

# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
005302881-02	OBS	No	180.849404	178.169022	233.3	20.412	10.7	8.5	4.02	6413	7.61	43.95
005302881-03	OBS	No	363.915884	376.574365	352.3	10.811	8.7	8.9	4.02	6413	9.37	17.30
005302881-04	OBS	No	49.250942	175.481490	265.8	3.501	8.5	9.2	4.02	6413	8.35	249.01
005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

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

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

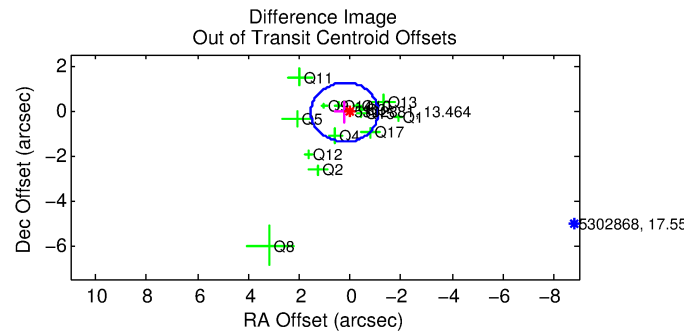
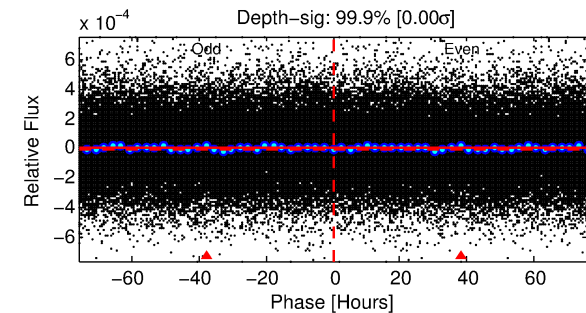
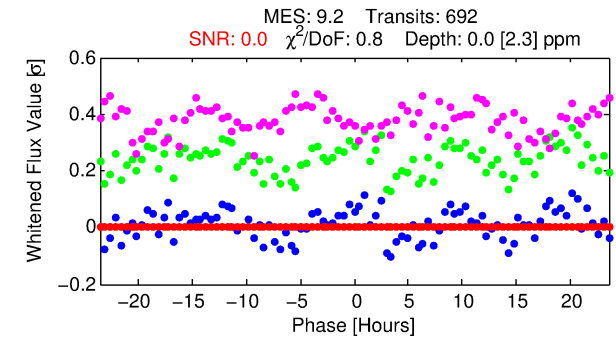
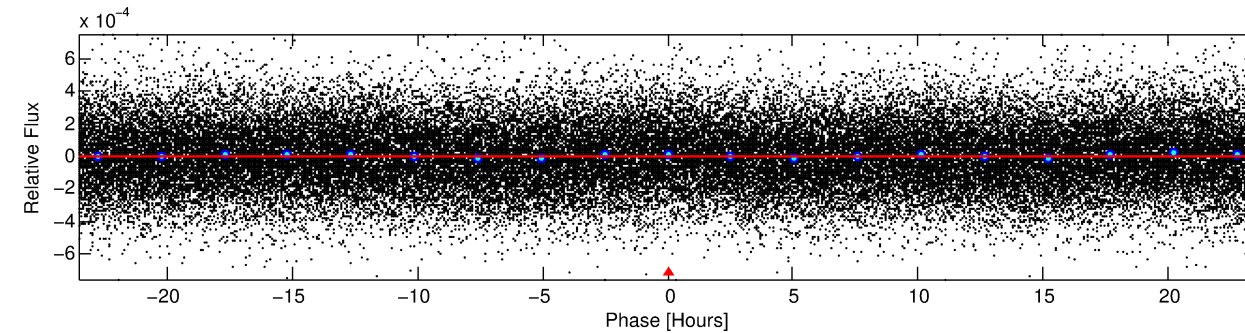
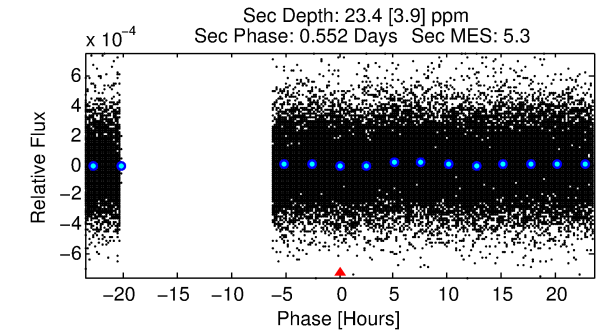
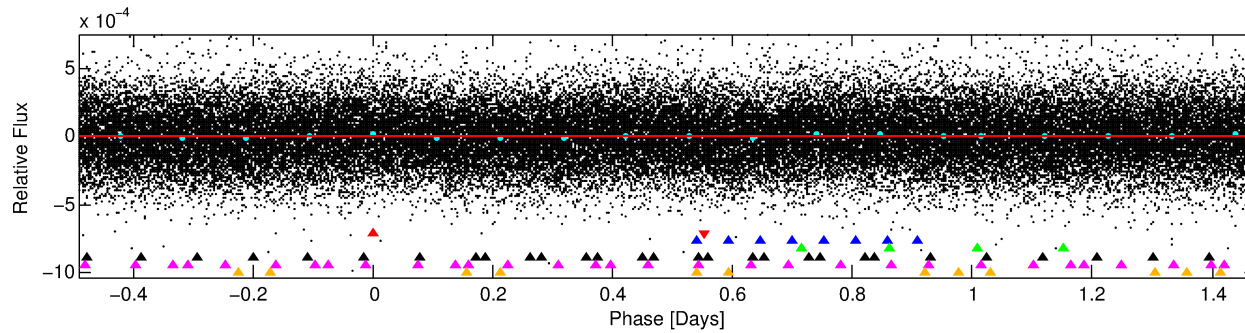
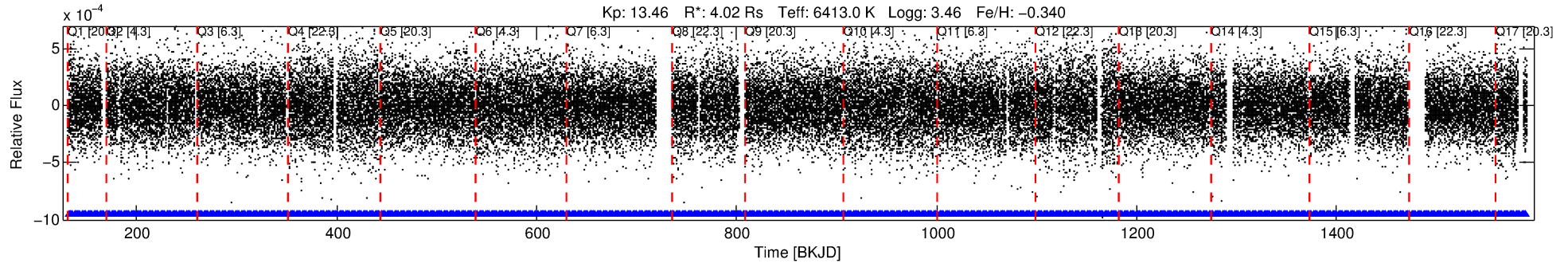
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005302881-01

No Significant Match Found

# DV One-Page Summary

KIC: 5302881 Candidate: 1 of 6 Period: 1.966 d



## DV Fit Results:

Period = 1.96633 [0.04606] d  
Epoch = 132.0339 [12.0755] BKJD  
Rp/R\* = 0.0001 [0.0122]  
a/R\* = 1.34 [242.83]  
b = 0.08 [5003.30]  
Seff = 18248.48 [12223.38]  
Teq = 2964 [496] K  
Rp = 0.05 [5.34] Re  
a = 0.0367 [0.0152] AU  
Ag = 6587.81 [1372961.40] [0.00σ]  
Teffp = 41282 [2150910] K [0.02σ]

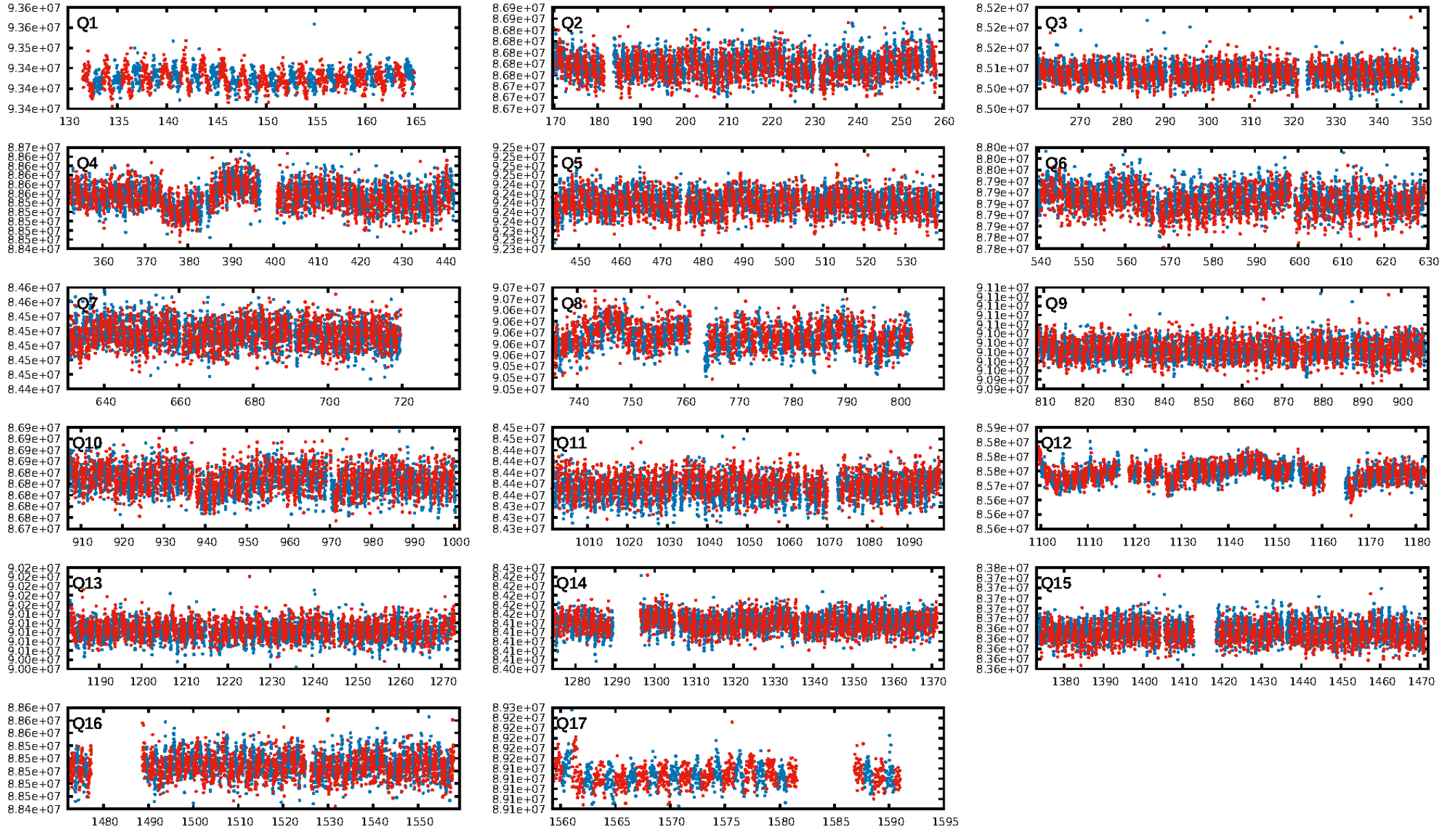
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [77.60σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.63e-10**  
RollingBand-fgt: 1.00 [660/660]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.235 arcsec [0.53σ]  
KicOffset-rm: 0.308 arcsec [0.69σ]  
OotOffset-st: 3/3/3/5 [14]  
KicOffset-st: 3/3/3/5 [14]  
DiffImageQuality-fgm: 0.29 [4/14]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:22 Z

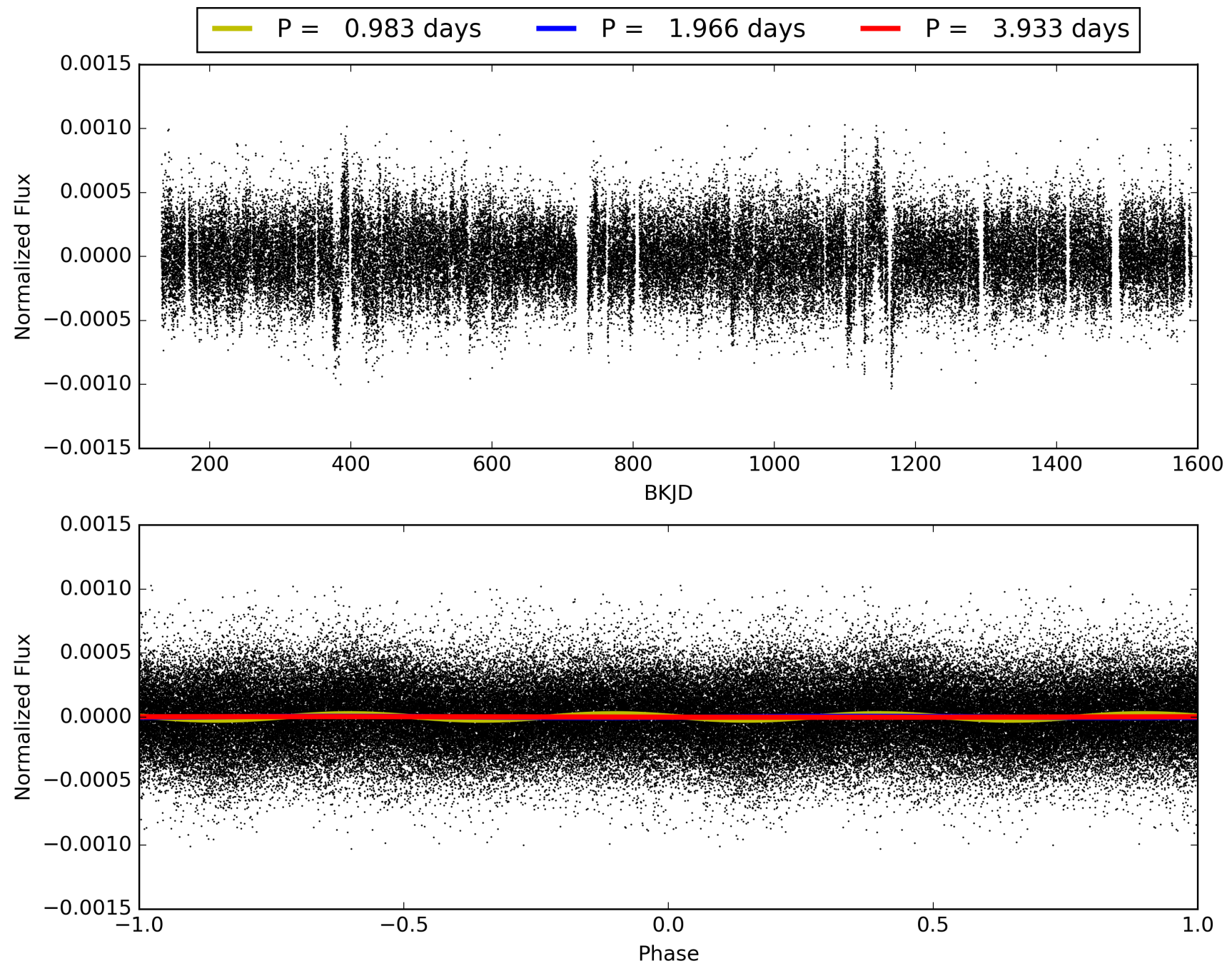
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005302881-01, PDC Light Curves





