

# KIC 007386431

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007386431-01	OBS	No	0.679263	131.560435	9.7	1.979	12.0	1.2	1.30	6831	0.47	12073.99
007386431-02	OBS	No	1.450855	131.764271	220.4	15.869	9.1	9.8	1.30	6831	2.33	4389.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007386431-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
007386431-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV

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

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

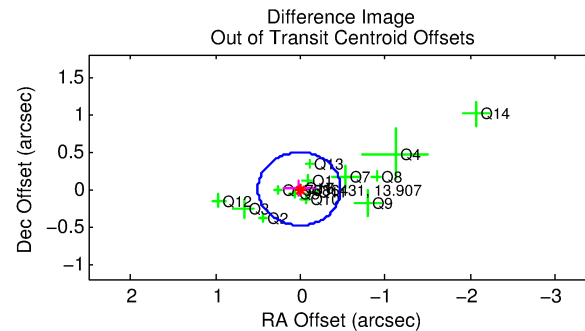
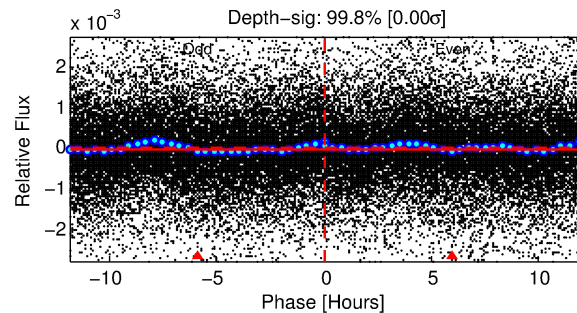
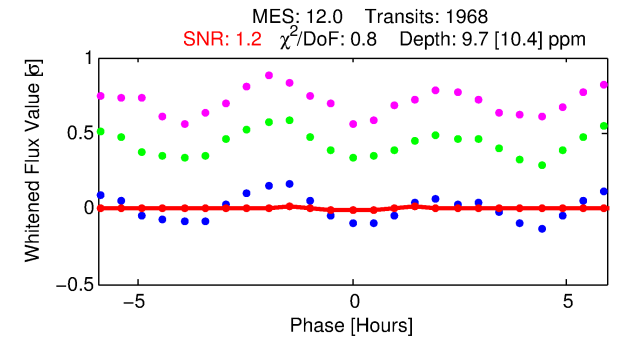
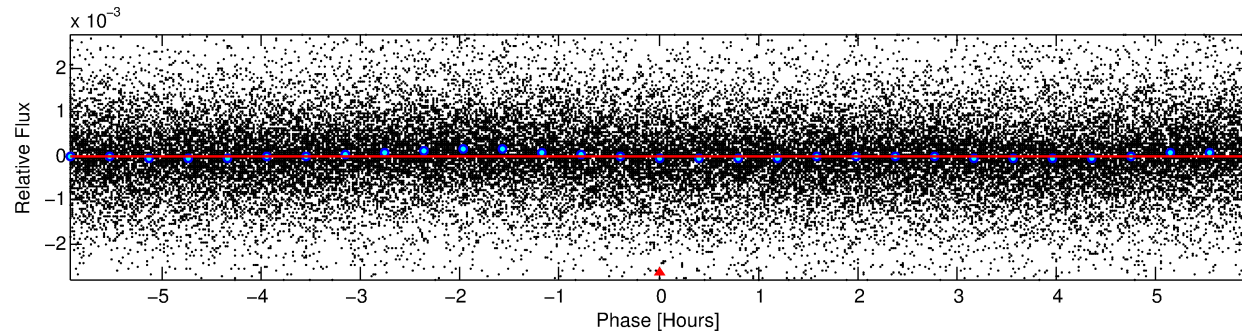
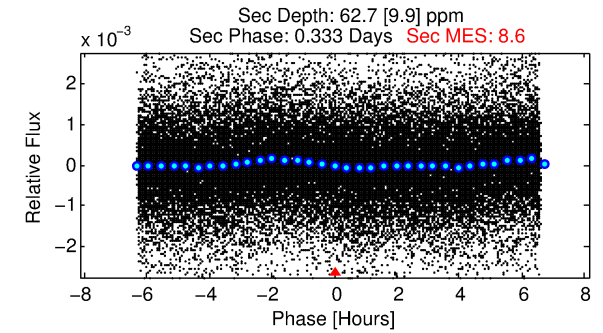
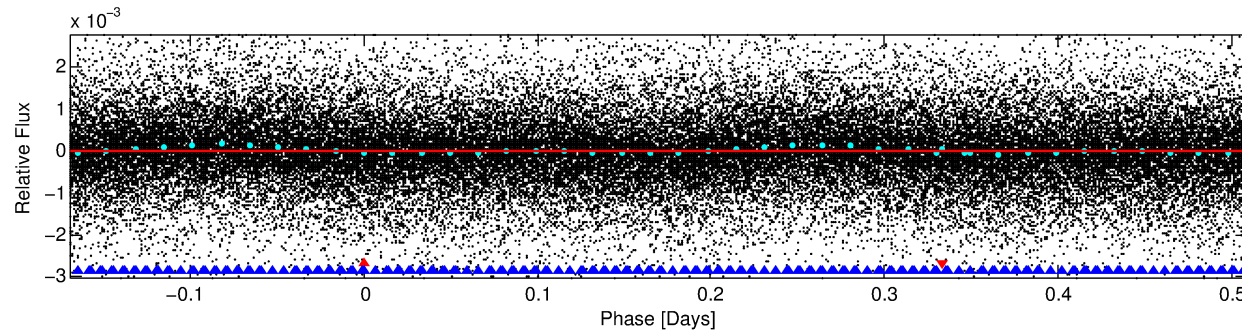
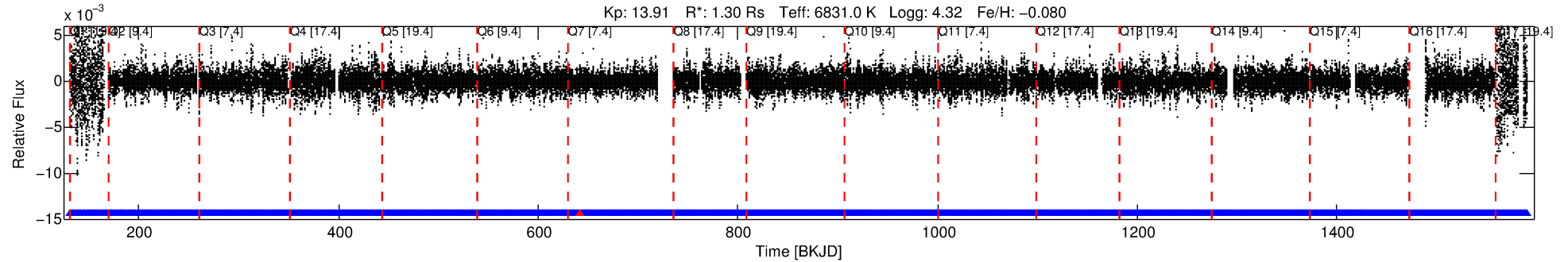
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007386431-01

No Significant Match Found

# DV One-Page Summary

KIC: 7386431 Candidate: 1 of 2 Period: 0.679 d



## DV Fit Results:

Period = 0.67926 [0.00008] d  
Epoch = 131.5604 [0.0099] BKJD  
Rp/R\* = 0.0033 [0.0024]  
a/R\* = 1.49 [2.47]  
b = 0.90 [0.64]  
Seff = 12073.99 [5106.54]  
Teq = 2673 [283] K  
Rp = 0.47 [0.38] Re  
a = 0.0165 [0.0046] AU  
Ag = 42.30 [64.00] [0.65σ]  
Teffp = 10539 [3877] K [2.02σ]

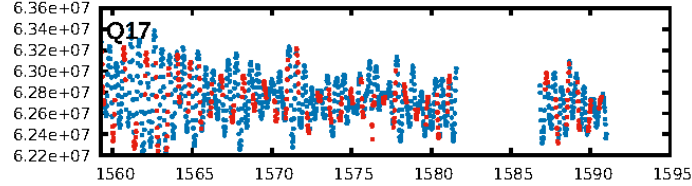
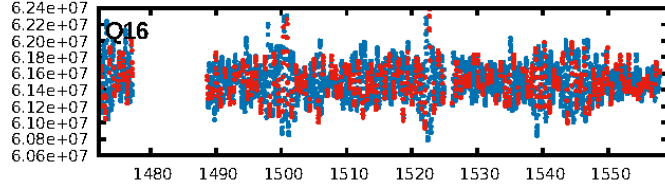
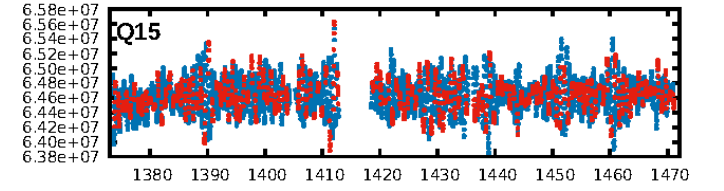
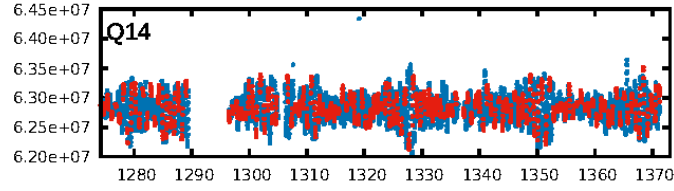
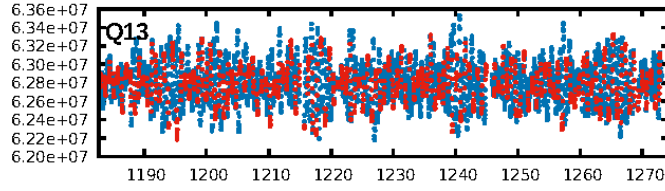
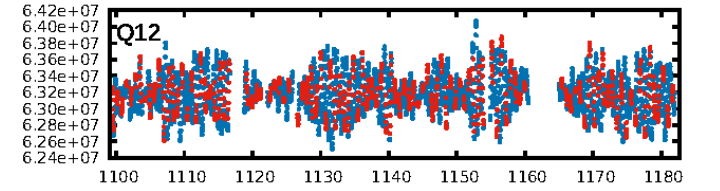
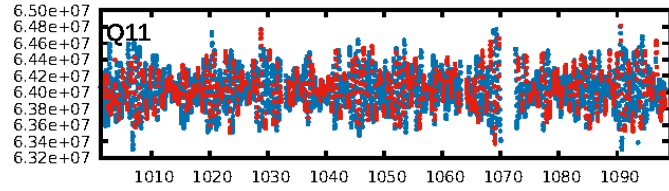
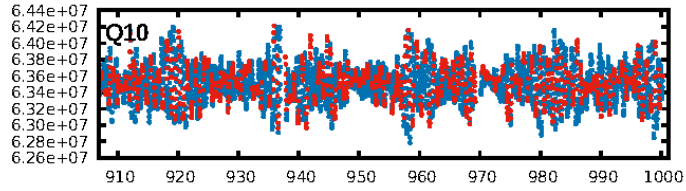
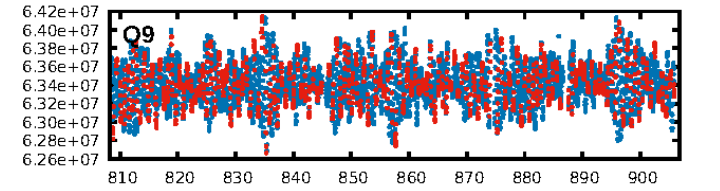
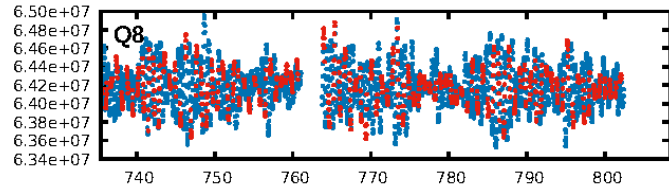
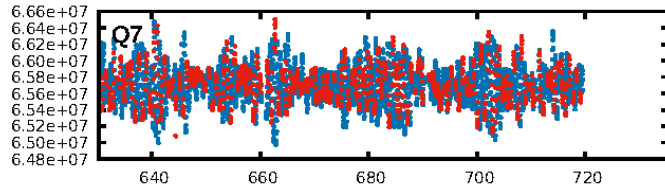
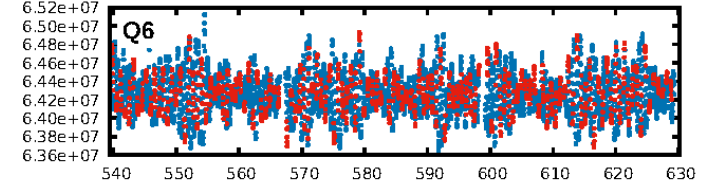
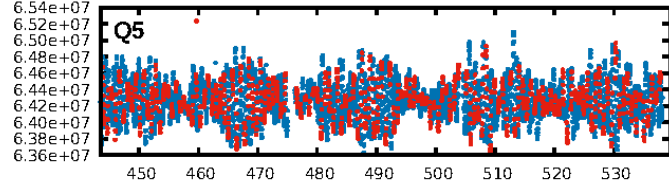
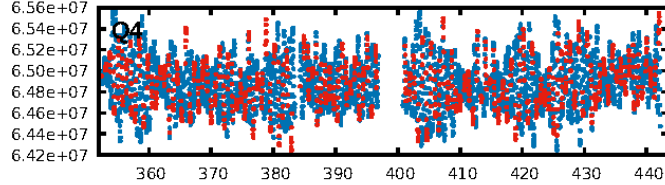
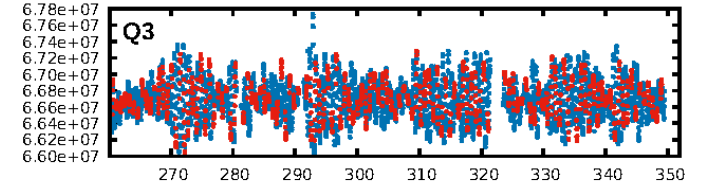
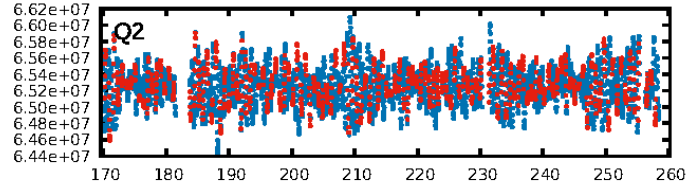
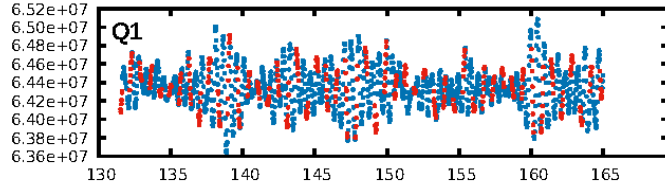
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 75.3% [1.16σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1878/1879]  
GhostDiagnostic-chr: 1.86  
Centroid-sig: 21.6%  
Centroid-so: 3.753 arcsec [1.13σ]  
OotOffset-rm: 0.012 arcsec [0.07σ]  
KicOffset-rm: 0.055 arcsec [0.30σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.44 [7/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 06:01:44 Z

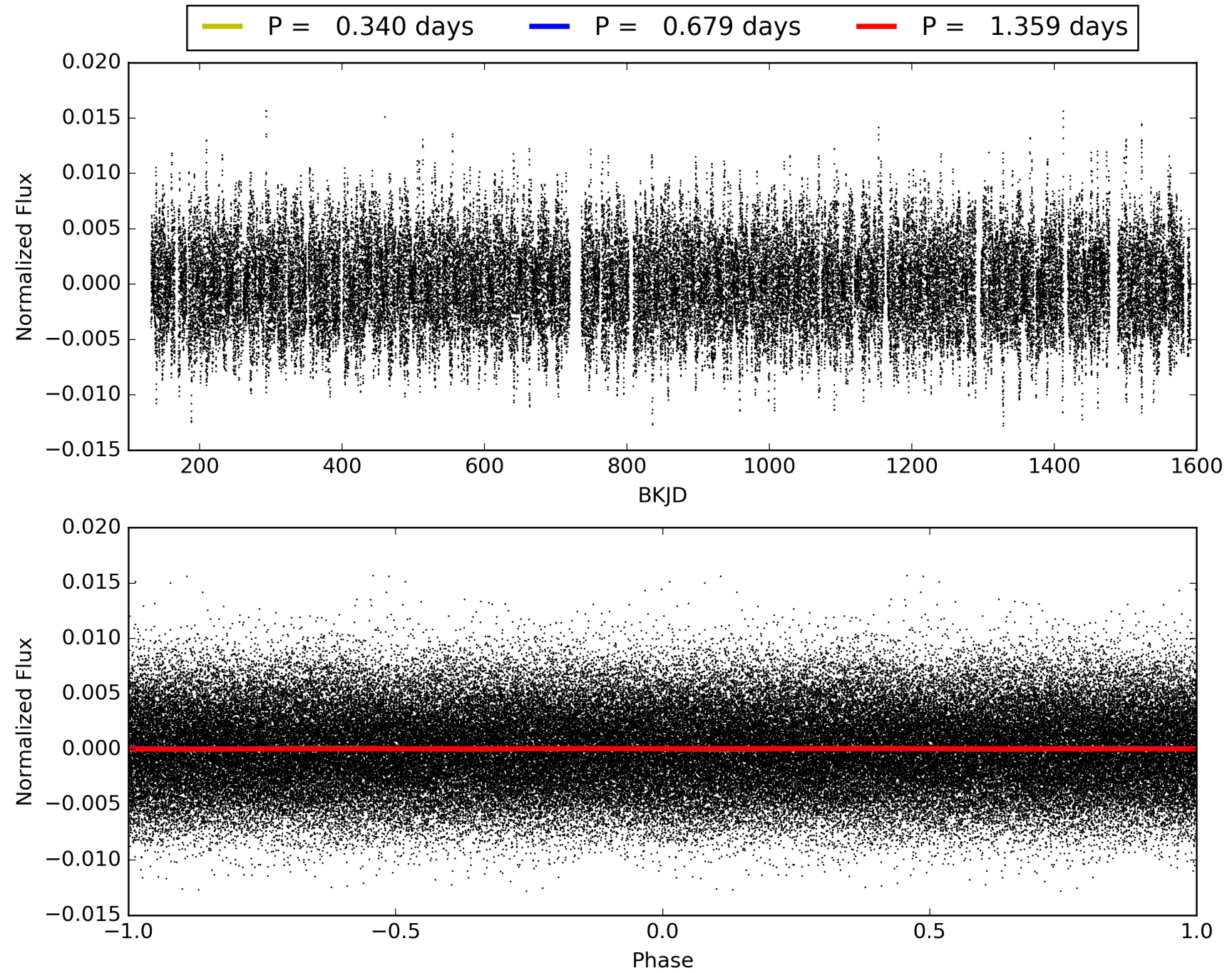
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007386431-01, PDC Light Curves



