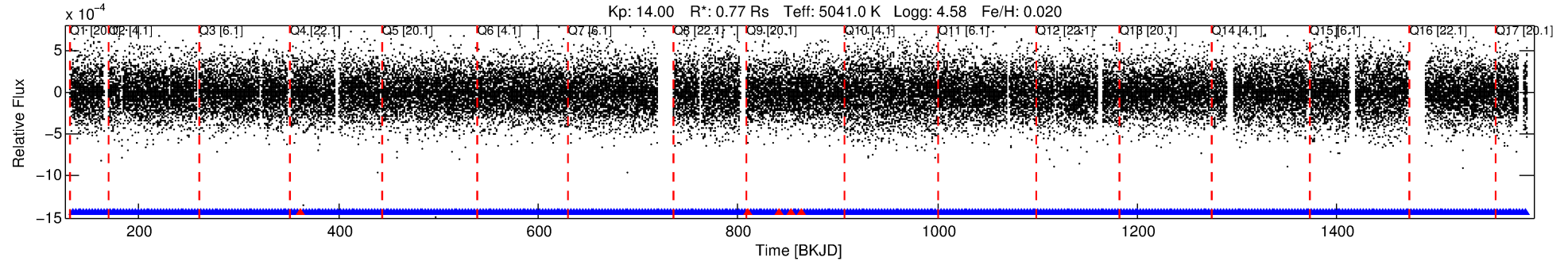
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005809890-02

No Significant Match Found

# DV One-Page Summary

KIC: 5809890 Candidate: 2 of 2 Period: 2.853 d  
KOI: K01050.02 Corr: 0.975



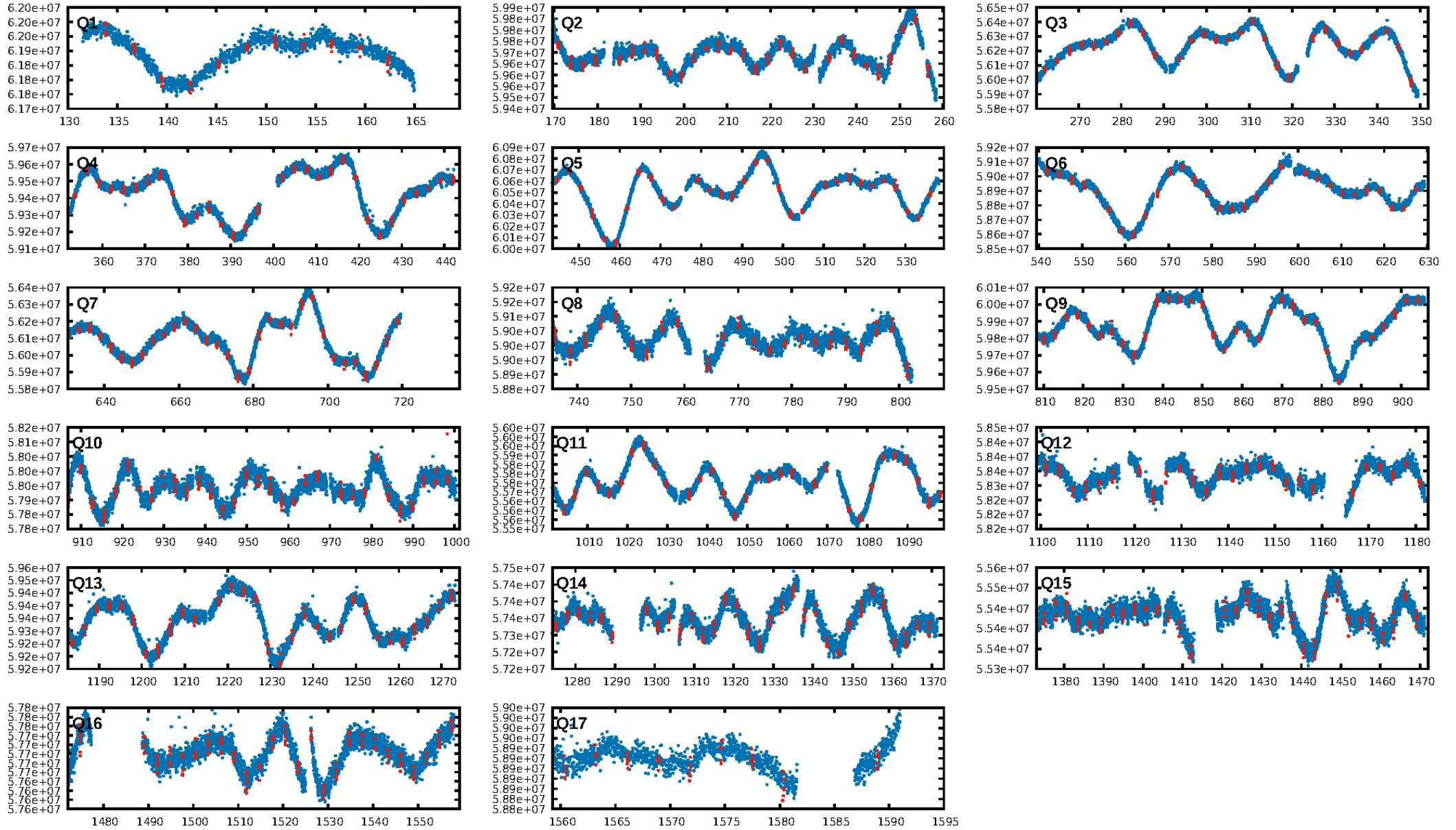
## DV Fit Results:

Period = 2.85313 [0.00000] d  
Epoch = 133.7972 [0.0007] BKJD  
Rp/R\* = 0.0183 [0.0045]  
a/R\* = 6.70 [6.43]  
b = 0.91 [0.19]  
Seff = 252.75 [29.58]  
Teq = 1017 [30] K  
Rp = 1.53 [0.39] Re  
a = 0.0366 [0.0021] AU  
Ag = 7.73 [4.47] [1.51 $\sigma$ ]  
Teffp = 2621 [378] K [4.23 $\sigma$ ]

## DV Diagnostic Results:

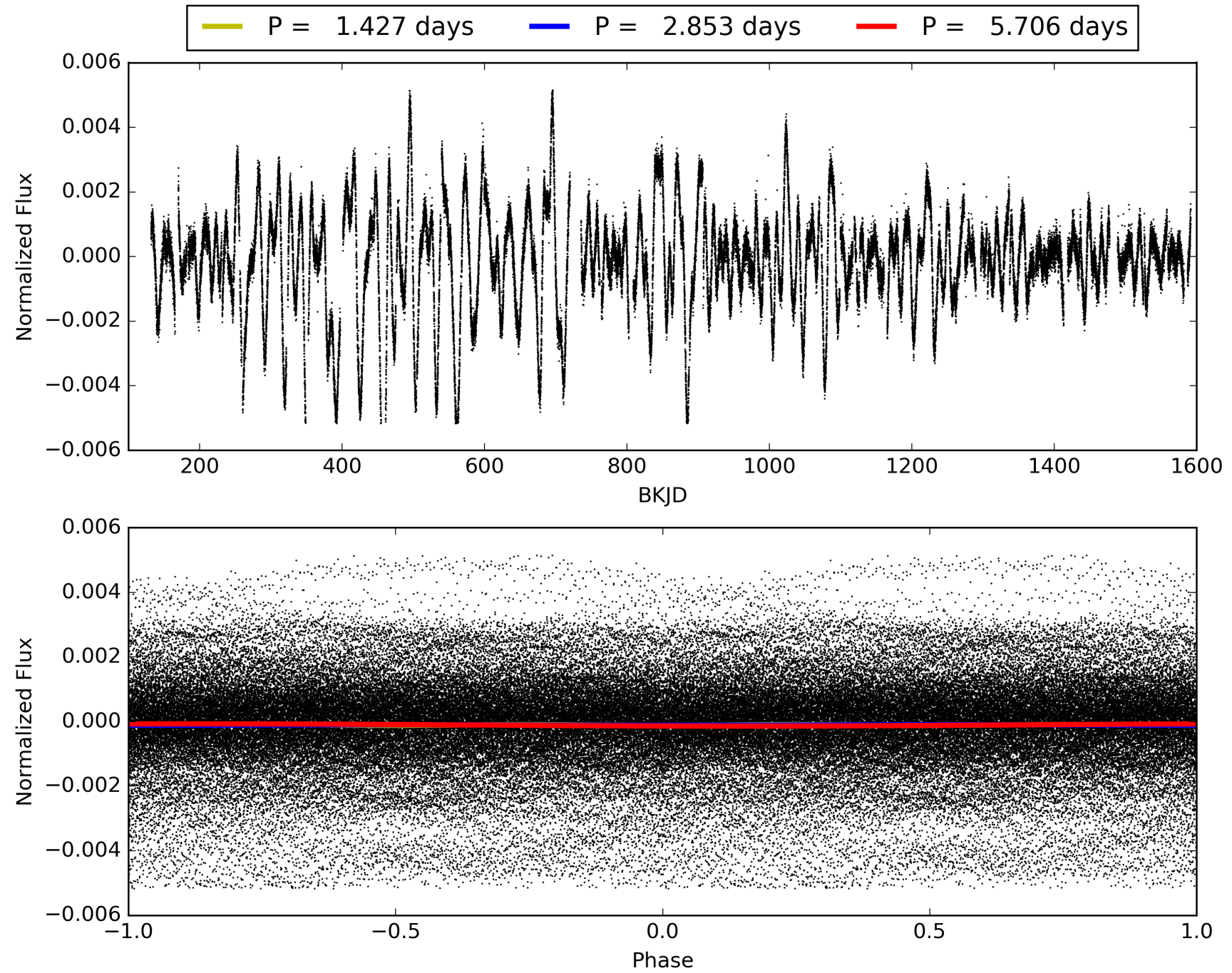
ShortPeriod-sig: 100.0% [17.73 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.40e-178  
RollingBand-fgt: 0.99 [387/392]  
GhostDiagnostic-chr: 10.49  
Centroid-sig: 24.2%  
Centroid-so: 0.547 arcsec [1.58 $\sigma$ ]  
OotOffset-rm: 0.206 arcsec [1.38 $\sigma$ ]  
KicOffset-rm: 0.191 arcsec [1.23 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005809890-02, PDC Light Curves