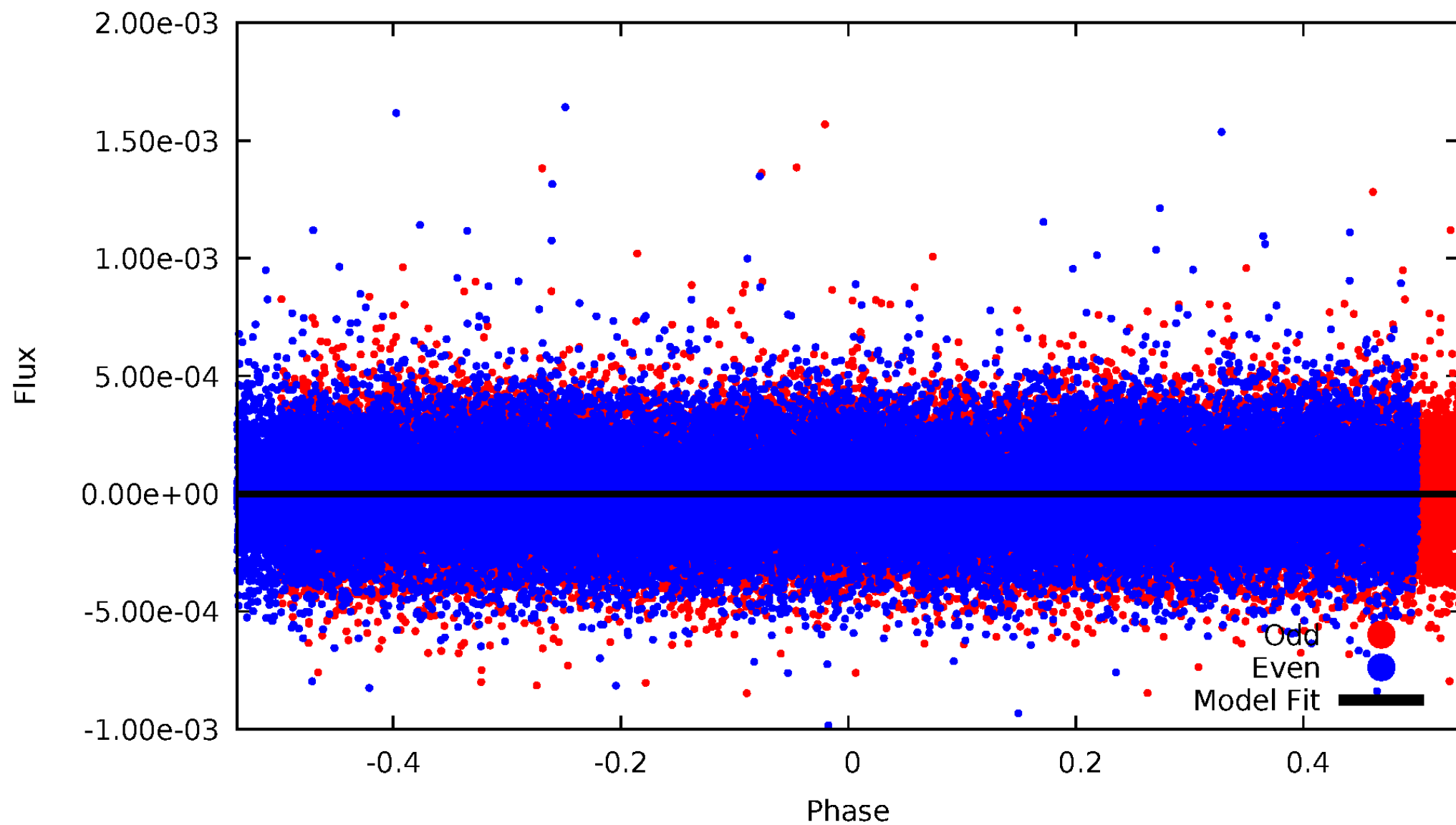
TCE 005302881-01





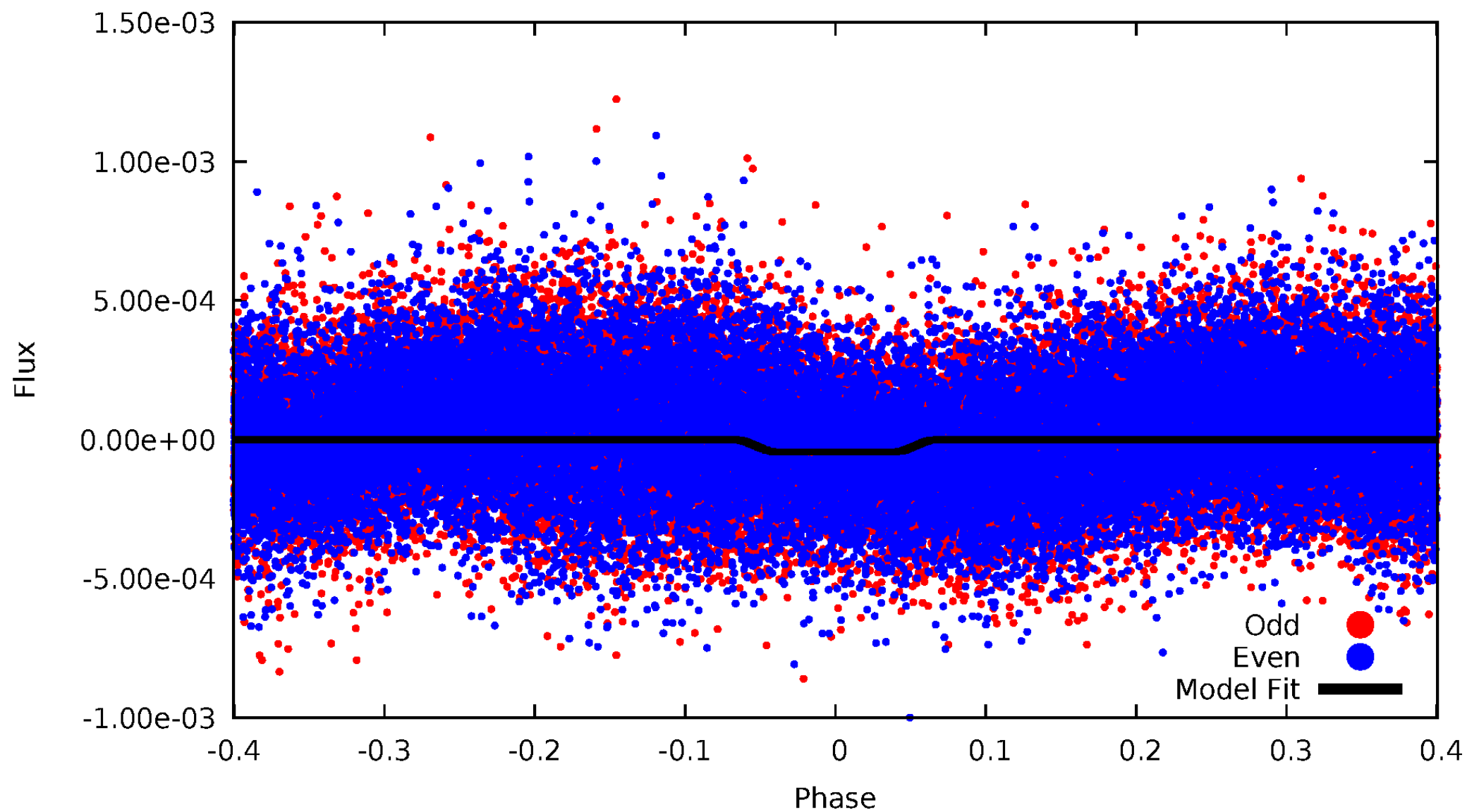
# DV Odd/Even

TCE 005302881-01

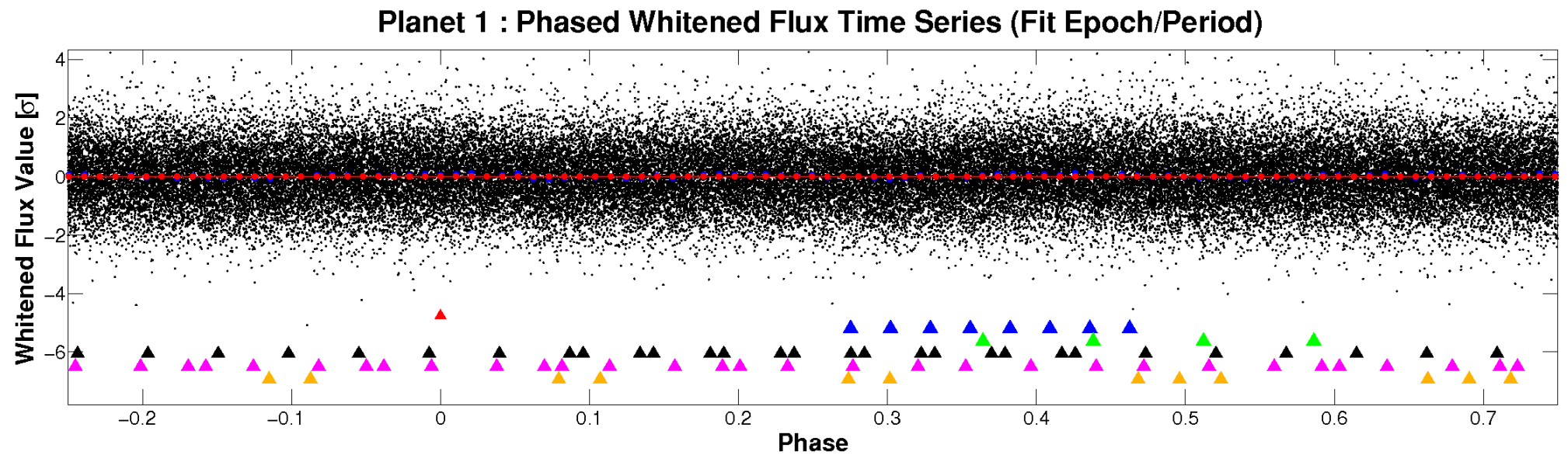
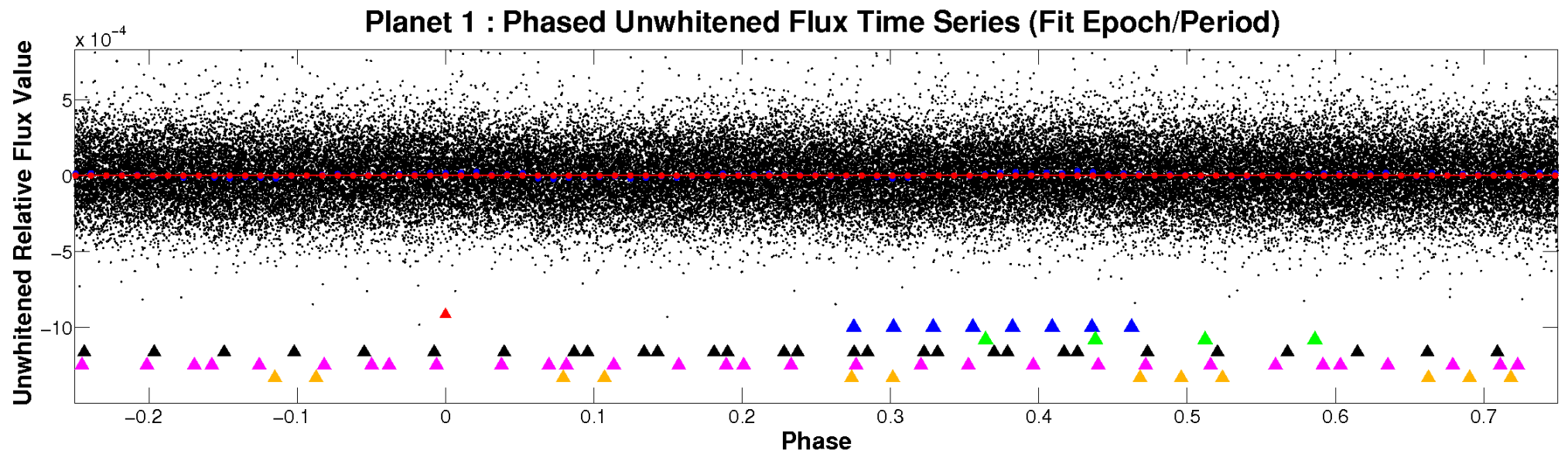


# ALT Odd/Even

TCE 005302881-01



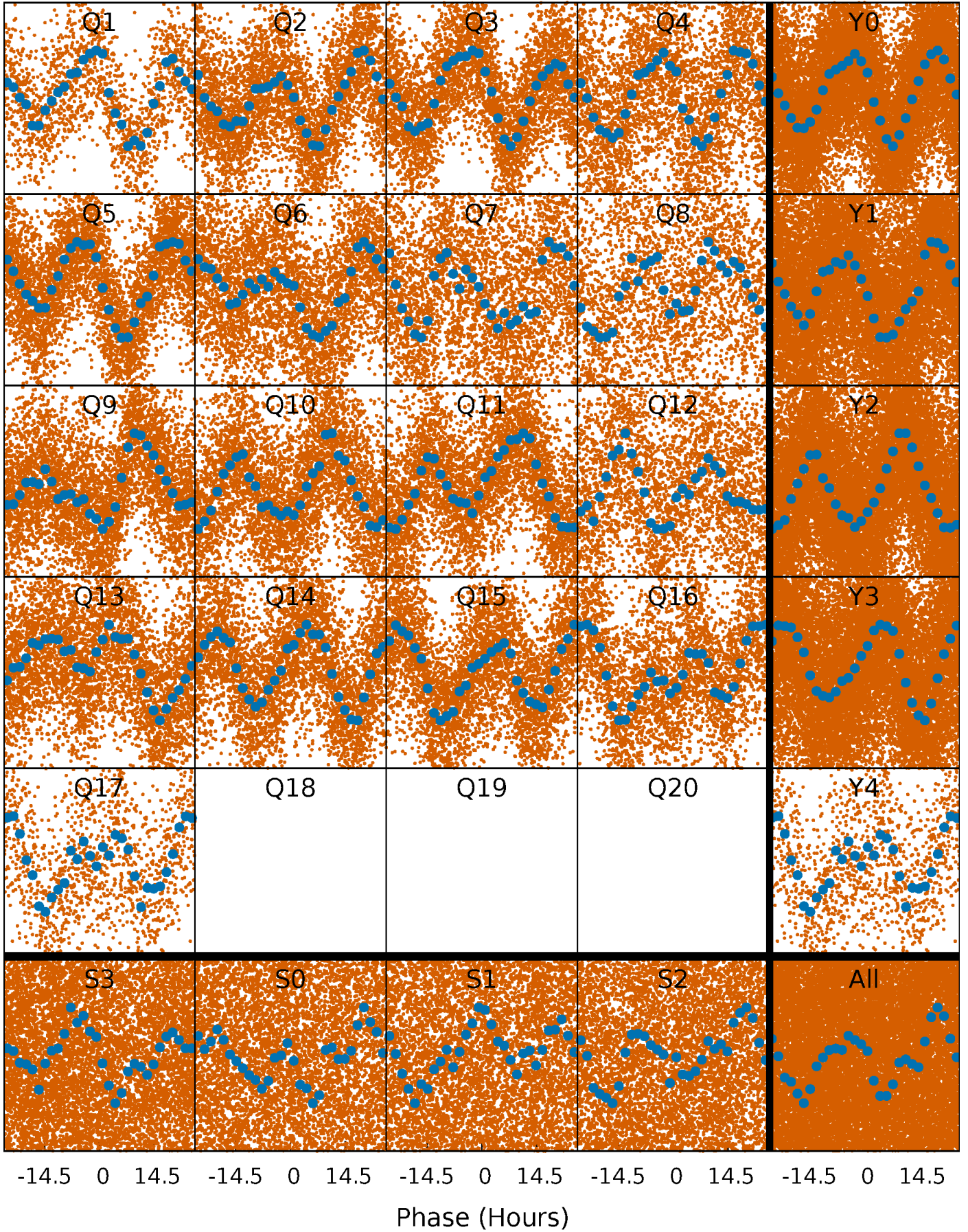
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

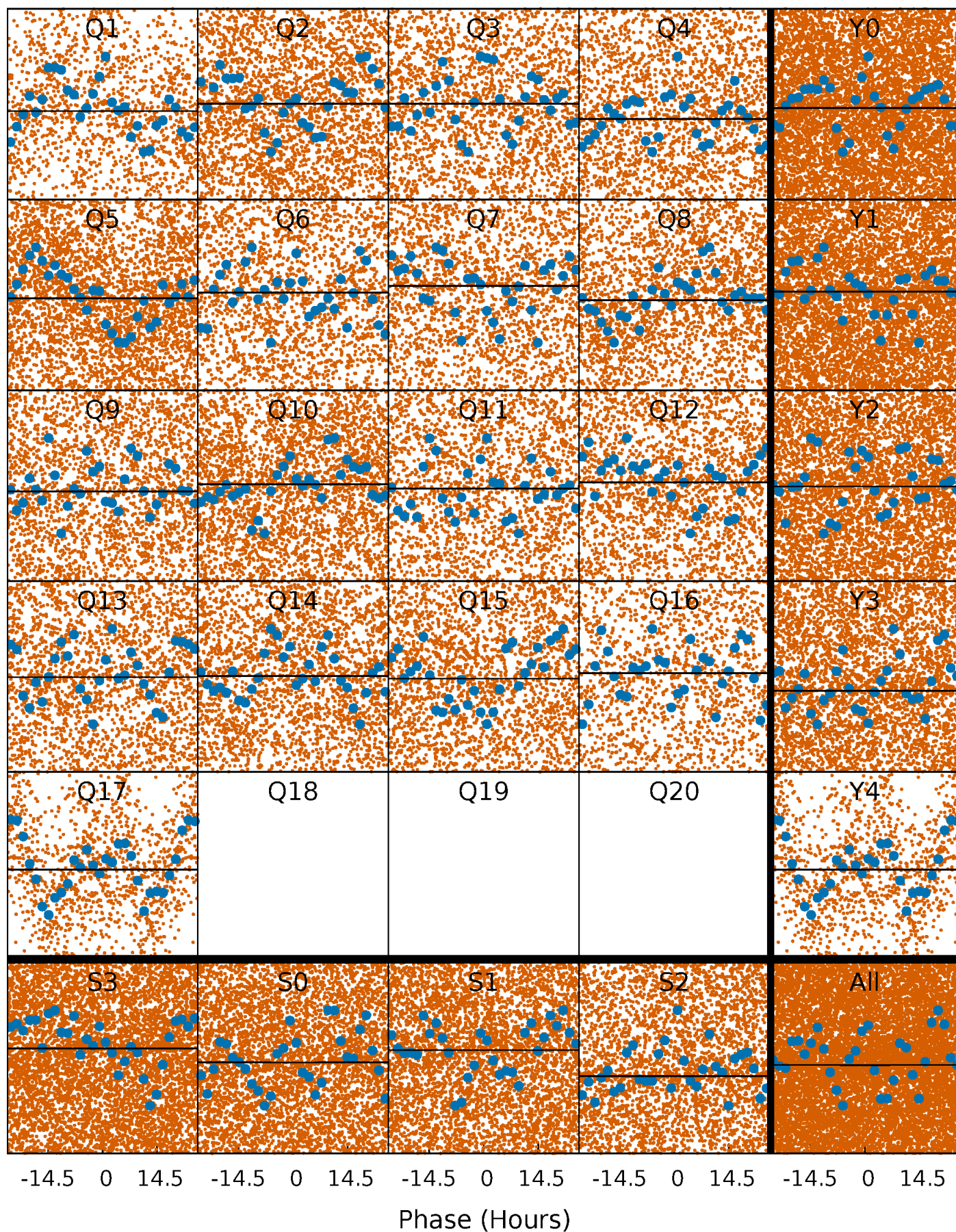
TCE 005302881-01 P= 1.966326 Days  $T_0=132.033929$  (BKJD)





## DV Quarter-Phased Transit Curves

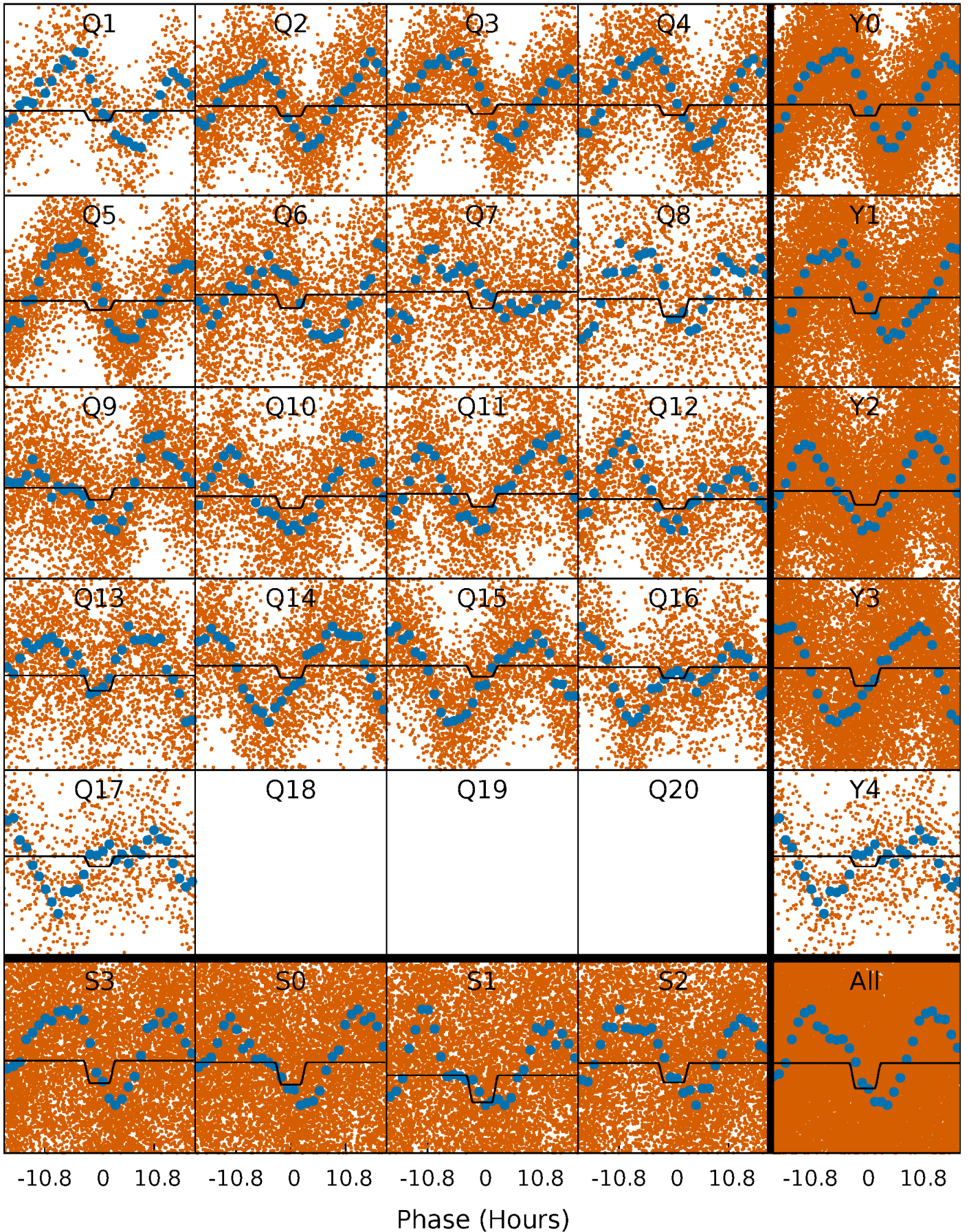
TCE 005302881-01    P= 1.966326 Days     $T_0=132.033929$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005302881-01   P= 1.965774 Days    $T_0=132.192339$  (BKJD)