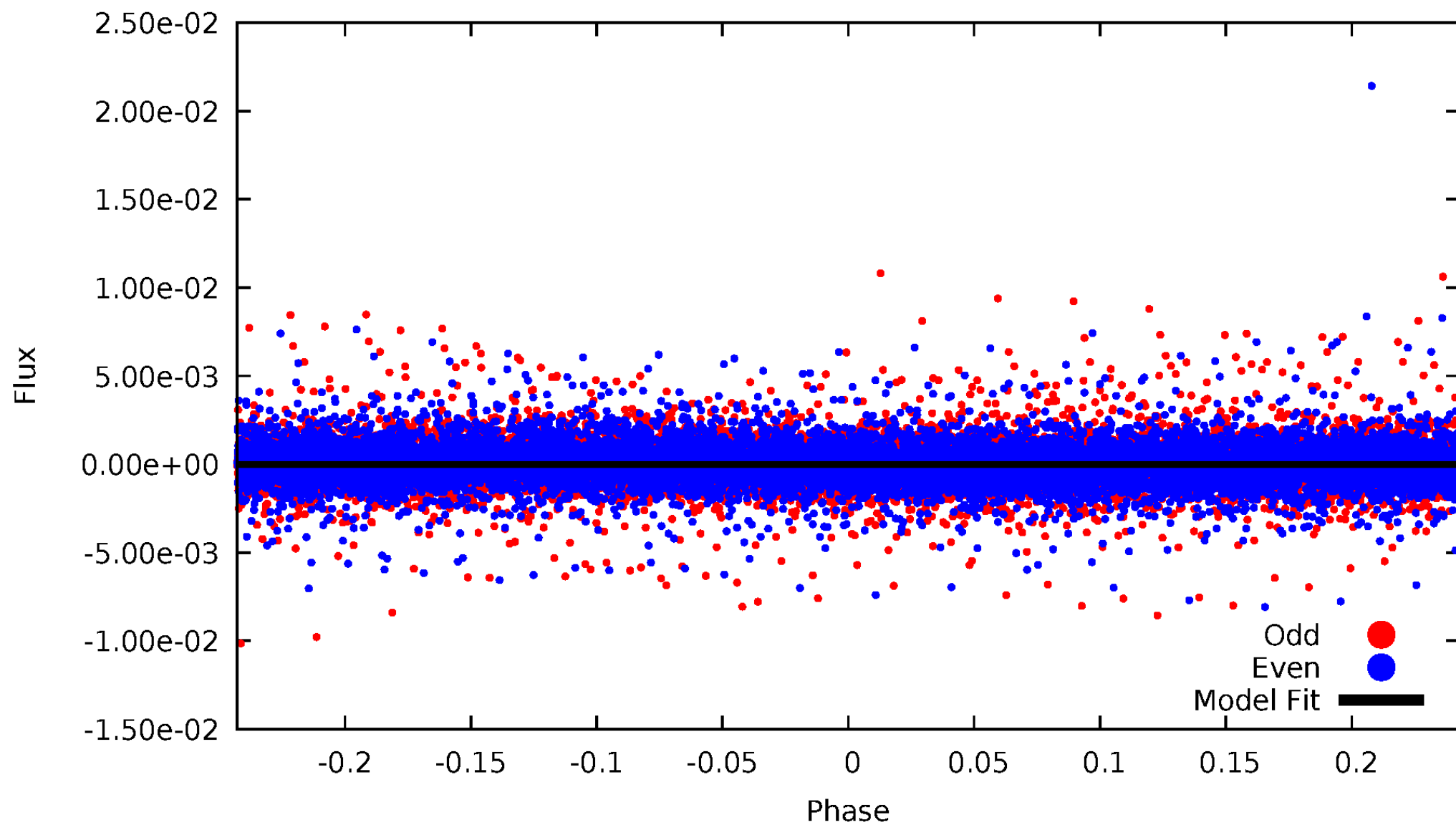


# TCE 007386431-01



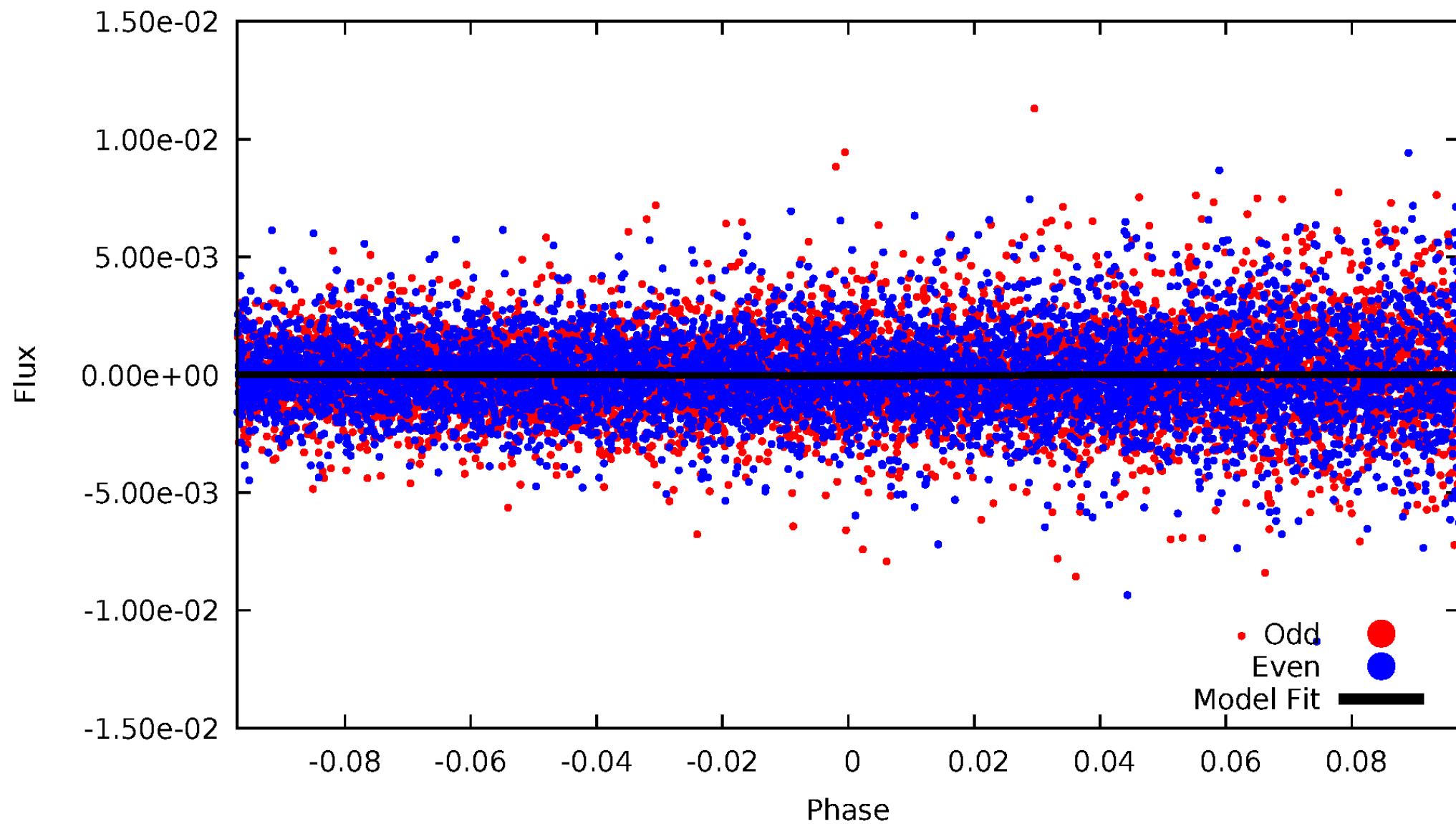
# DV Odd/Even

TCE 007386431-01



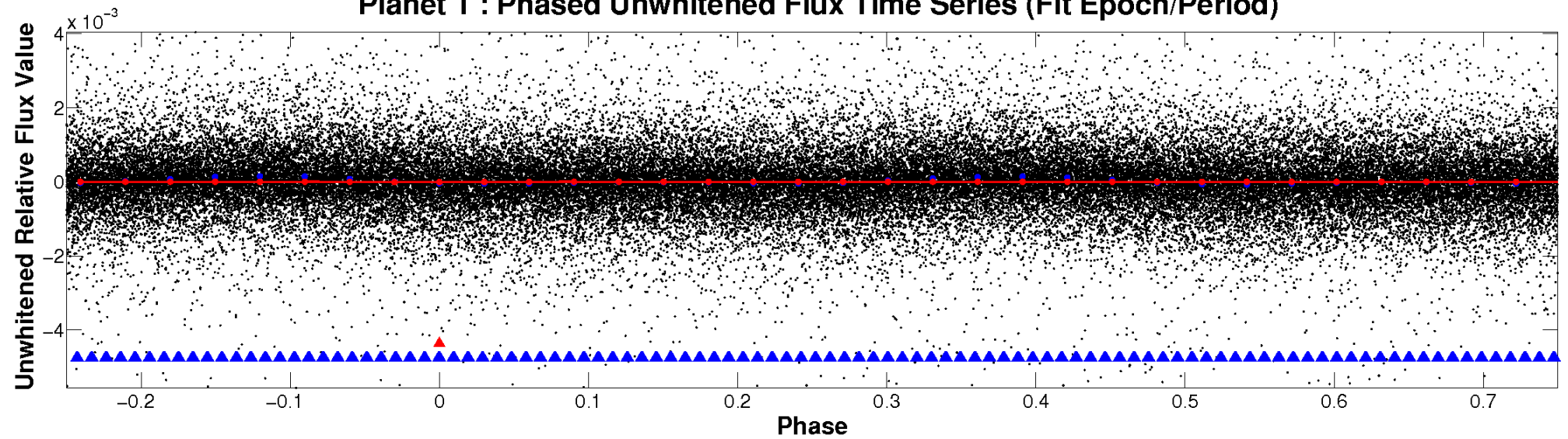
# ALT Odd/Even

TCE 007386431-01

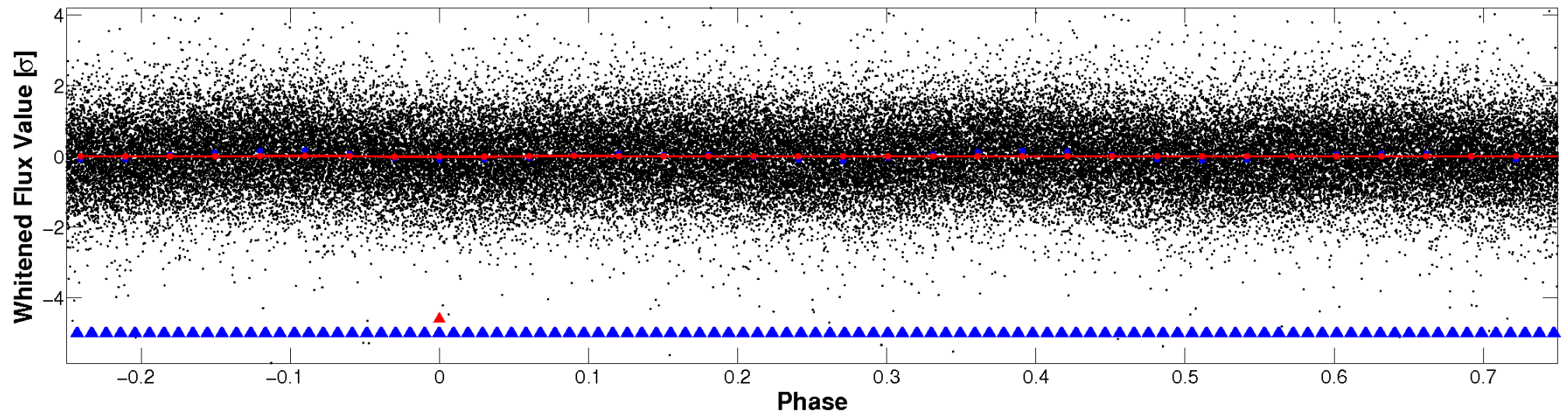


# Non-Whitened Vs. Whitened Light Curve

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



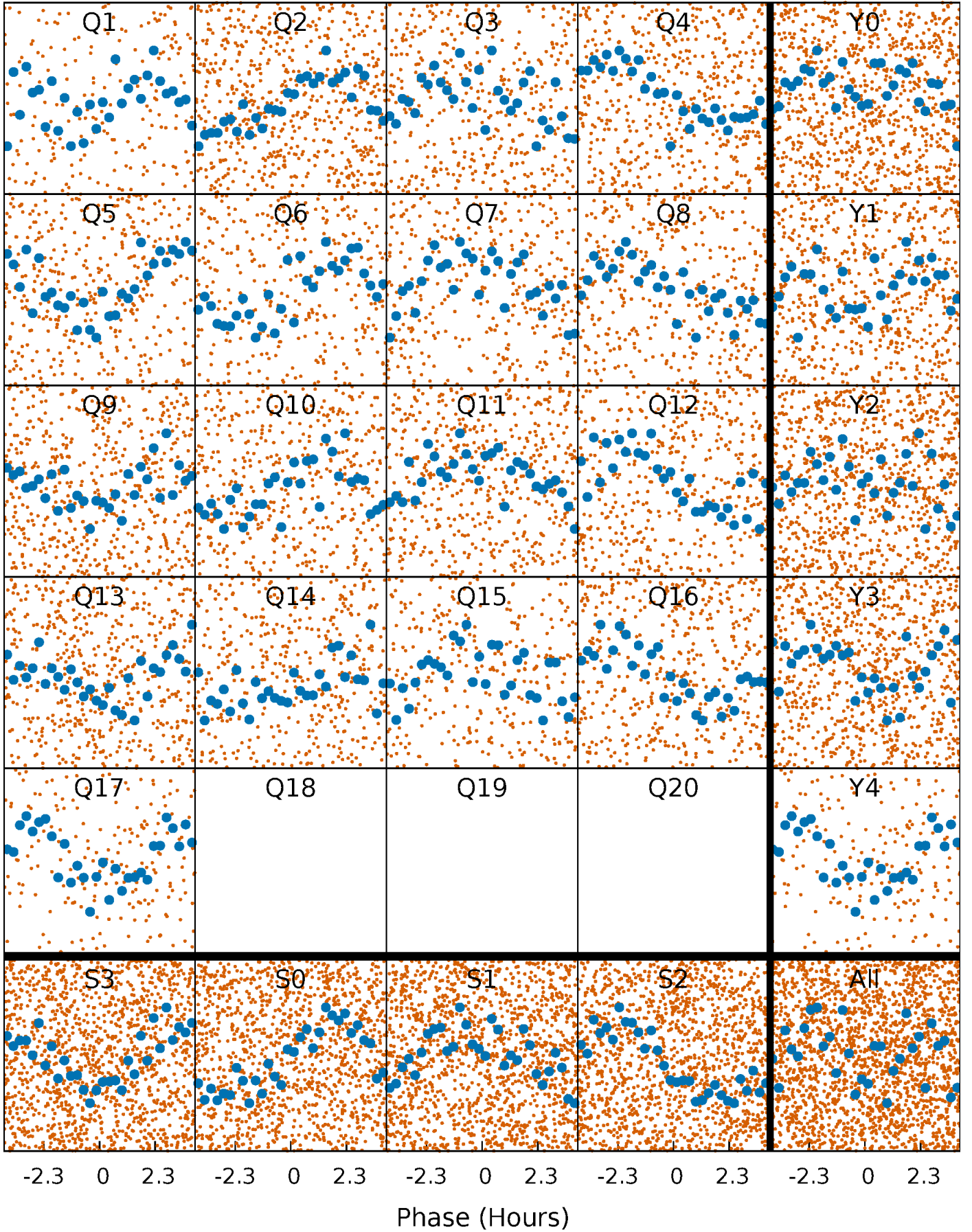
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

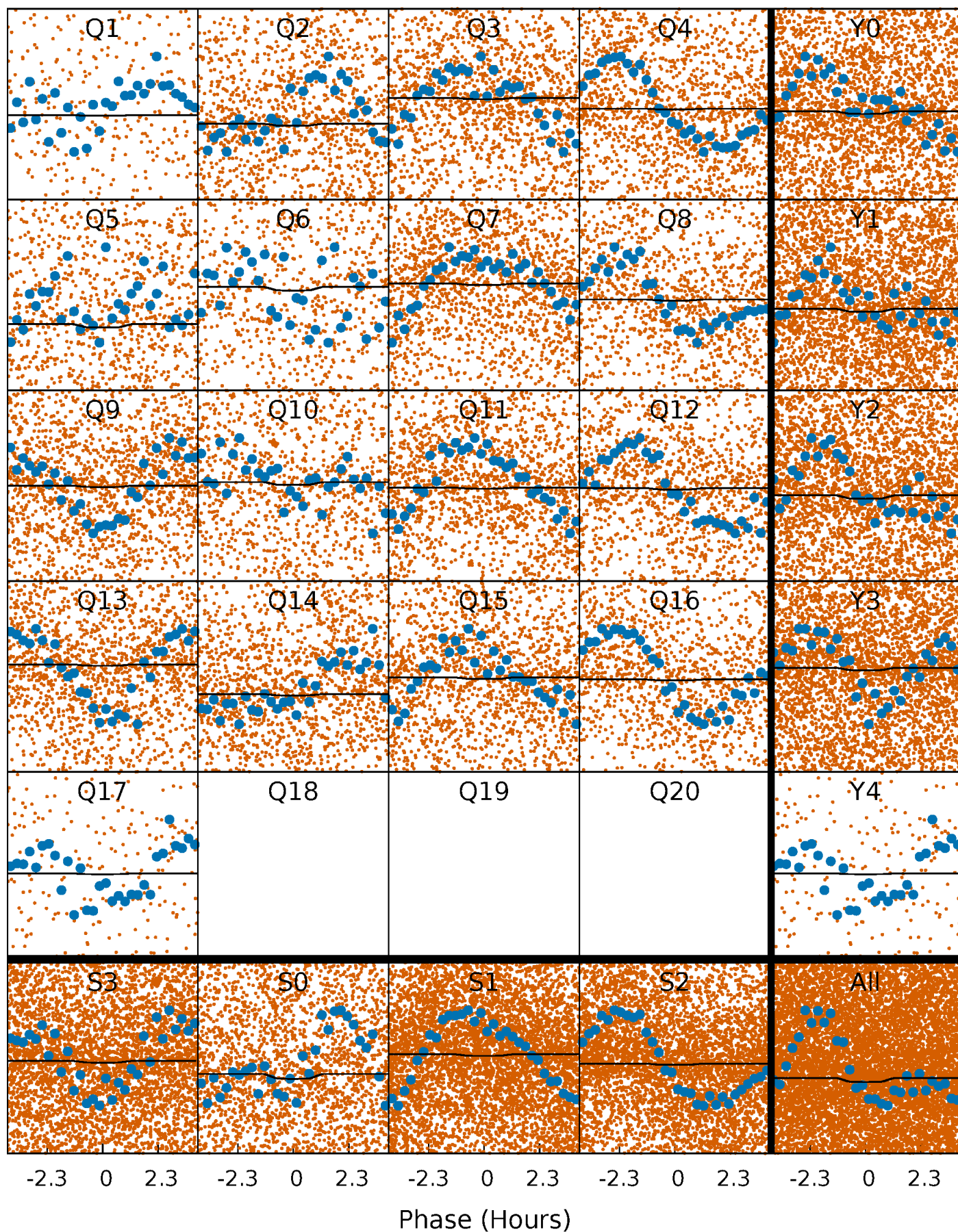
TCE 007386431-01   P= 0.679263 Days    $T_0=131.560435$  (BKJD)





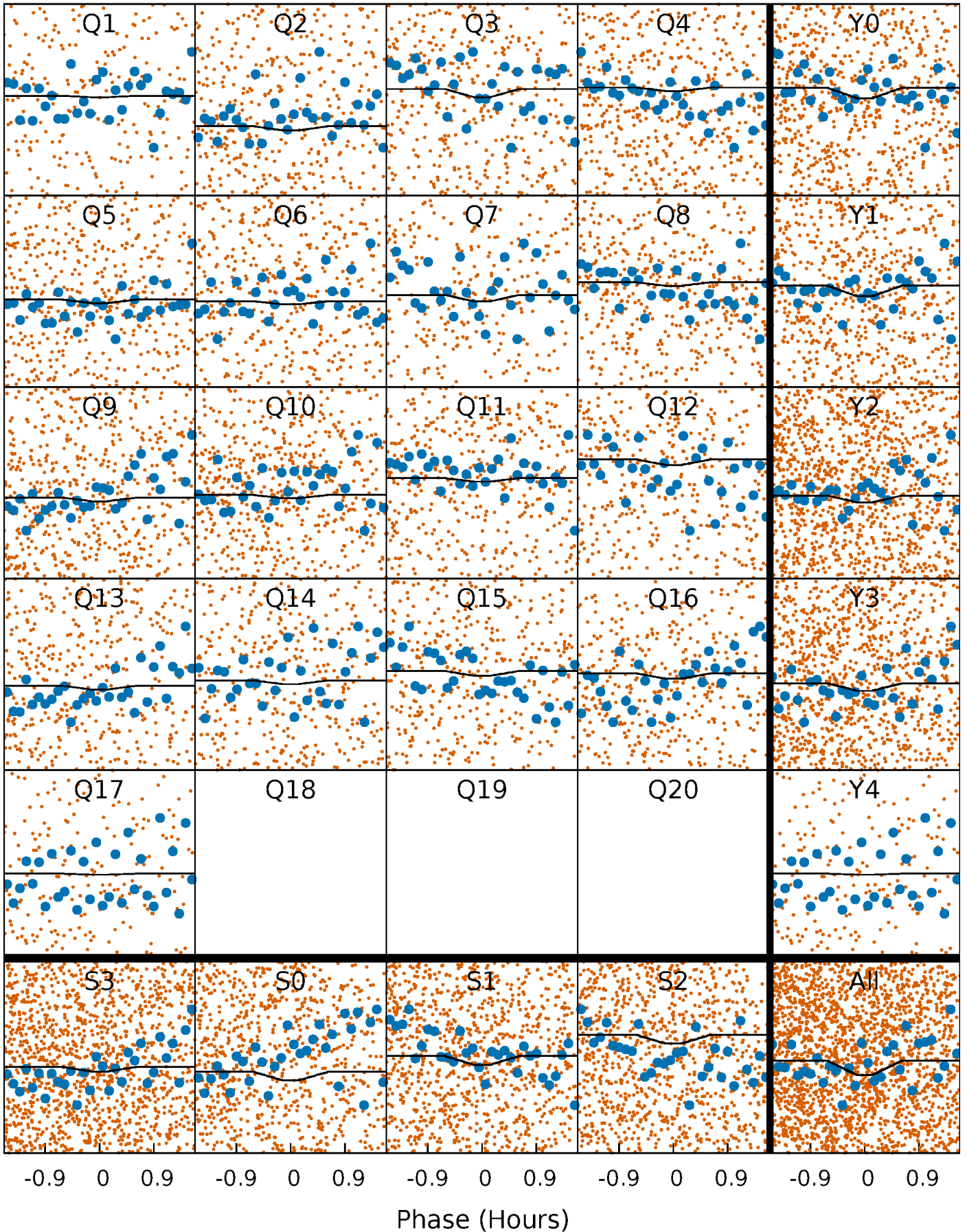
# DV Quarter-Phased Transit Curves

TCE 007386431-01 P= 0.679263 Days  $T_0=131.560435$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

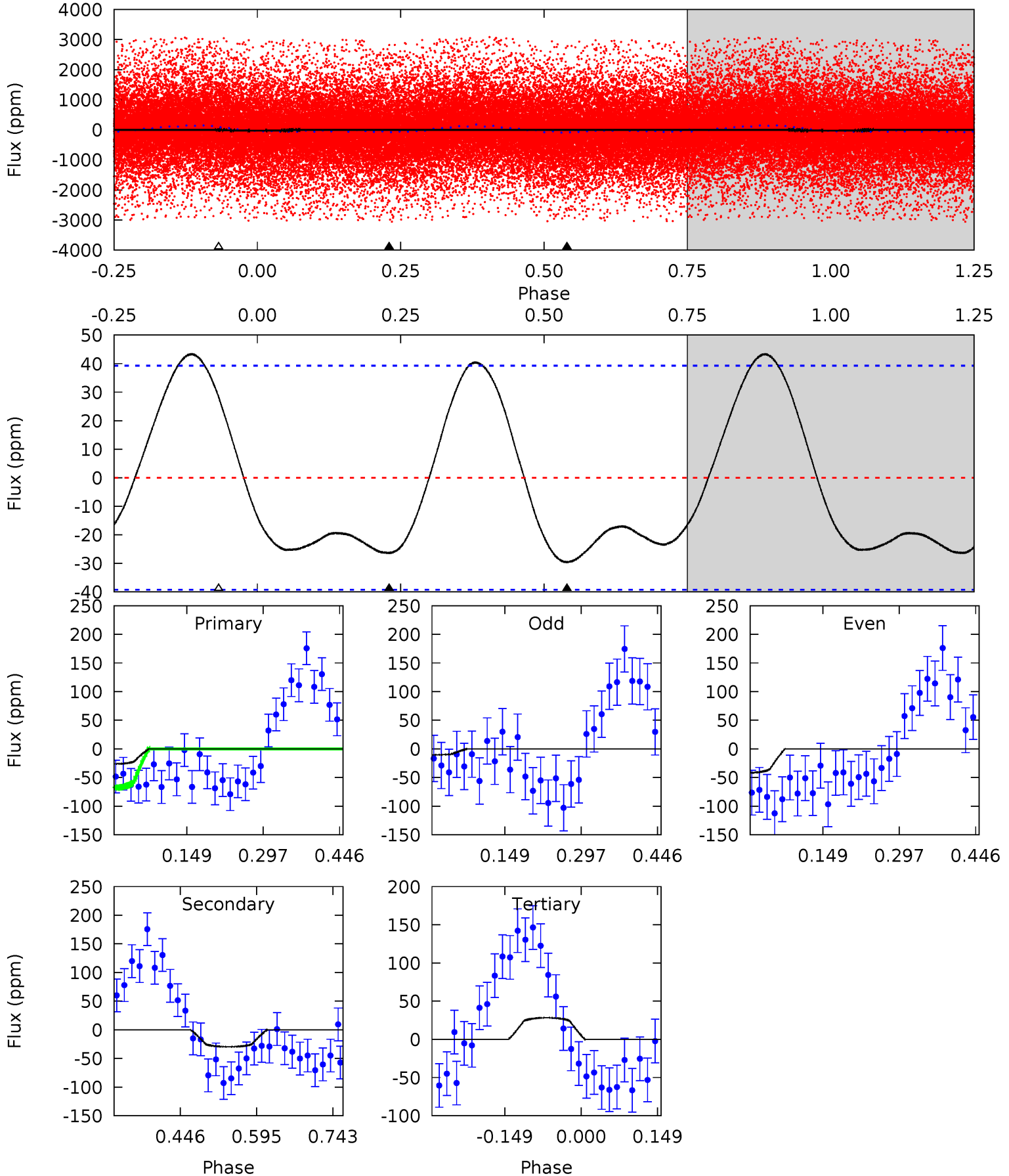
TCE 007386431-01 P= 0.679287 Days  $T_0=131.560023$  (BKJD)



# DV Model-Shift Uniqueness Test

007386431-01, P = 0.679263 Days, E = 130.881172 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
3.01	3.38	-3.23	0	4.48	1.44	2.86	6.24	3.01	6.61	3.38	1.80	2.37	0.59	3.18