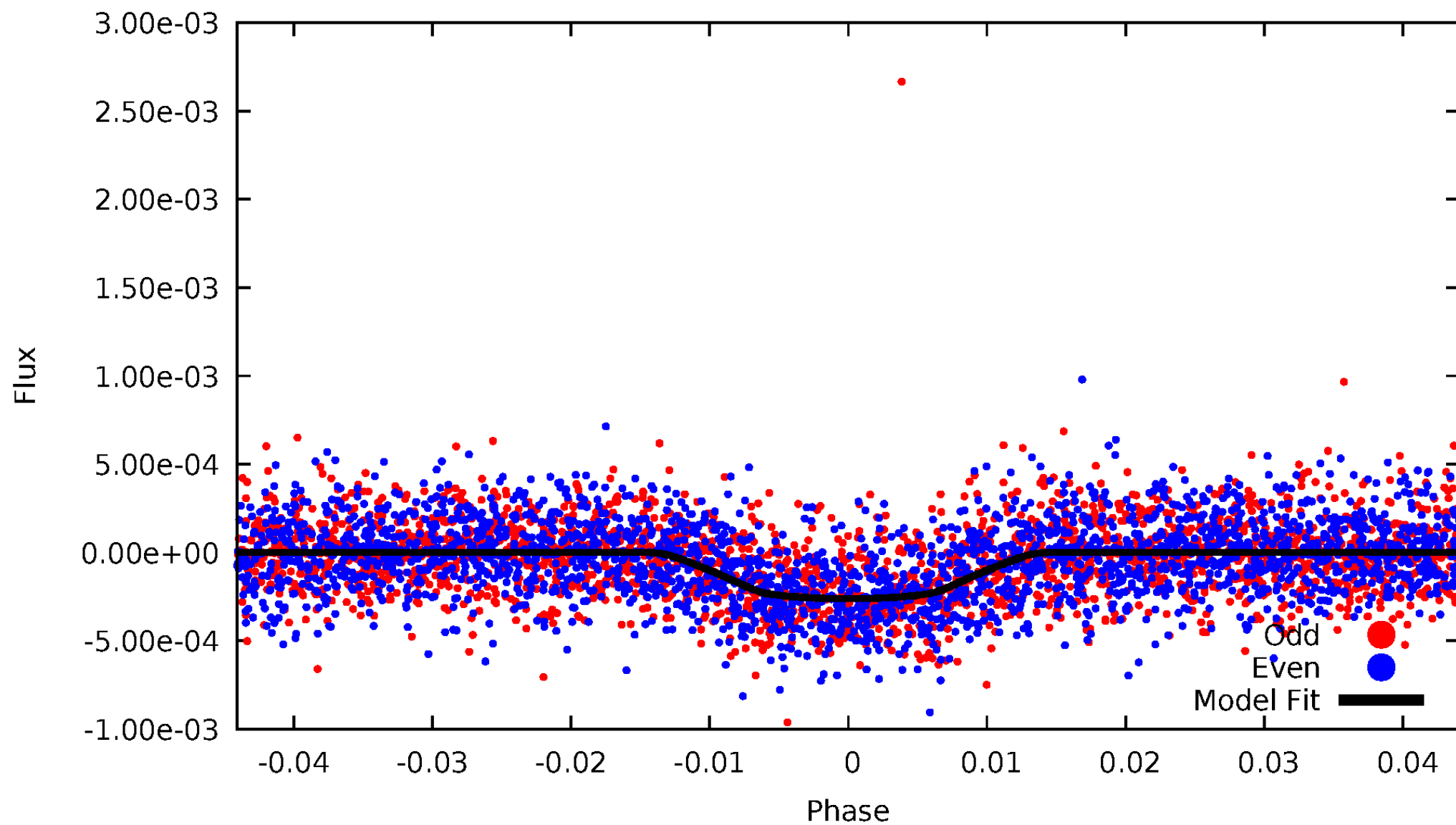


TCE 005809890-02



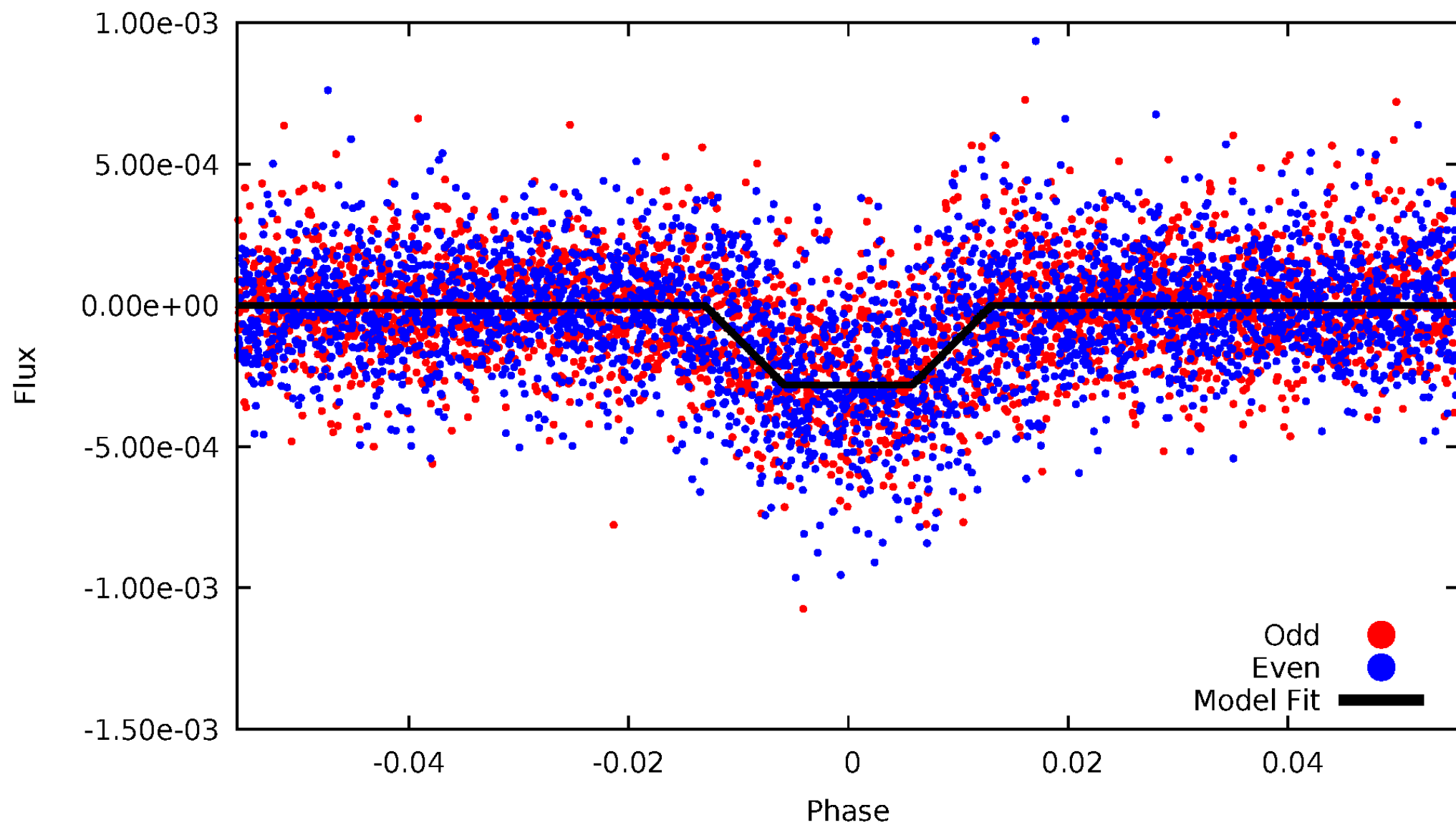
# DV Odd/Even

TCE 005809890-02



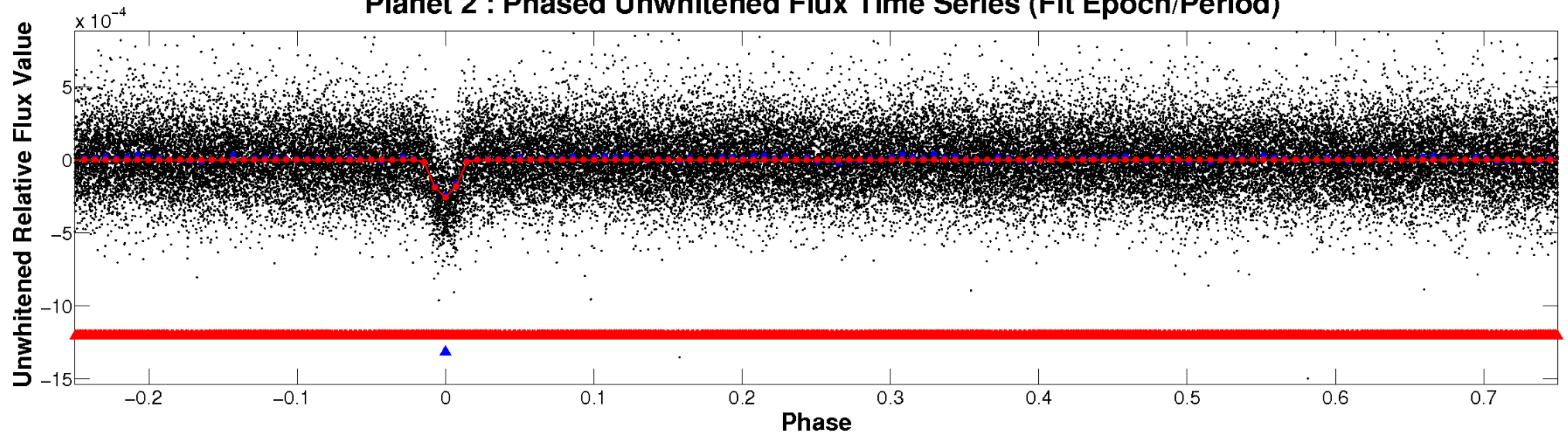
# ALT Odd/Even

TCE 005809890-02

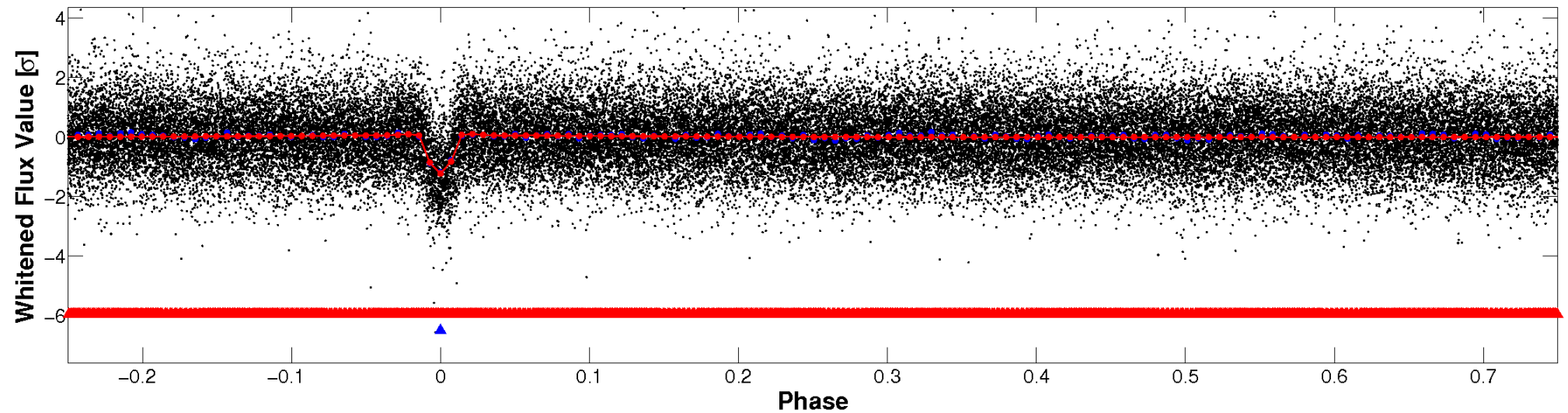