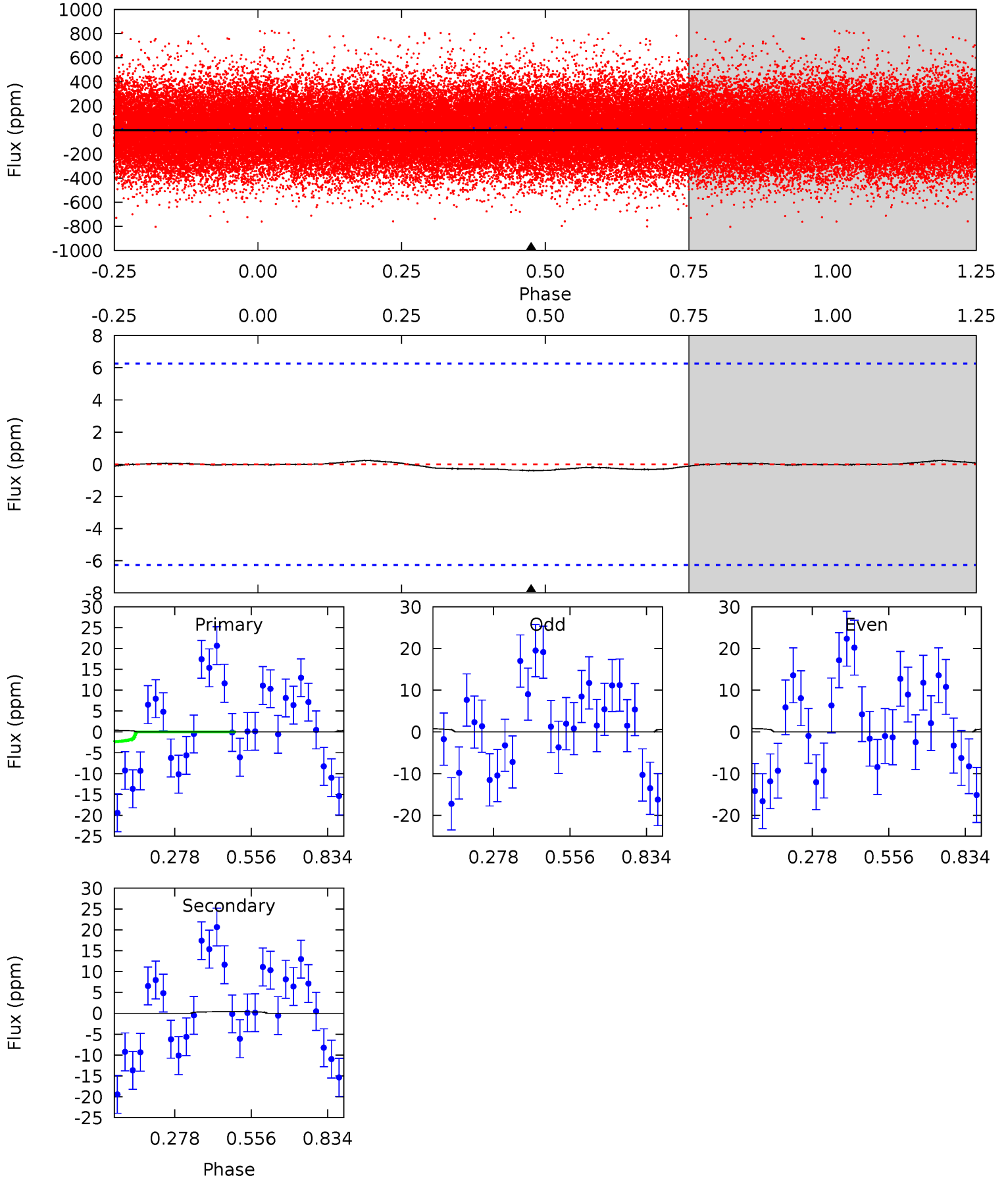




# DV Model-Shift Uniqueness Test

005302881-01, P = 1.966326 Days, E = 130.067603 Days

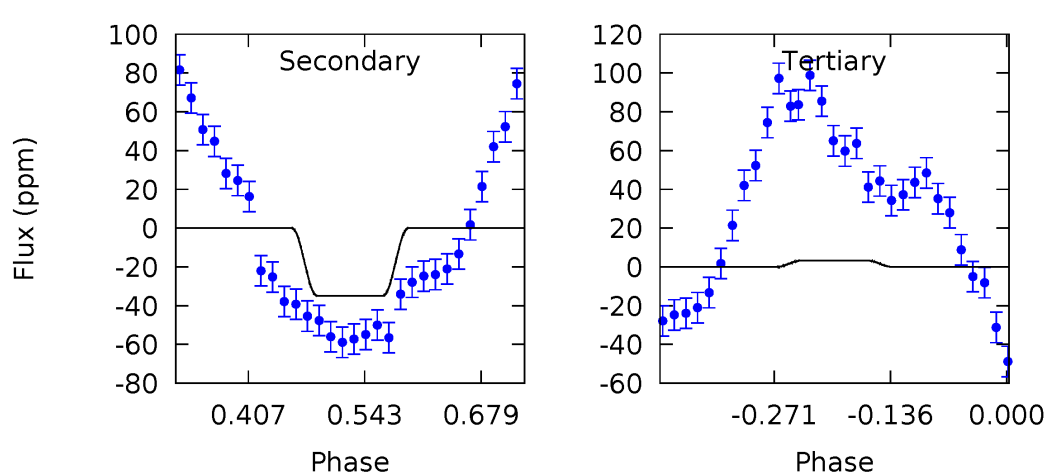
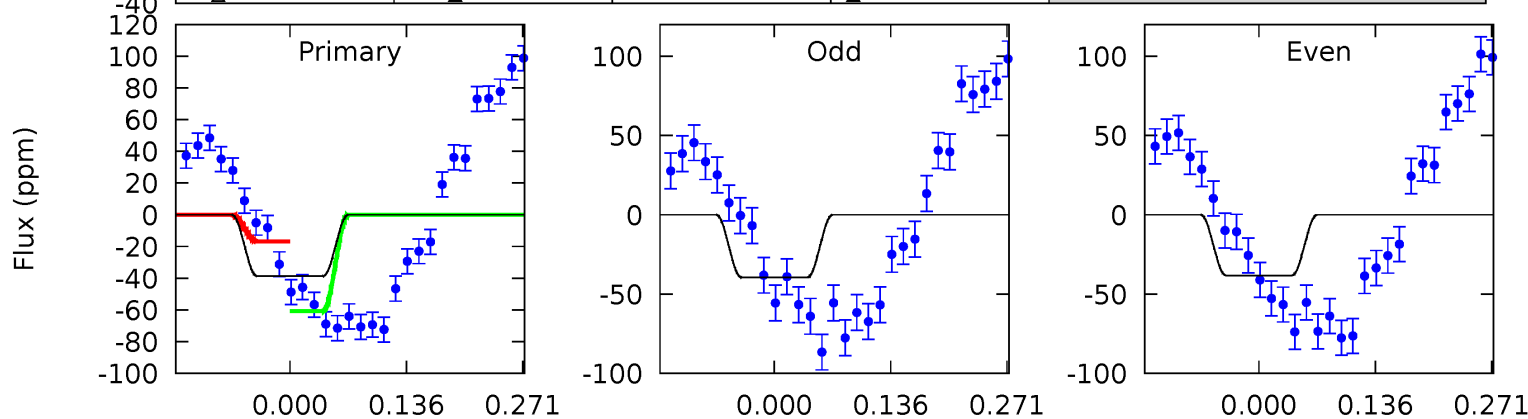
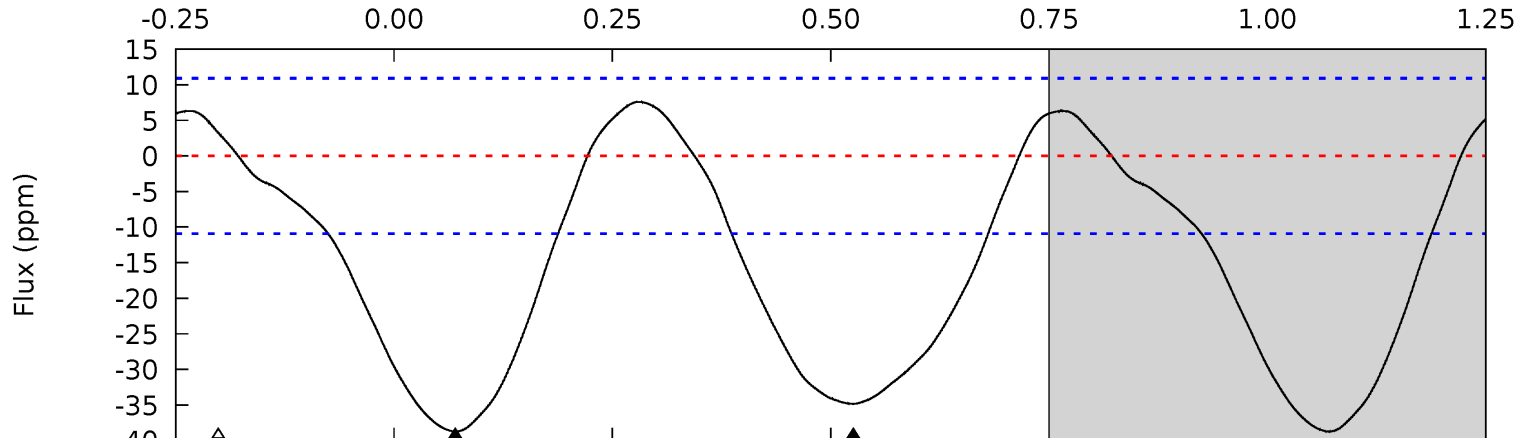
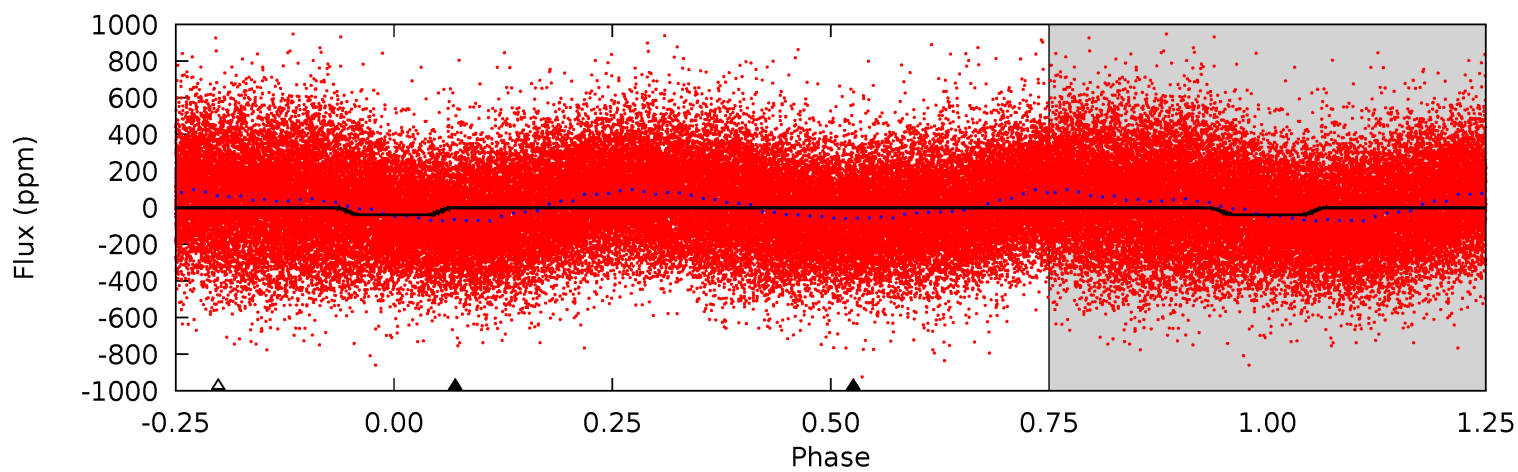
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.28	0.28	0	0	4.35	1.08	0.05	0.28	0.28	0.28	0.28	0.02	2.59	0.38	0.03



# Alt Model-Shift Uniqueness Test

005302881-01, P = 1.965774 Days, E = 130.226565 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
16.0	14.4	-1.34	0	4.50	1.49	2.56	17.3	16.0	15.7	14.4	0.25	1.03	0.16	9.15



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-0 \pm 1$	$3.03^{+3.95}_{-2.10}$	$4053^{+277}_{-425}$	$-3668^{+6488}_{-326}$	$0.014^{+0.340}_{-0.132}$
Alt.	$-35 \pm 2$	$4.65^{+4.27}_{-3.20}$	$4048^{+265}_{-389}$	$4402^{+3973}_{-1698}$	$1.165^{+10.088}_{-0.832}$

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



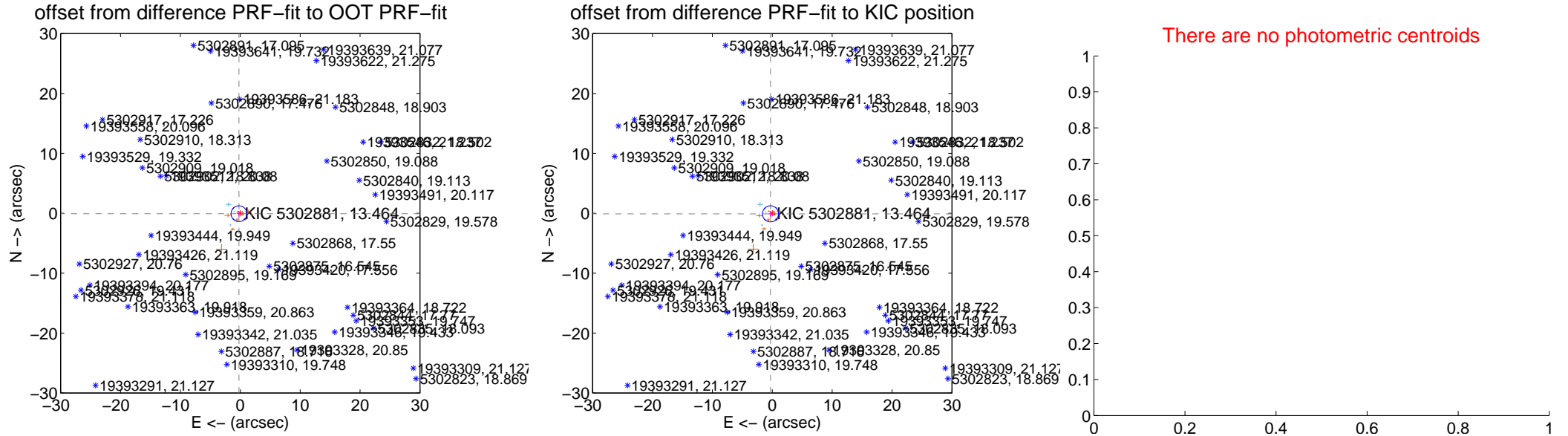
## DV Centroid Data

Supplemental centroid analysis for 005302881-01. Kepler magnitude: 13.46. Transit SNR 0.01

There are 4 quarters with good PRF difference image offsets

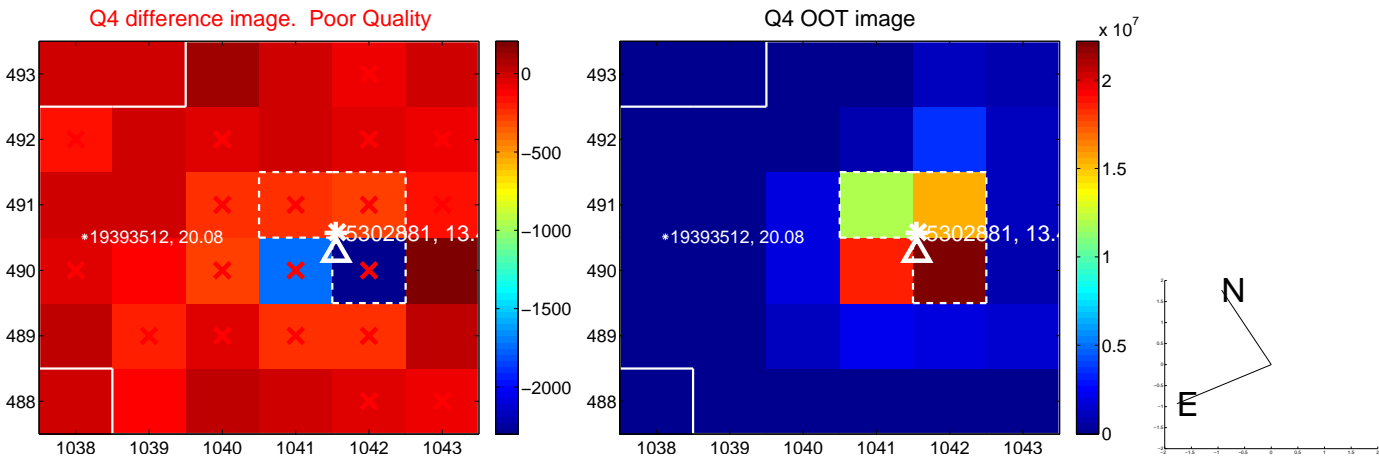
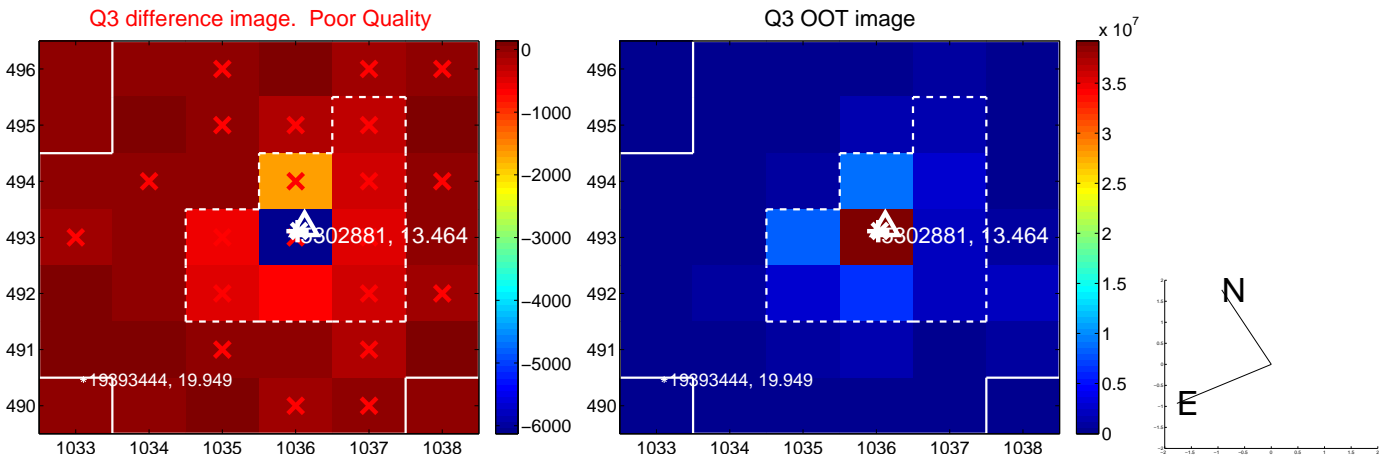
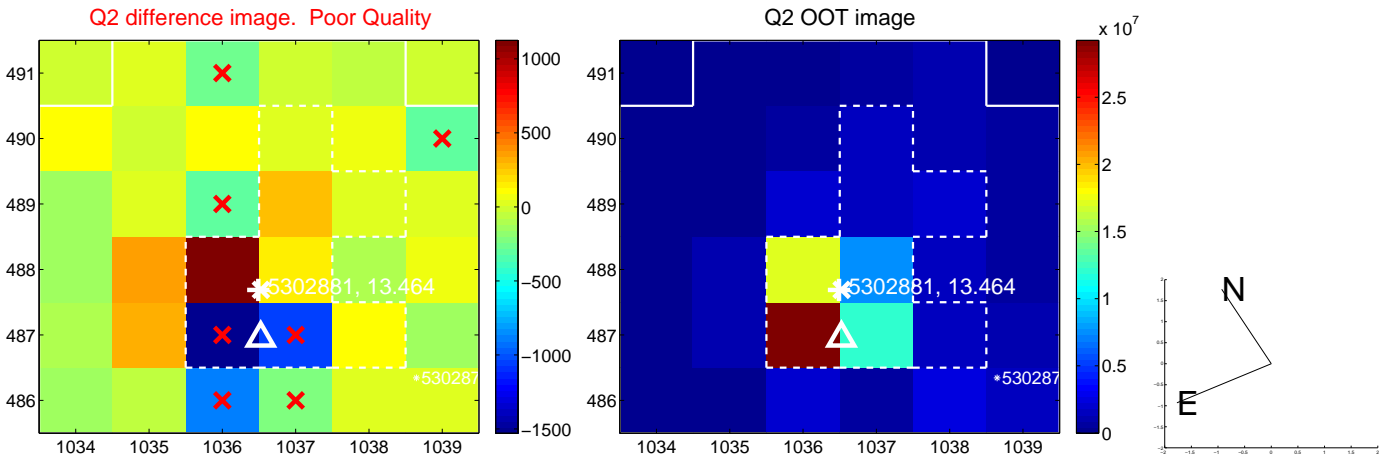
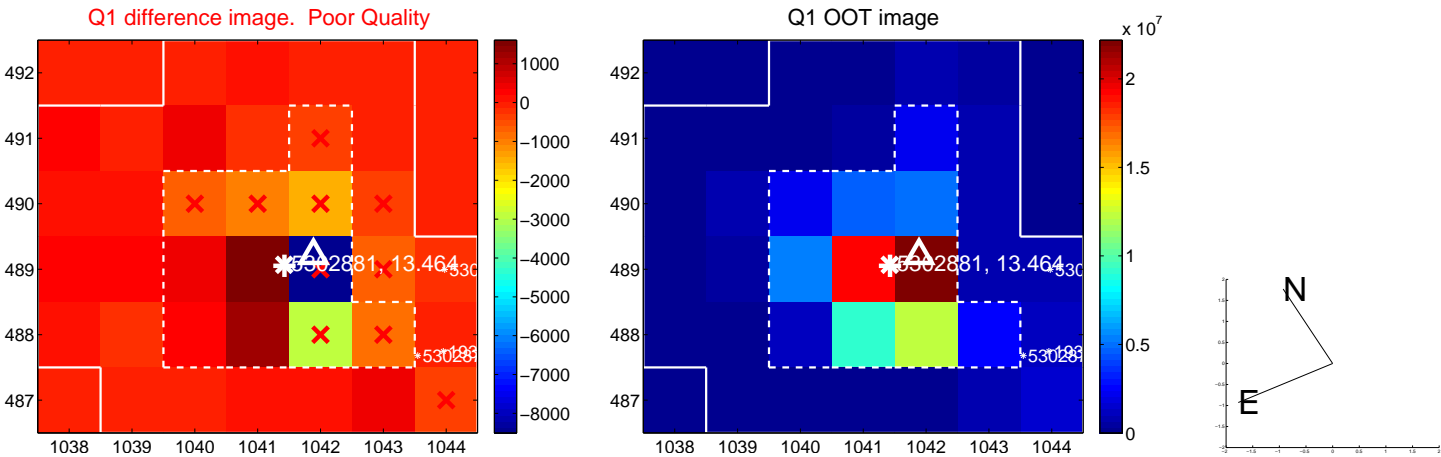
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.235 \pm 0.440$	0.53	$0.221 \pm 0.360$	$-0.079 \pm 0.481$
PRF-fit source offset from KIC position	$0.308 \pm 0.449$	0.69	$0.291 \pm 0.379$	$-0.100 \pm 0.468$
photometric centroid source offset	—	—	—	—

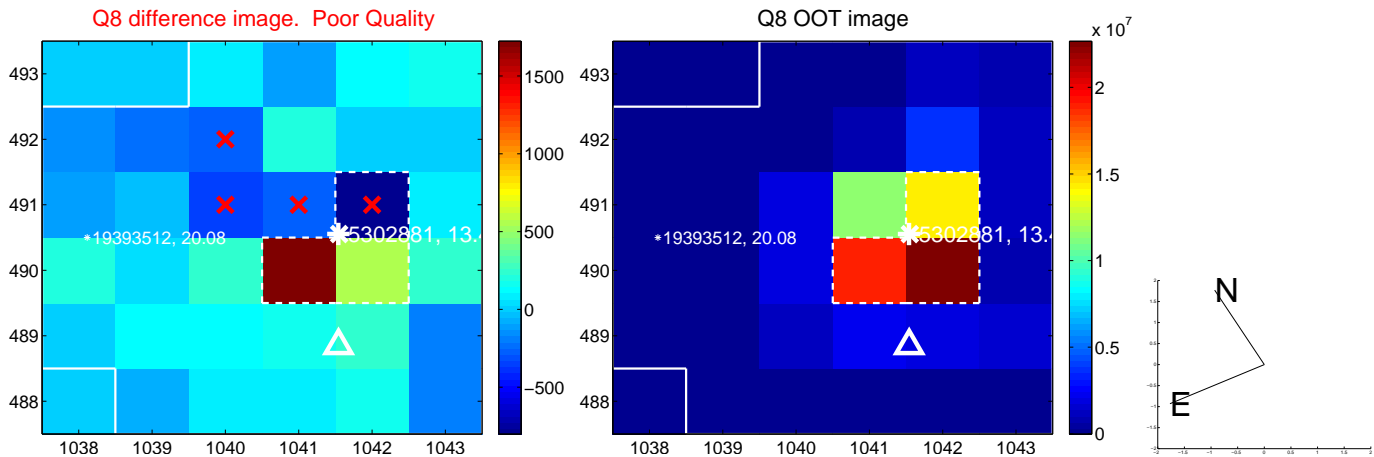
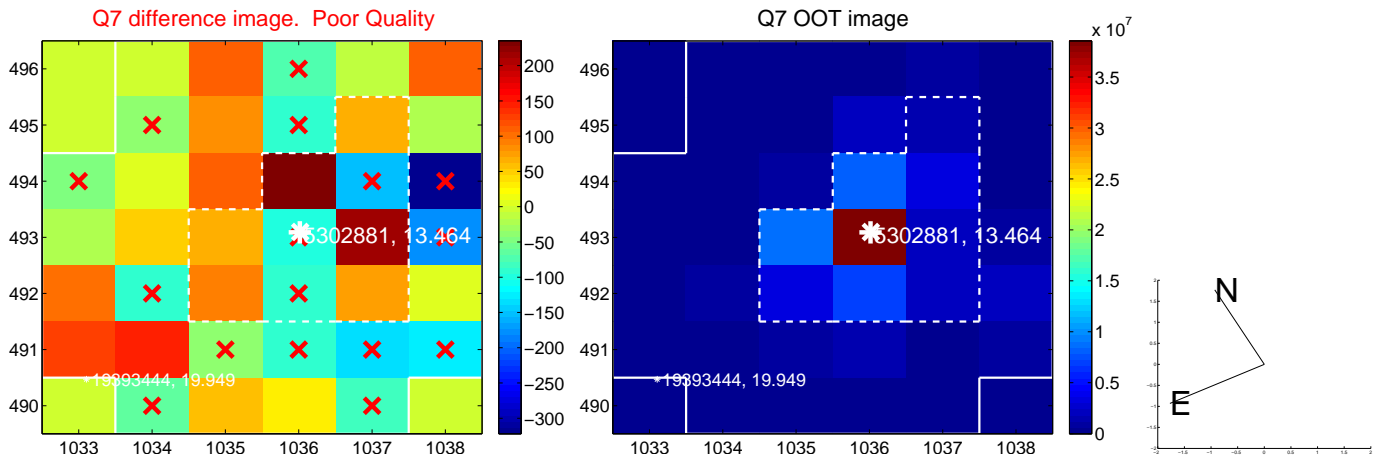
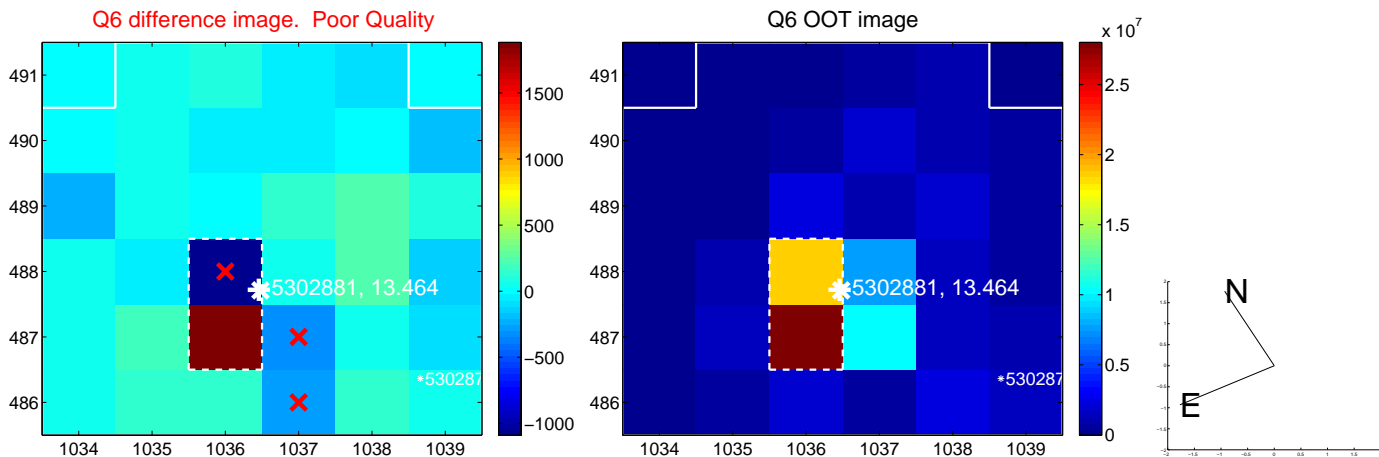
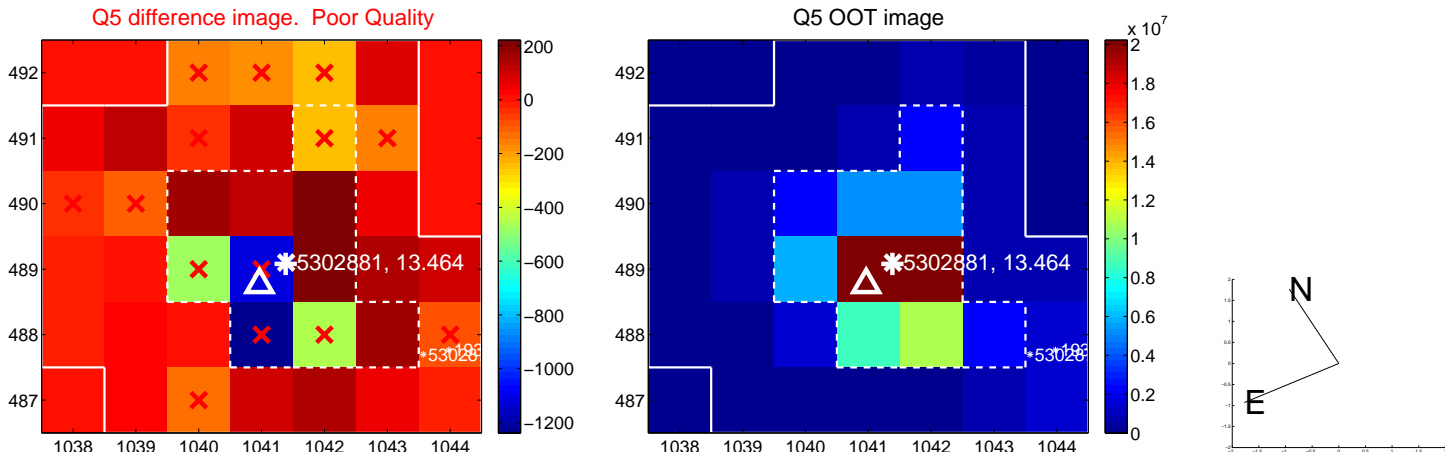