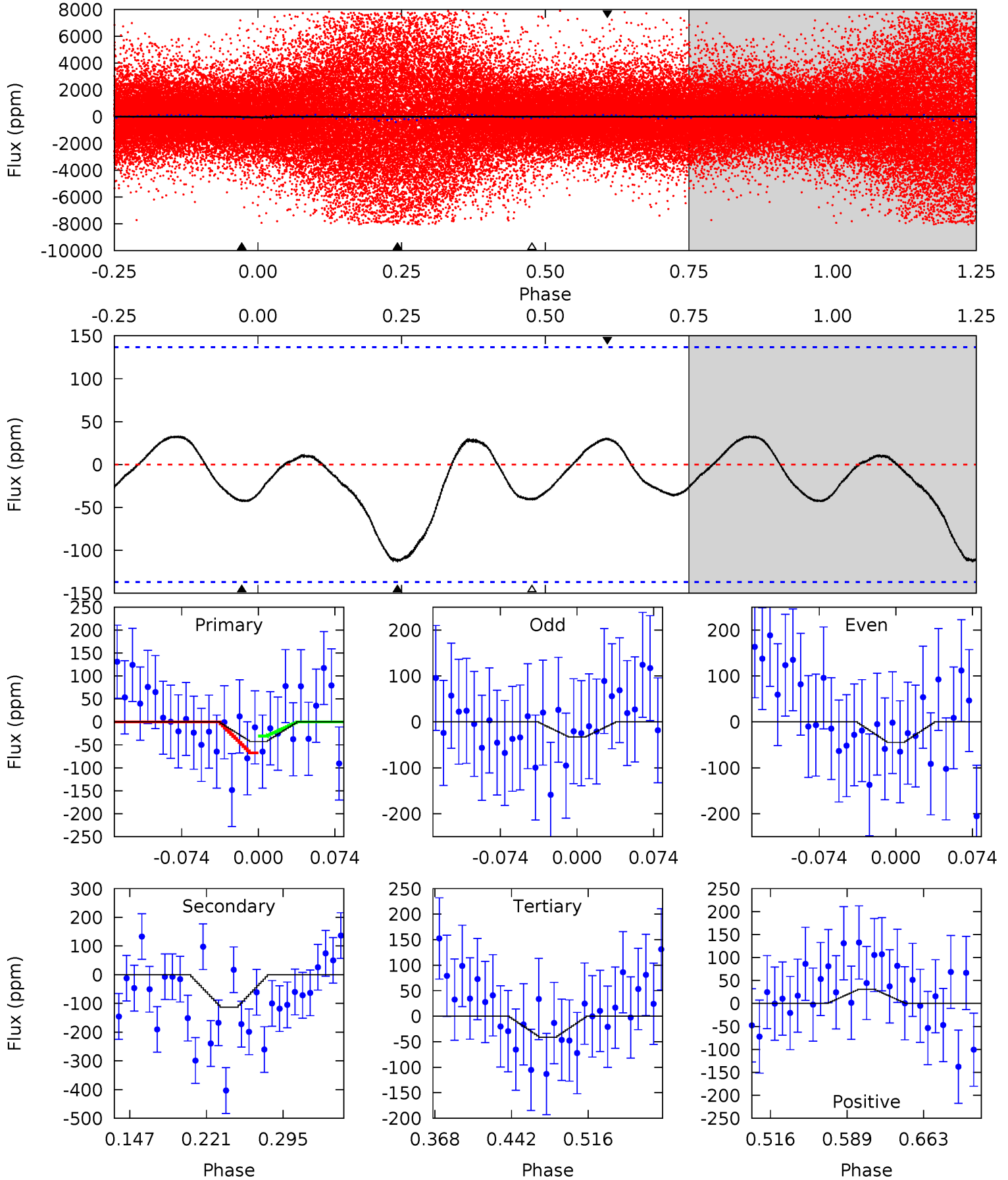




# Alt Model-Shift Uniqueness Test

007386431-01, P = 0.679287 Days, E = 130.880736 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
1.45	3.83	1.39	1.03	4.63	1.79	0.77	0.06	0.41	2.44	2.80	0.21	0.42	0.23	0.57





### Stellar Parameters For KIC 007386431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6831^{+189}_{-283}$	$4.324^{+0.067}_{-0.202}$	$-0.080^{+0.250}_{-0.350}$	$1.296^{+0.457}_{-0.152}$	$1.302^{+0.190}_{-0.190}$	$0.842^{+0.251}_{-0.454}$
	+3%/-4%	+2%/-5%	+312%/-438%	+35%/-12%	+15%/-15%	+30%/-54%
Source	PHO1	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 007386431-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-30 \pm 9$	$0.53^{+0.34}_{-0.31}$	$3786^{+315}_{-195}$	$8636^{+9599}_{-2298}$	$15^{+79}_{-10}$
Alt.	$-113 \pm 30$	$0.98^{+0.42}_{-0.34}$	$3778^{+299}_{-214}$	$8878^{+3385}_{-1750}$	$17^{+24}_{-9}$

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

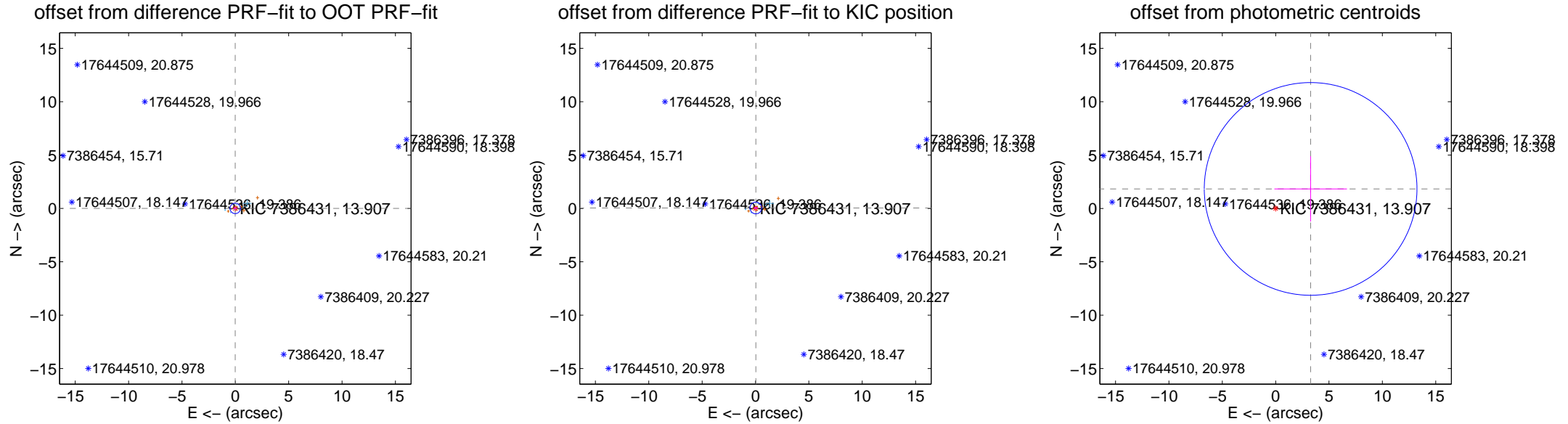
## DV Centroid Data

Supplemental centroid analysis for 007386431-01. Kepler magnitude: 13.91. Transit SNR 1.24

There are 7 quarters with good PRF difference image offsets

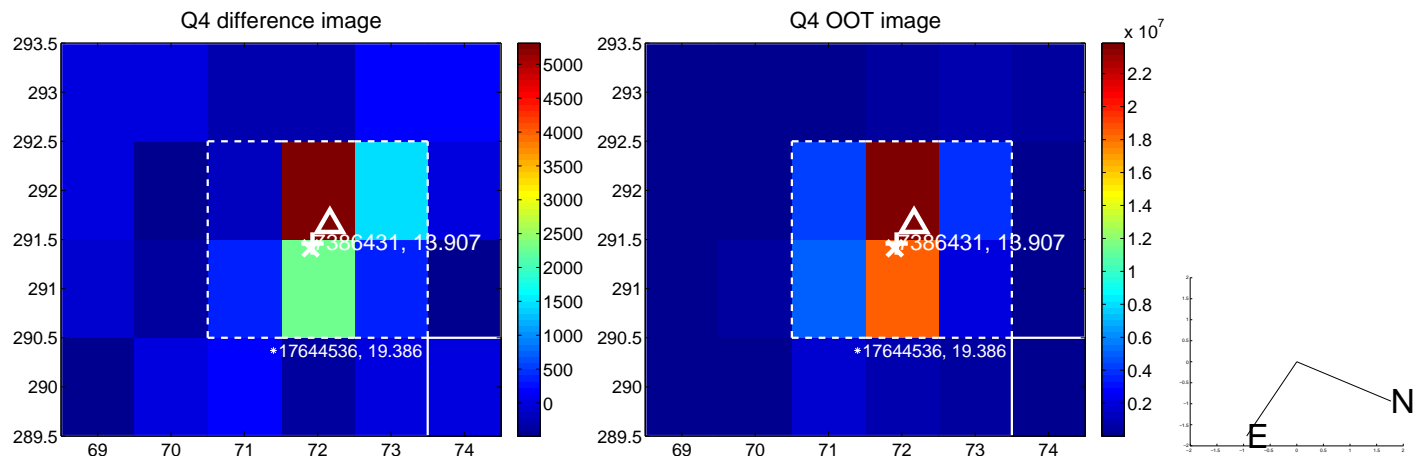
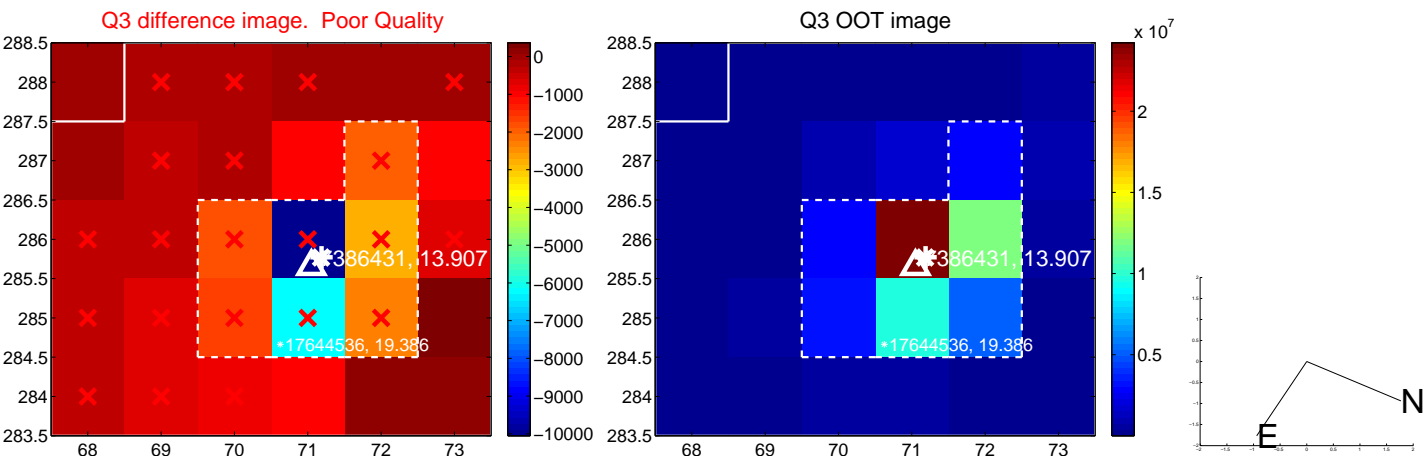
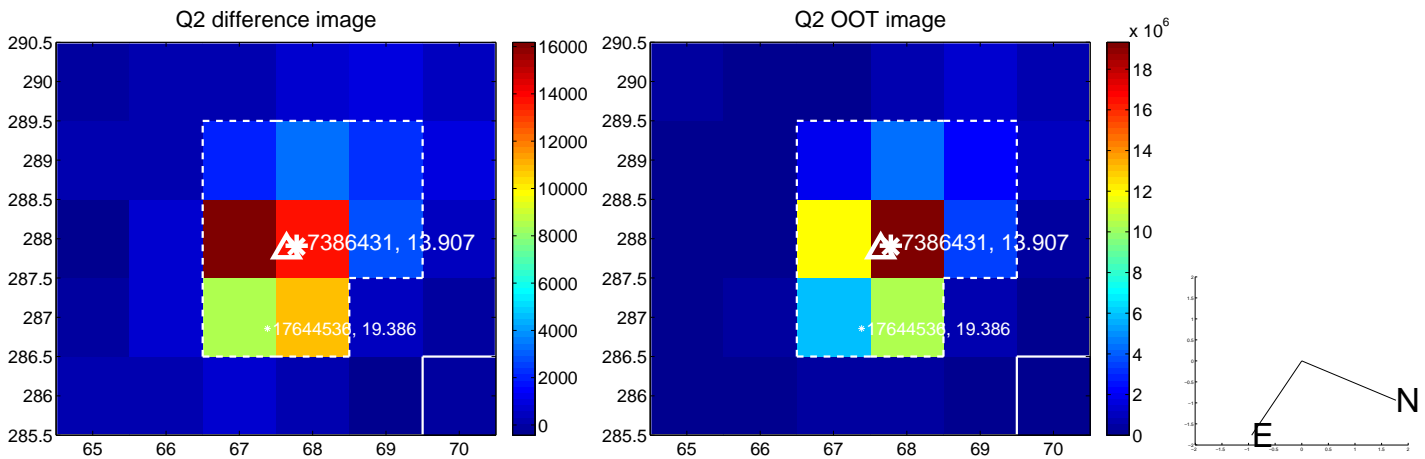
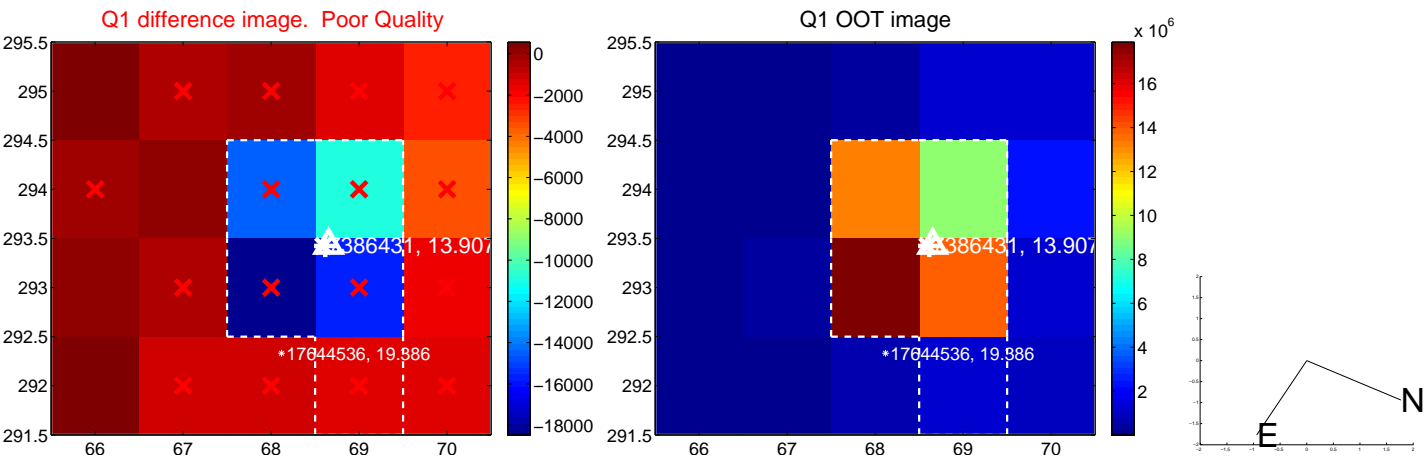
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.012 \pm 0.163$	0.07	$0.011 \pm 0.185$	$0.003 \pm 0.100$
PRF-fit source offset from KIC position	$0.055 \pm 0.183$	0.30	$-0.034 \pm 0.195$	$0.044 \pm 0.107$
photometric centroid source offset	$3.75 \pm 3.32$	1.13	$-3.28 \pm 3.40$	$1.83 \pm 3.06$

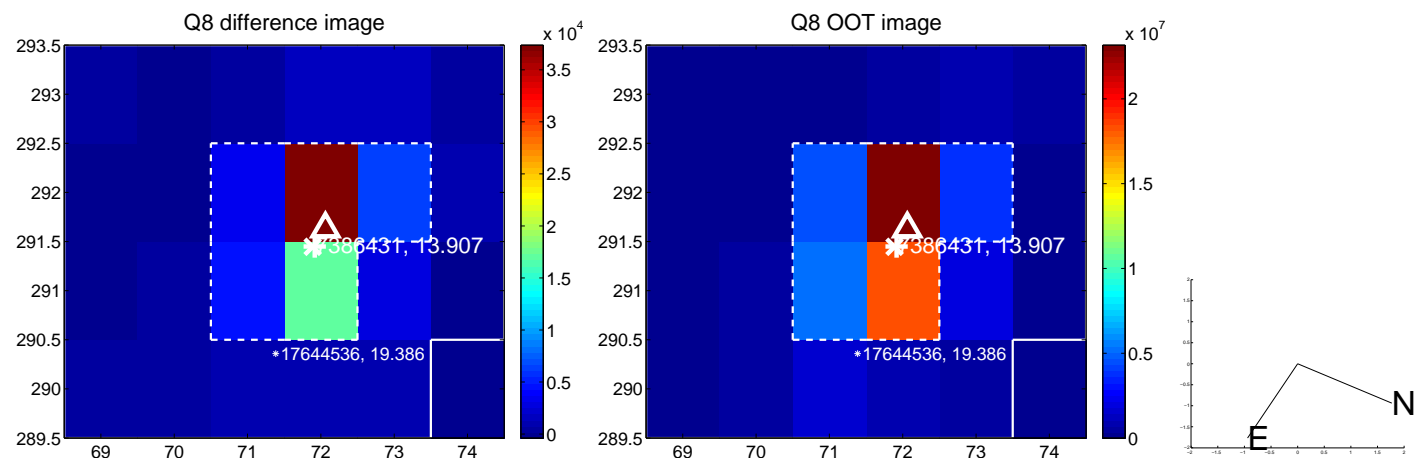
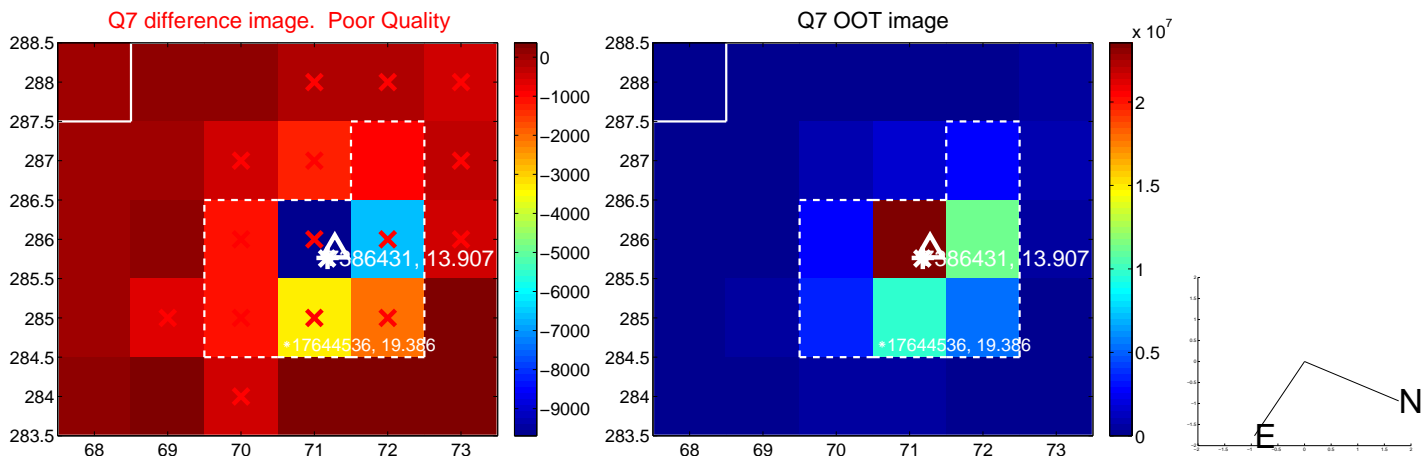
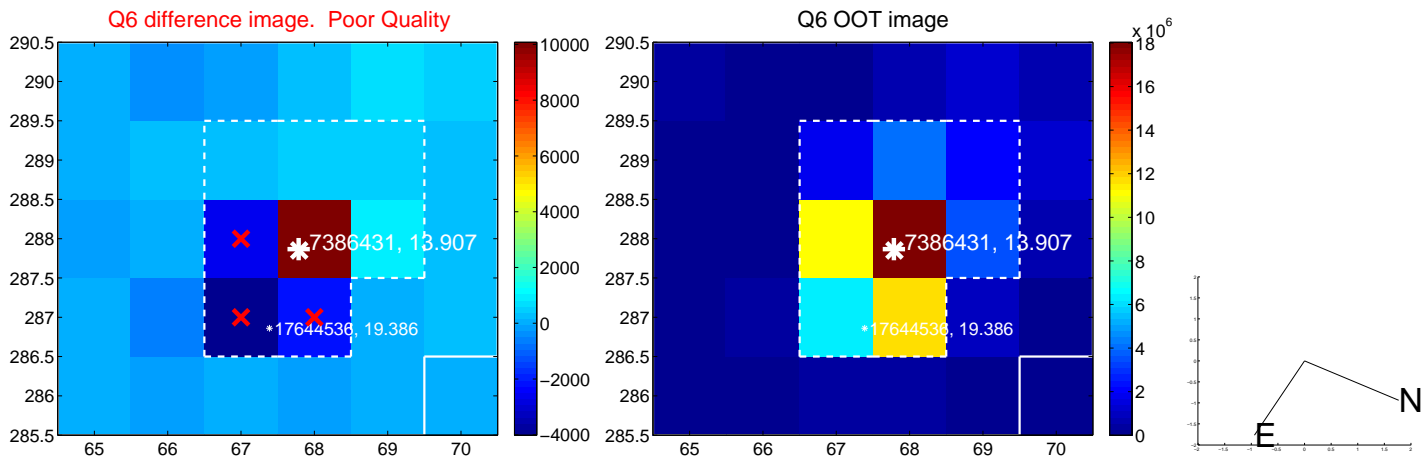
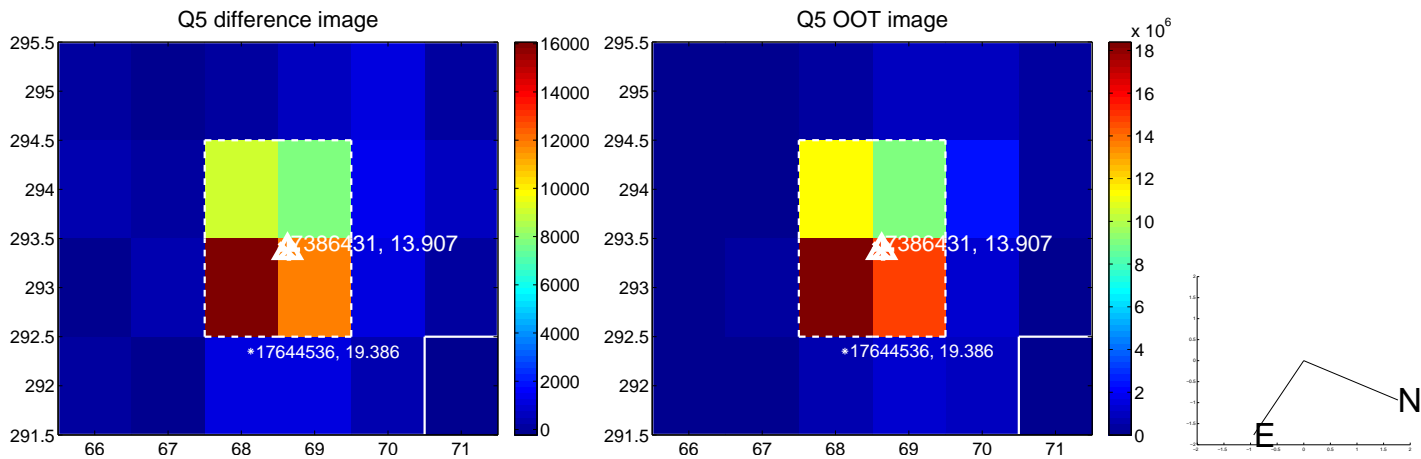