# Non-Whitened Vs. Whitened Light Curve

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

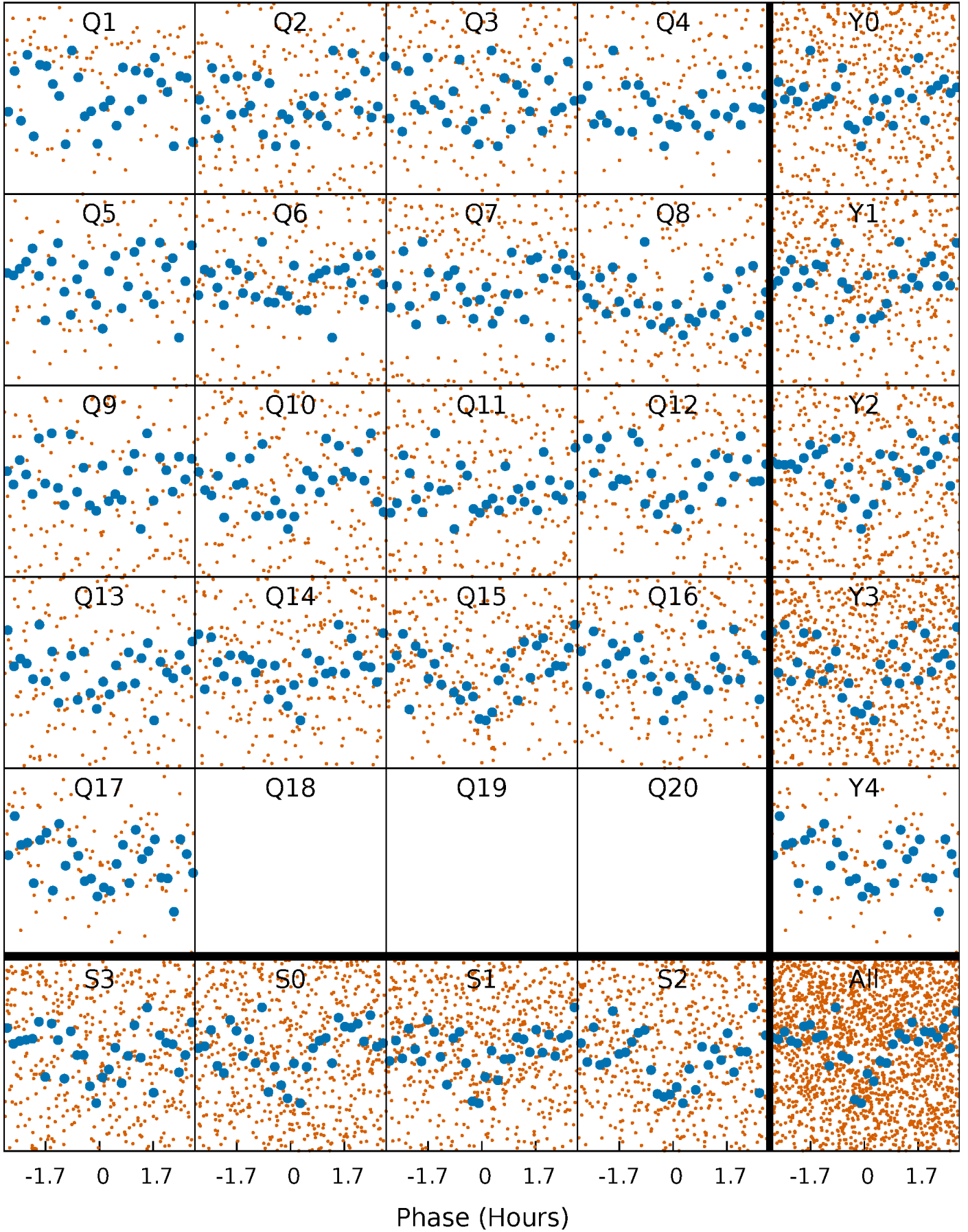


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

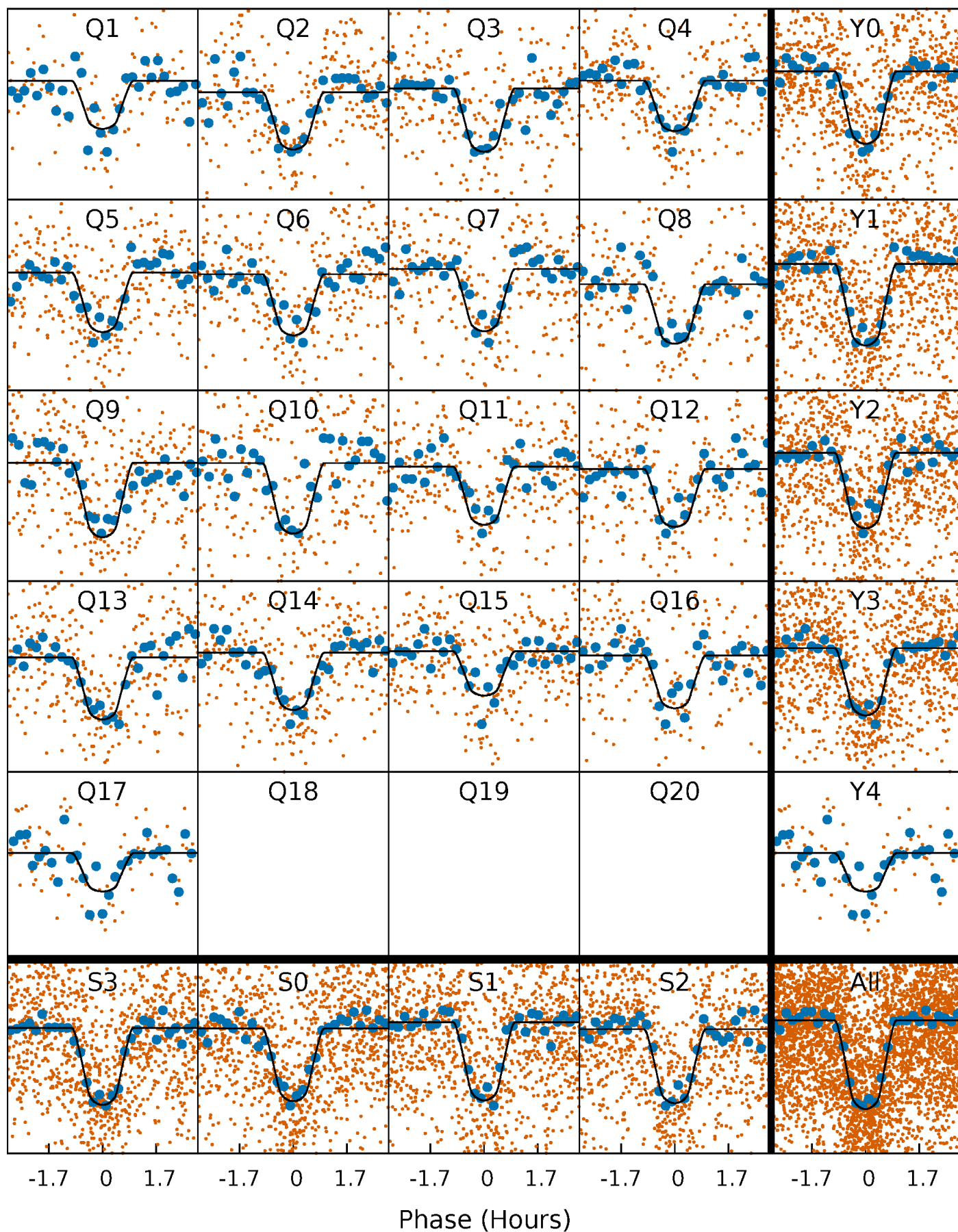
TCE 005809890-02   P= 2.853133 Days    $T_0=133.797234$  (BKJD)