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

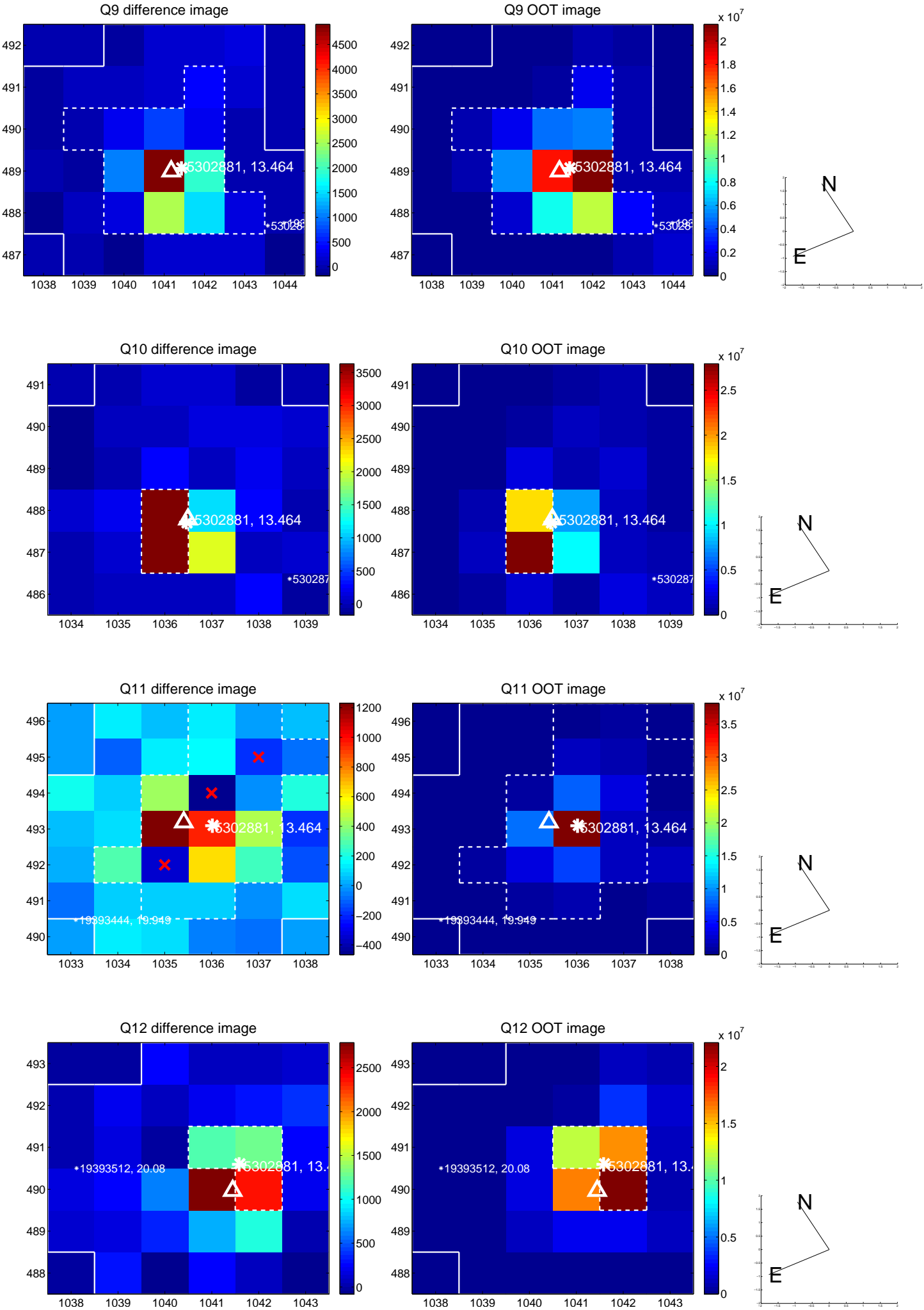


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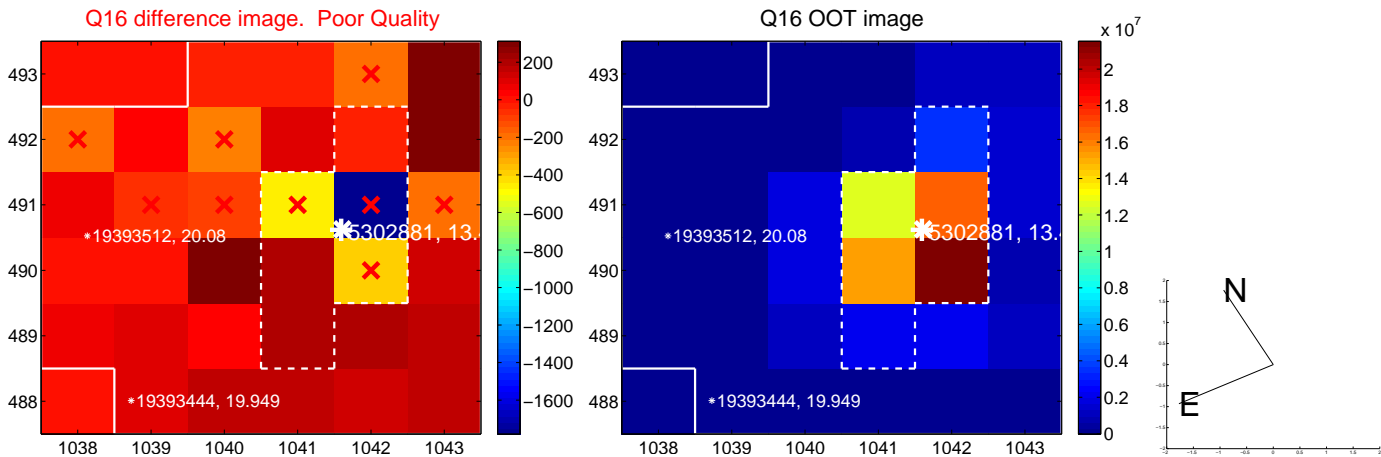
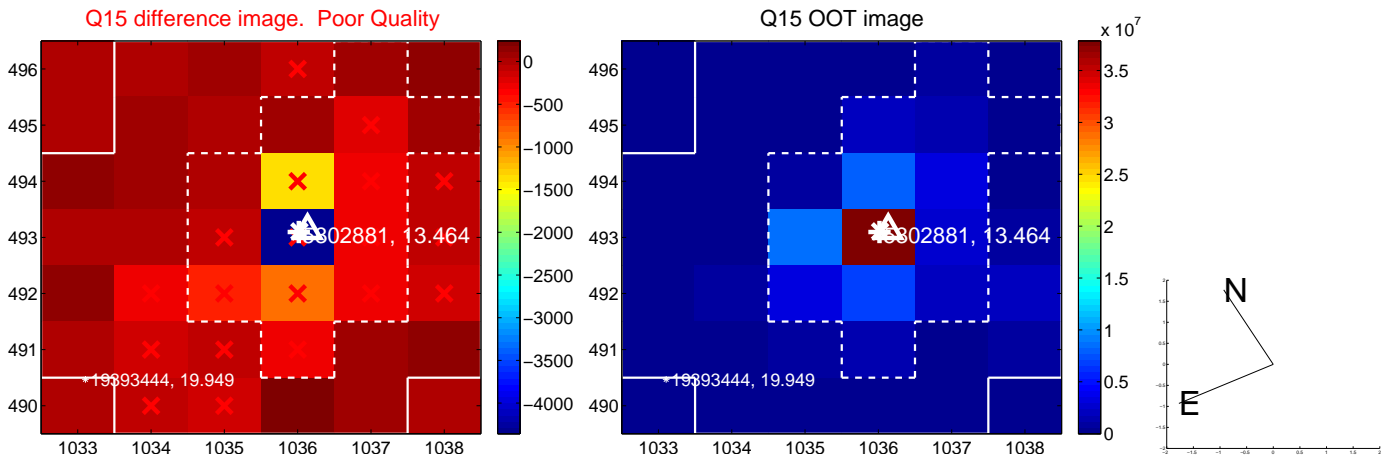
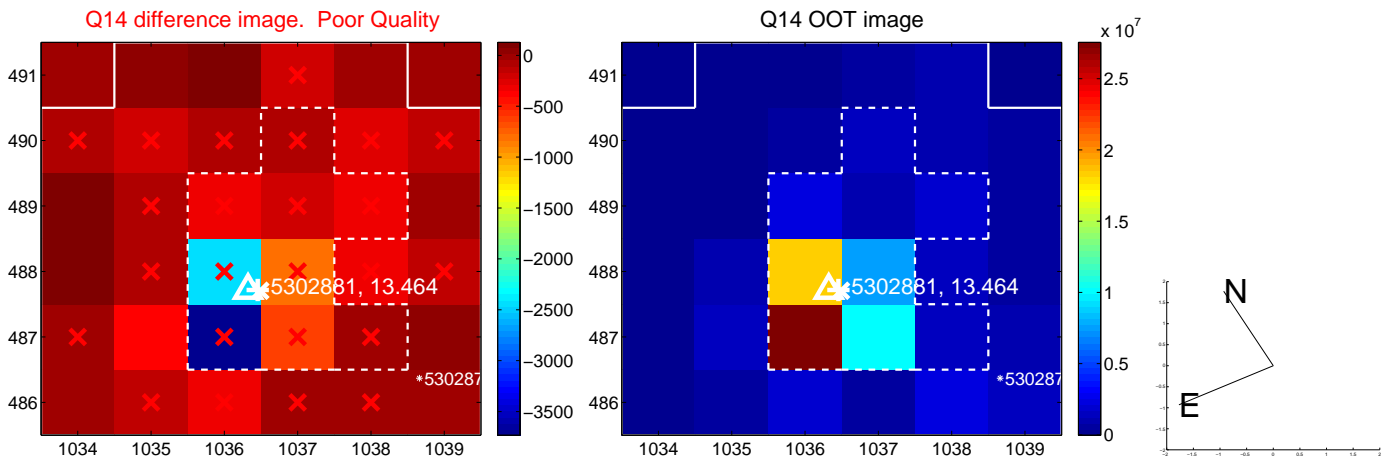
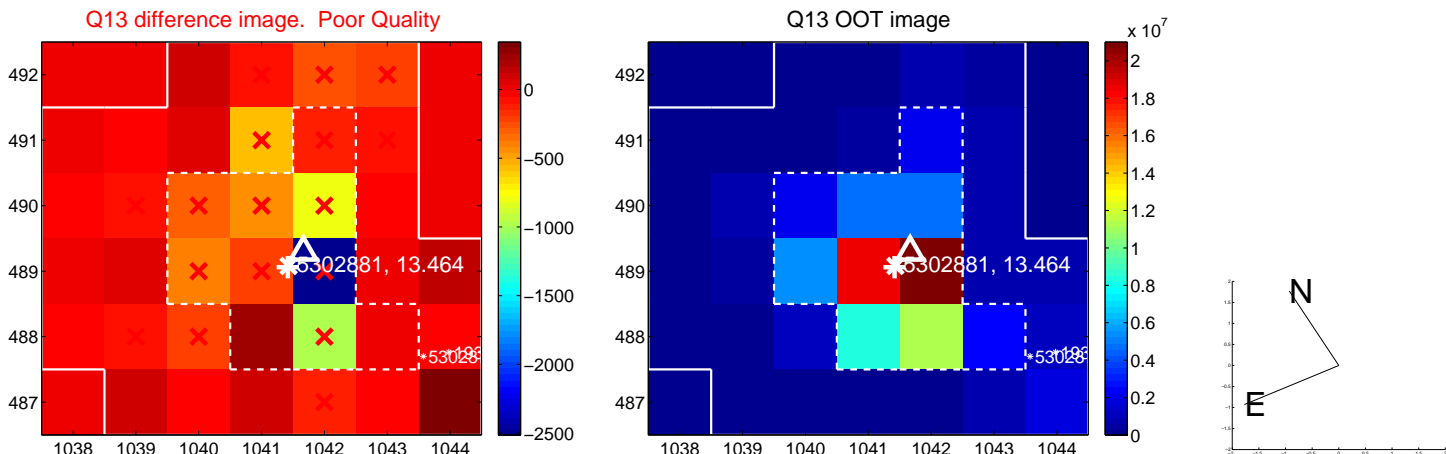




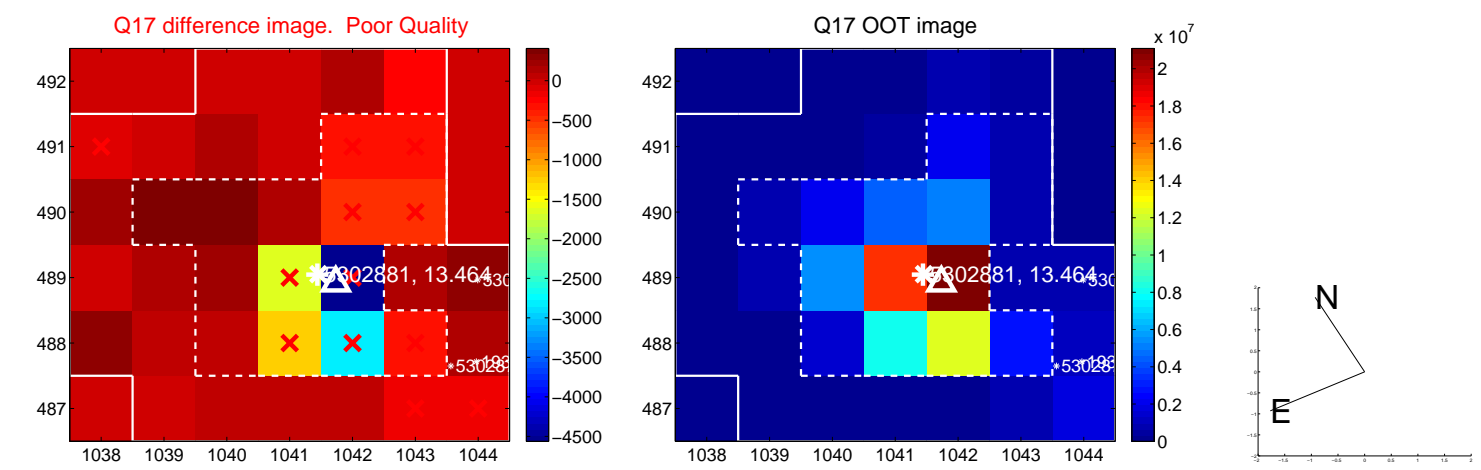
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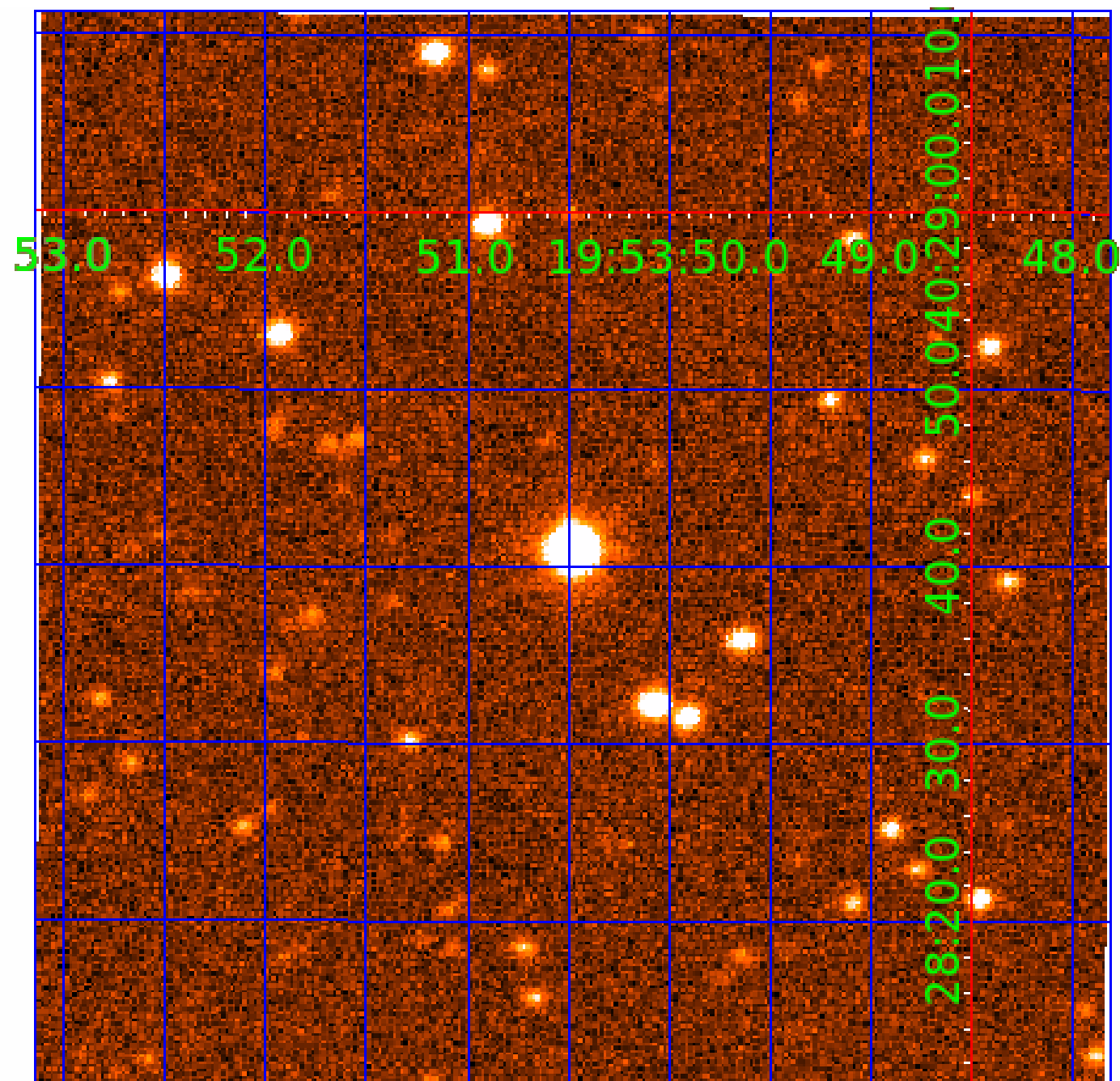
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
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005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