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

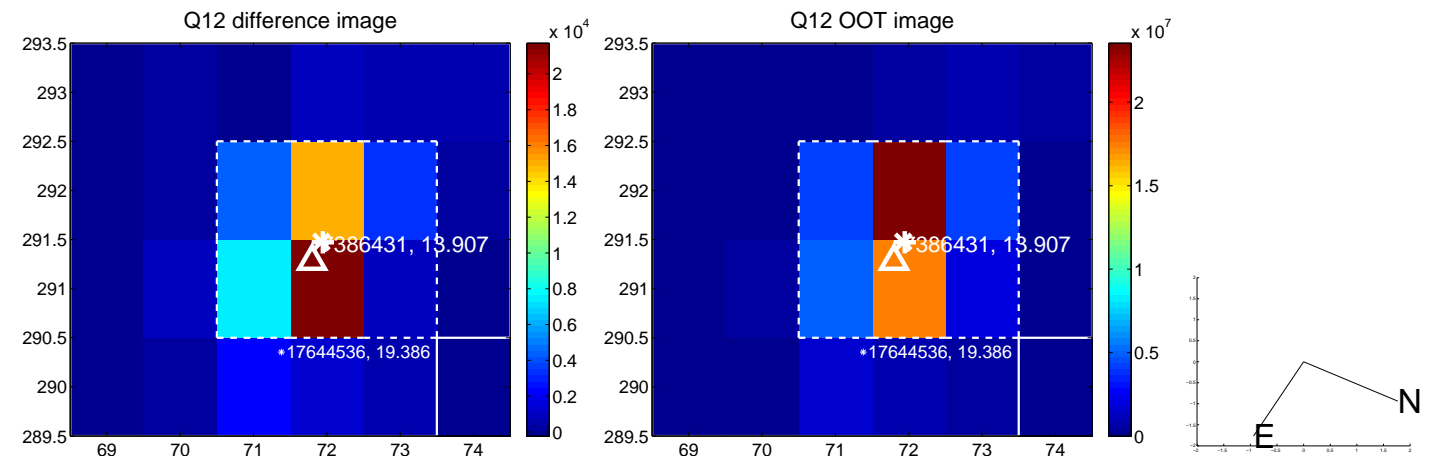
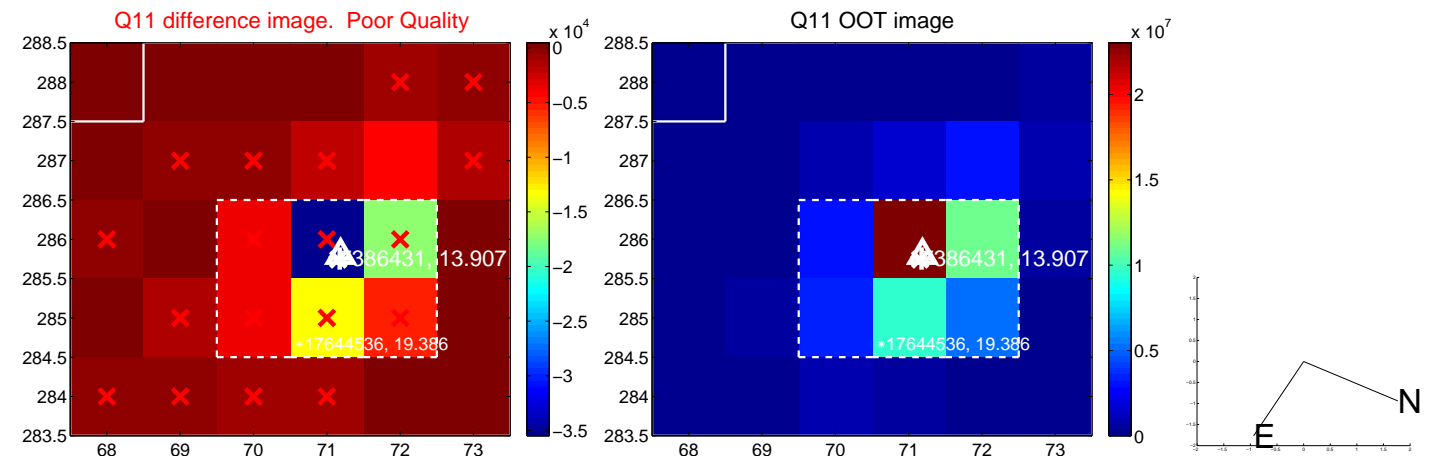
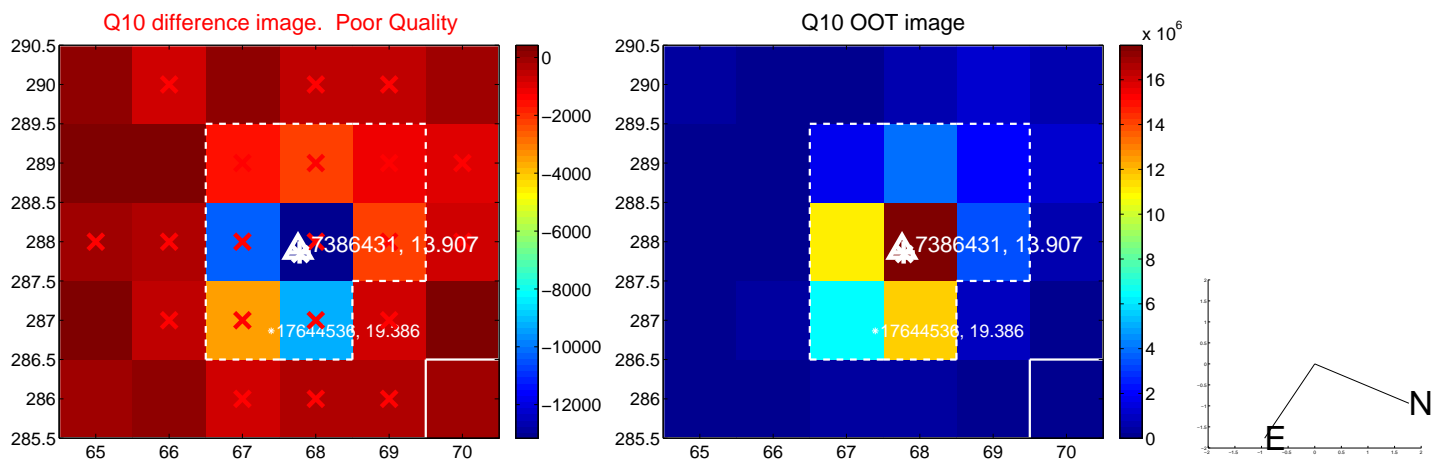
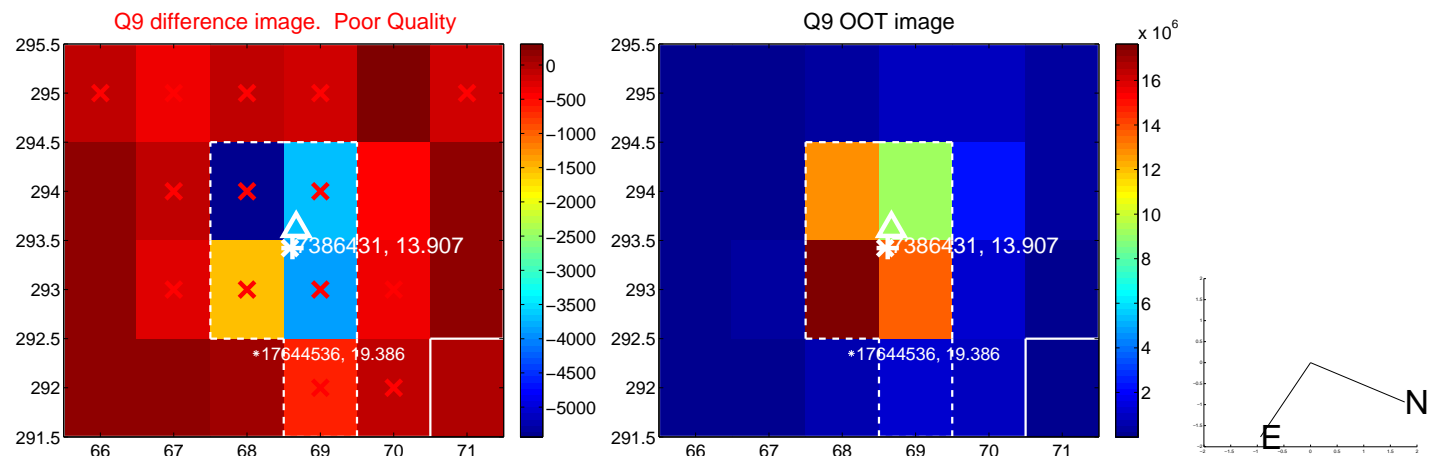


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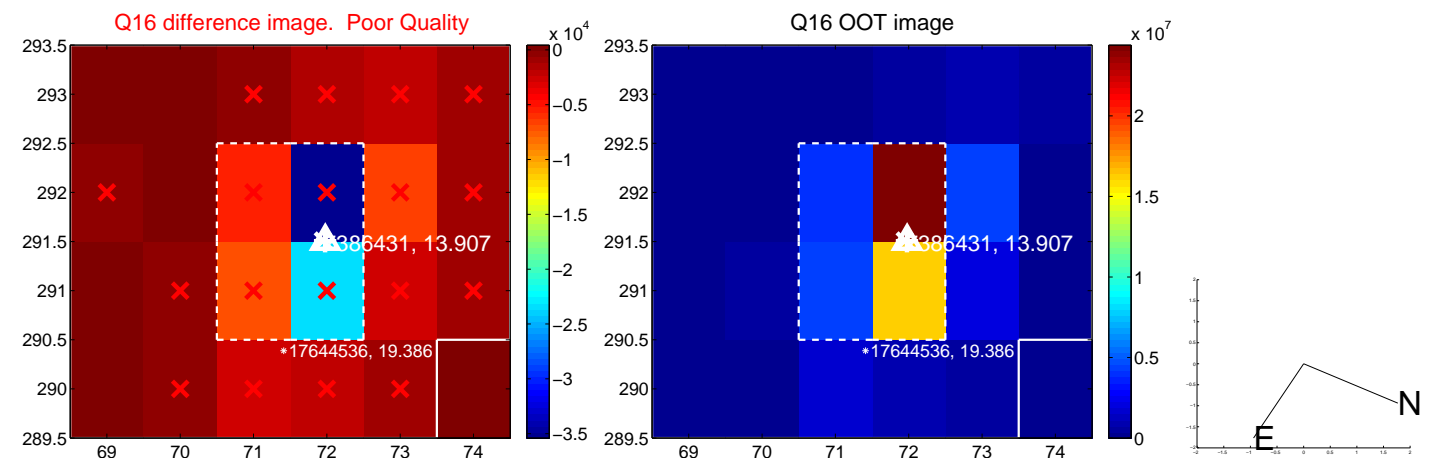
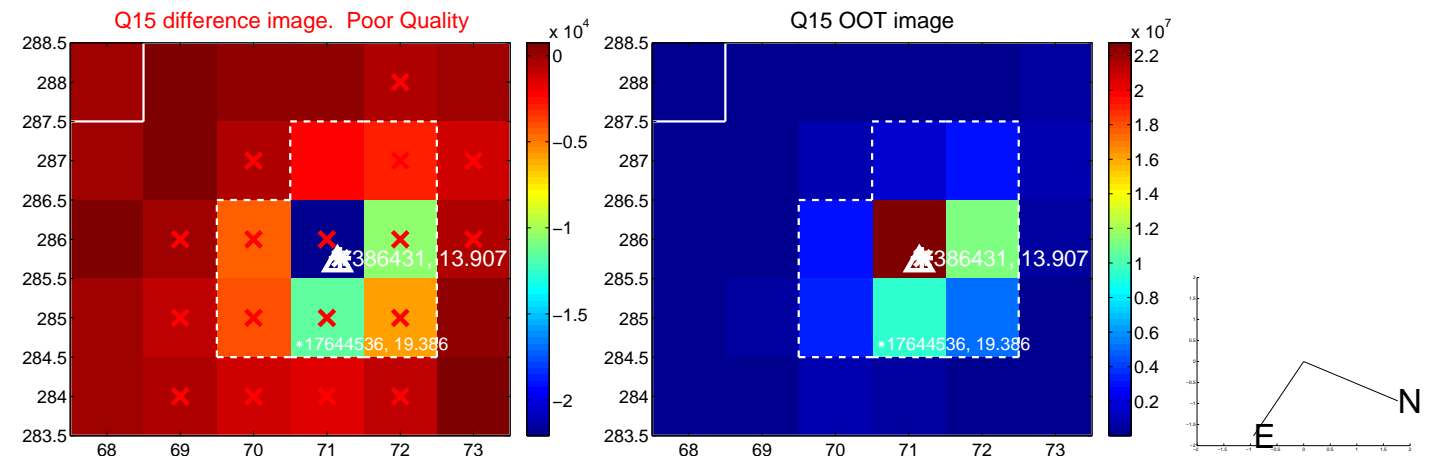
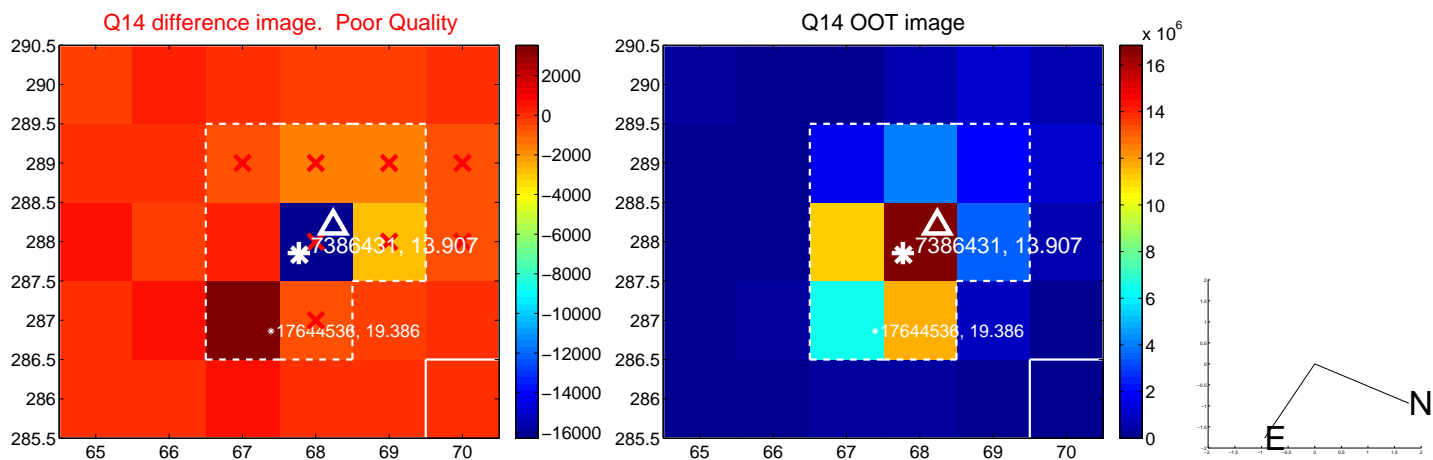
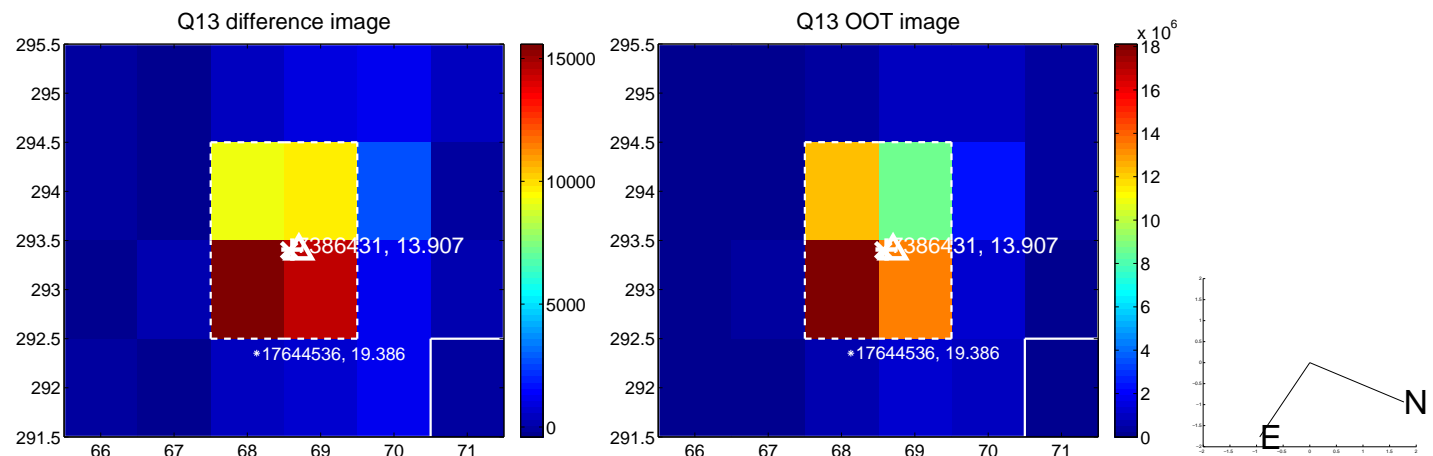




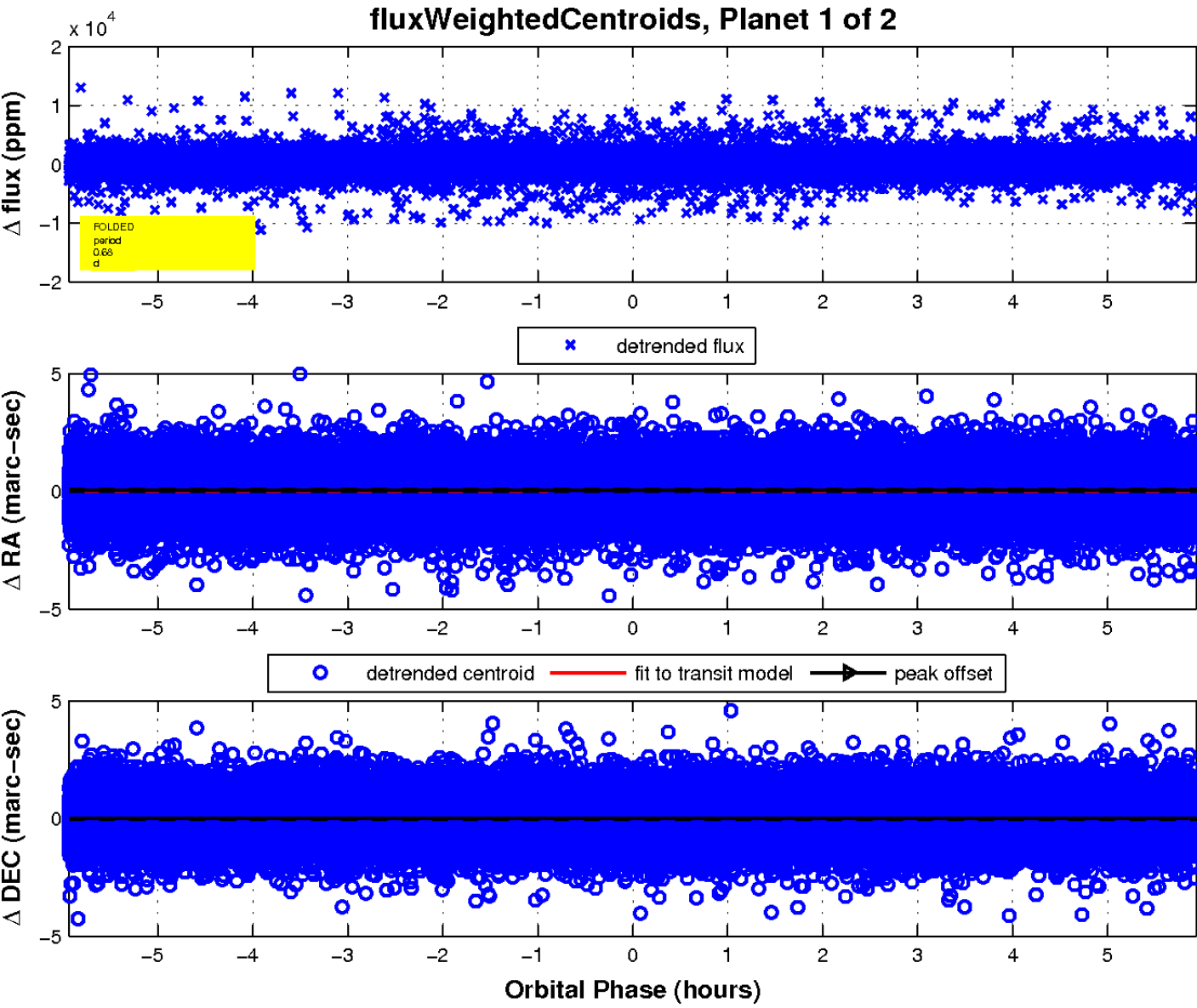
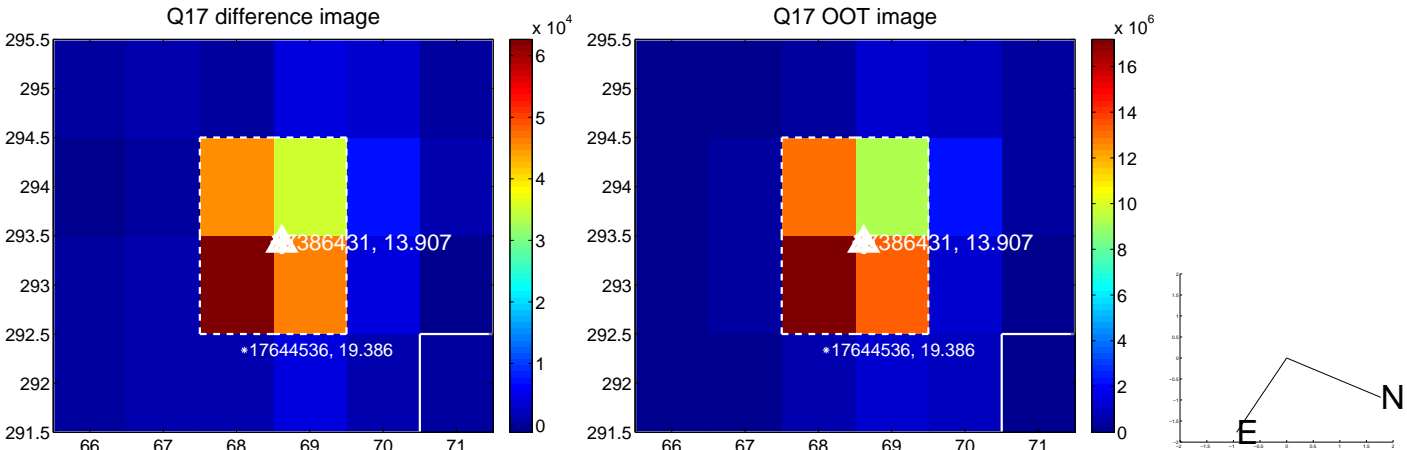
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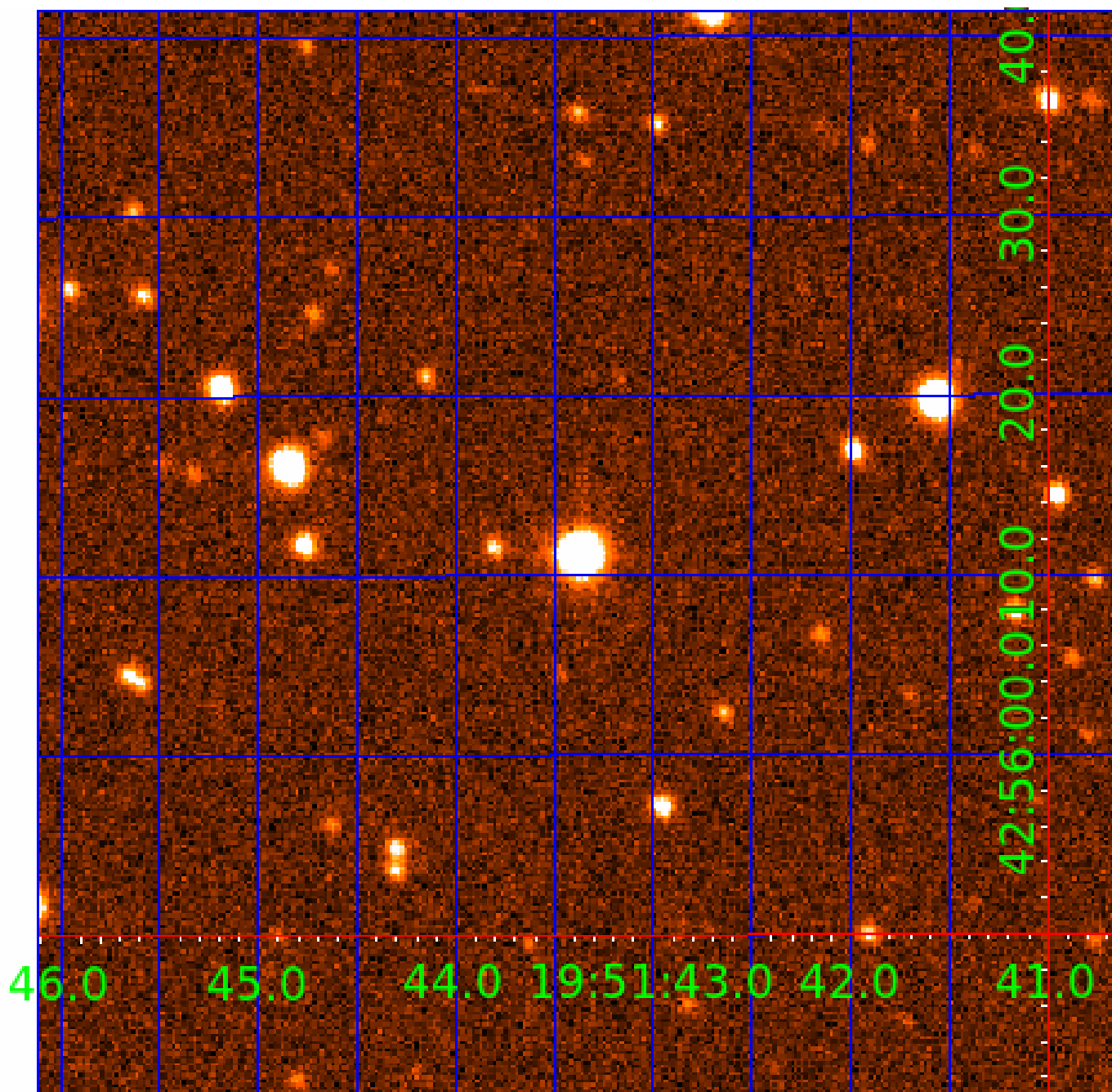