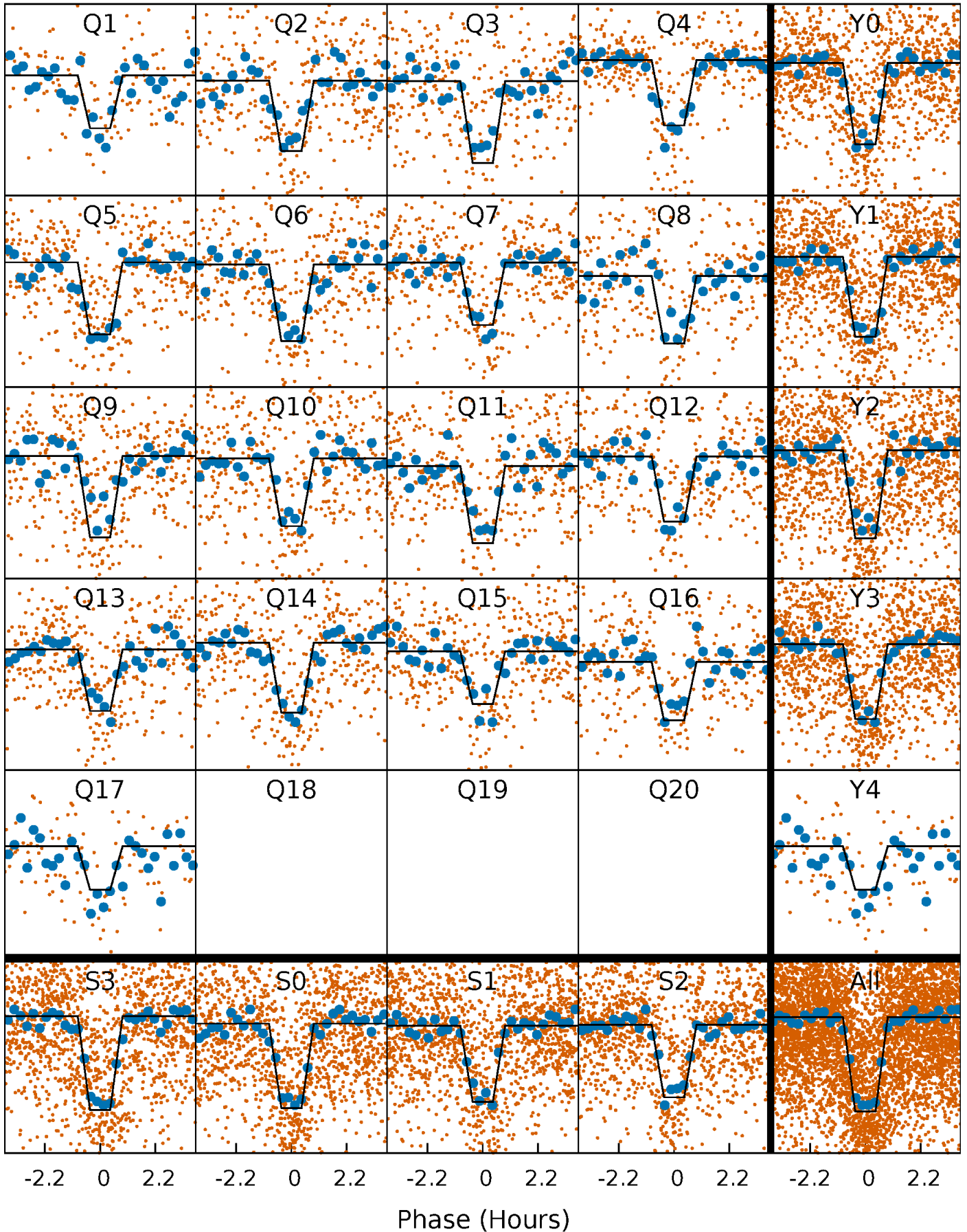
# DV Quarter-Phased Transit Curves

TCE 005809890-02   P= 2.853133 Days    $T_0=133.797234$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

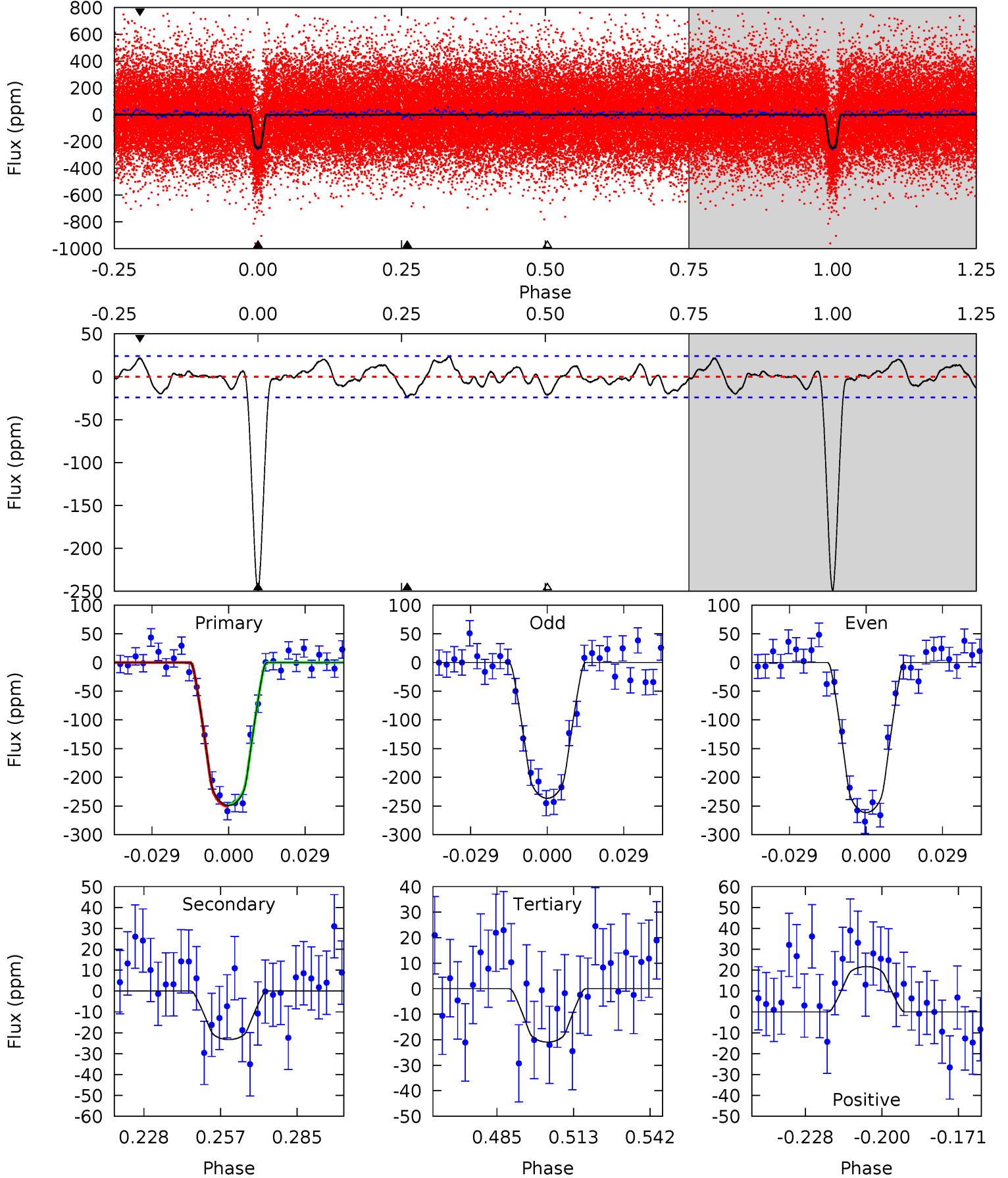
TCE 005809890-02     $P = 2.853130$  Days     $T_0 = 133.797158$  (BKJD)



# DV Model-Shift Uniqueness Test

005809890-02, P = 2.853133 Days, E = 130.944101 Days

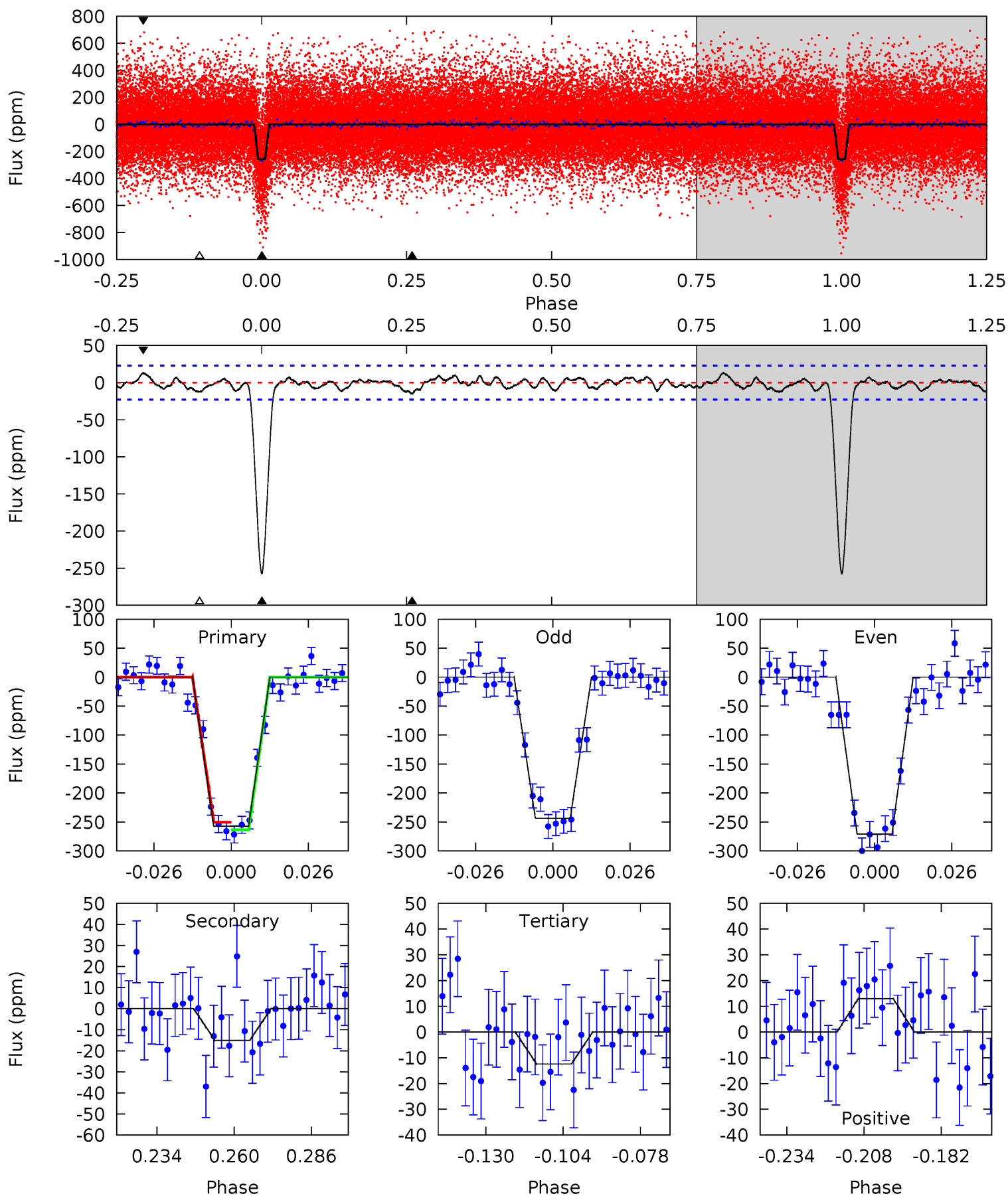
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
49.8	4.65	4.18	4.34	4.82	2.19	1.91	45.6	45.4	0.47	0.31	2.52	1.00	0.09	0.28



# Alt Model-Shift Uniqueness Test

005809890-02, P = 2.853130 Days, E = 130.944028 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
54.6	3.19	2.63	2.76	4.84	2.23	1.09	52.0	51.9	0.56	0.43	2.89	1.00	0.05	1.39



### Stellar Parameters For KIC 005809890

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5041^{+100}_{-100}$	$4.576^{+0.028}_{-0.048}$	$0.020^{+0.150}_{-0.150}$	$0.766^{+0.051}_{-0.037}$	$0.807^{+0.043}_{-0.043}$	$2.528^{+0.296}_{-0.387}$
	+2%/-2%	+1%/-1%	+750%/-750%	+7%/-5%	+5%/-5%	+12%/-15%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 005809890-02 / KOI 1050.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-23 \pm 5$	$1.56^{+0.37}_{-0.40}$	$1426^{+35}_{-36}$	$3122^{+305}_{-230}$	$6.942^{+5.783}_{-2.721}$
Alt.	$-15 \pm 5$	$1.43^{+0.35}_{-0.39}$	$1427^{+36}_{-33}$	$3004^{+335}_{-260}$	$5.423^{+5.302}_{-2.503}$