**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.

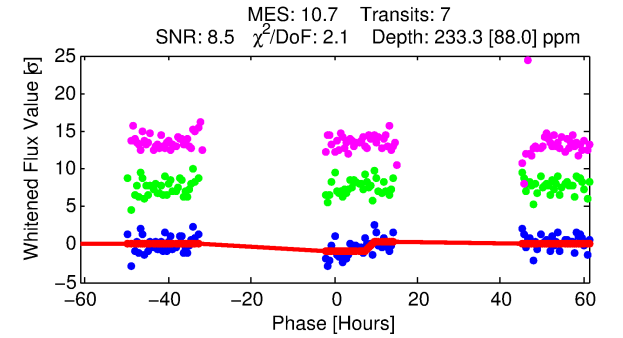
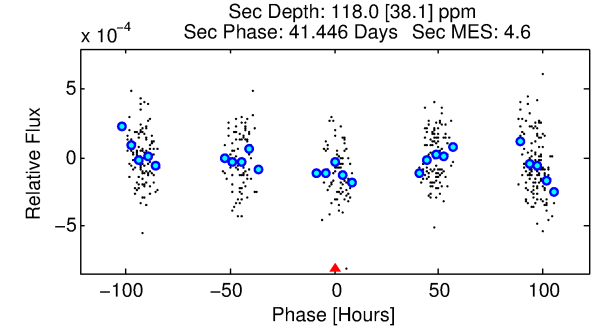
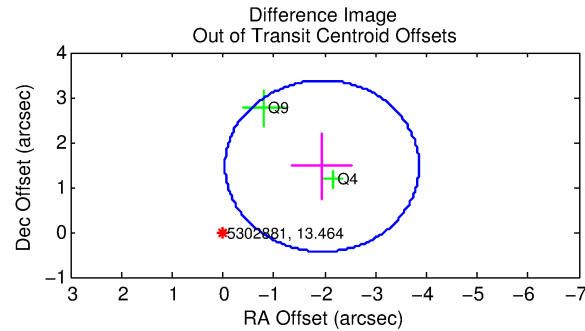
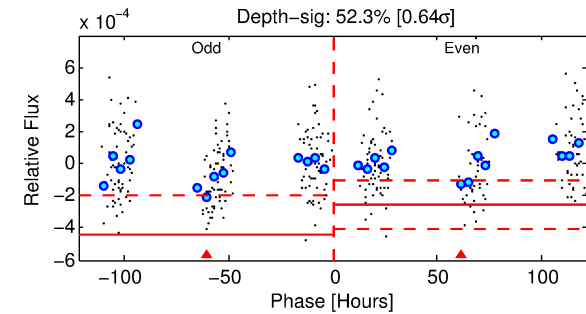
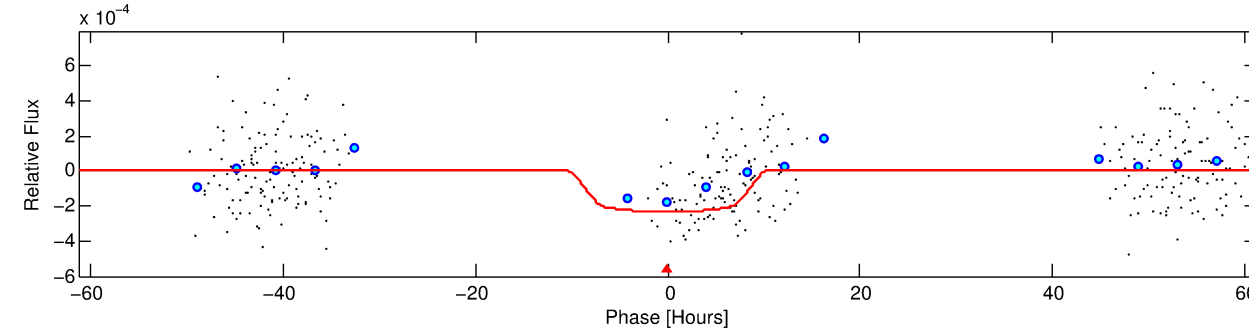
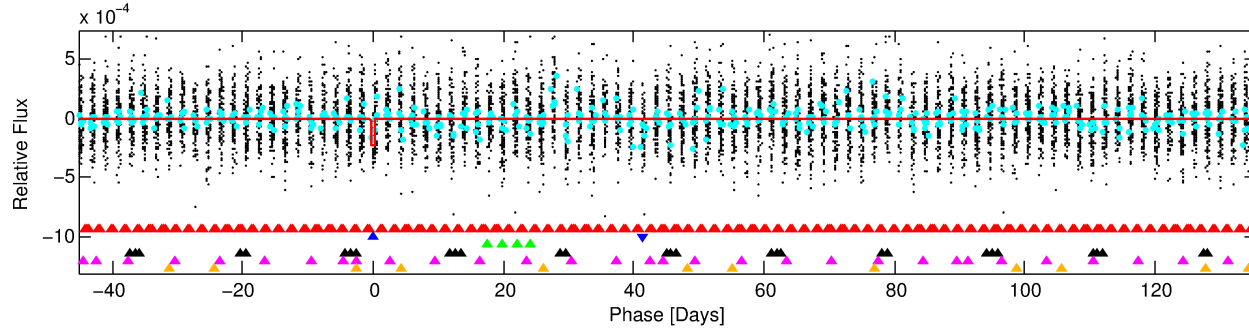
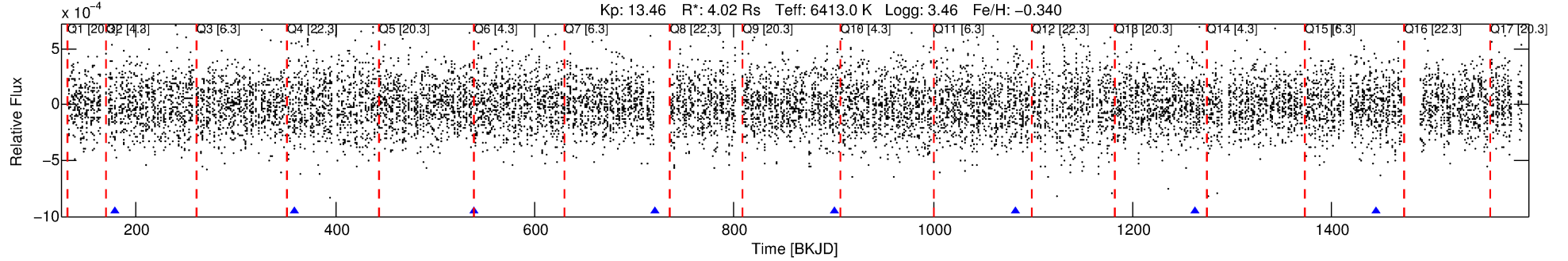
## Ephemeris Match Information For 005302881-02

No Significant Match Found



# DV One-Page Summary

KIC: 5302881 Candidate: 2 of 6 Period: 180.849 d



## DV Fit Results:

Period = 180.84940 [0.01664] d  
Epoch = 178.1690 [0.3261] BKJD  
Rp/R\* = 0.0173 [0.0033]  
a/R\* = 24.34 [20.74]  
b = 0.95 [0.05]  
Seff = 43.96 [29.41]  
Teq = 657 [110] K  
Rp = 7.61 [3.63] Re  
a = 0.7468 [0.3101] AU  
Ag = 625.60 [515.68] [1.21 $\sigma$ ]  
Teffp = 5077 [648] K [6.72 $\sigma$ ]

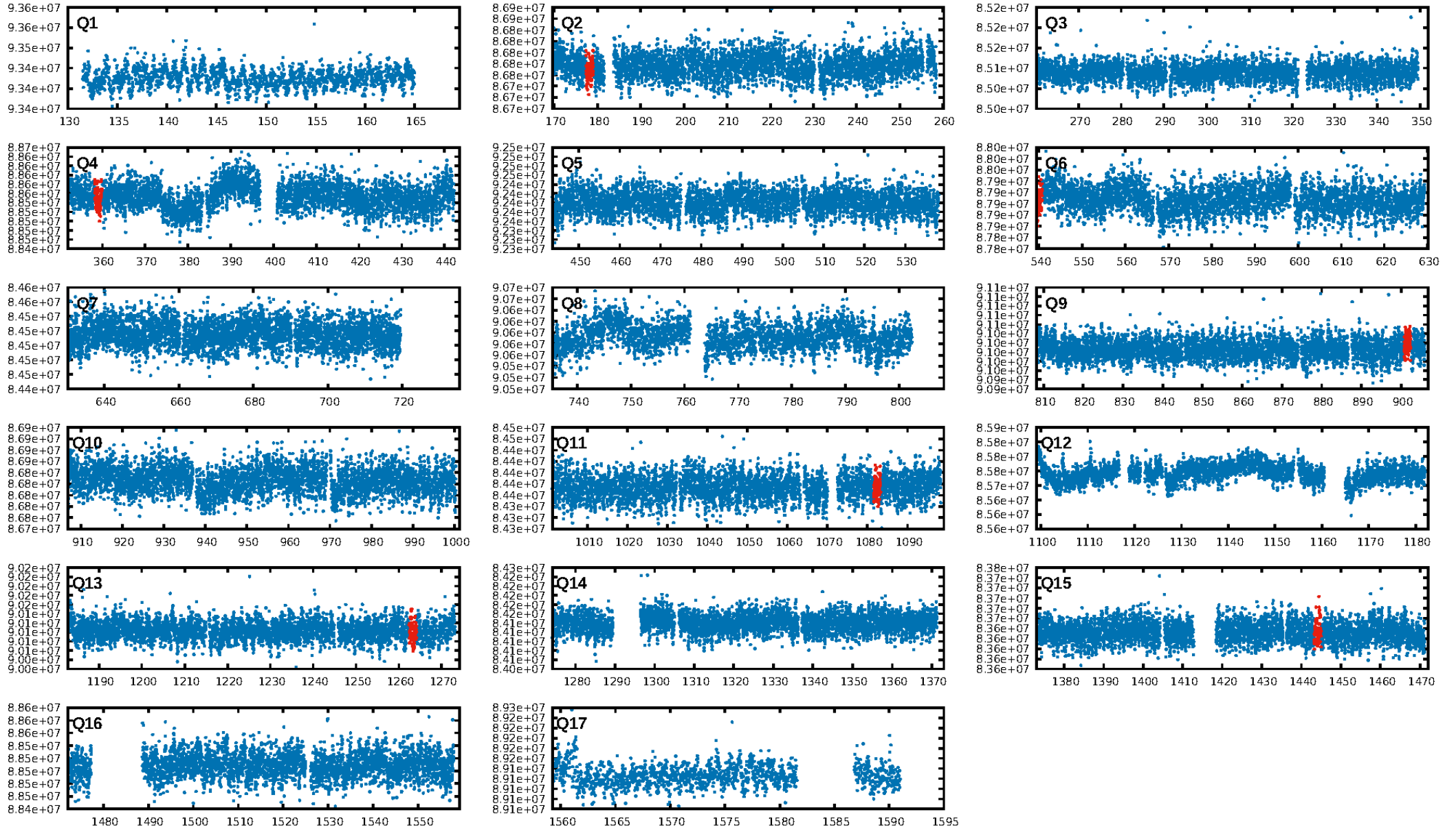
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [53.02 $\sigma$ ]  
LongPeriod-sig: 100.0% [190.21 $\sigma$ ]  
ModelChiSquare2-sig: 1.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.66e-14  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 4.372  
Centroid-sig: 0.1%  
Centroid-so: 1.561 arcsec [1.51 $\sigma$ ]  
OotOffset-rm: 2.440 arcsec [3.84 $\sigma$ ]  
KicOffset-rm: 2.341 arcsec [3.77 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/5]

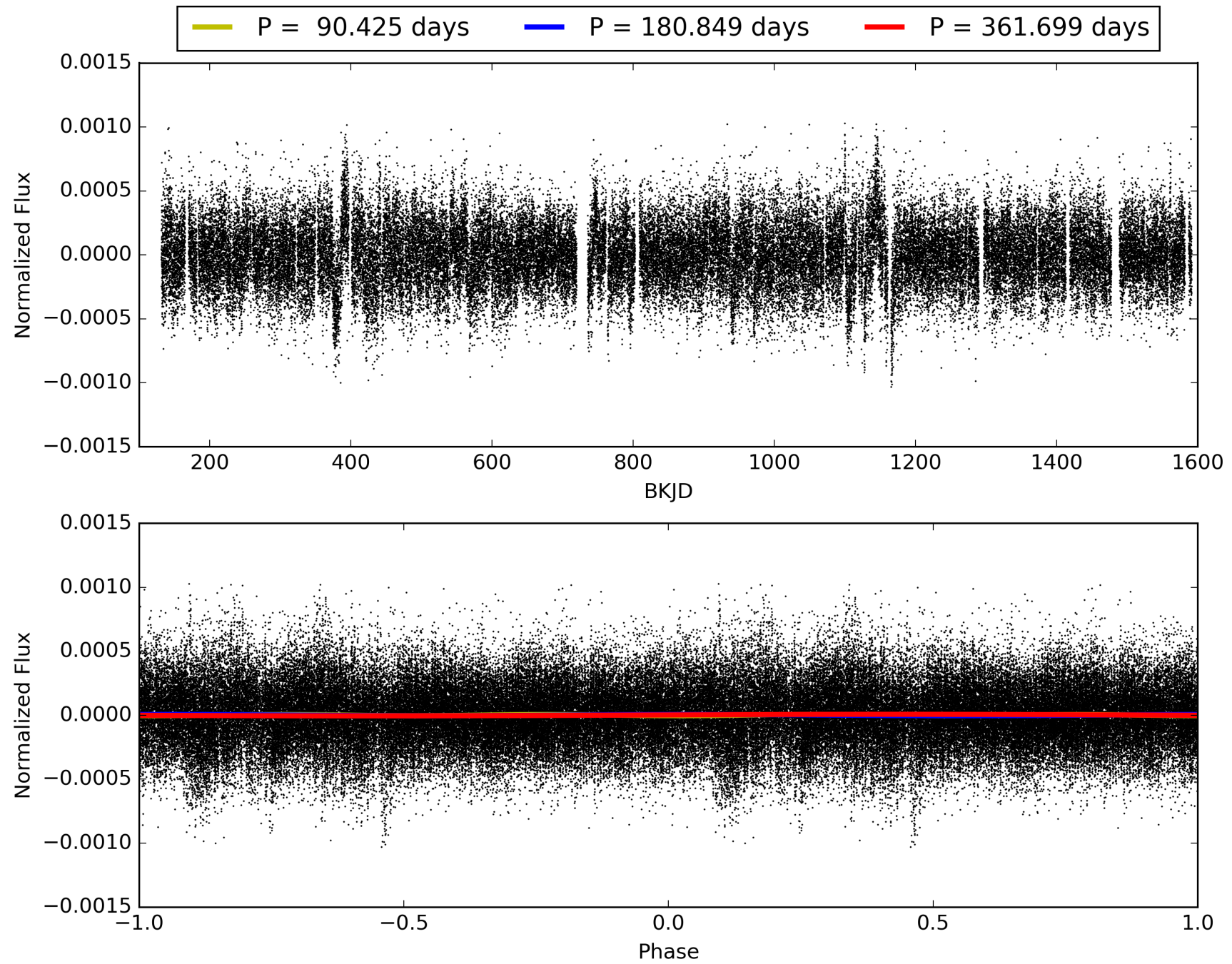
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:39 Z