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UKIRT Image

Declination





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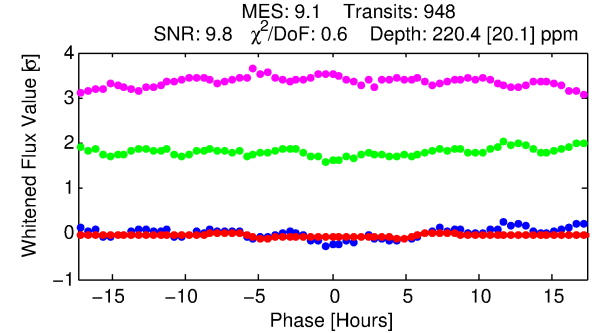
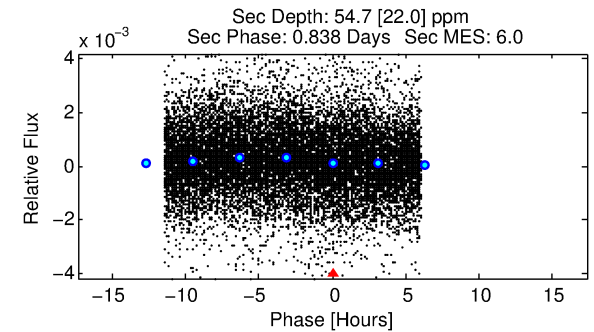
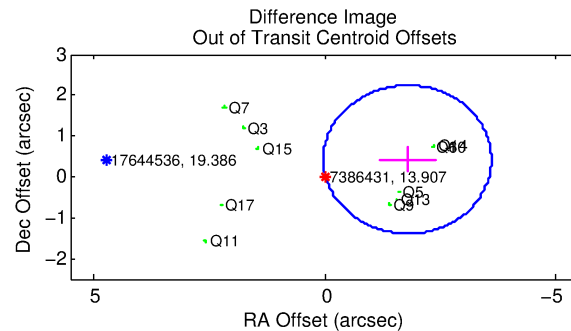
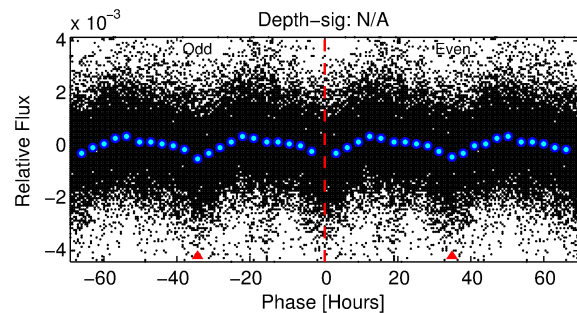
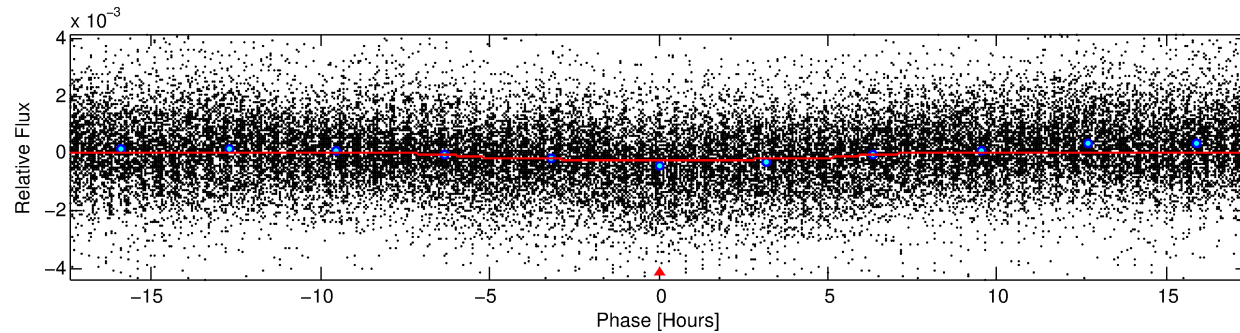
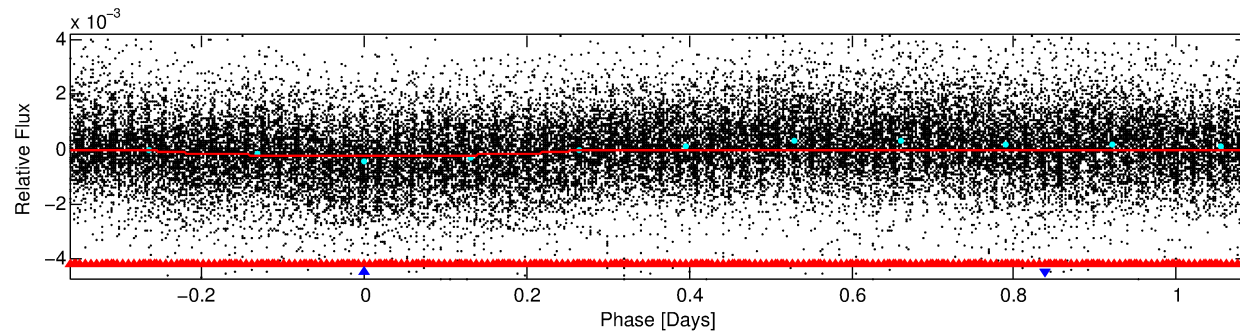
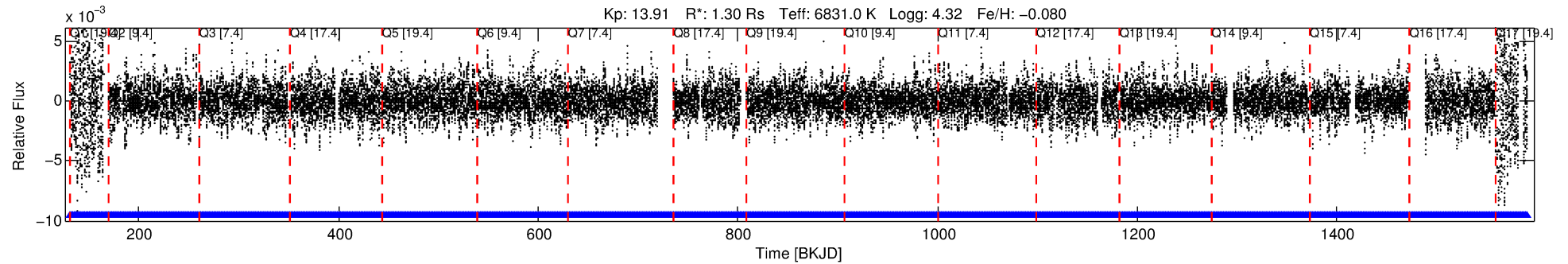
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007386431-02

No Significant Match Found

# DV One-Page Summary

KIC: 7386431 Candidate: 2 of 2 Period: 1.451 d



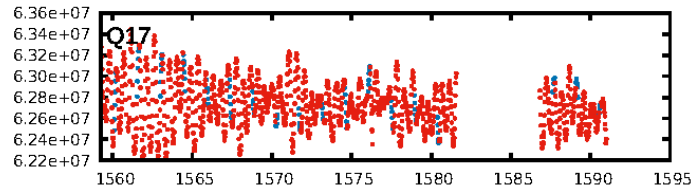
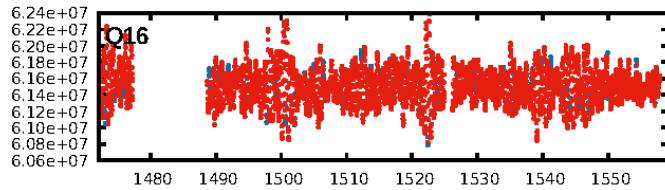
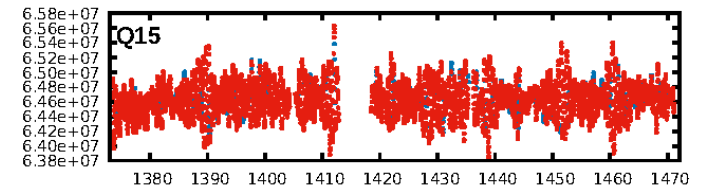
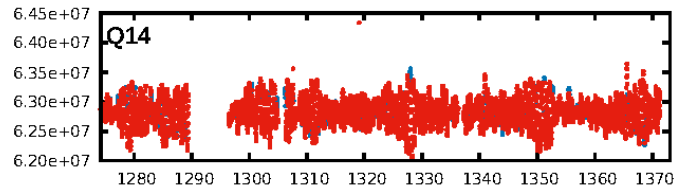
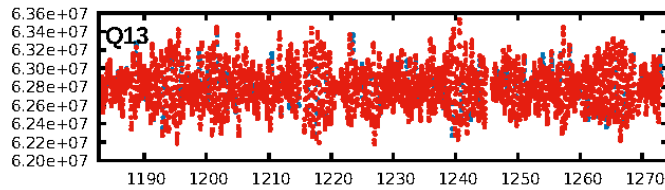
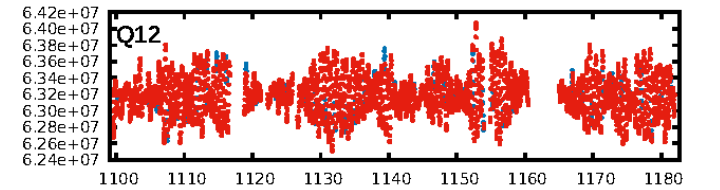
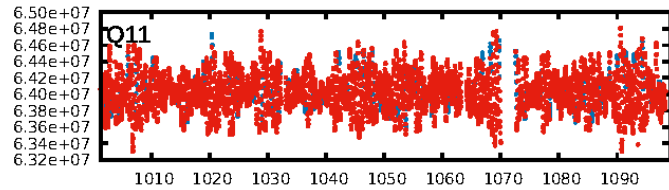
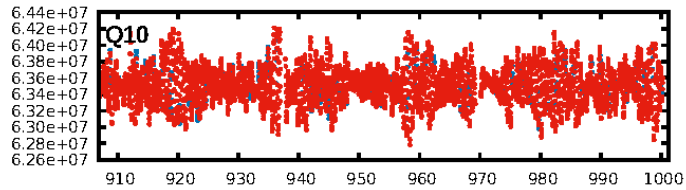
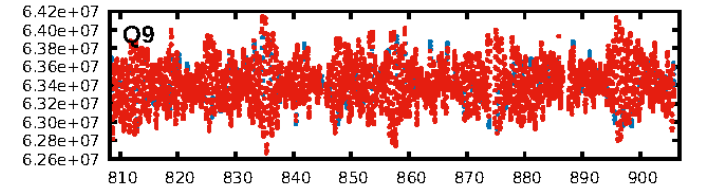
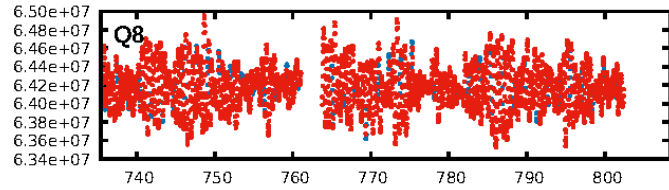
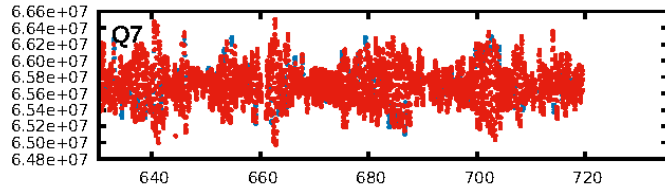
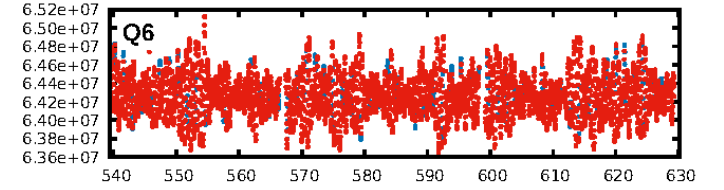
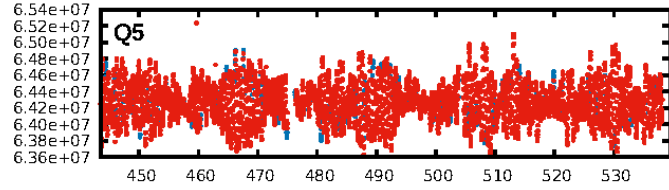
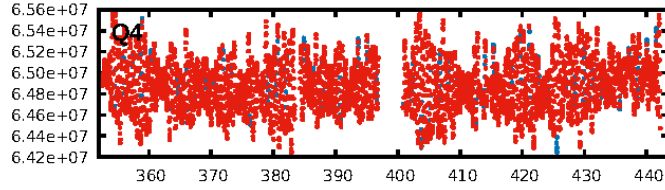
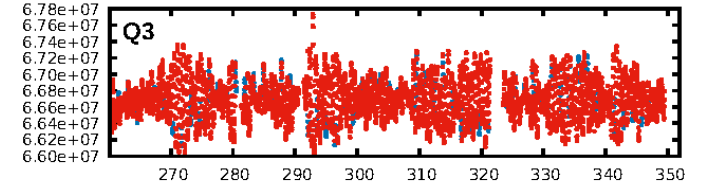
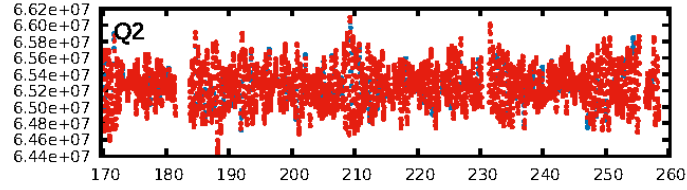
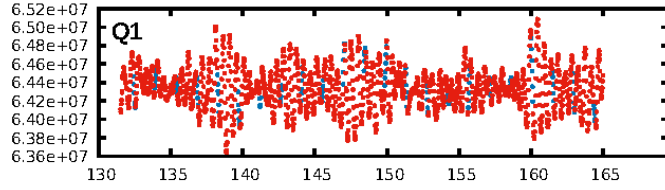
## DV Fit Results:

Period = 1.45085 [0.00003] d  
Epoch = 131.7643 [0.0091] BKJD  
Rp/R\* = 0.0165 [0.0007]  
a/R\* = 1.02 [0.00]  
b = 0.94 [0.01]  
Seff = 4389.38 [1856.43]  
Teq = 2076 [219] K  
Rp = 2.33 [0.83] Re  
a = 0.0273 [0.0077] AU  
Ag = 4.13 [2.34] [1.34σ]  
Teffp = 4575 [508] K [4.52σ]

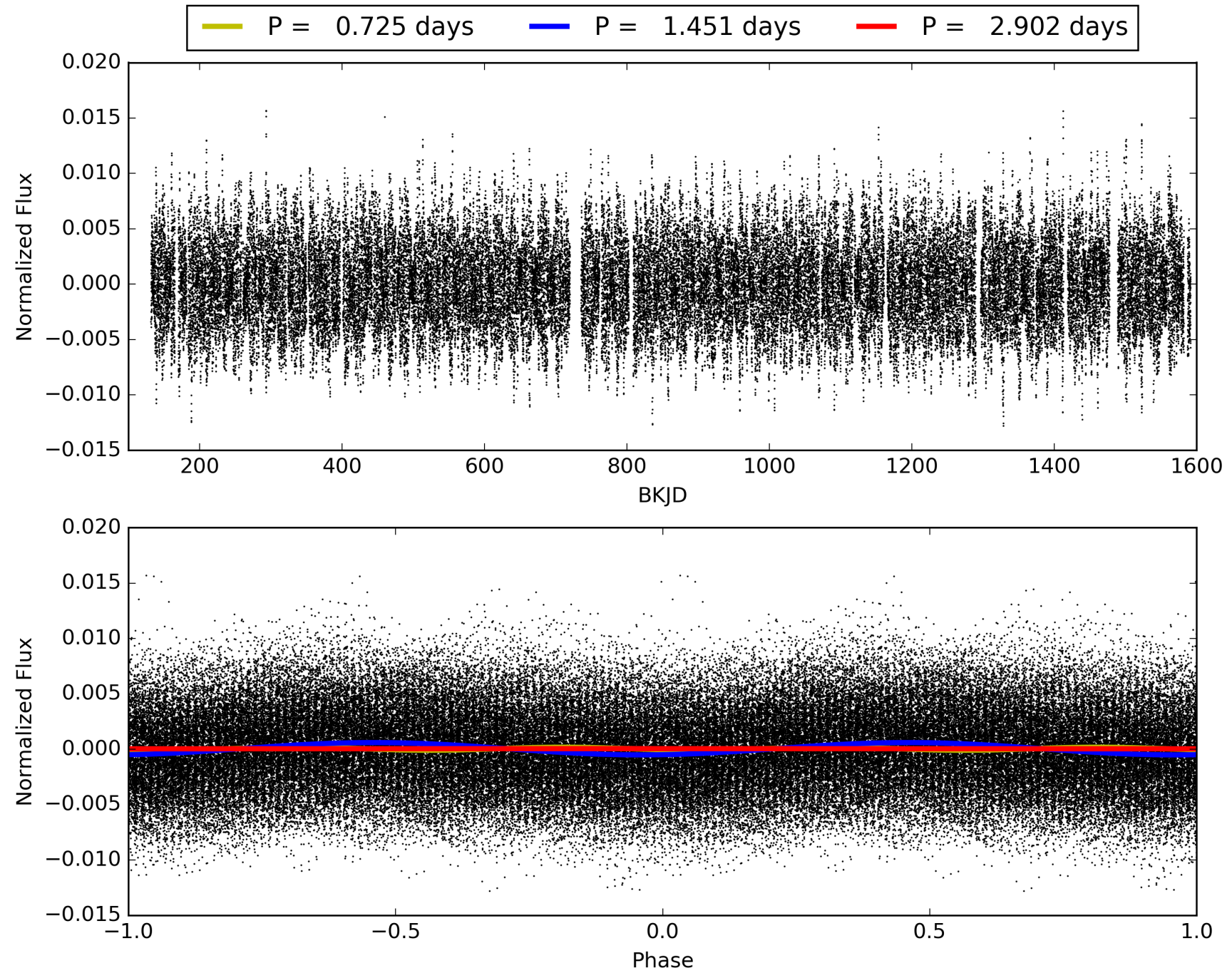
## DV Diagnostic Results:

ShortPeriod-sig: 75.3% [1.16σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [904/904]  
GhostDiagnostic-chr: 1.332  
Centroid-sig: 1.3%  
Centroid-so: 0.317 arcsec [3.36σ]  
OotOffset-rm: 1.840 arcsec [3.04σ]  
KicOffset-rm: 1.897 arcsec [3.27σ]  
OotOffset-st: 3/4/0/4 [11]  
KicOffset-st: 3/4/0/4 [11]  
DiffImageQuality-fgm: 0.91 [10/11]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 007386431-02, PDC Light Curves