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

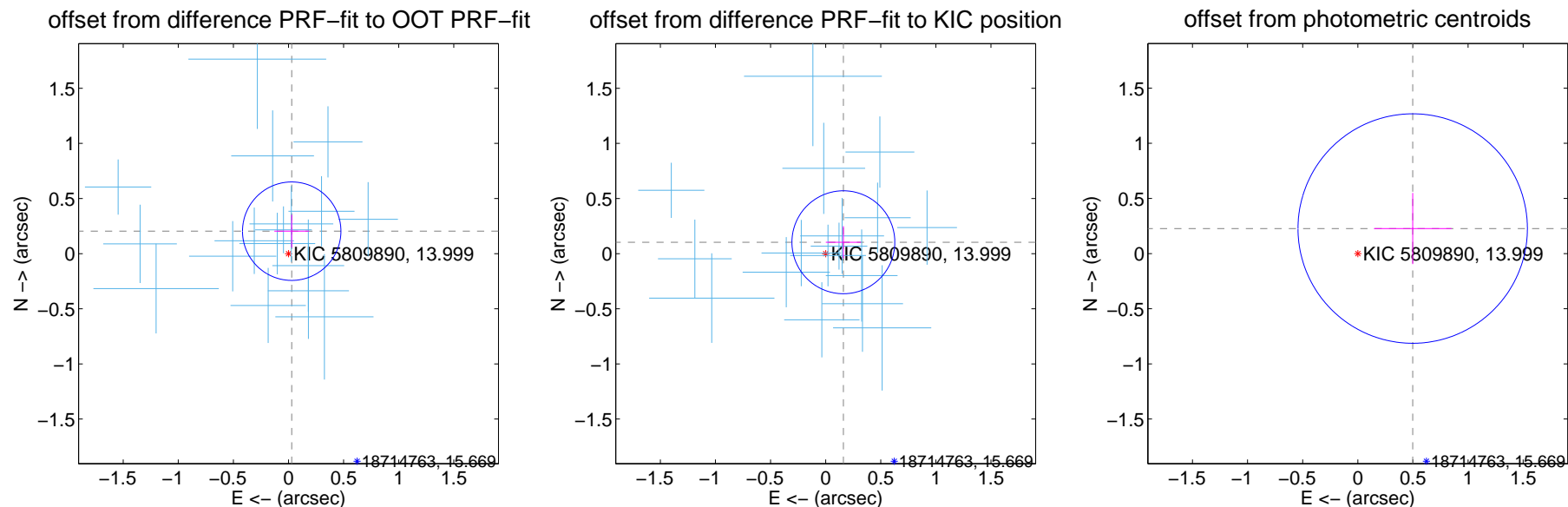
## DV Centroid Data

Supplemental centroid analysis for 005809890-02. Kepler magnitude: 14.00. Transit SNR 34.21

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

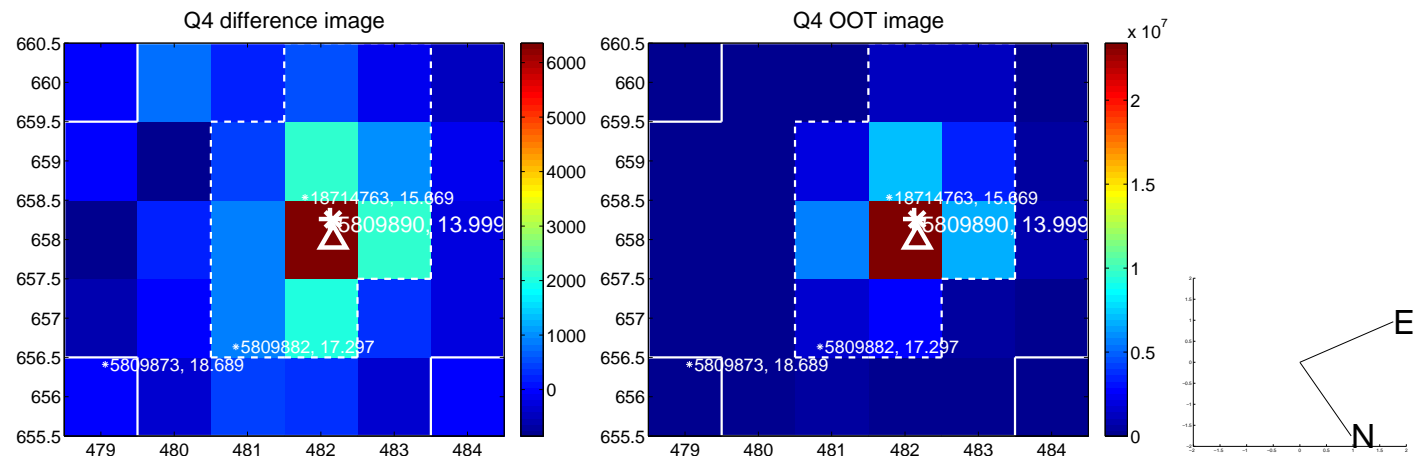
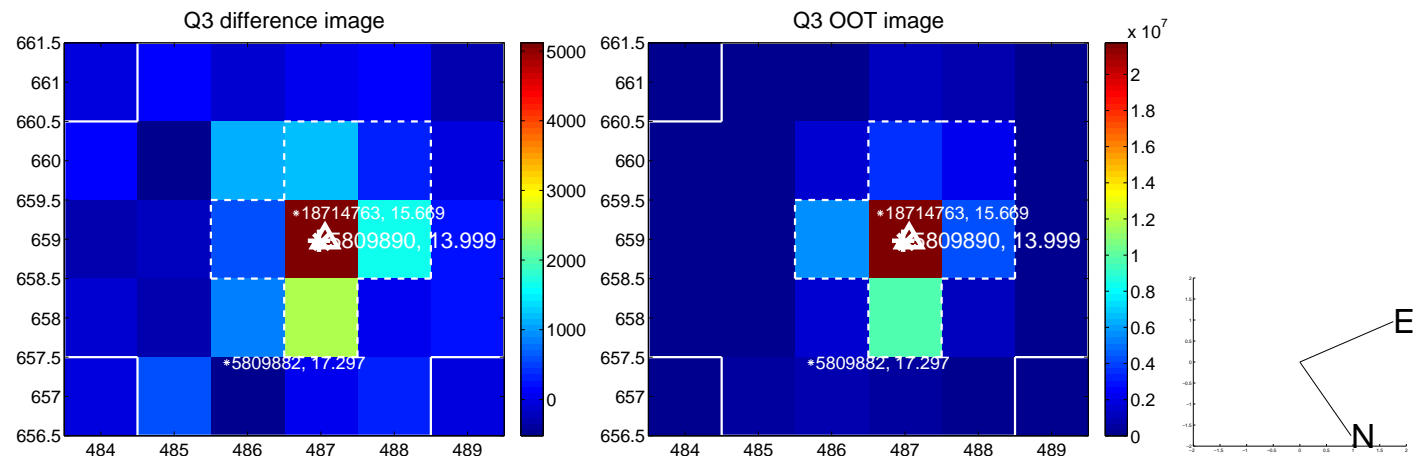
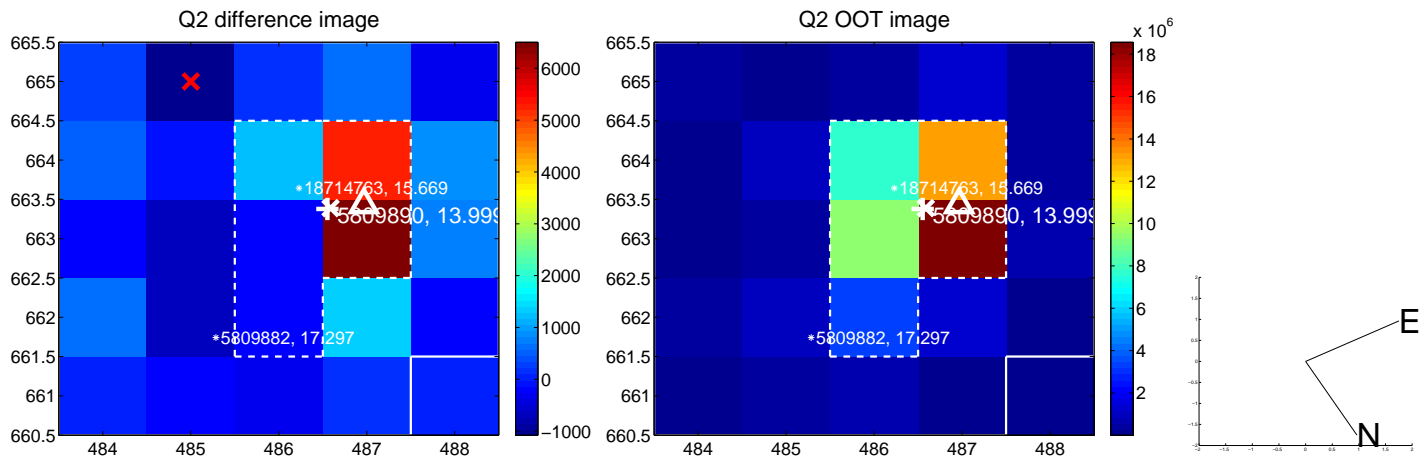
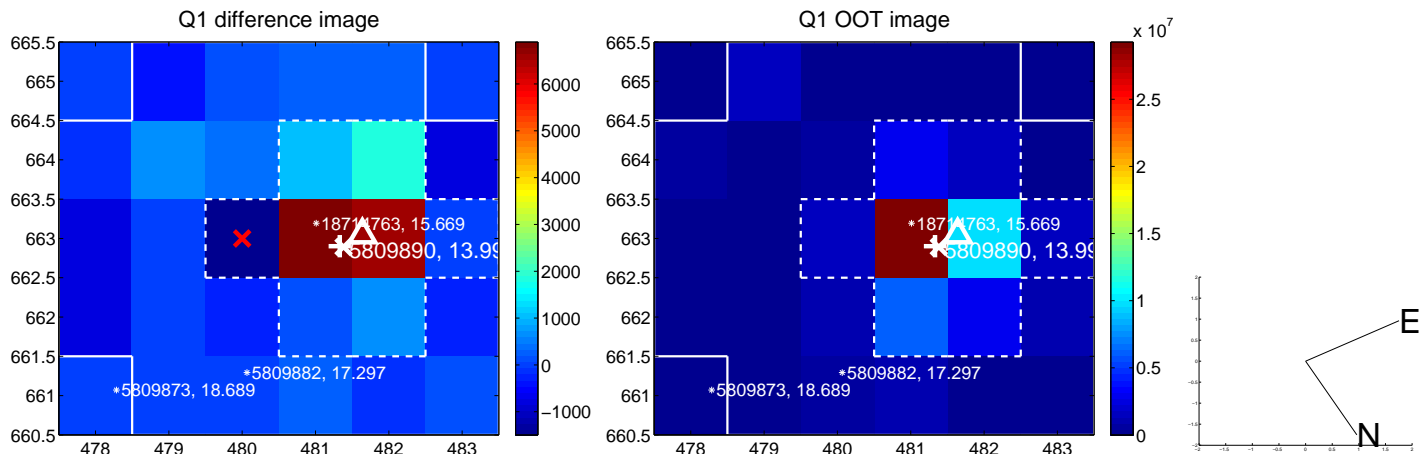
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.206 \pm 0.149$	1.38	$-0.029 \pm 0.158$	$0.204 \pm 0.148$
PRF-fit source offset from KIC position	$0.191 \pm 0.156$	1.23	$-0.161 \pm 0.159$	$0.103 \pm 0.146$
photometric centroid source offset	$0.55 \pm 0.35$	1.58	$-0.50 \pm 0.35$	$0.23 \pm 0.32$