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

# TCE 005302881-02, PDC Light Curves

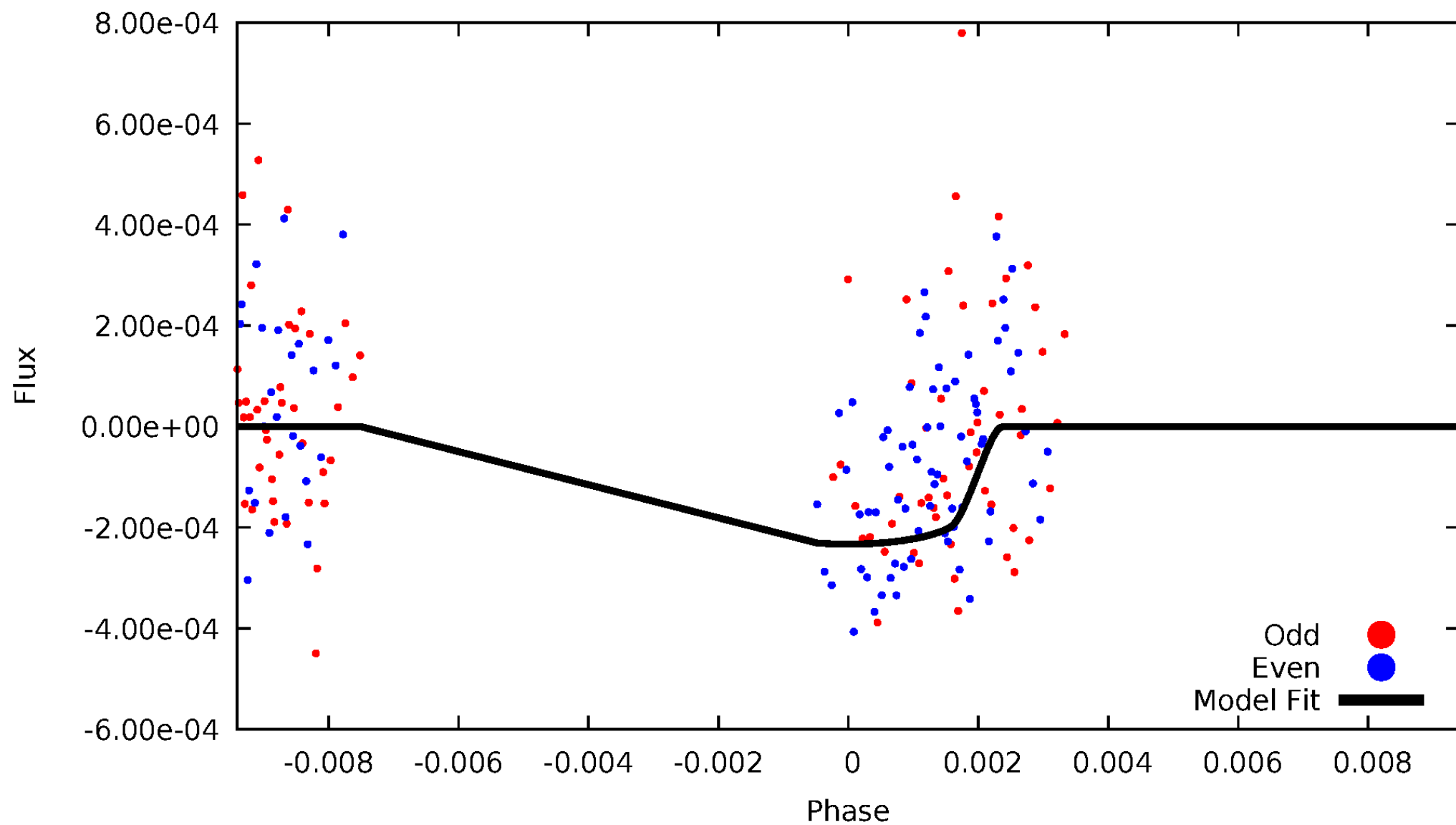


TCE 005302881-02



# DV Odd/Even

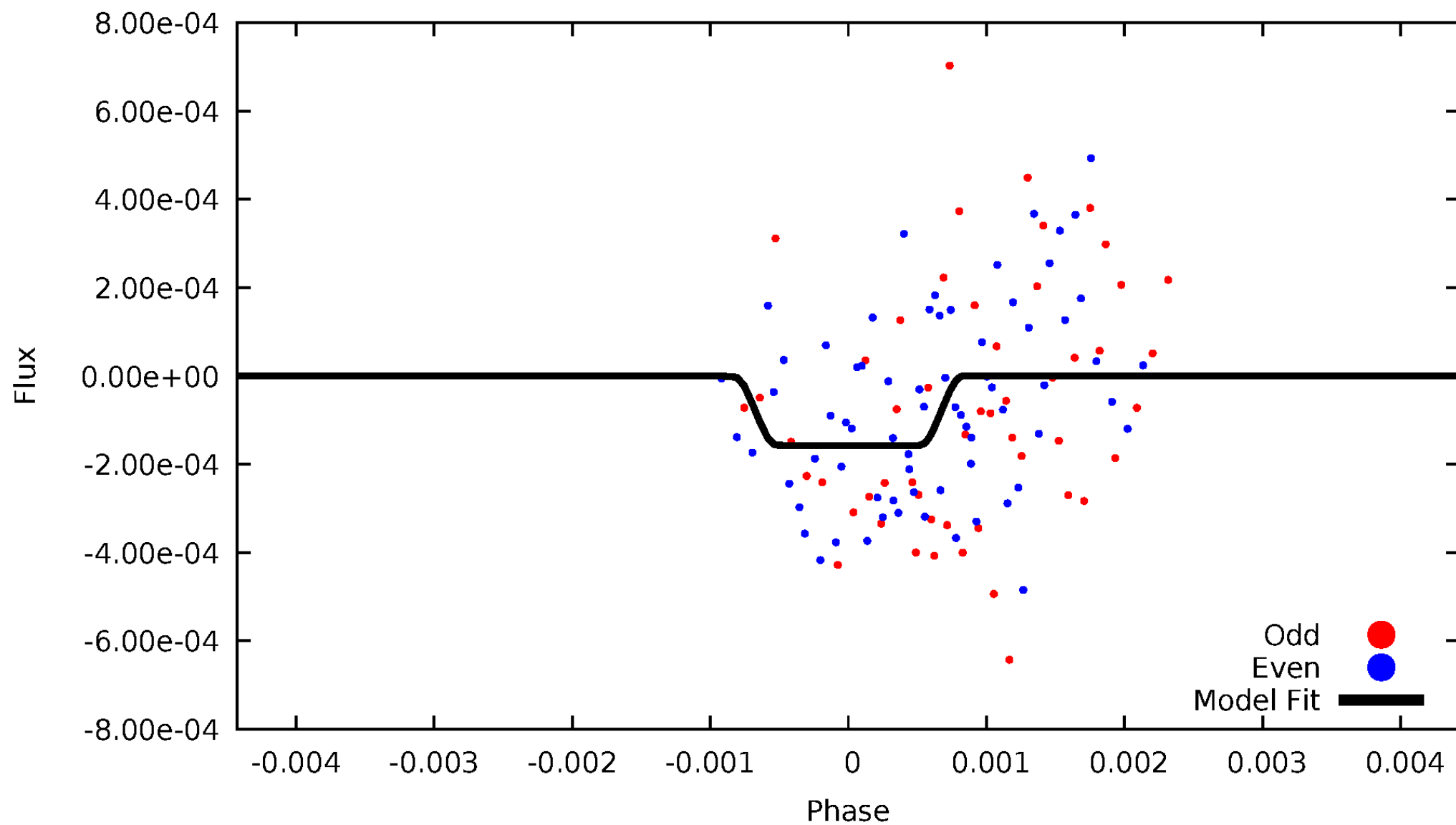
TCE 005302881-02





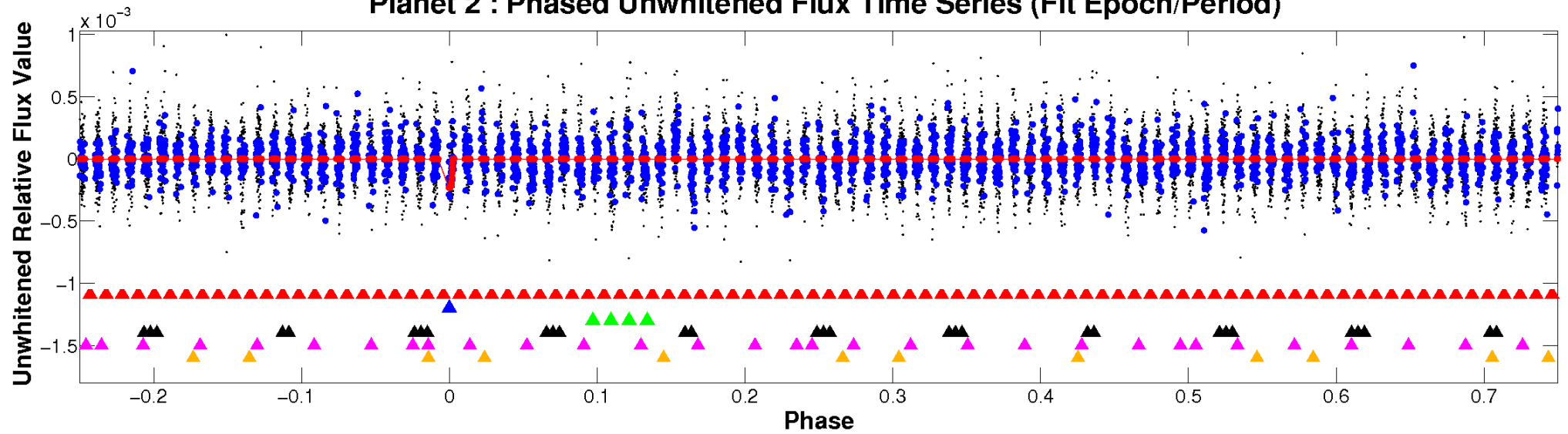
# ALT Odd/Even

TCE 005302881-02

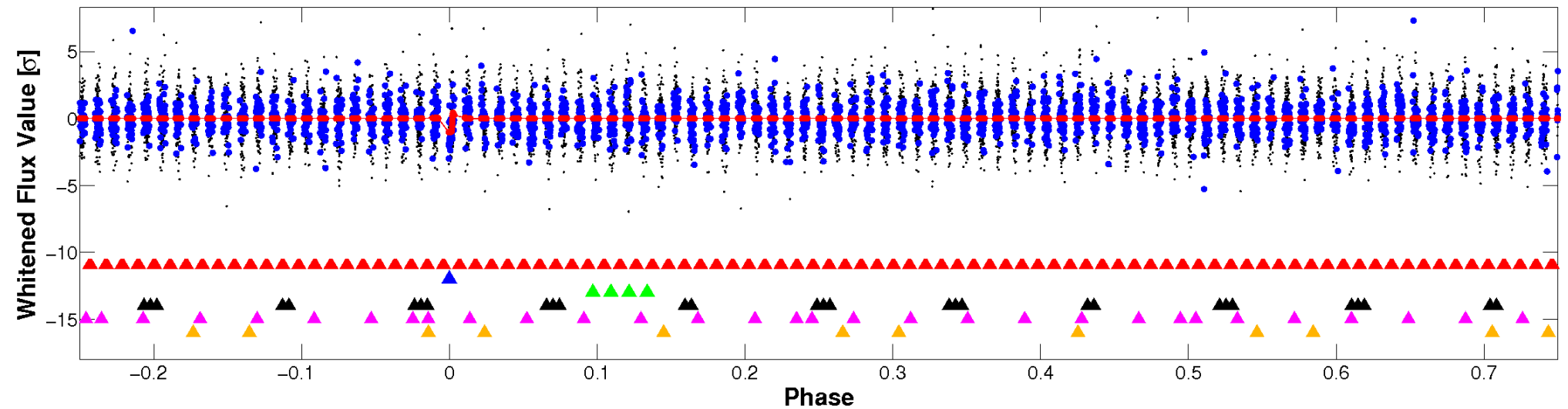


# Non-Whitened Vs. Whitened Light Curve

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

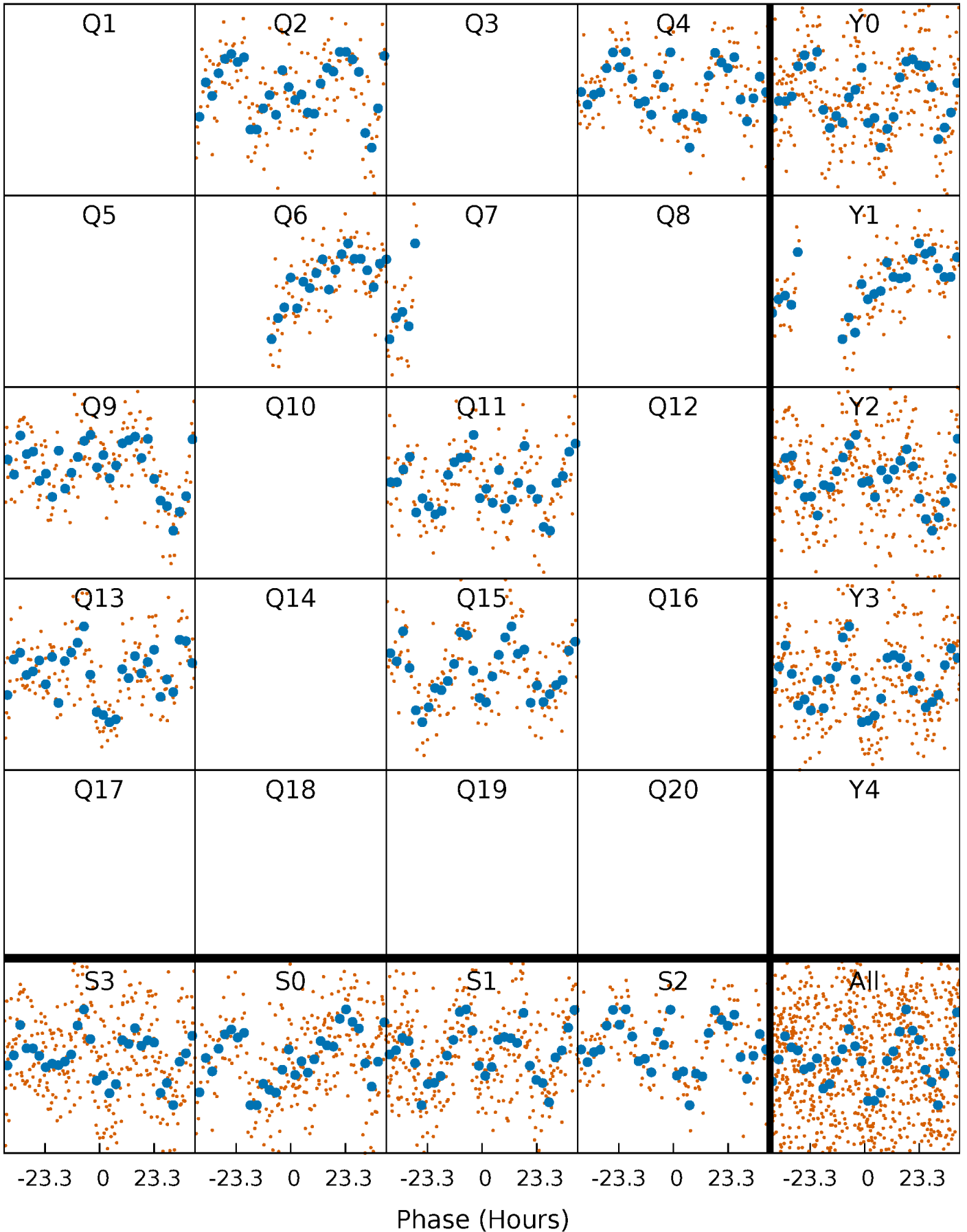


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



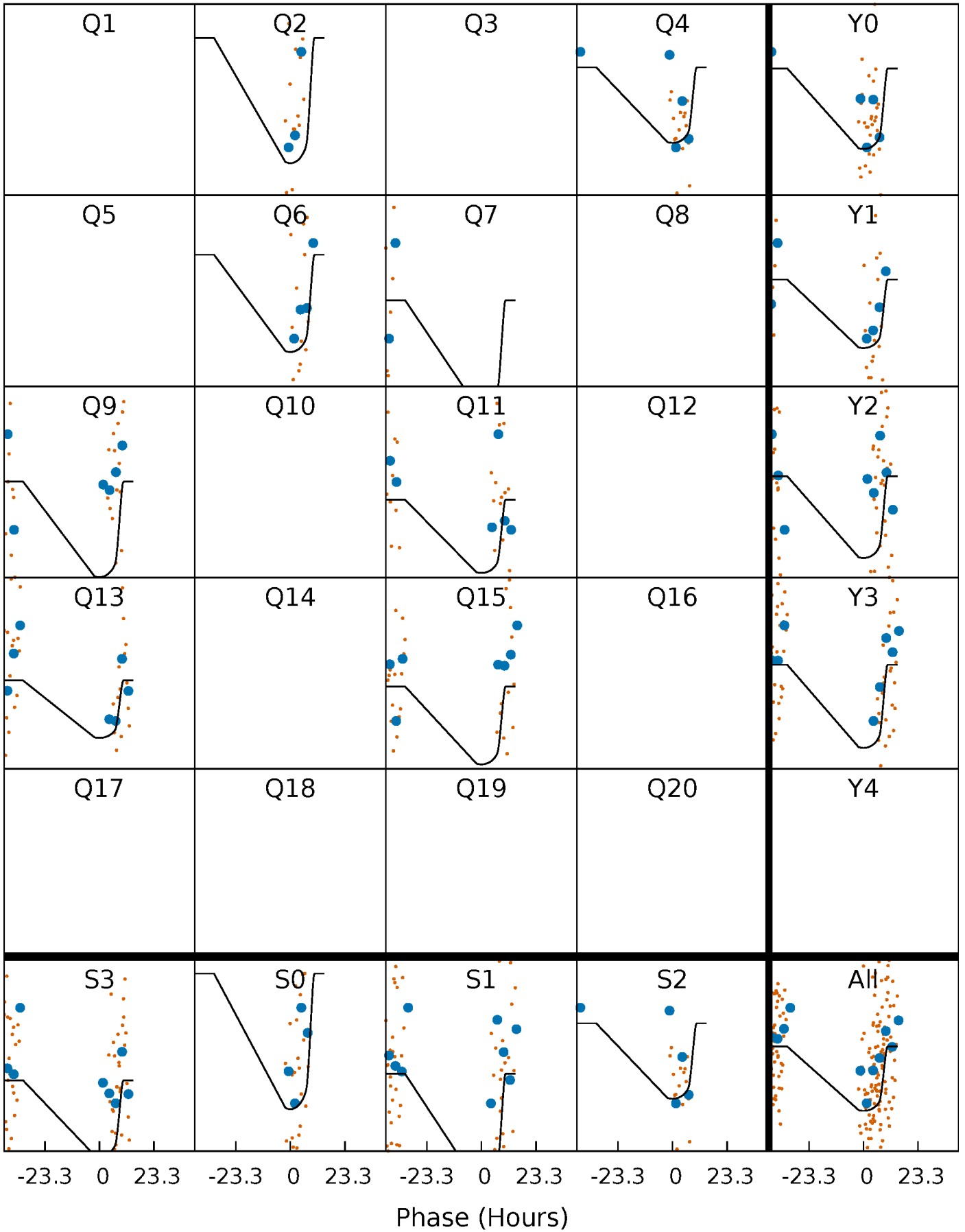
# PDC Quarter-Phased Transit Curves

TCE 005302881-02     $P=180.849404$  Days     $T_0=178.169022$  (BKJD)



# DV Quarter-Phased Transit Curves

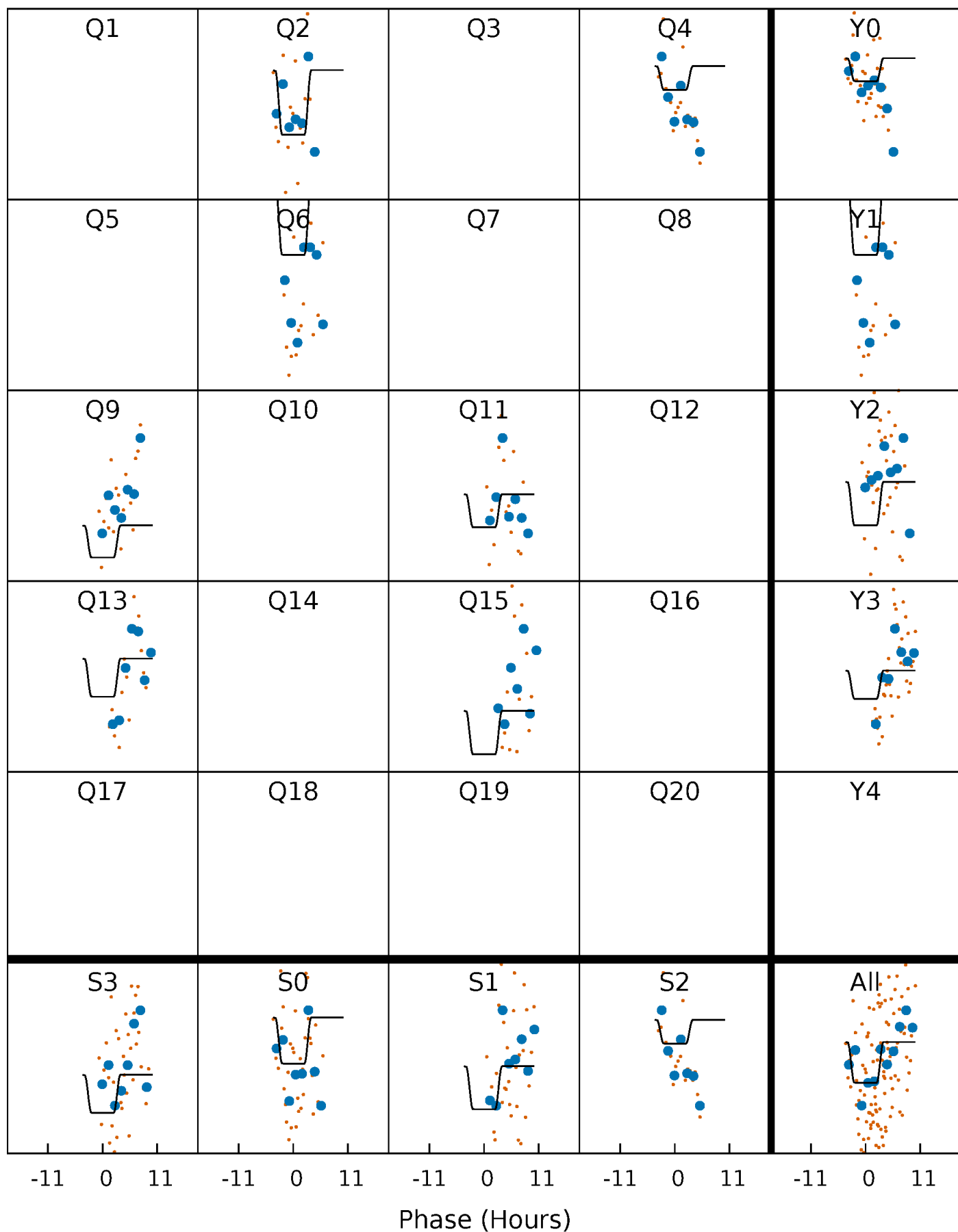
TCE 005302881-02     $P=180.849404$  Days     $T_0=178.169022$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

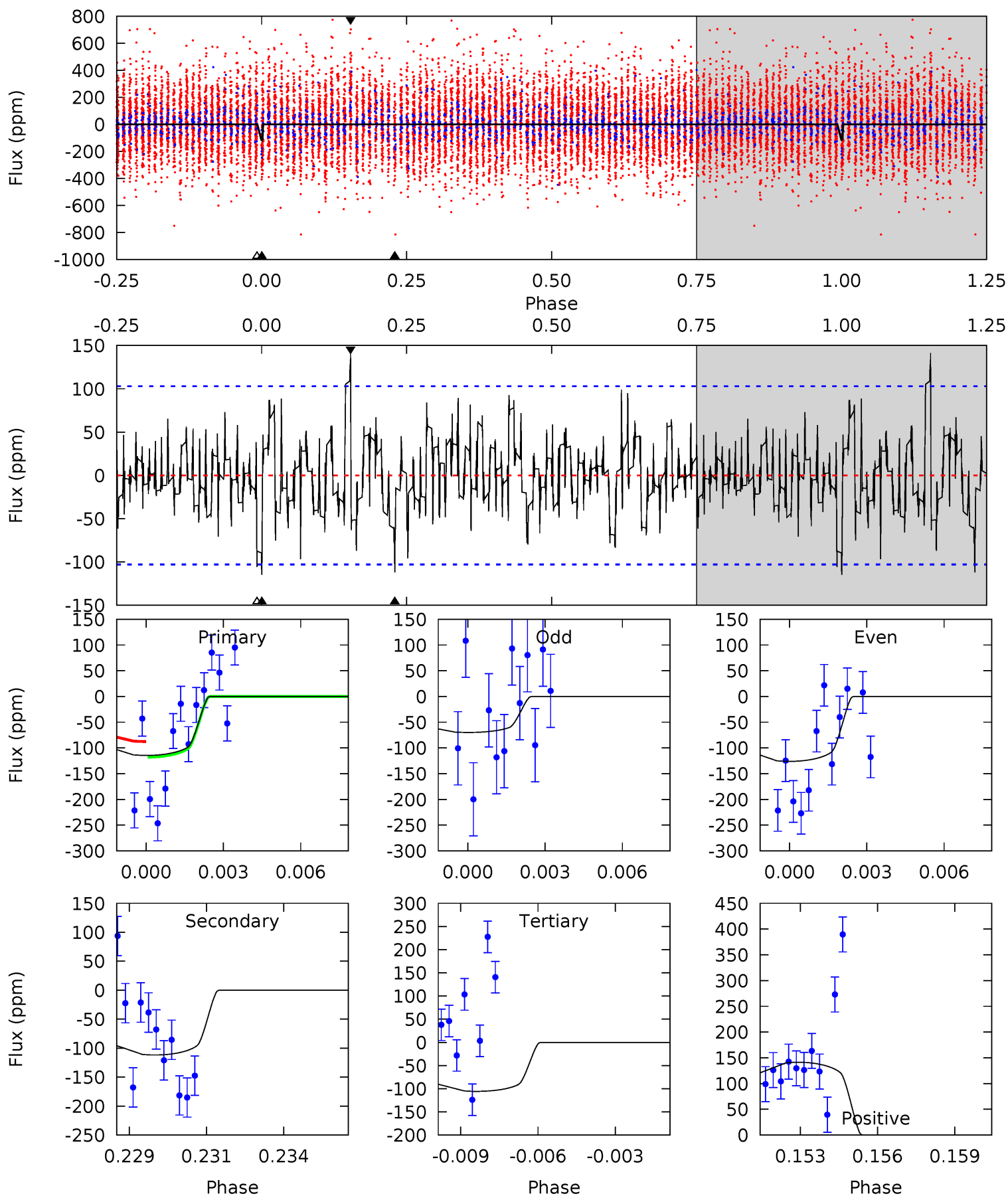
TCE 005302881-02 P=180.864251 Days  $T_0=178.248546$  (BKJD)



# DV Model-Shift Uniqueness Test

005302881-02, P = 180.849404 Days, E = 178.169022 Days

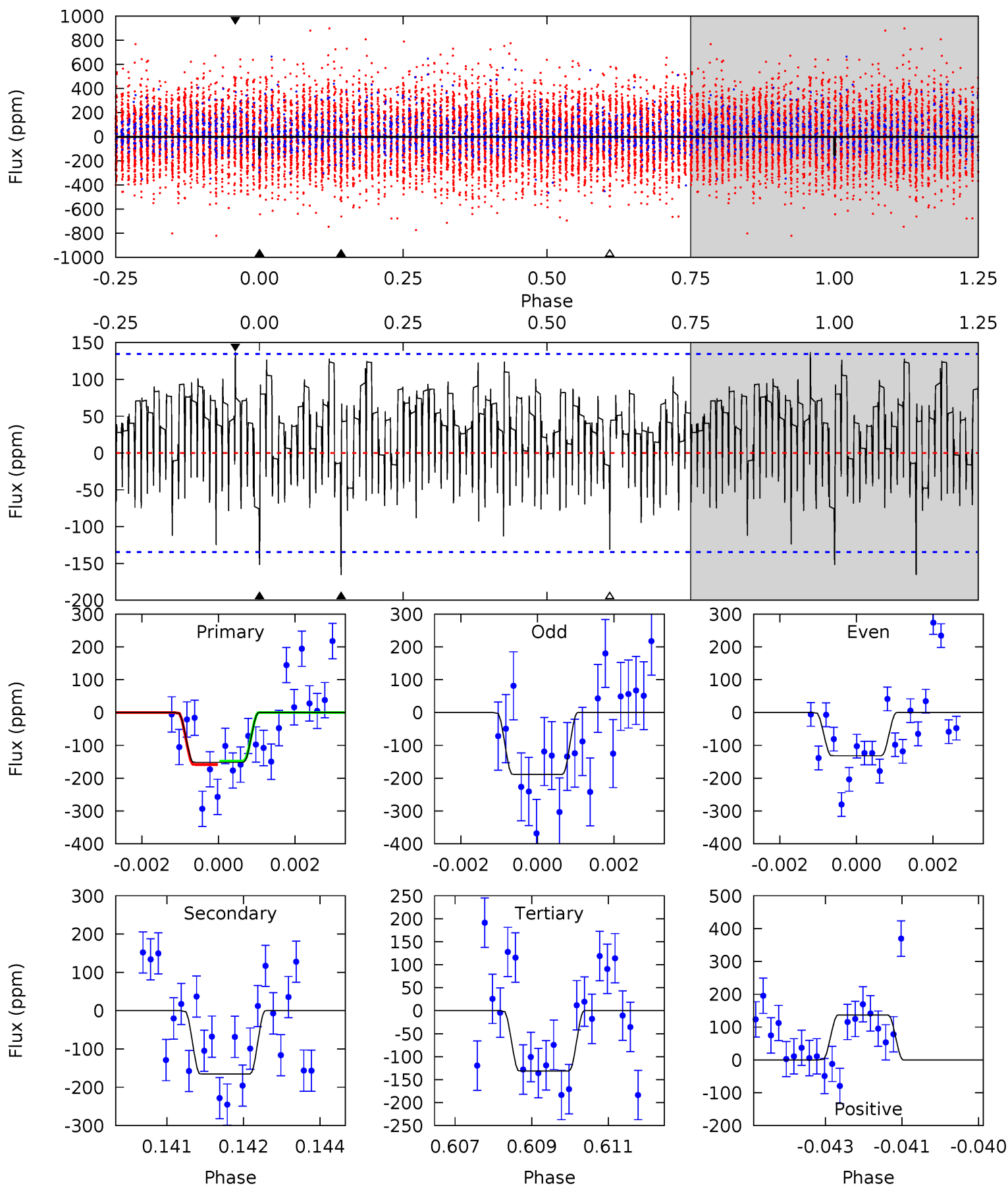
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.85	5.72	5.40	7.23	5.26	2.98	1.70	0.45	-1.37	0.31	-1.51	1.40	0.50	0.55	0.41