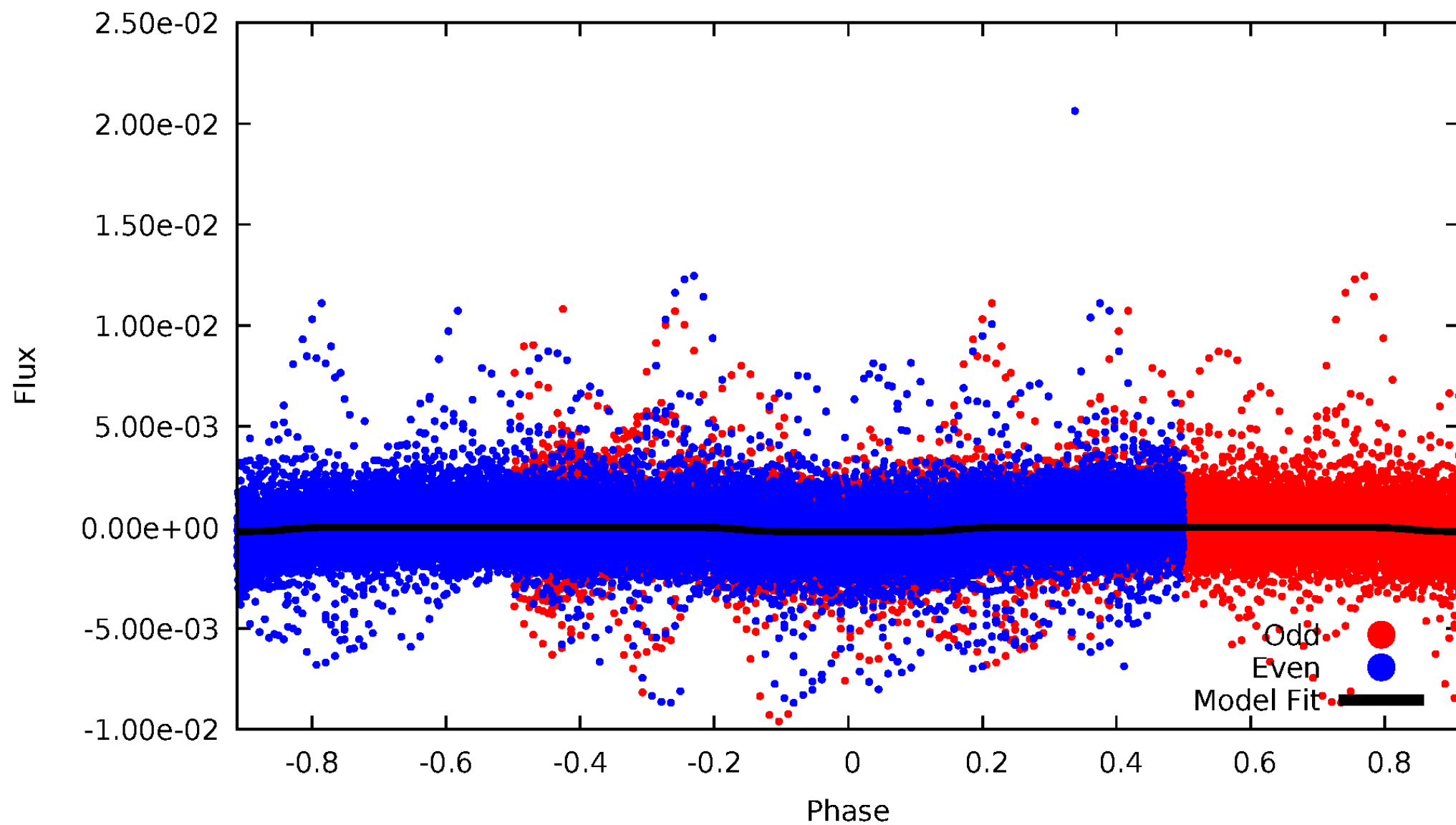
# TCE 007386431-02





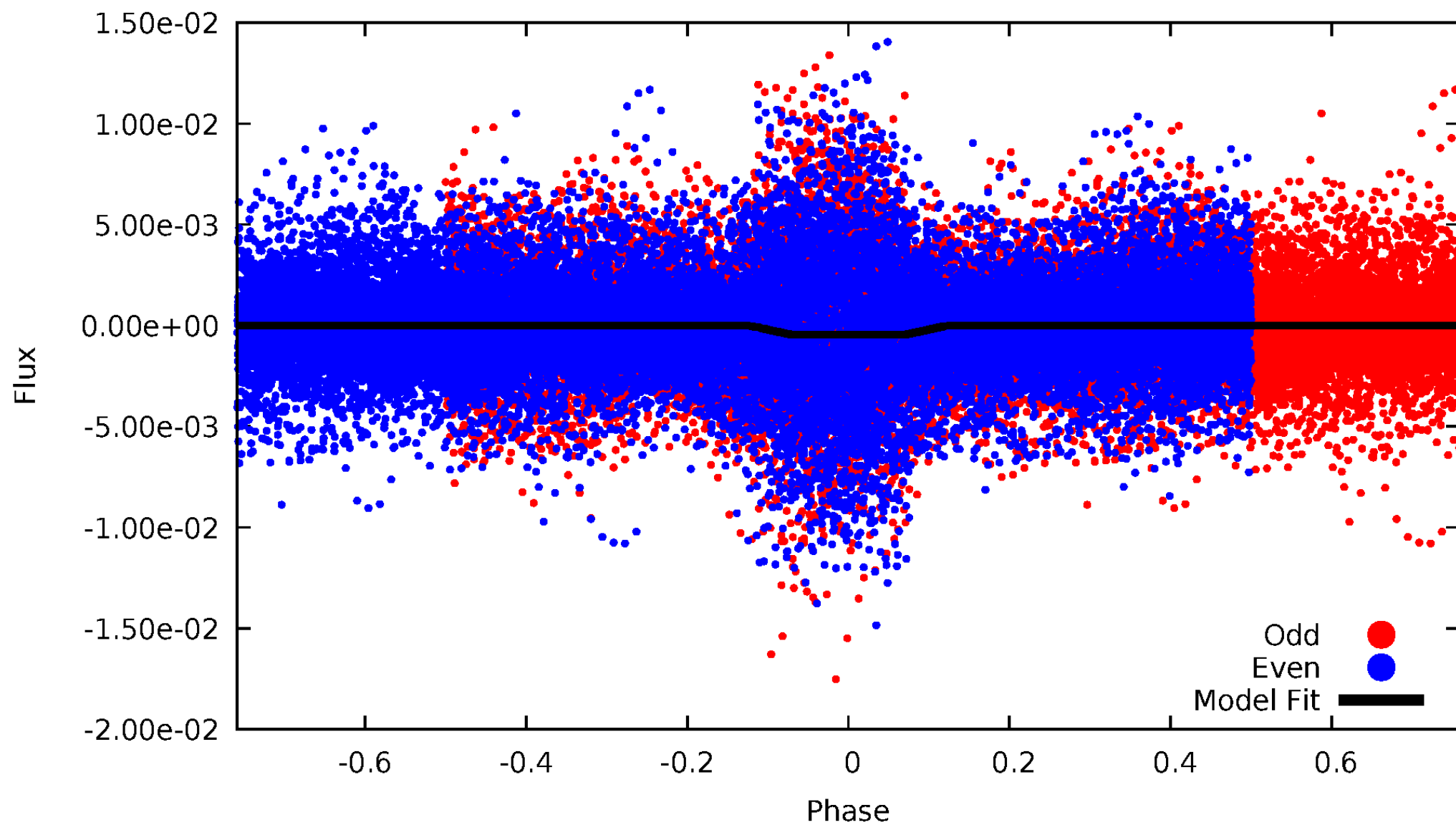
# DV Odd/Even

TCE 007386431-02



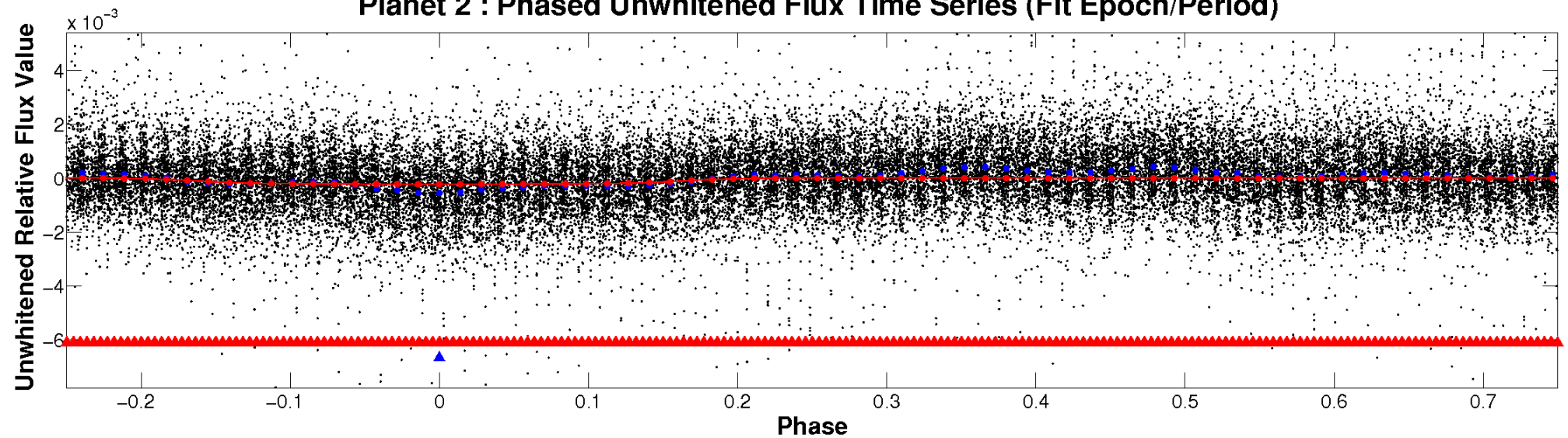
# ALT Odd/Even

TCE 007386431-02

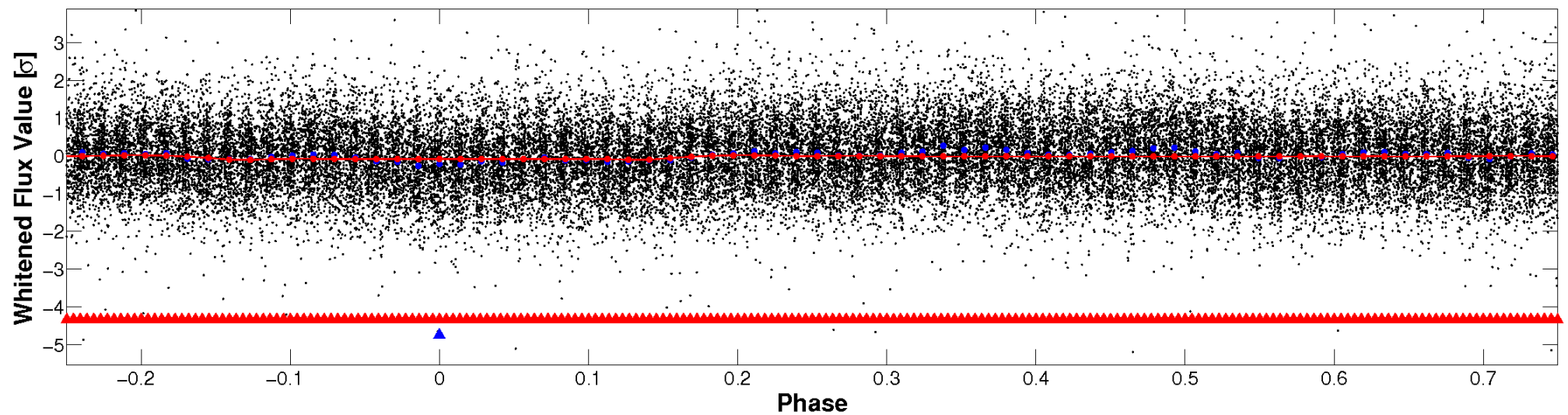


# Non-Whitened Vs. Whitened Light Curve

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

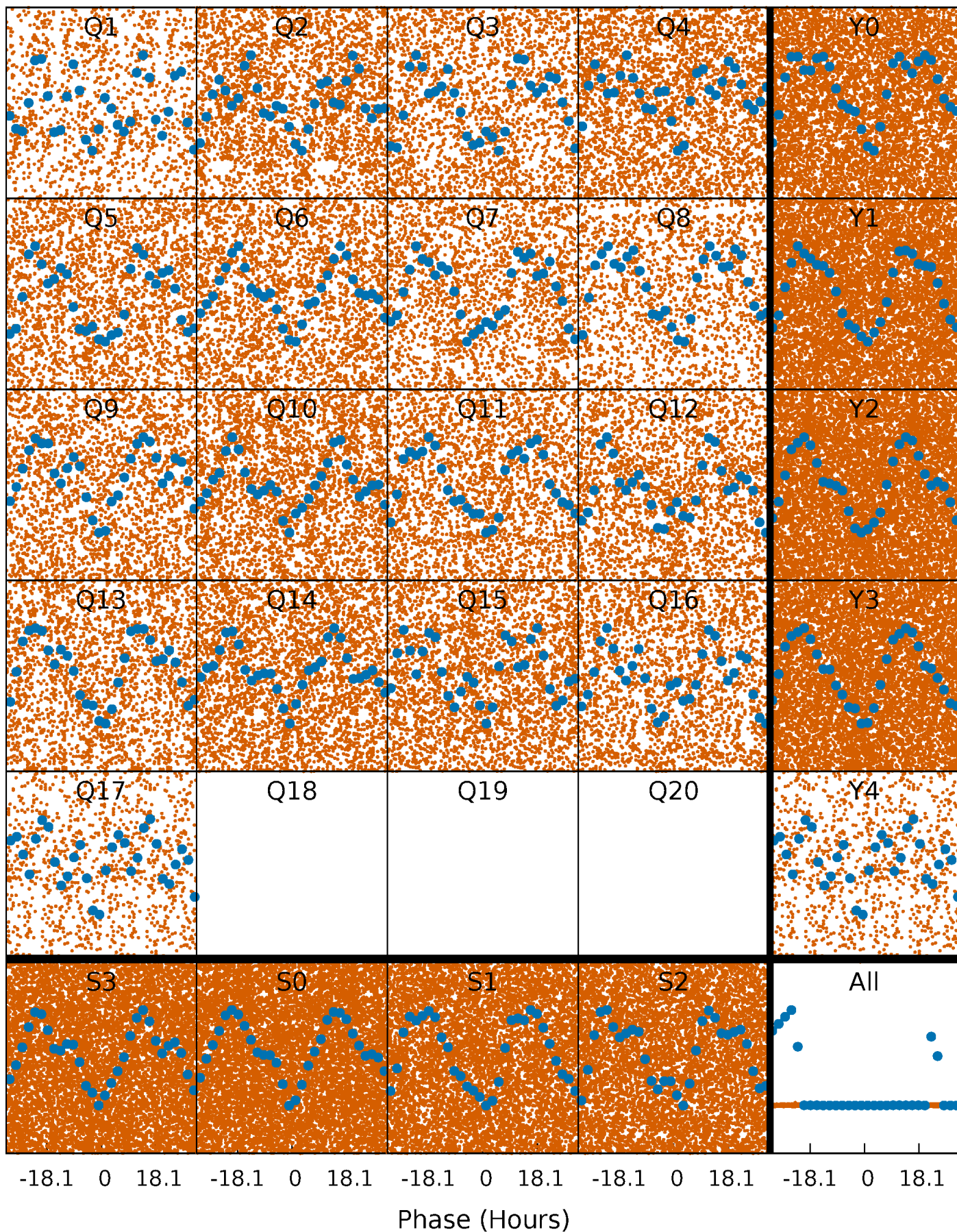


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

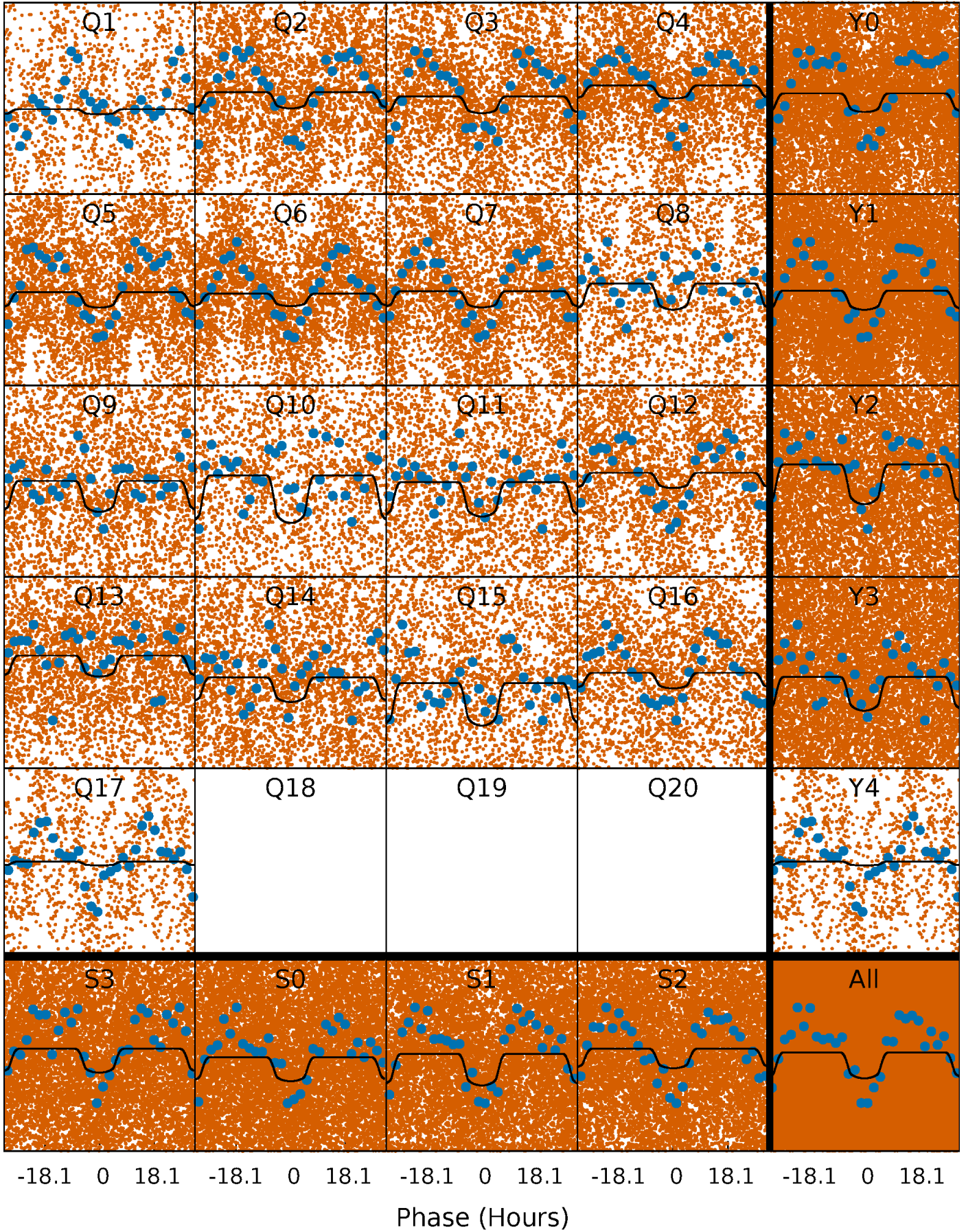
TCE 007386431-02   P= 1.450855 Days    $T_0=131.764271$  (BKJD)





# DV Quarter-Phased Transit Curves

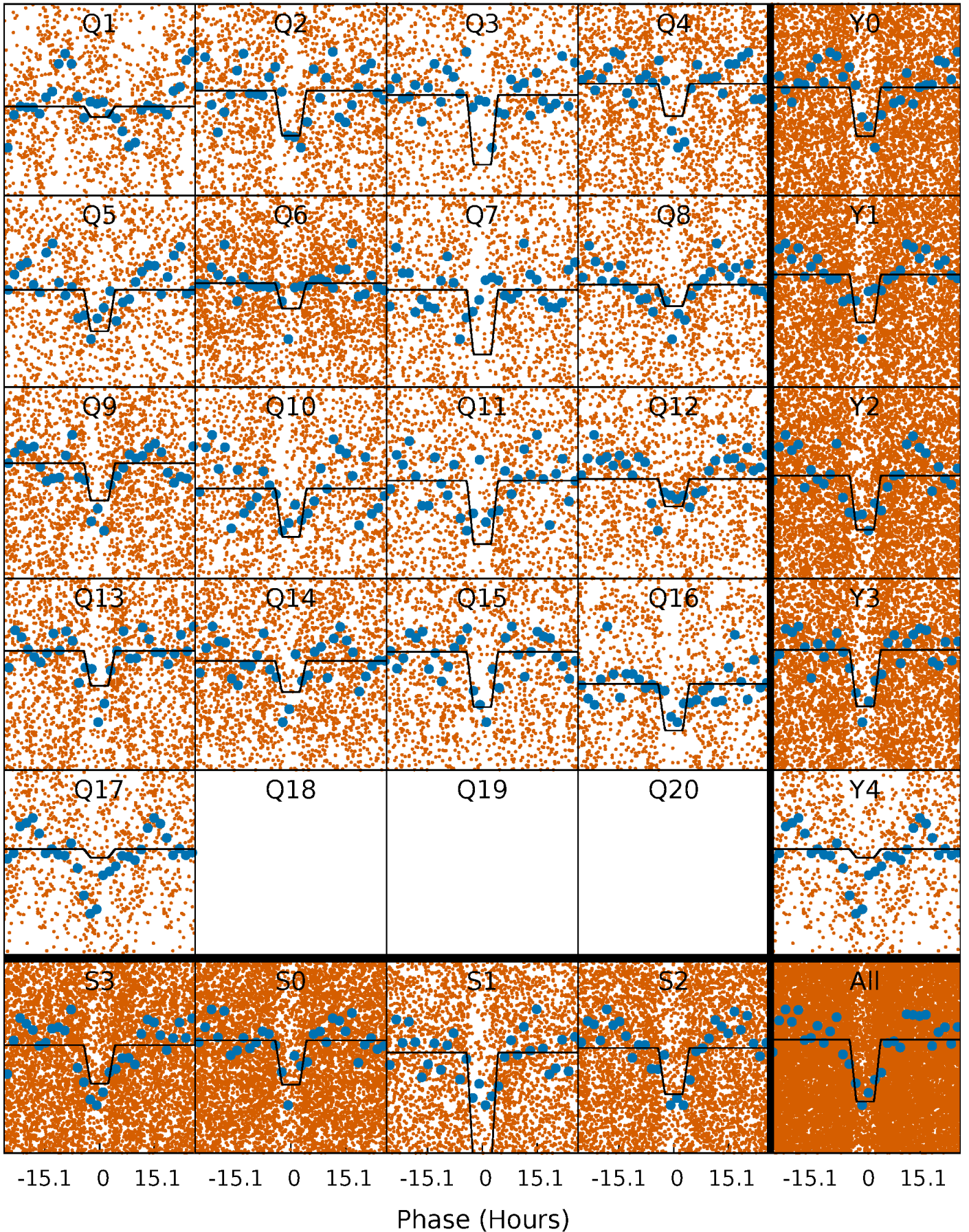
TCE 007386431-02   P= 1.450855 Days    $T_0=131.764271$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

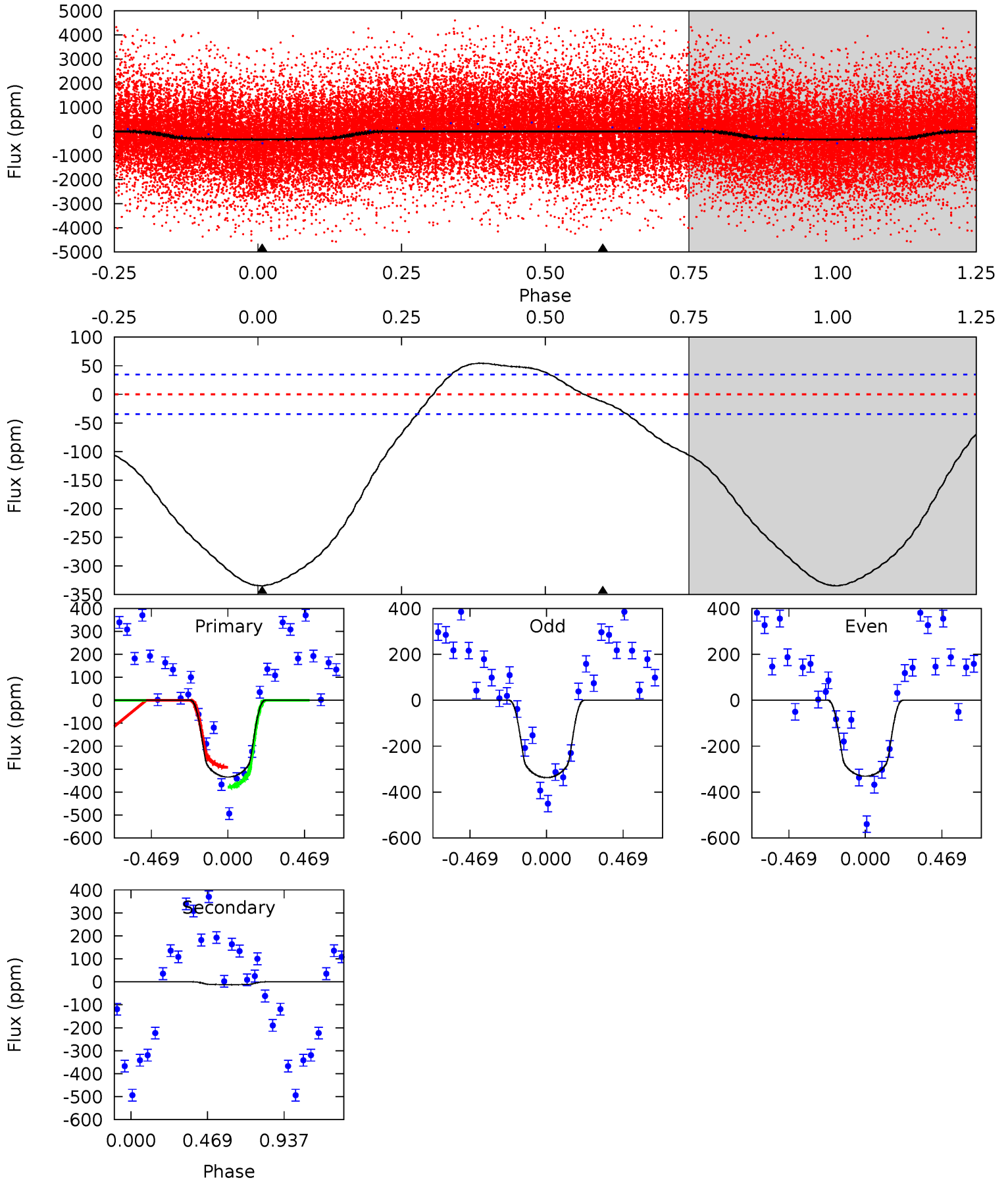
TCE 007386431-02   P= 1.450849 Days    $T_0=131.787673$  (BKJD)