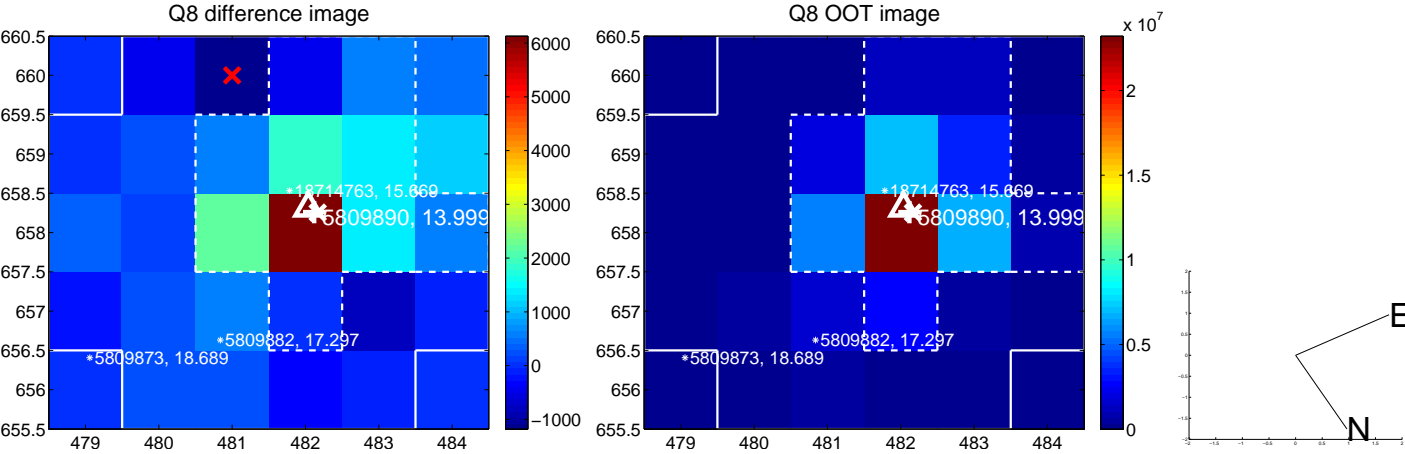
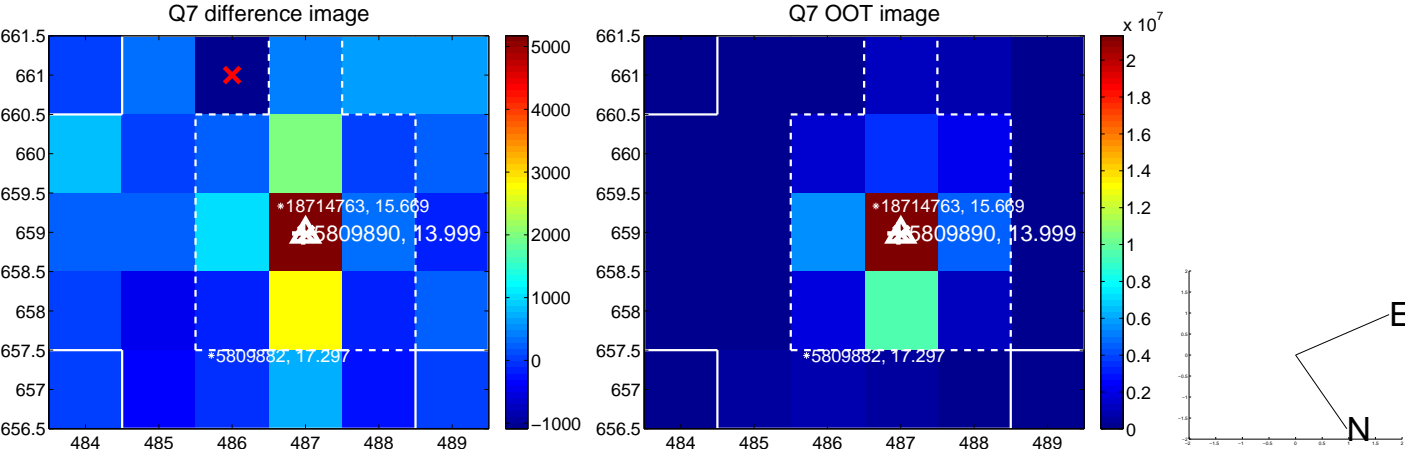
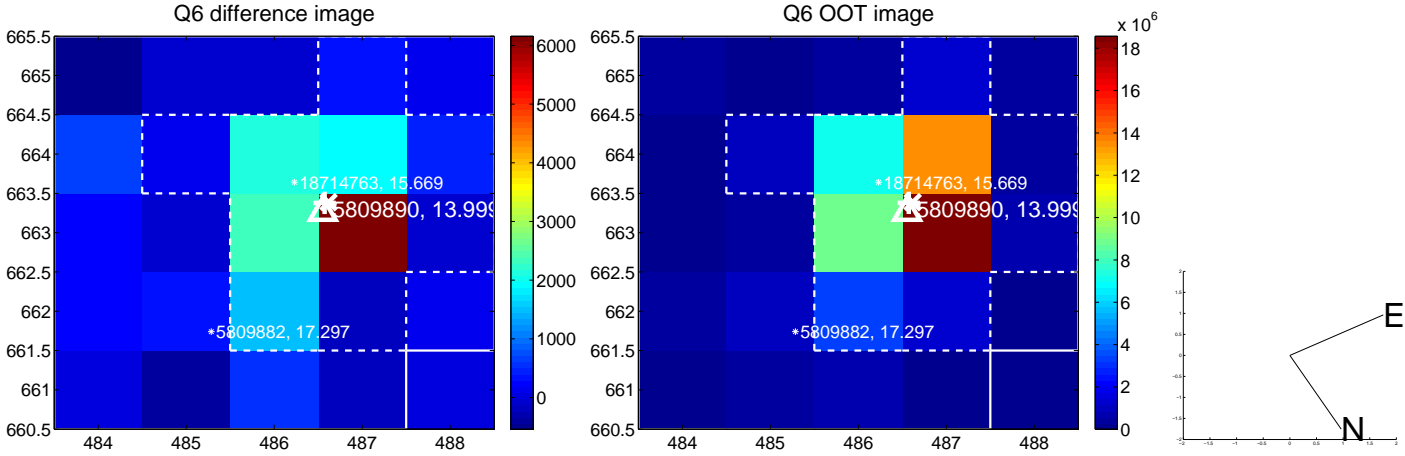
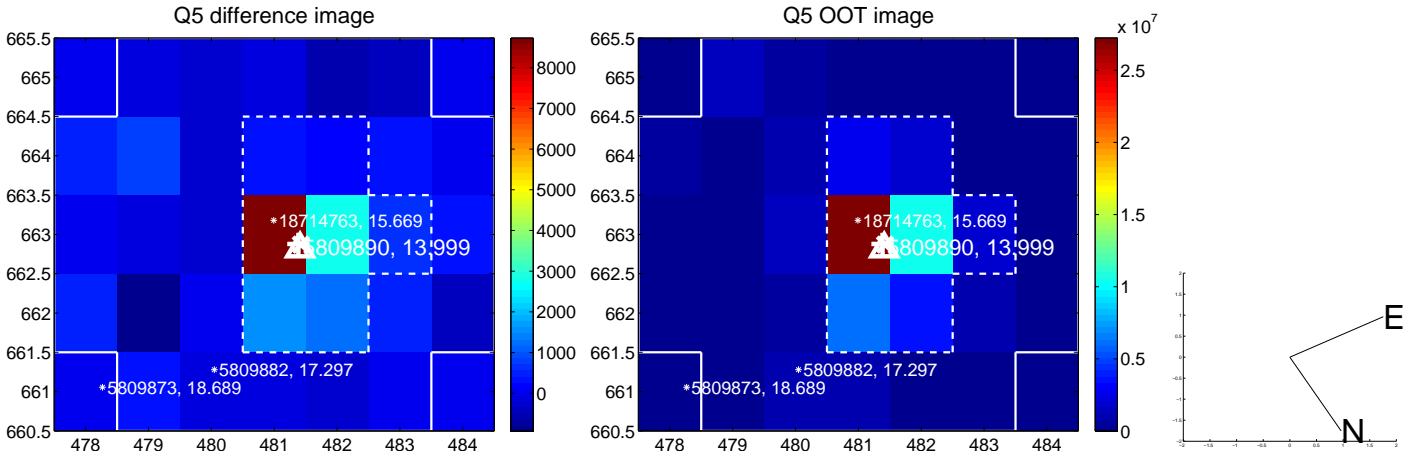
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