# Alt Model-Shift Uniqueness Test

005302881-02, P = 180.864251 Days, E = 178.248546 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.06	6.61	5.24	5.47	5.37	3.16	1.84	0.82	0.59	1.36	1.14	1.08	0.83	0.45	0.20



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-112 \pm 20$	$7.02^{+1.84}_{-1.86}$	$900^{+56}_{-101}$	$5104^{+554}_{-421}$	$693^{+596}_{-257}$
Alt.	$-165 \pm 25$	$5.01^{+1.82}_{-1.51}$	$897^{+55}_{-91}$	$6518^{+1103}_{-799}$	$2042^{+1947}_{-955}$

$T_{\text{max}}$  = 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

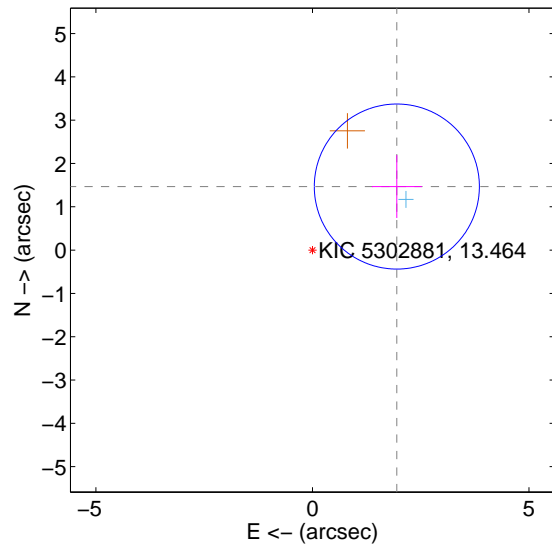
Supplemental centroid analysis for 005302881-02. Kepler magnitude: 13.46. Transit SNR 8.54

There are 1 quarters with good PRF difference image offsets

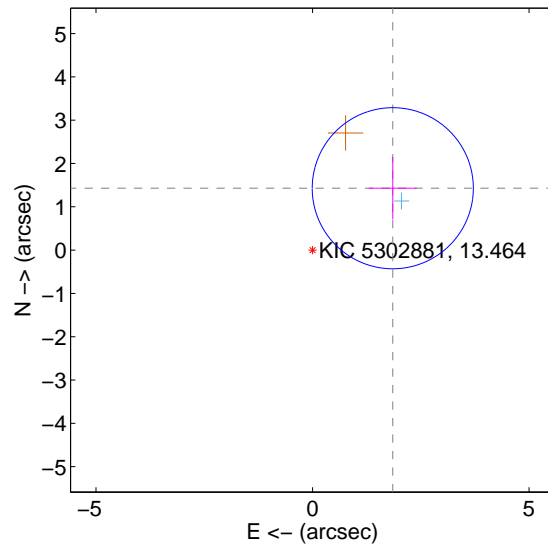
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.440 \pm 0.635$	3.84	$-1.949 \pm 0.578$	$1.468 \pm 0.726$
PRF-fit source offset from KIC position	$2.341 \pm 0.620$	3.77	$-1.854 \pm 0.552$	$1.429 \pm 0.721$
photometric centroid source offset	$1.56 \pm 1.03$	1.51	$0.36 \pm 1.01$	$1.52 \pm 1.03$

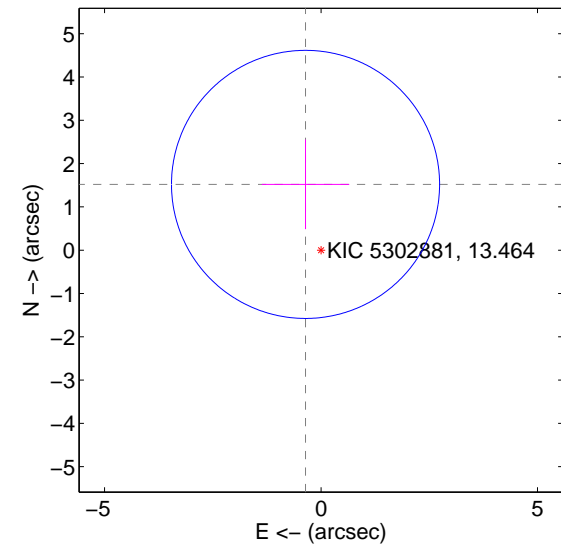
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



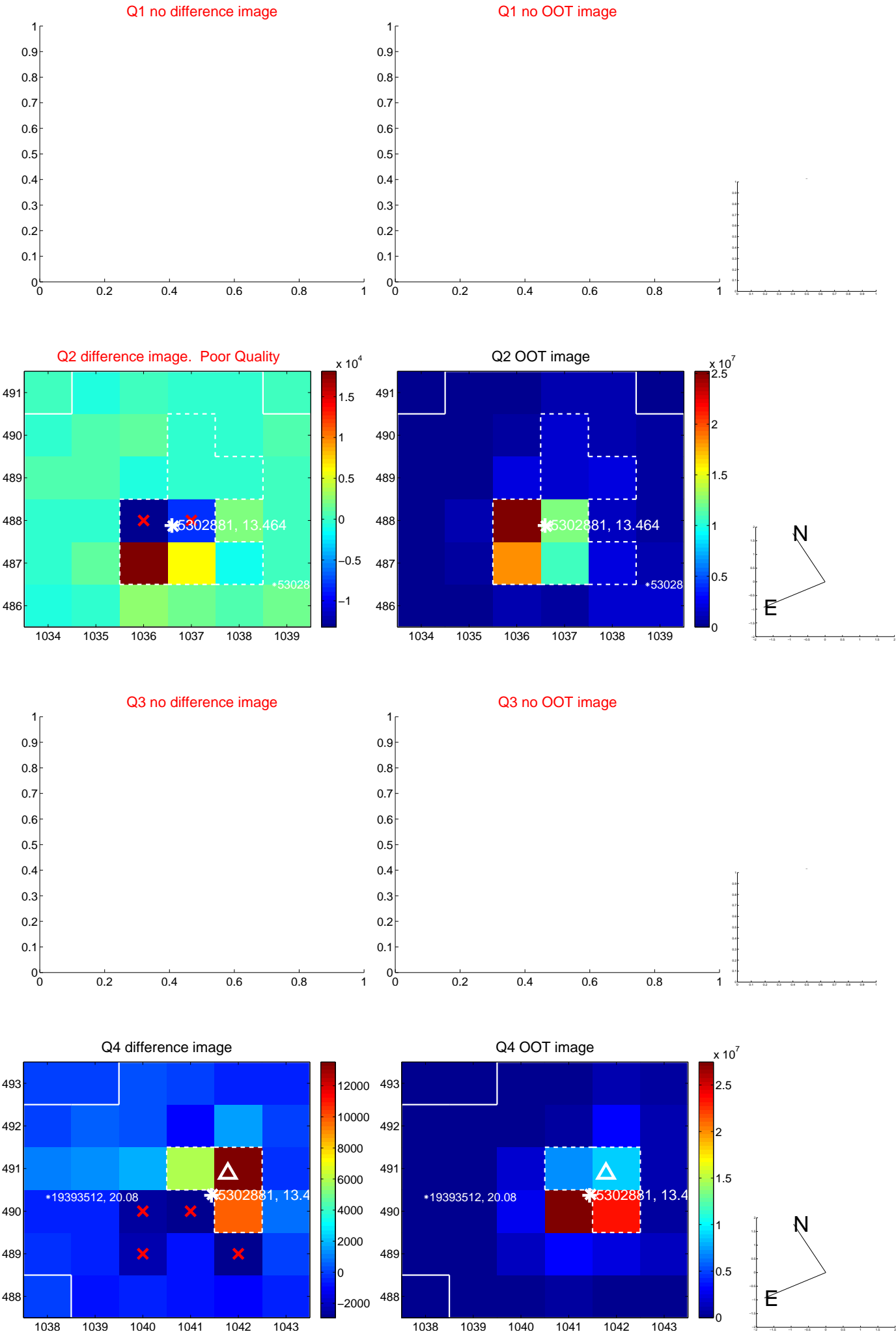
offset from photometric centroids



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.



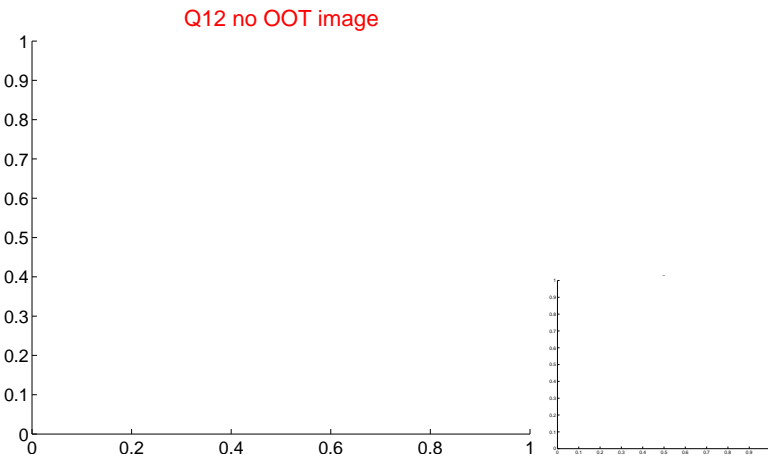
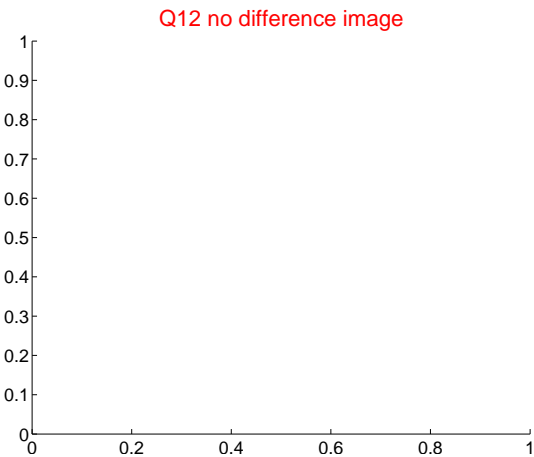
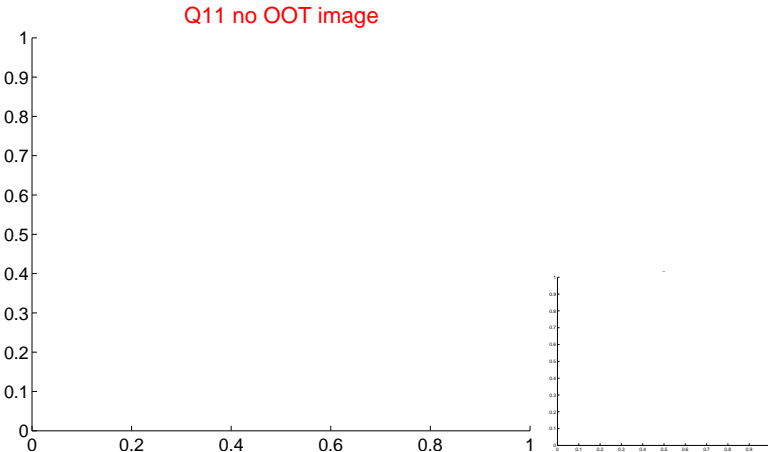
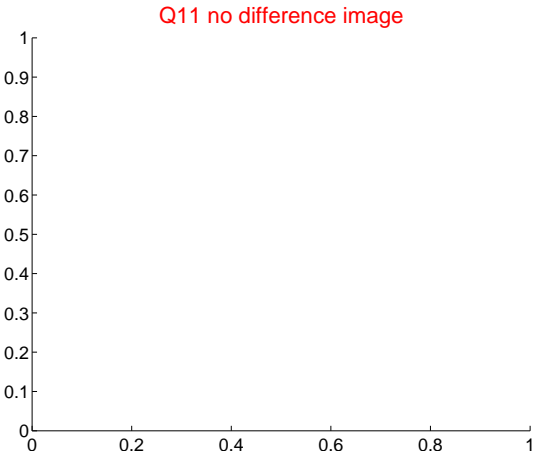
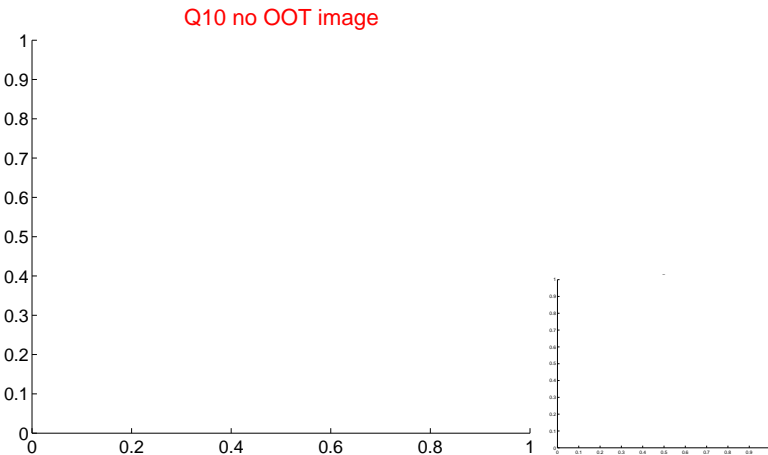
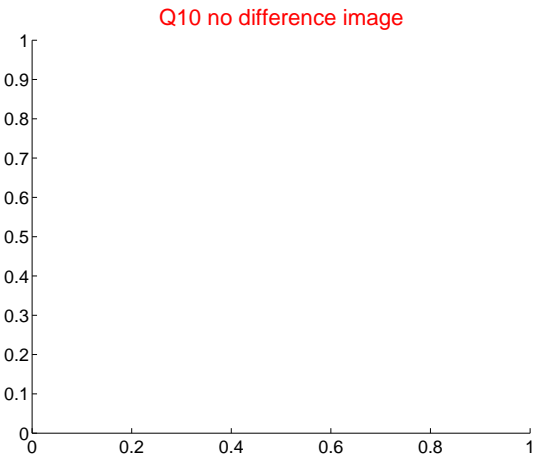
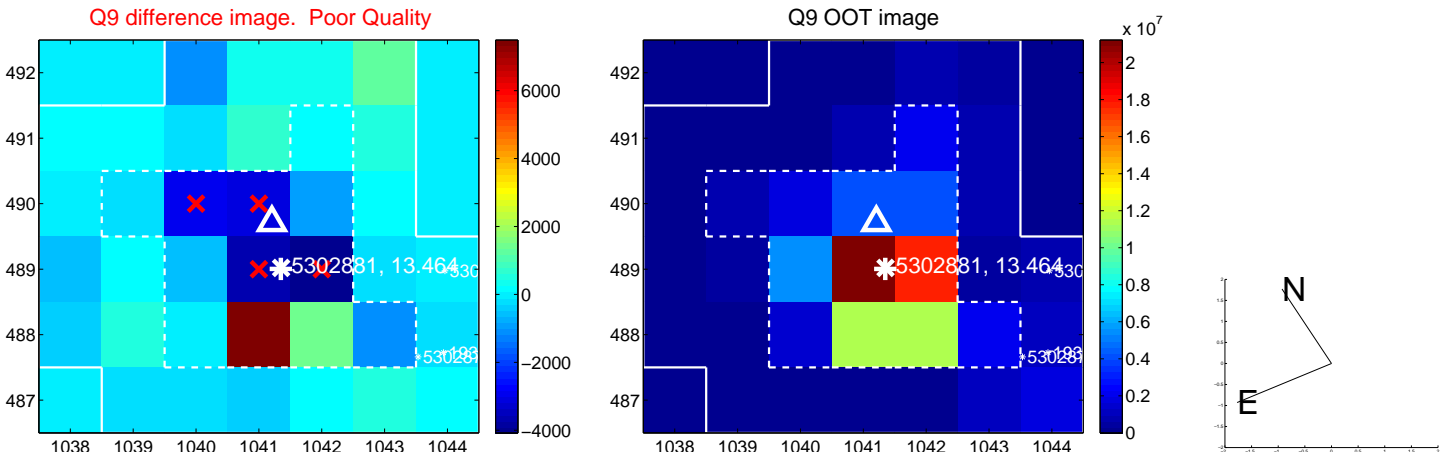
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



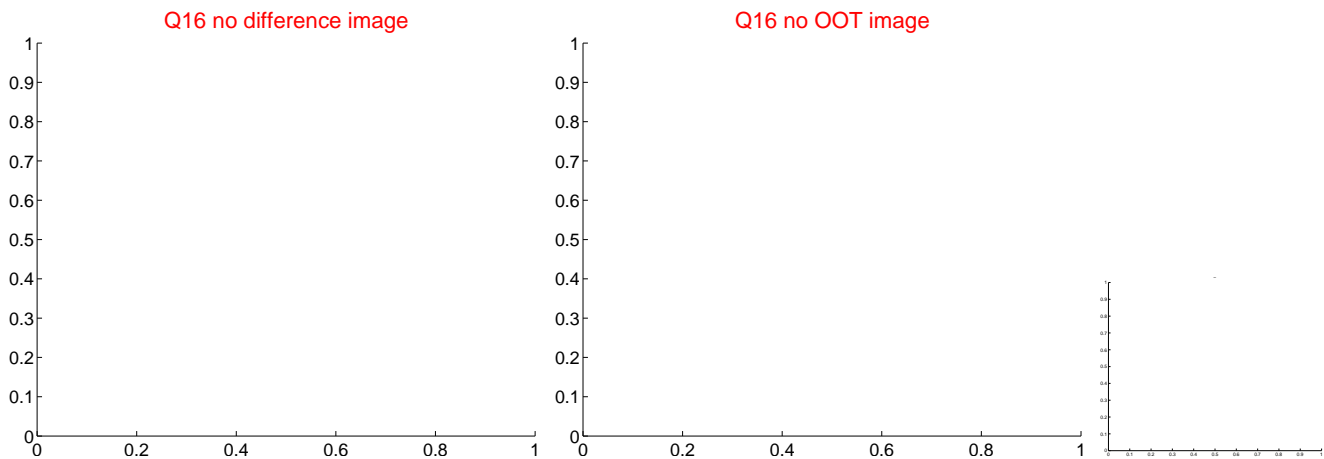
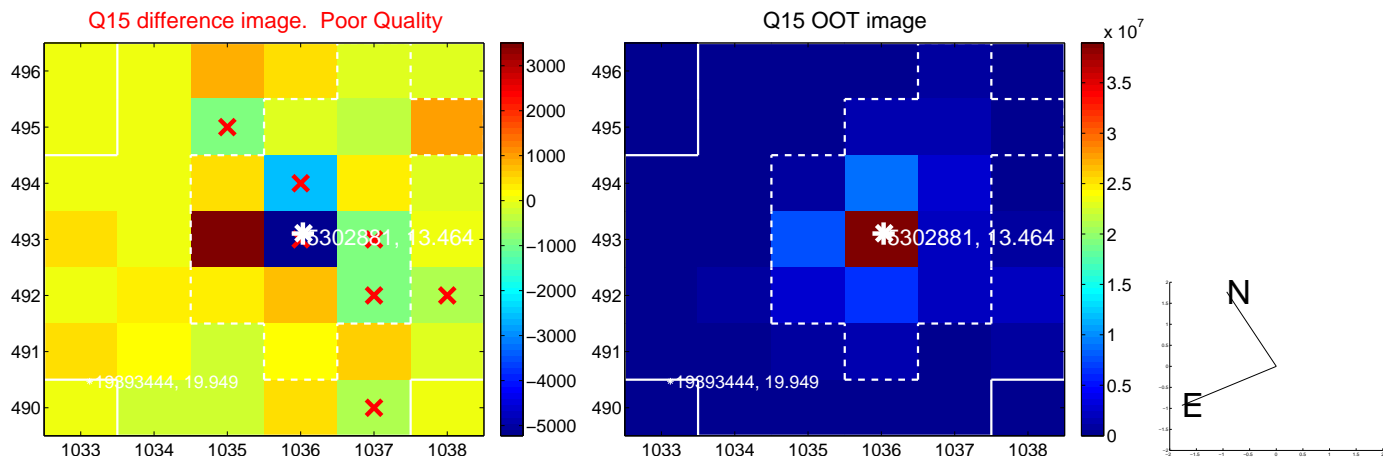
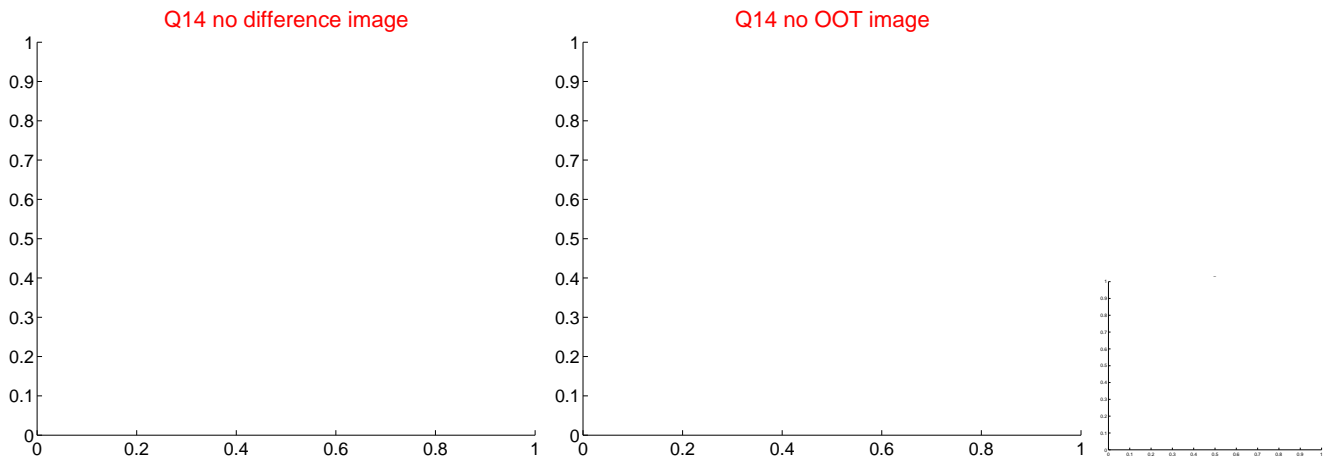
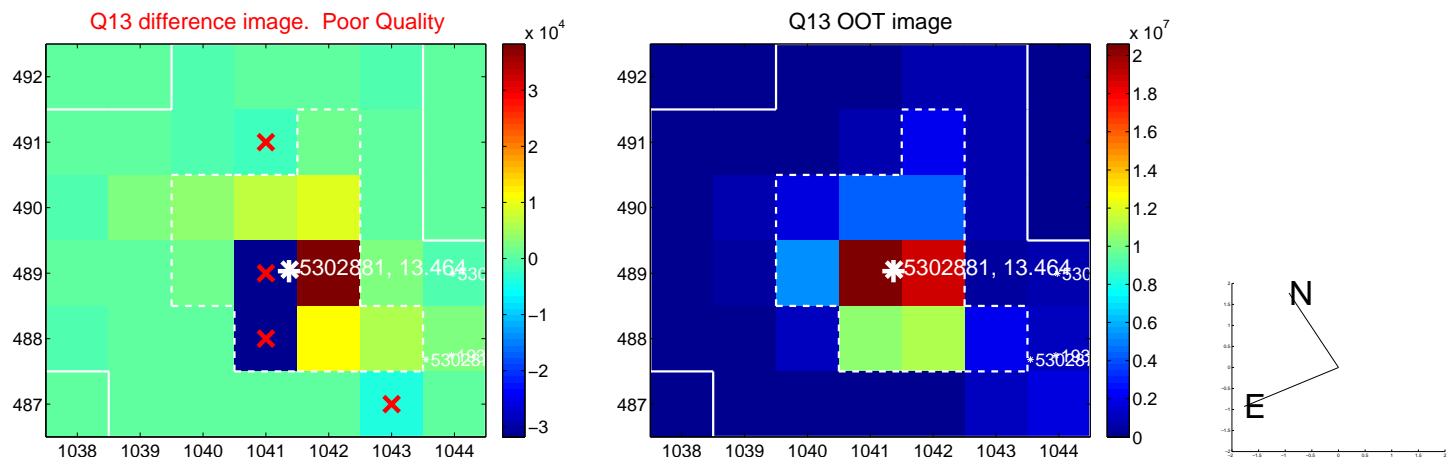
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