# DV Model-Shift Uniqueness Test

007386431-02, P = 1.450855 Days, E = 130.313416 Days

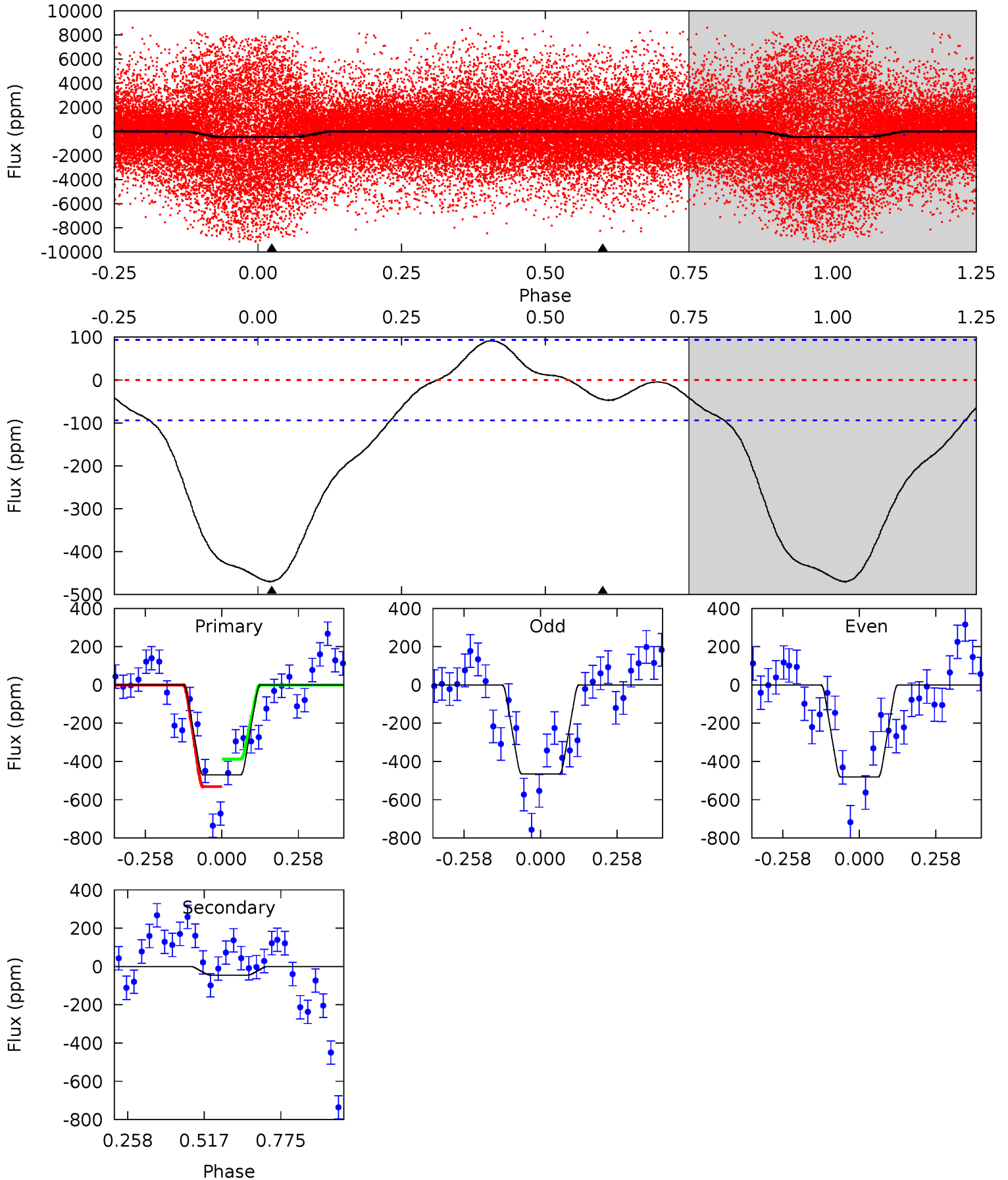
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
40.9	1.56	0	0	4.23	0.72	4.09	40.9	40.9	1.56	1.56	0.36	1.23	0.14	5.16



# Alt Model-Shift Uniqueness Test

007386431-02, P = 1.450849 Days, E = 130.336824 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
21.9	2.09	0	0	4.36	1.13	1.18	21.9	21.9	2.09	2.09	0.36	0.85	0.16	2.94



### Stellar Parameters For KIC 007386431

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6831^{+189}_{-283}$	$4.324^{+0.067}_{-0.202}$	$-0.080^{+0.250}_{-0.350}$	$1.296^{+0.457}_{-0.152}$	$1.302^{+0.190}_{-0.190}$	$0.842^{+0.251}_{-0.454}$
	+3%/-4%	+2%/-5%	+312%/-438%	+35%/-12%	+15%/-15%	+30%/-54%
Source	PHO1	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 007386431-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	-13±8	$2.39^{+0.41}_{-0.23}$	$2950^{+207}_{-154}$	$3336^{+414}_{-5524}$	$0.822^{+0.611}_{-0.543}$
Alt.	-45±21	$3.10^{+0.57}_{-0.30}$	$2940^{+218}_{-156}$	$3942^{+351}_{-524}$	$1.814^{+0.964}_{-0.926}$

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

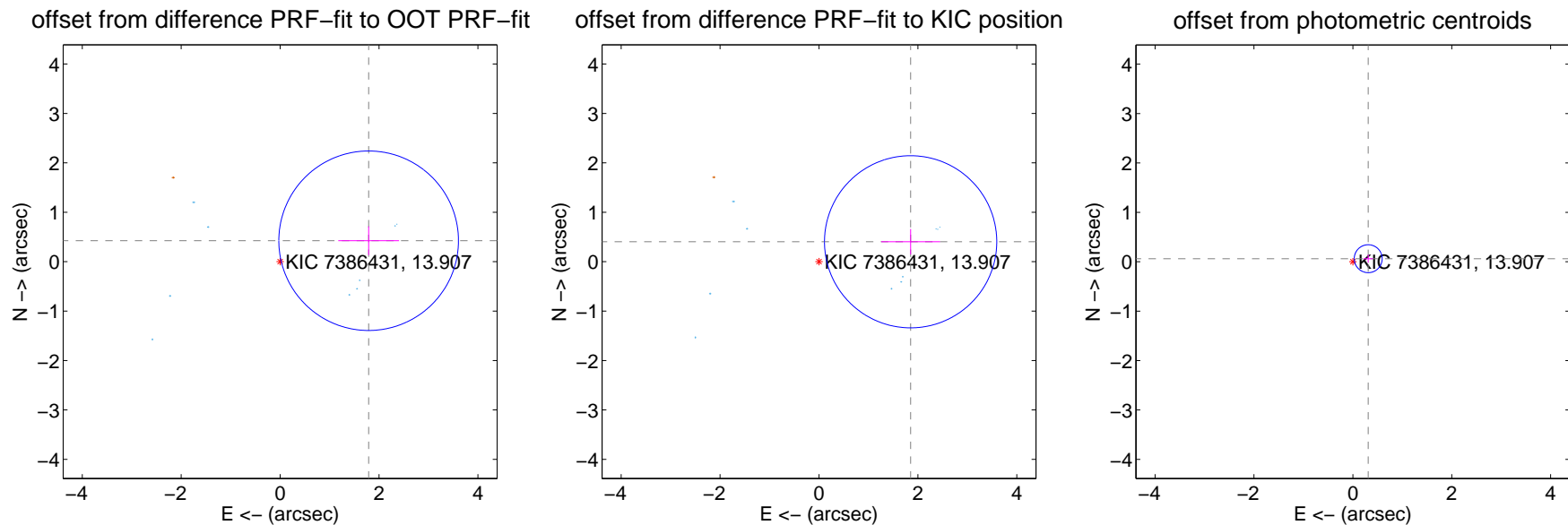
## DV Centroid Data

Supplemental centroid analysis for 007386431-02. Kepler magnitude: 13.91. Transit SNR 9.80

There are 10 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

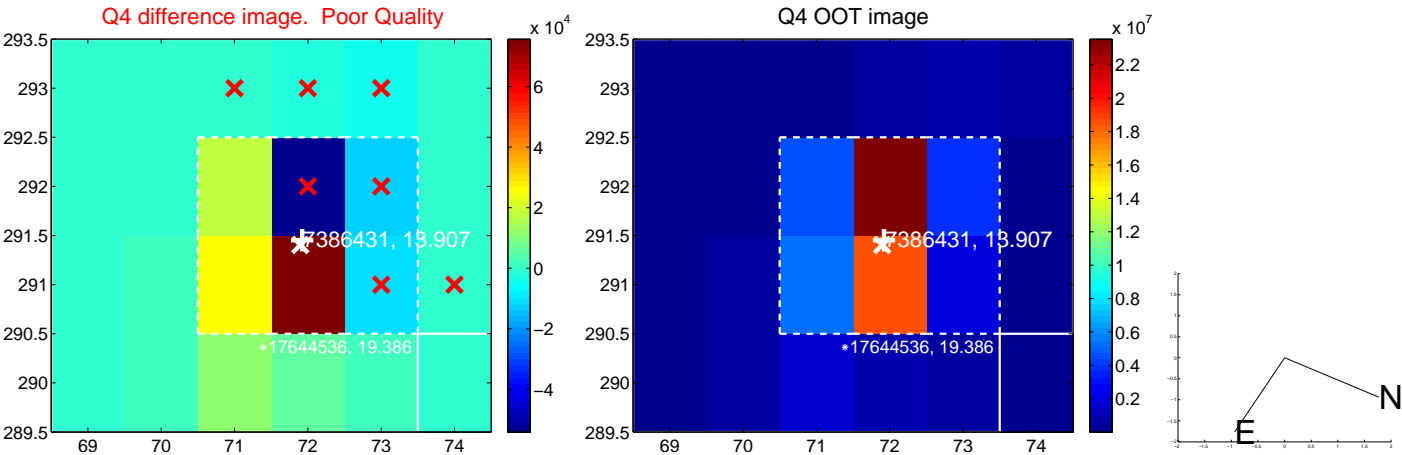
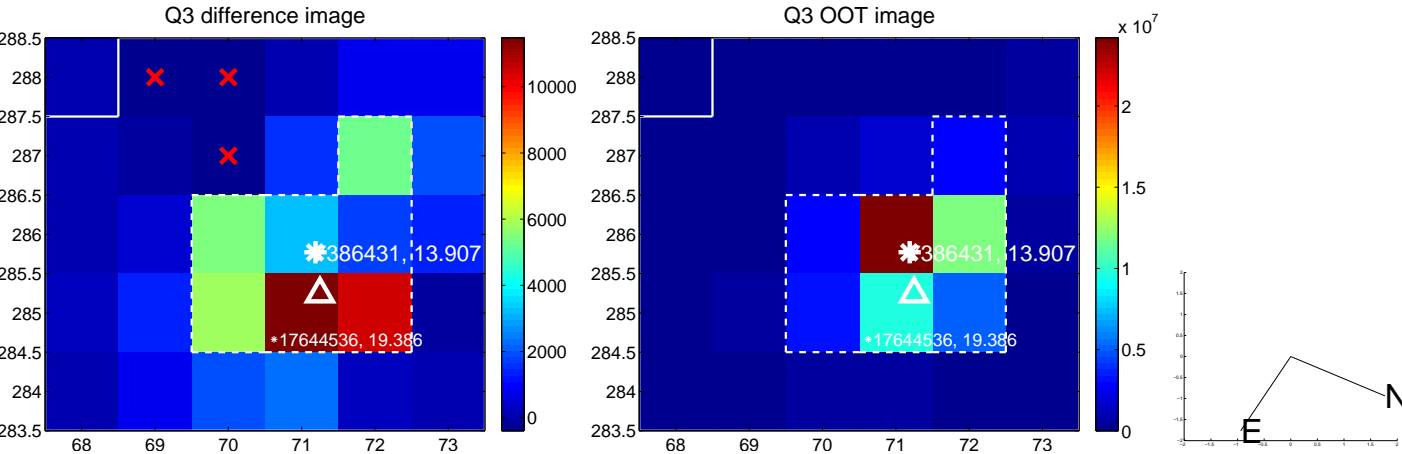
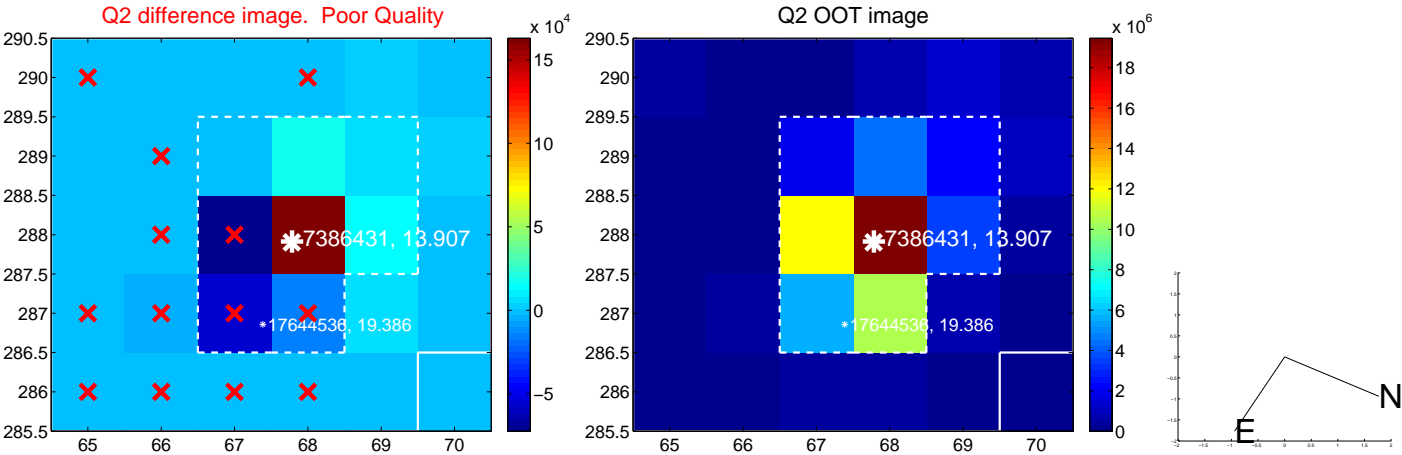
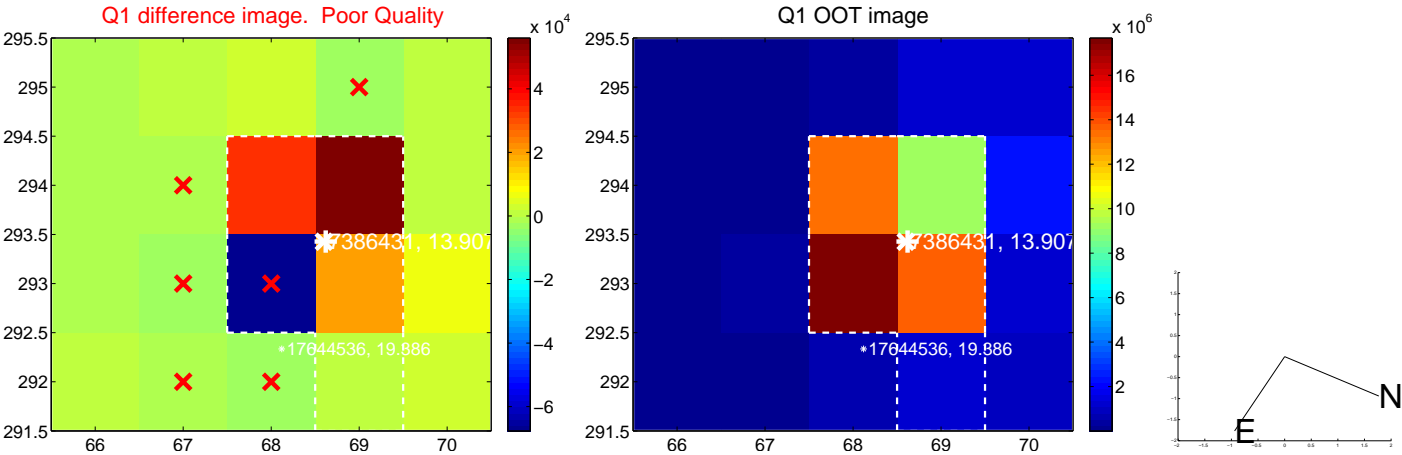
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.840 \pm 0.605$	3.04	$-1.791 \pm 0.615$	$0.424 \pm 0.291$
PRF-fit source offset from KIC position	$1.897 \pm 0.581$	3.27	$-1.853 \pm 0.595$	$0.403 \pm 0.258$
photometric centroid source offset	$0.32 \pm 0.09$	3.36	$-0.31 \pm 0.09$	$0.06 \pm 0.08$



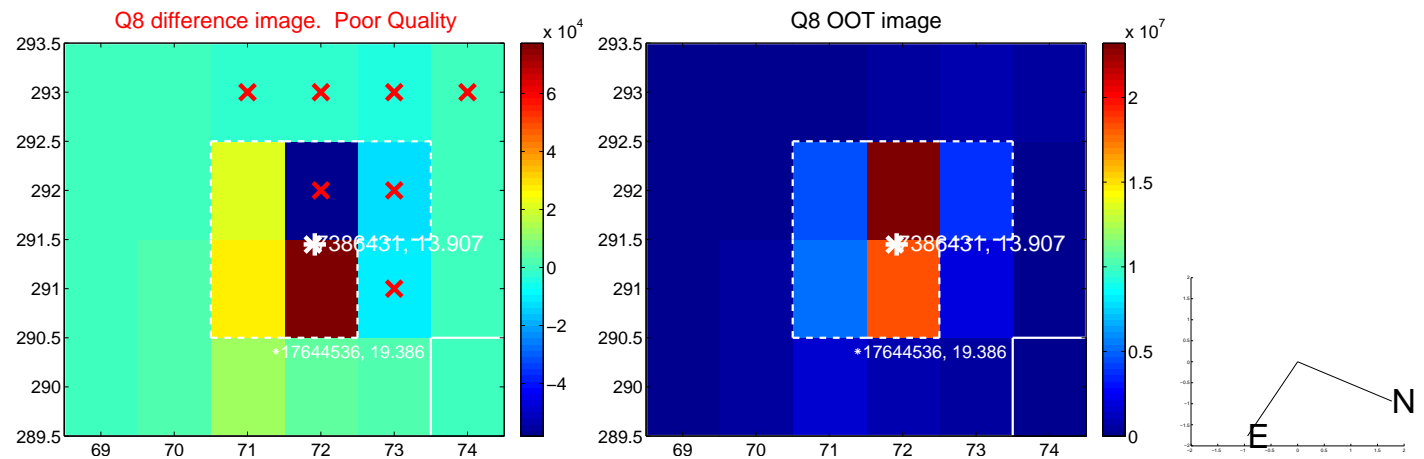
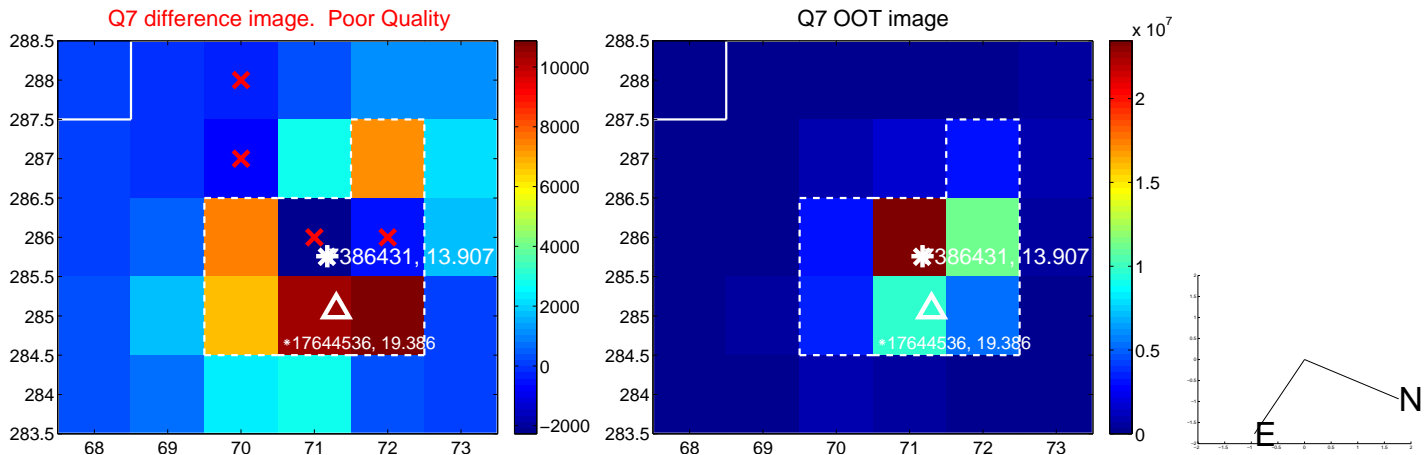
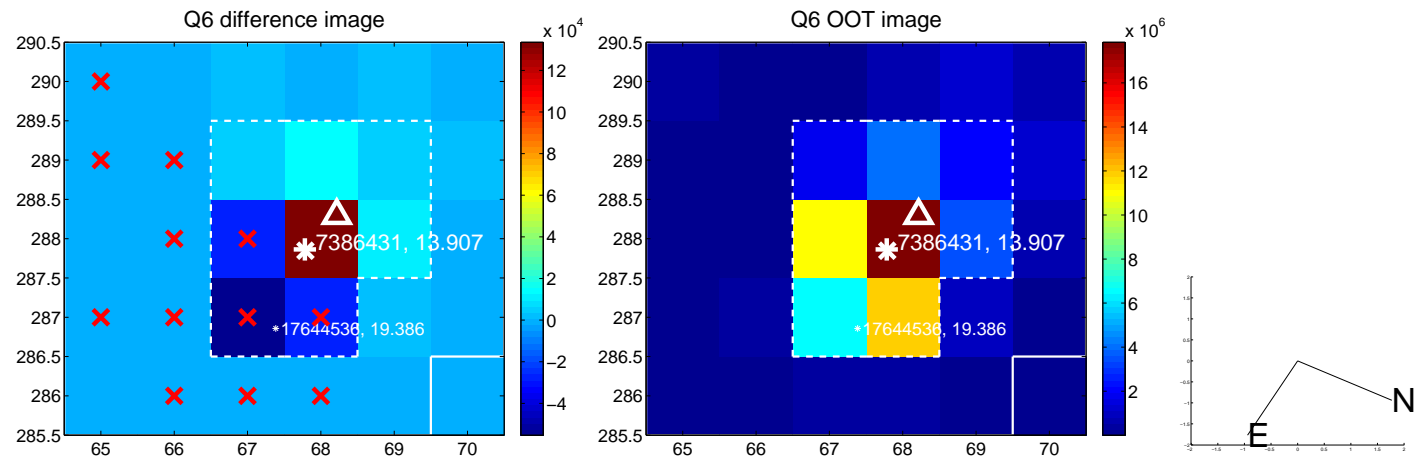
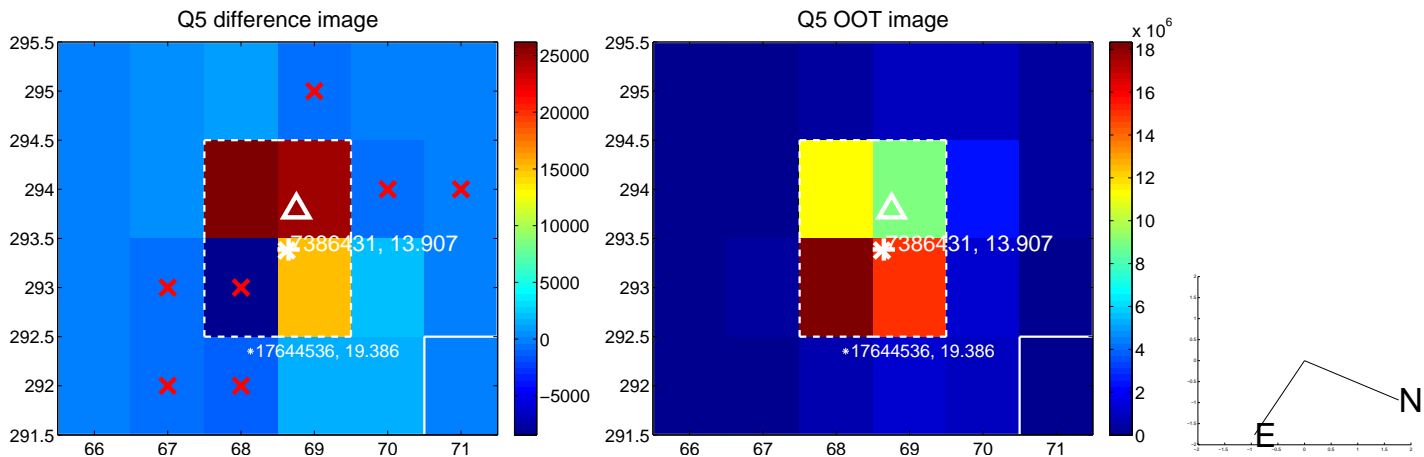
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