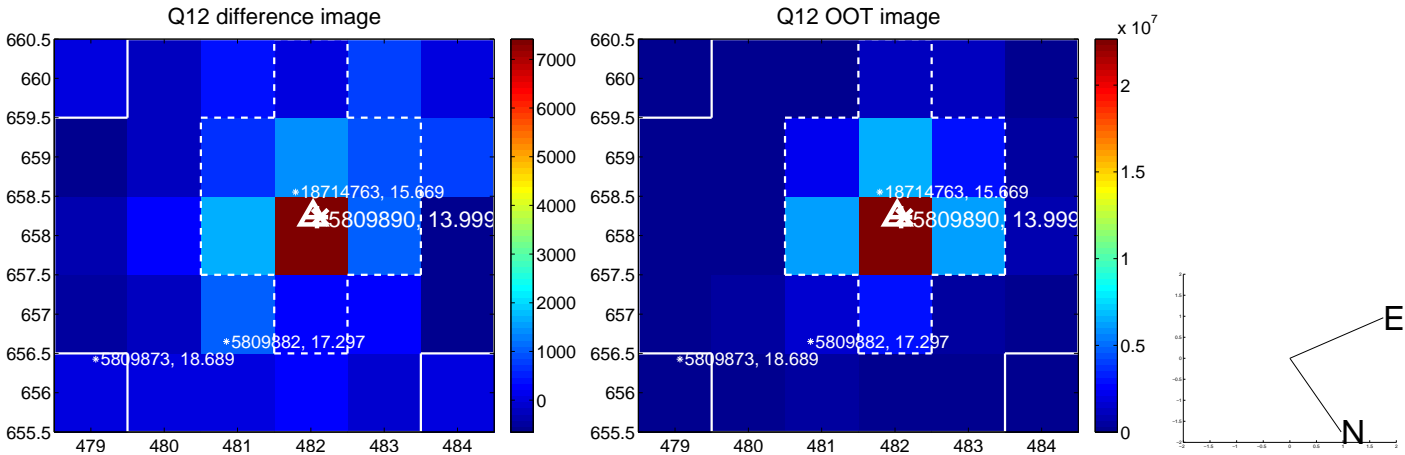
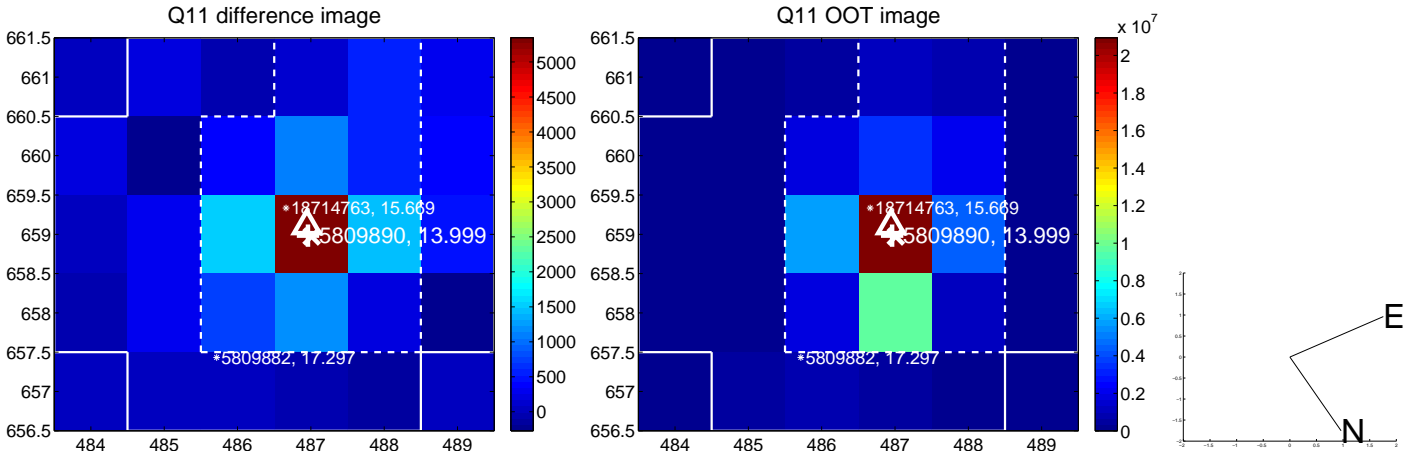
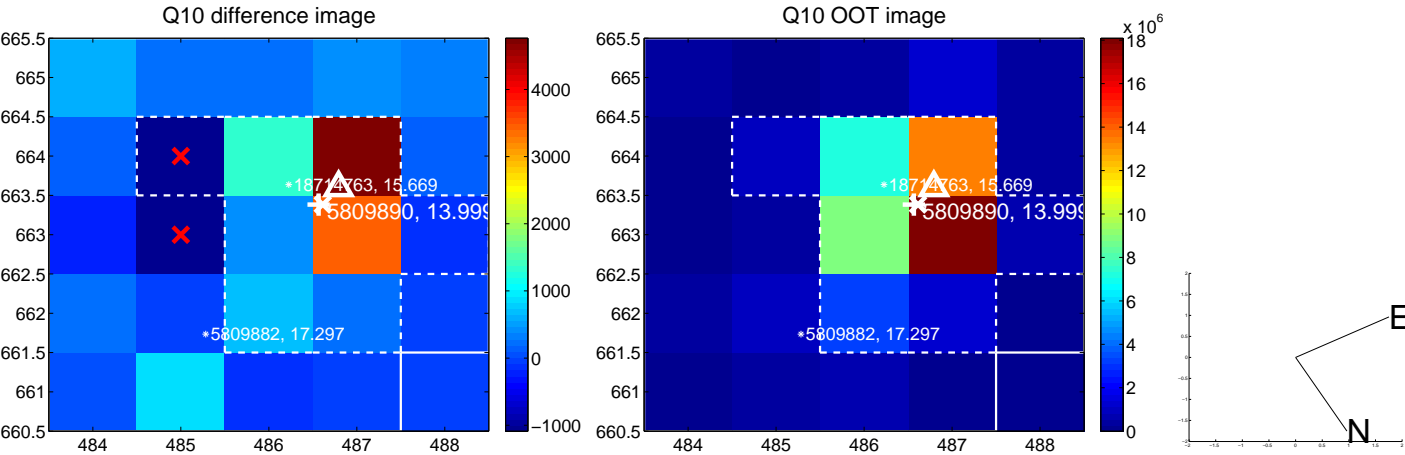
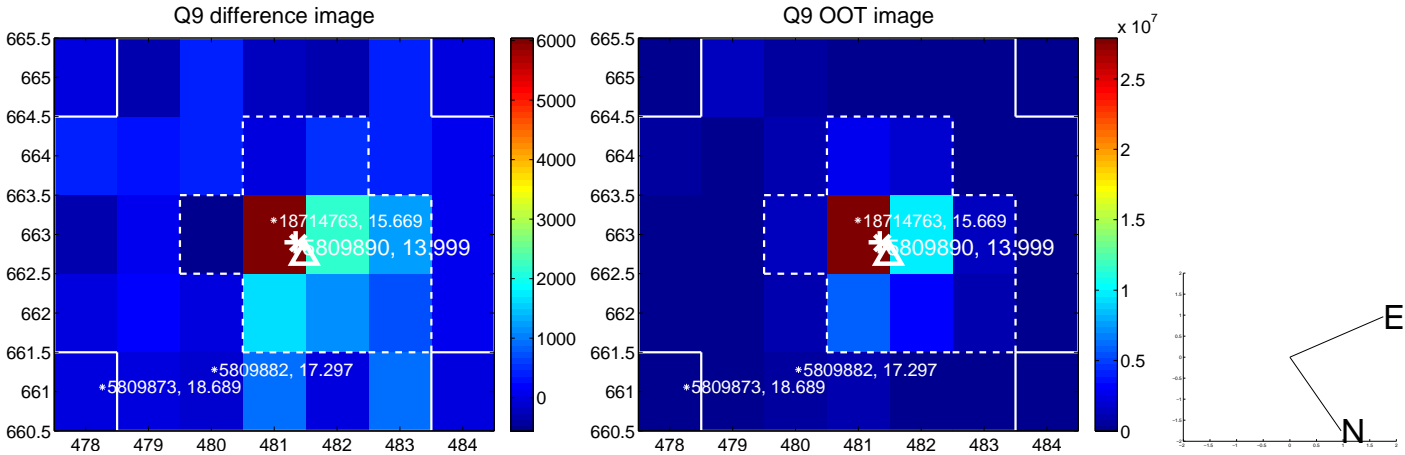
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



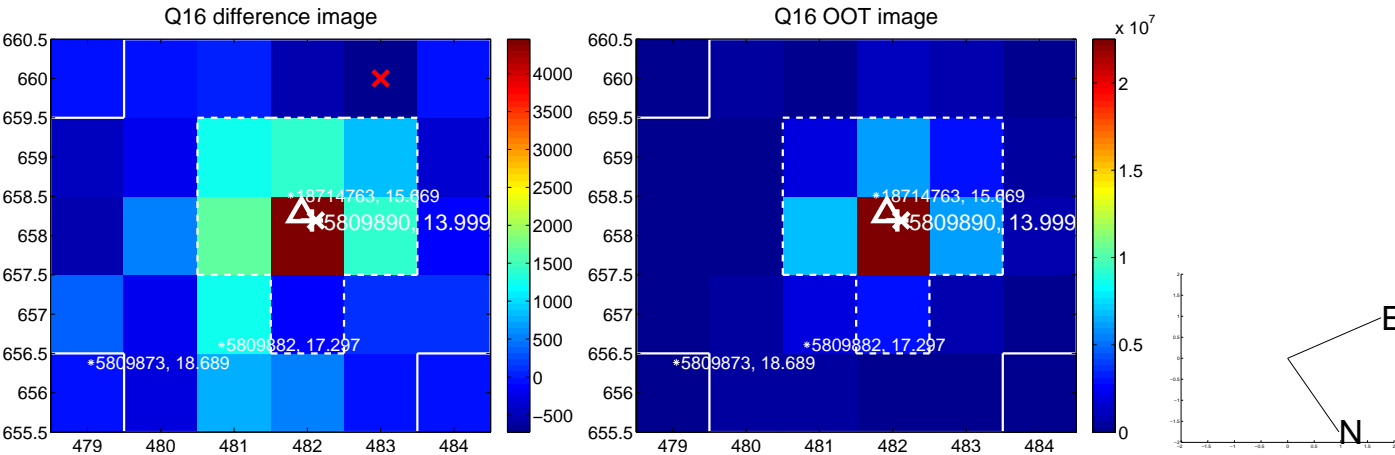
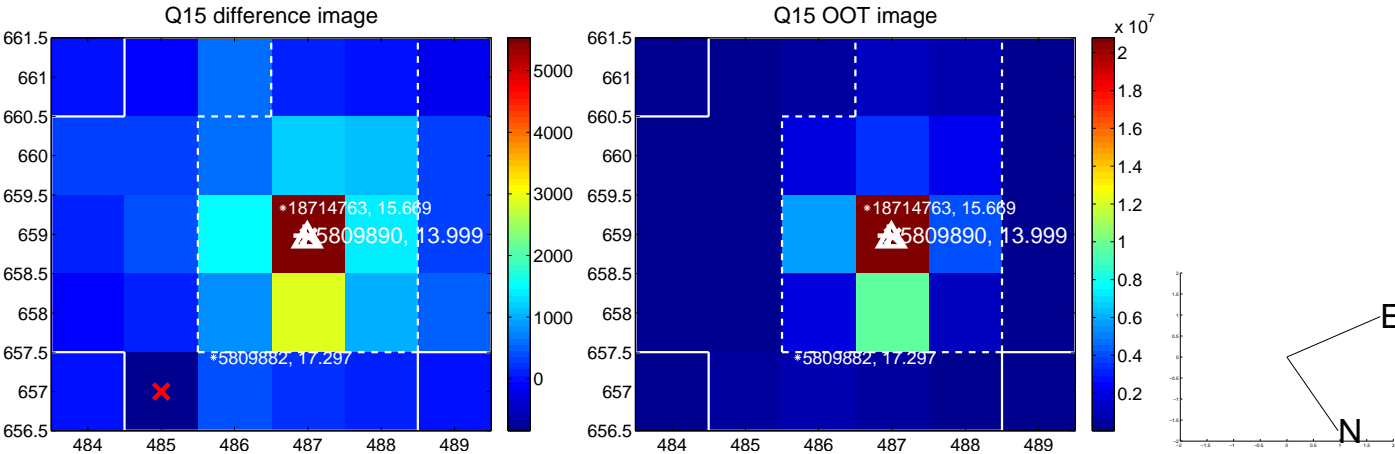
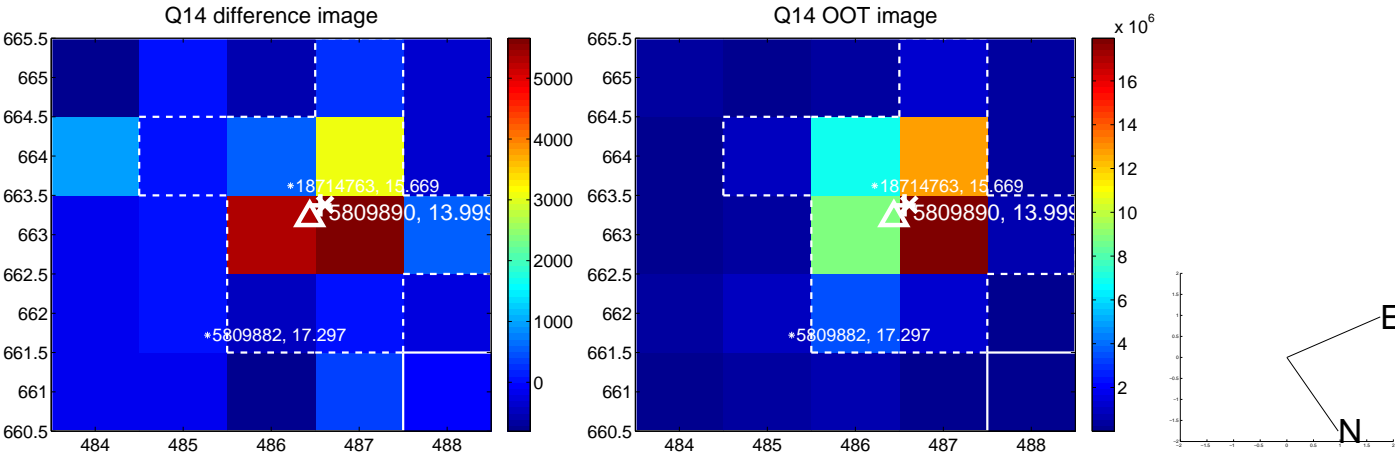
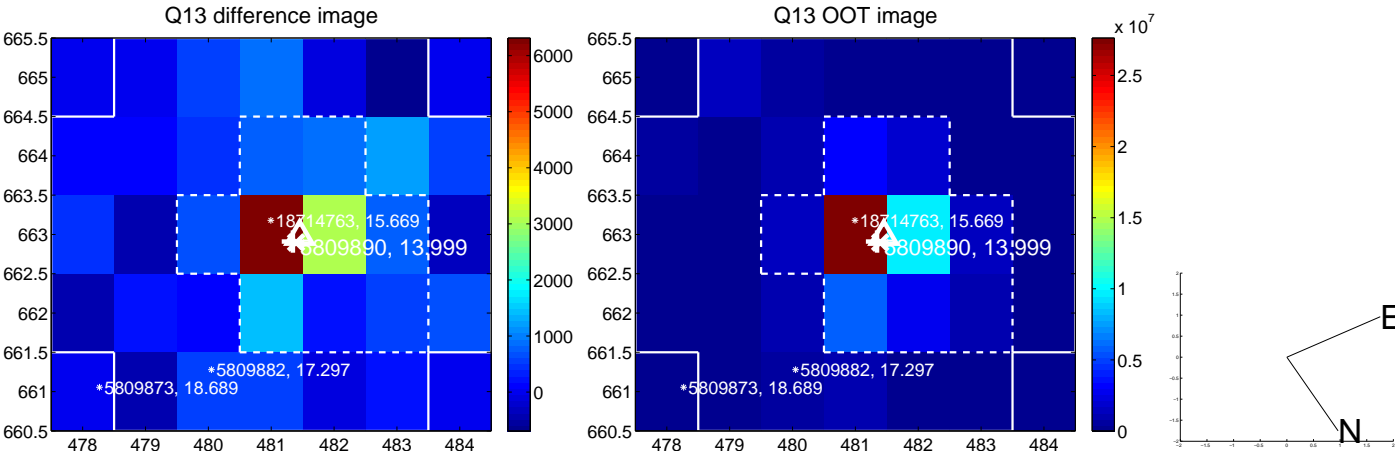
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



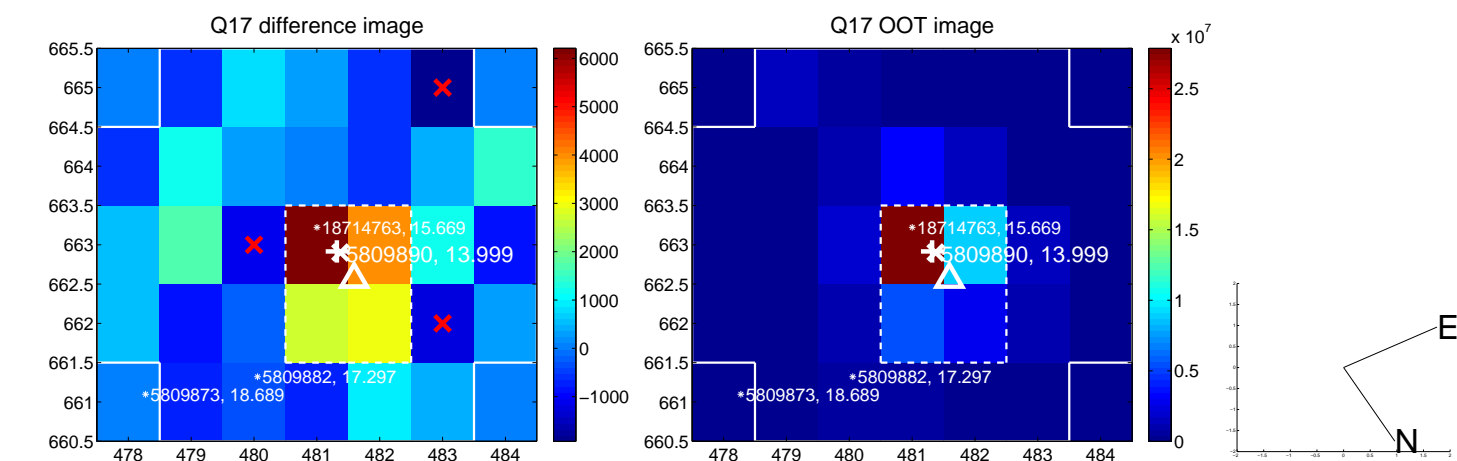
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



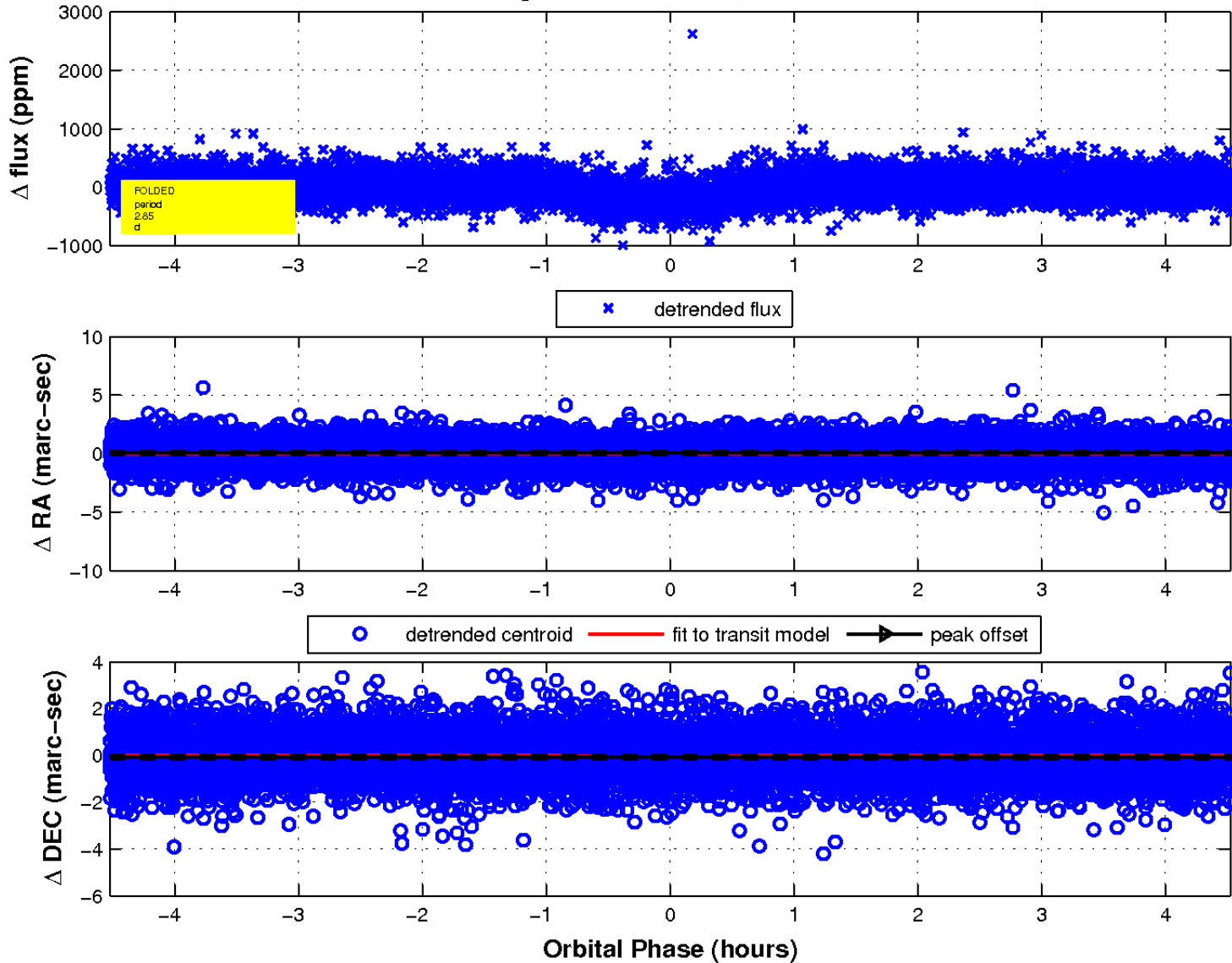
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