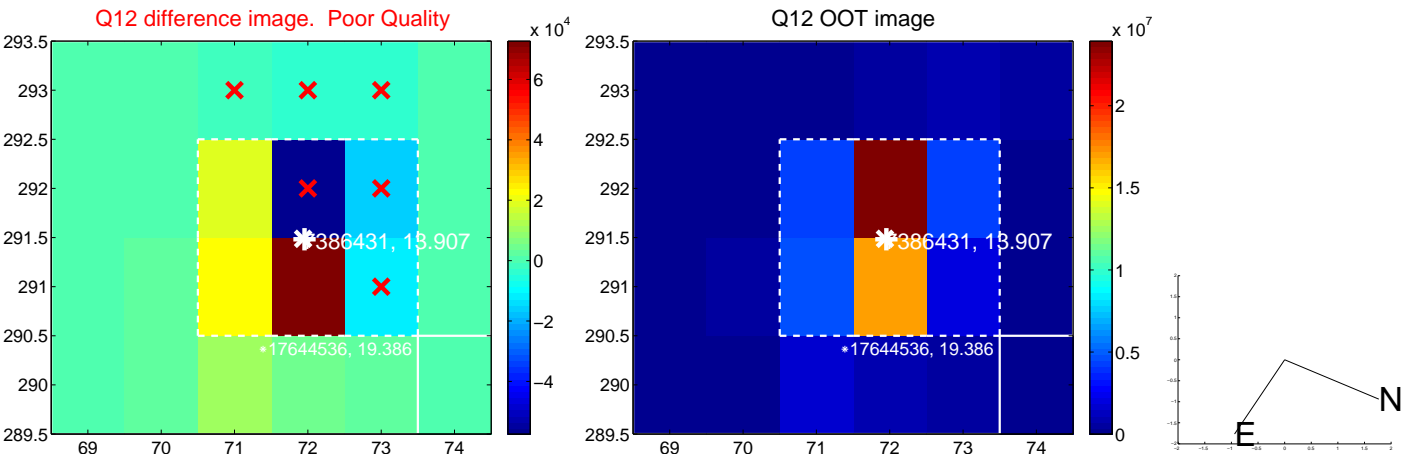
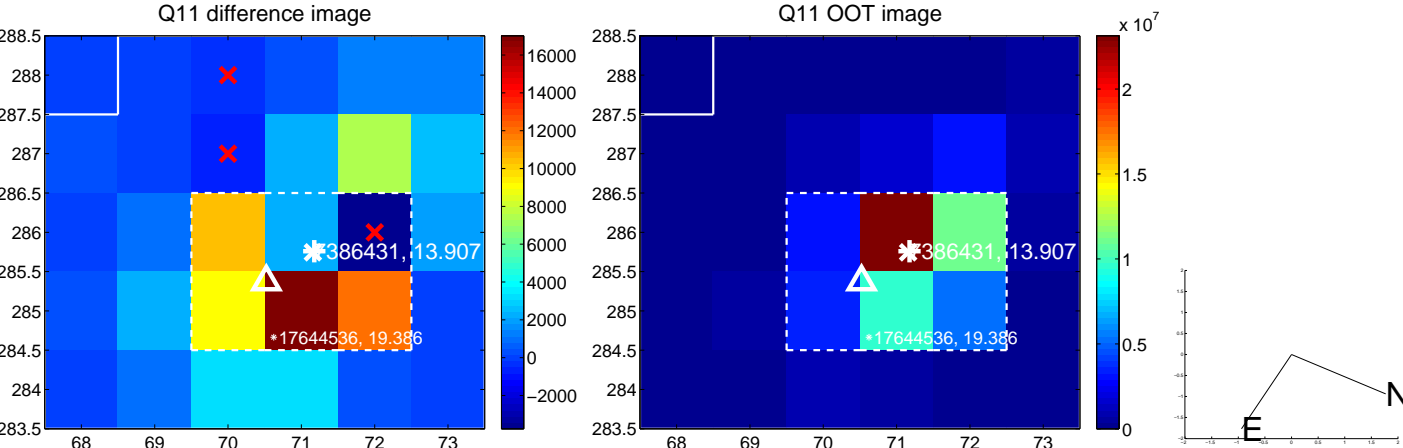
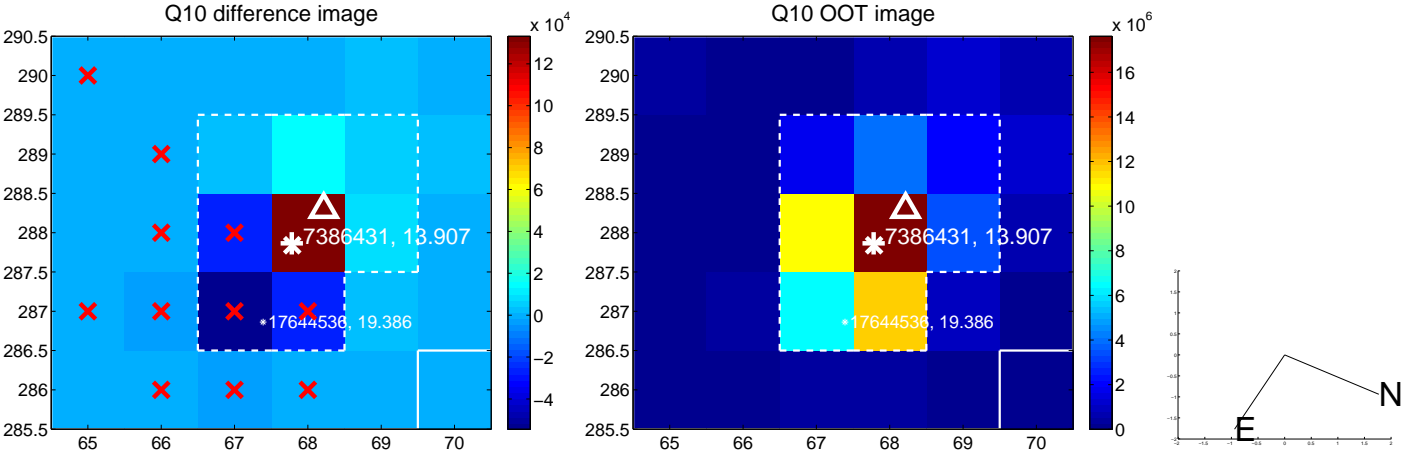
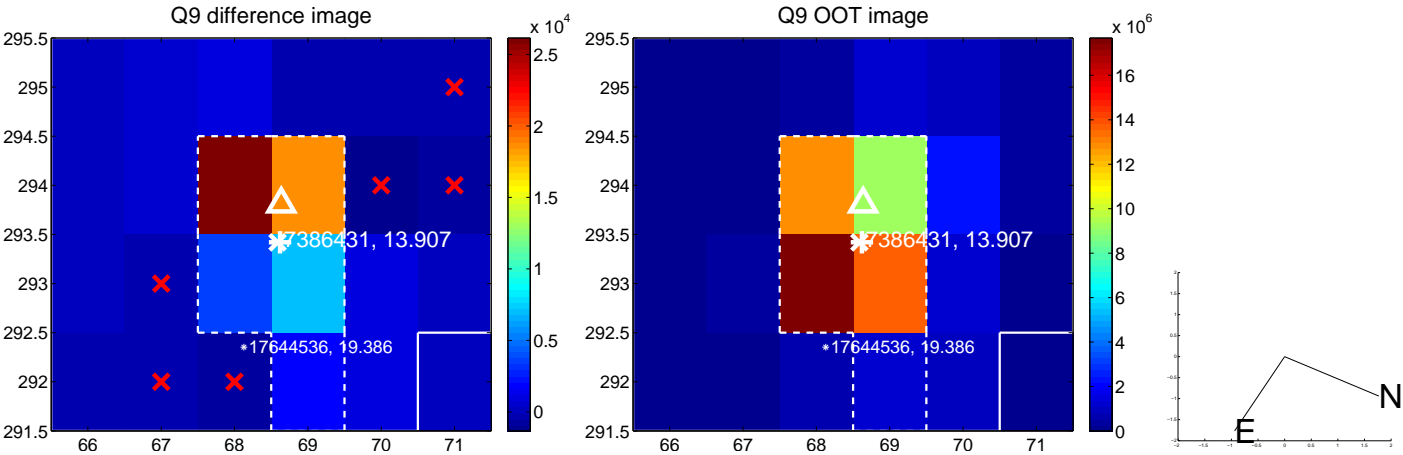
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



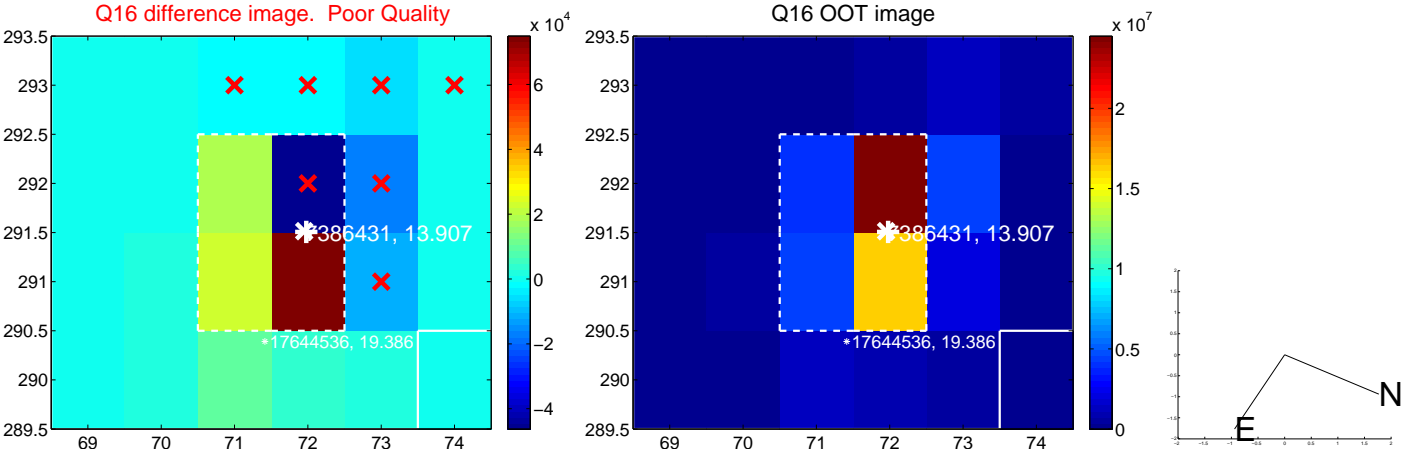
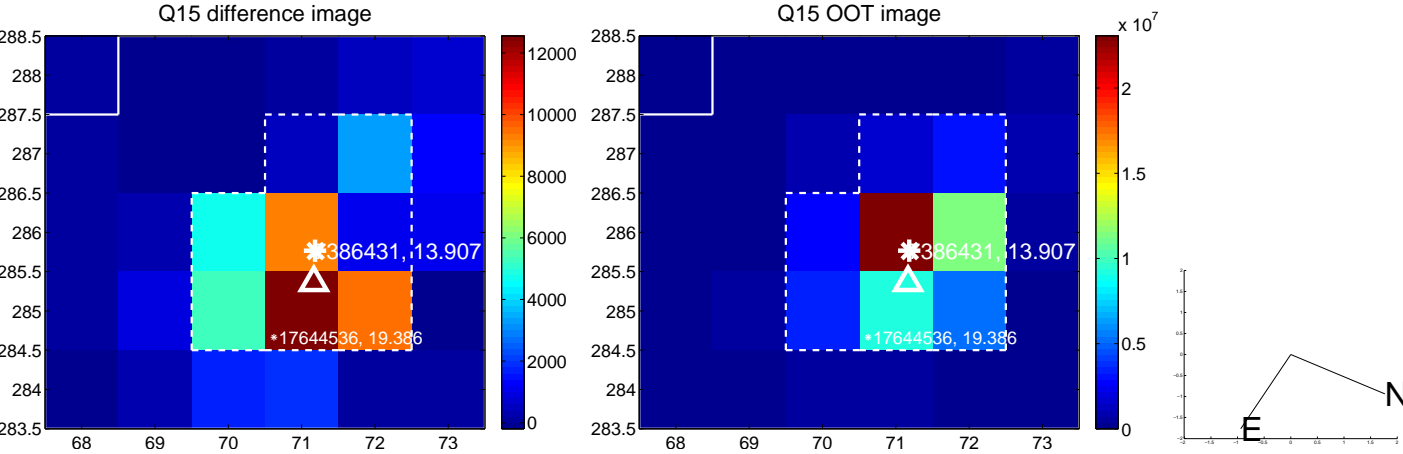
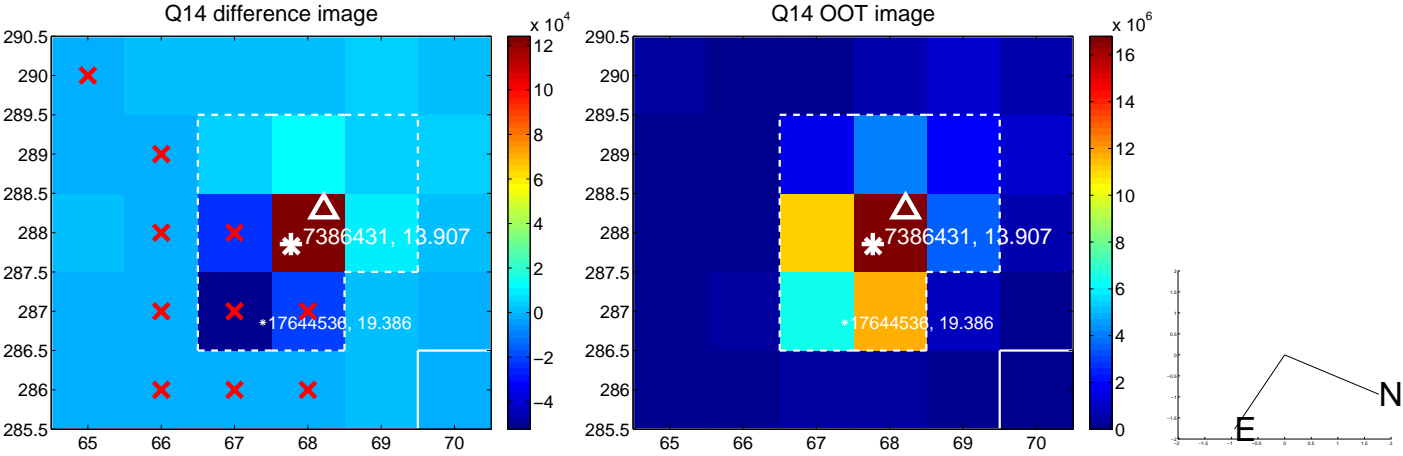
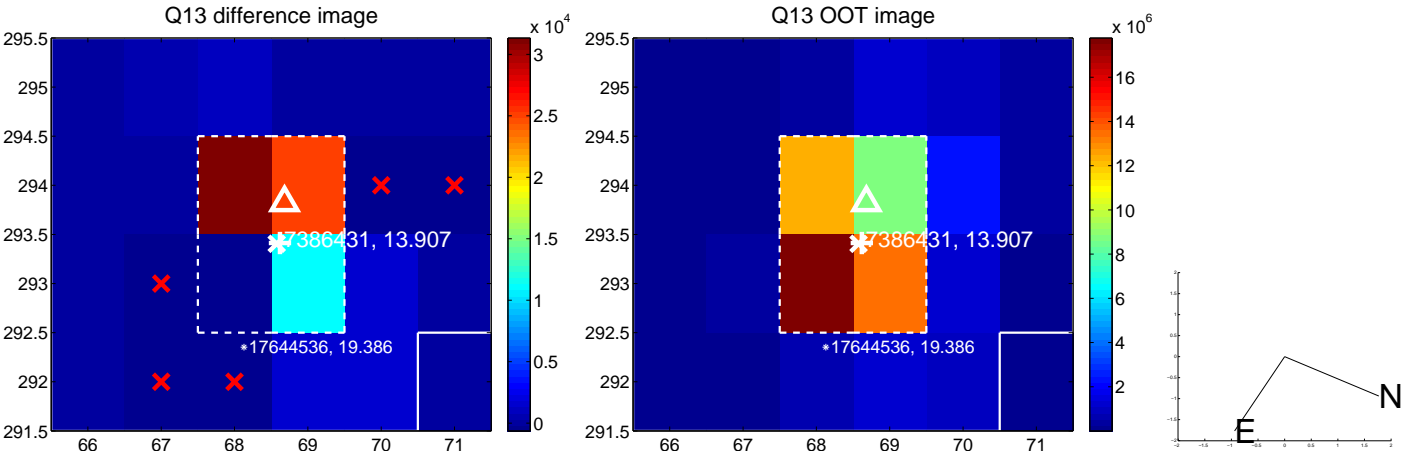
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



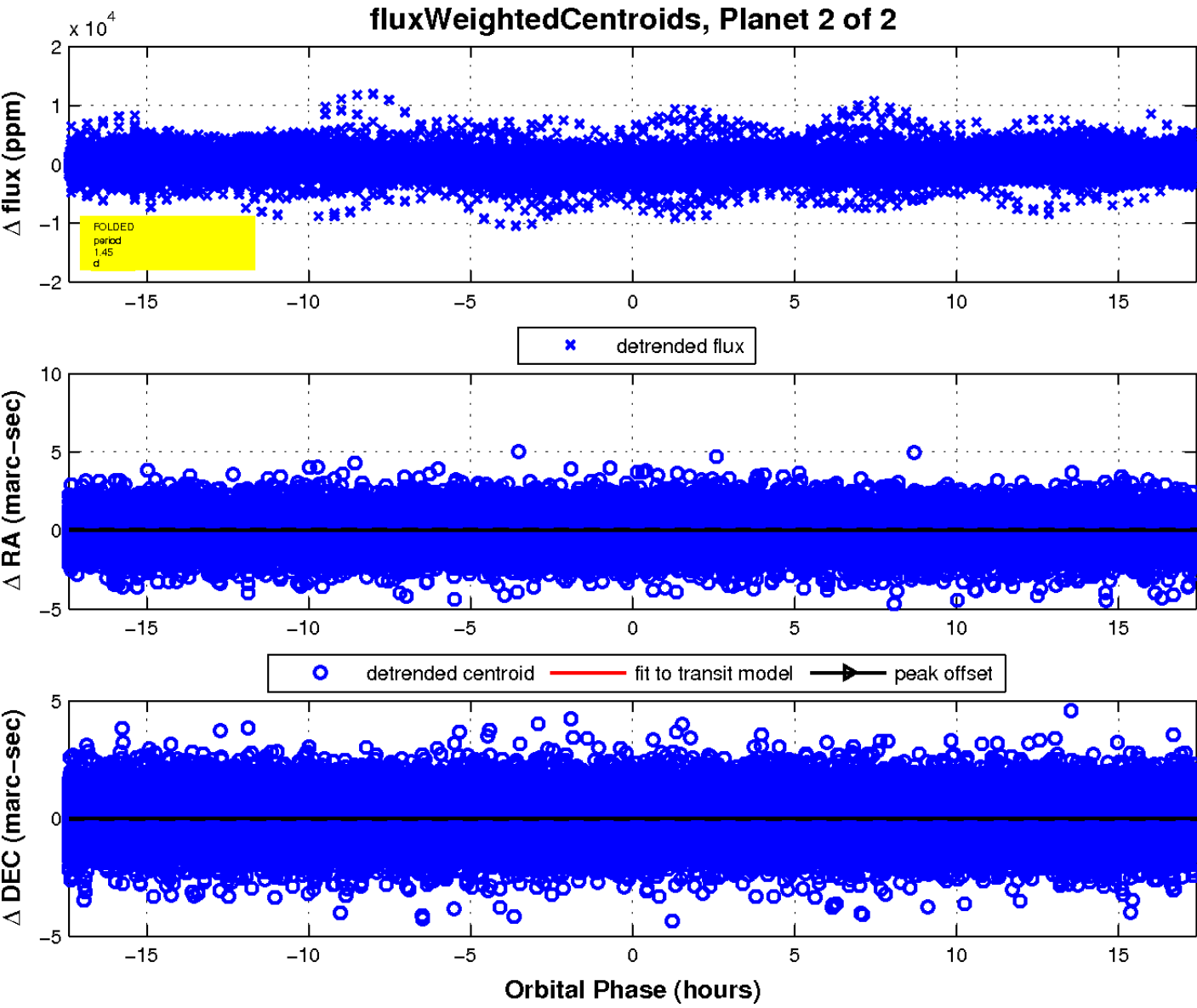
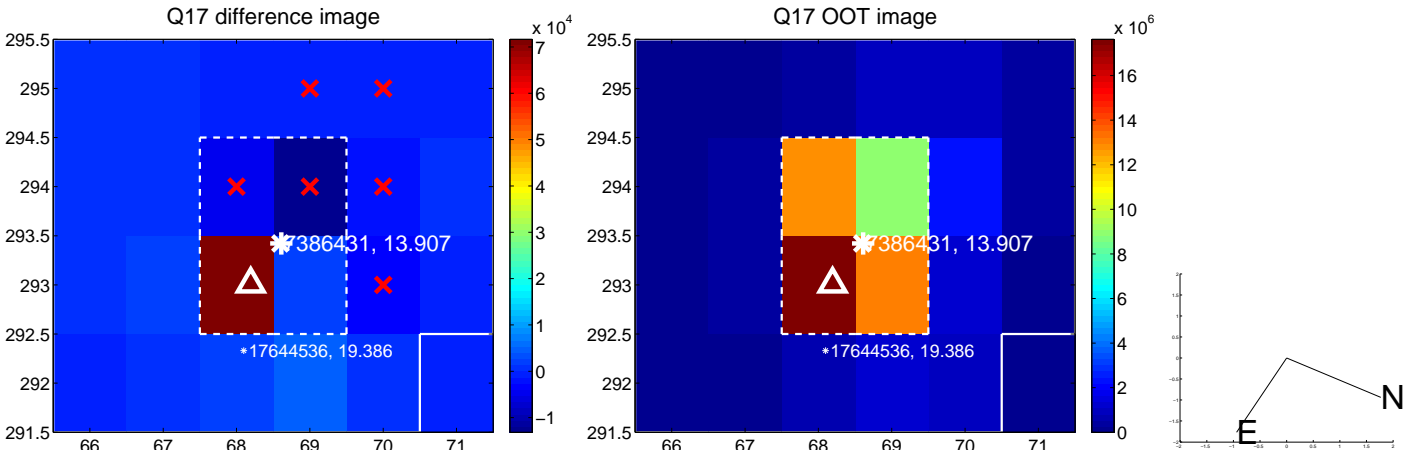
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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





UKIRT Image

Declination