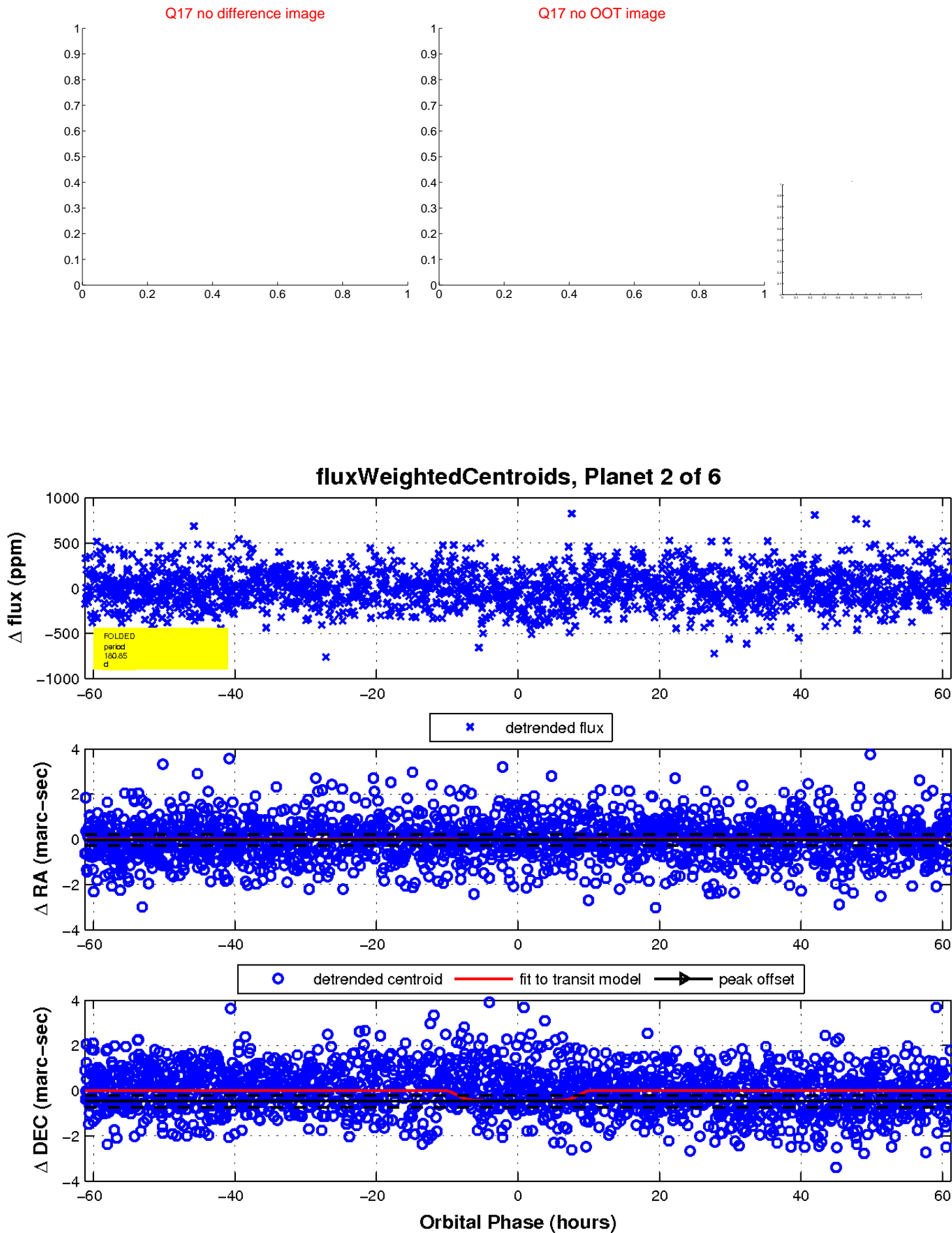
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



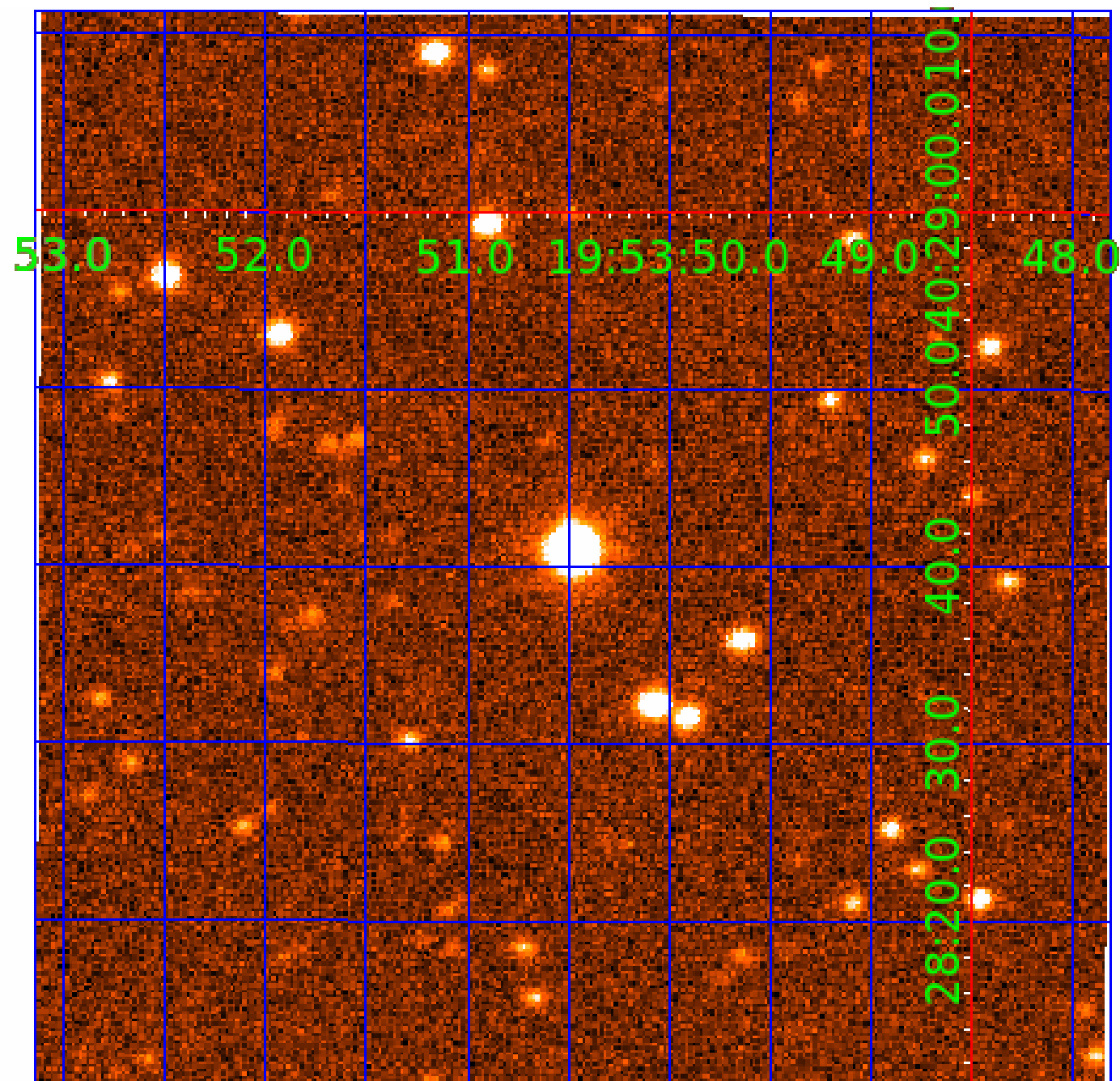
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
005302881-02	OBS	No	180.849404	178.169022	233.3	20.412	10.7	8.5	4.02	6413	7.61	43.95
005302881-03	OBS	No	363.915884	376.574365	352.3	10.811	8.7	8.9	4.02	6413	9.37	17.30
005302881-04	OBS	No	49.250942	175.481490	265.8	3.501	8.5	9.2	4.02	6413	8.35	249.01
005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

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

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

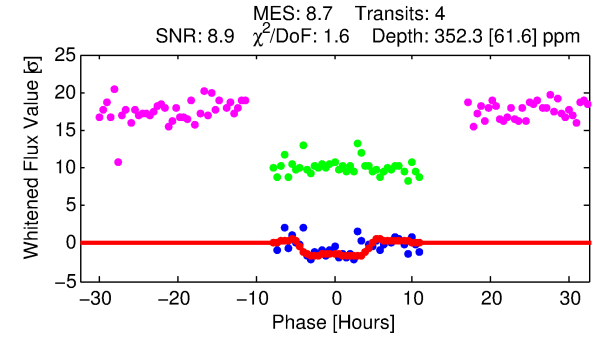
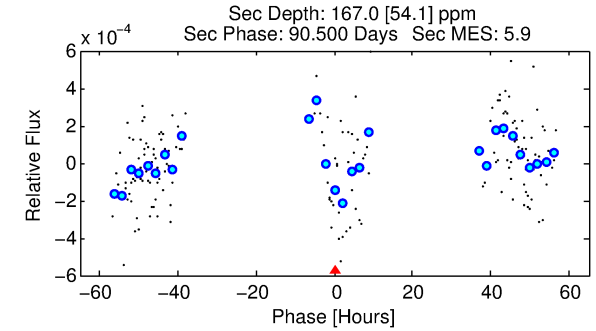
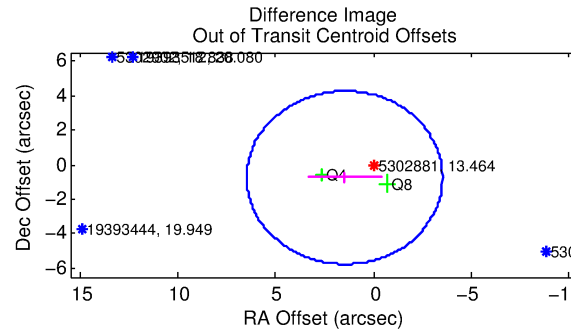
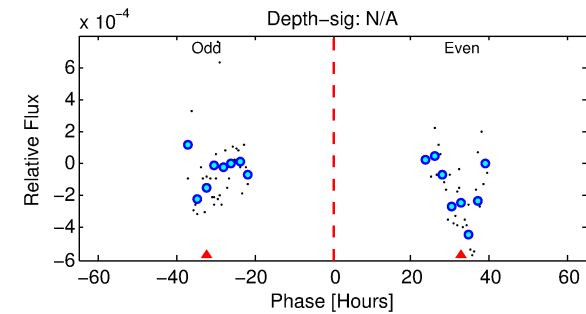
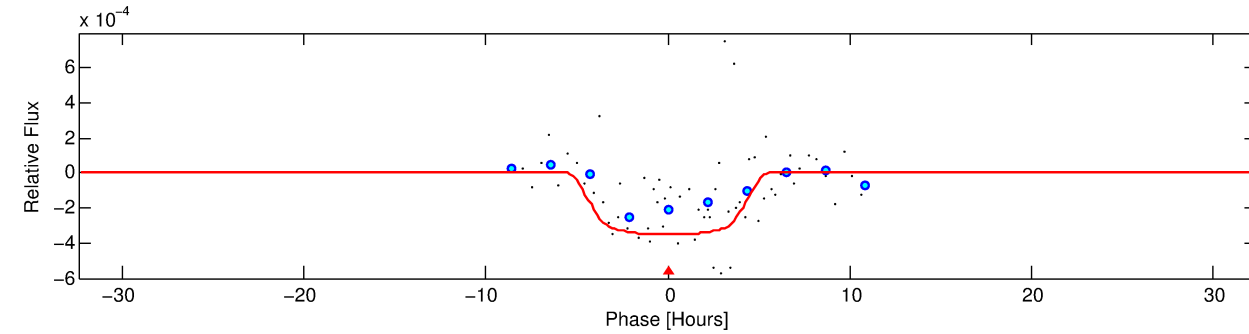
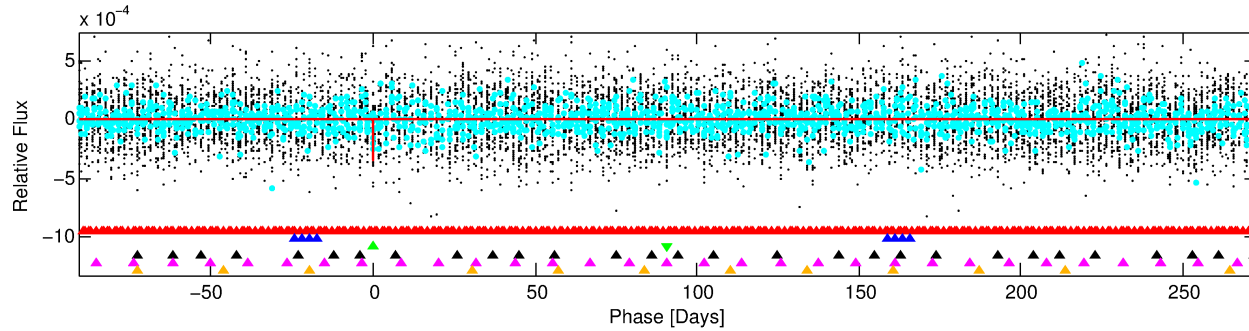
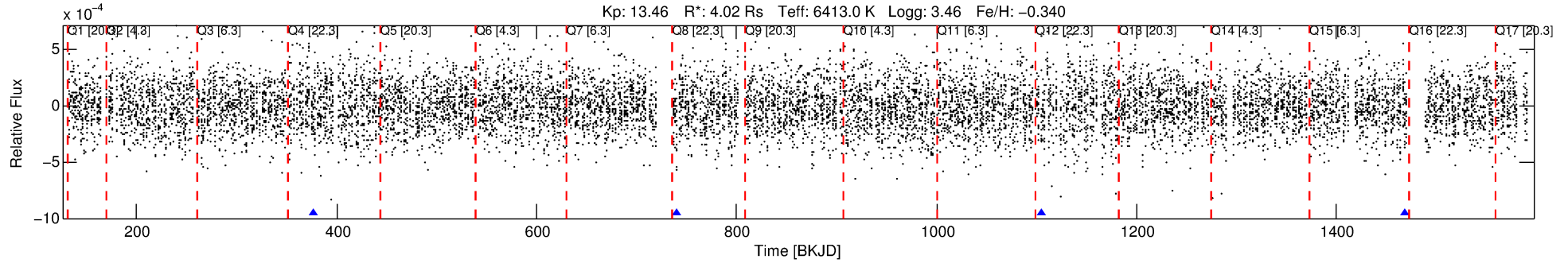
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005302881-03

No Significant Match Found

# DV One-Page Summary

KIC: 5302881 Candidate: 3 of 6 Period: 363.916 d



## DV Fit Results:

Period = 363.91588 [0.02418] d  
Epoch = 376.5744 [0.0414] BKJD  
Rp/R\* = 0.0213 [0.0024]  
a/R\* = 94.85 [34.69]  
b = 0.95 [0.03]  
Seff = 17.30 [11.58]  
Teq = 520 [87] K  
Rp = 9.37 [4.25] Re  
a = 1.1903 [0.4943] AU  
Ag = 1483.71 [1139.58] [1.30] $\sigma$   
Teffp = 4990 [517] K [8.53] $\sigma$

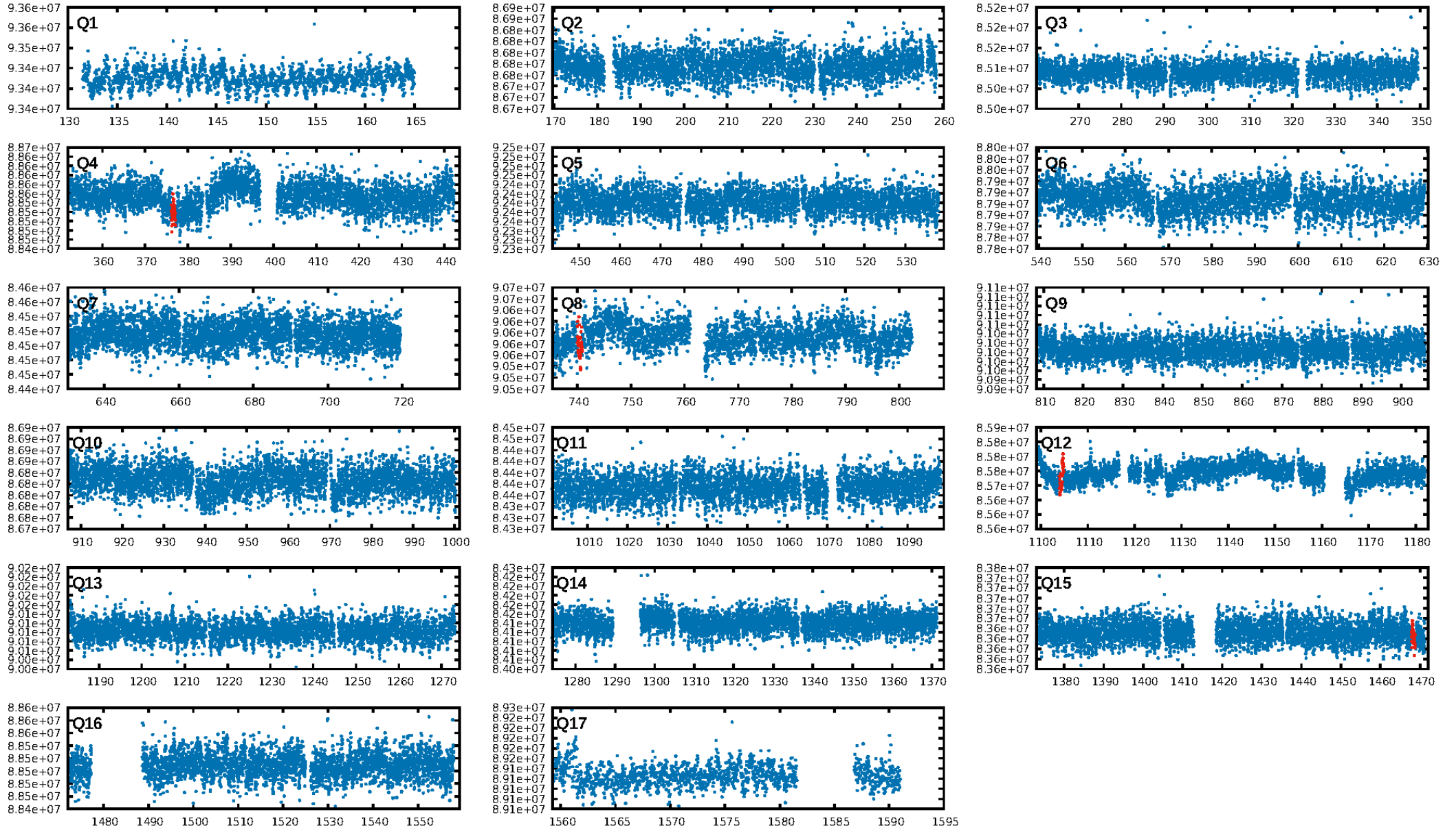
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [190.21] $\sigma$   
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 51.3%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 5.15e-08**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 4.581  
Centroid-sig: 19.9%  
Centroid-so: 0.695 arcsec [0.75] $\sigma$   
OotOffset-rm: 1.655 arcsec [0.99] $\sigma$   
OotOffset-st: 0/0/2/0 [2]  
KicOffset-rm: 1.738 arcsec [1.02] $\sigma$   
KicOffset-st: 0/0/2/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/3]

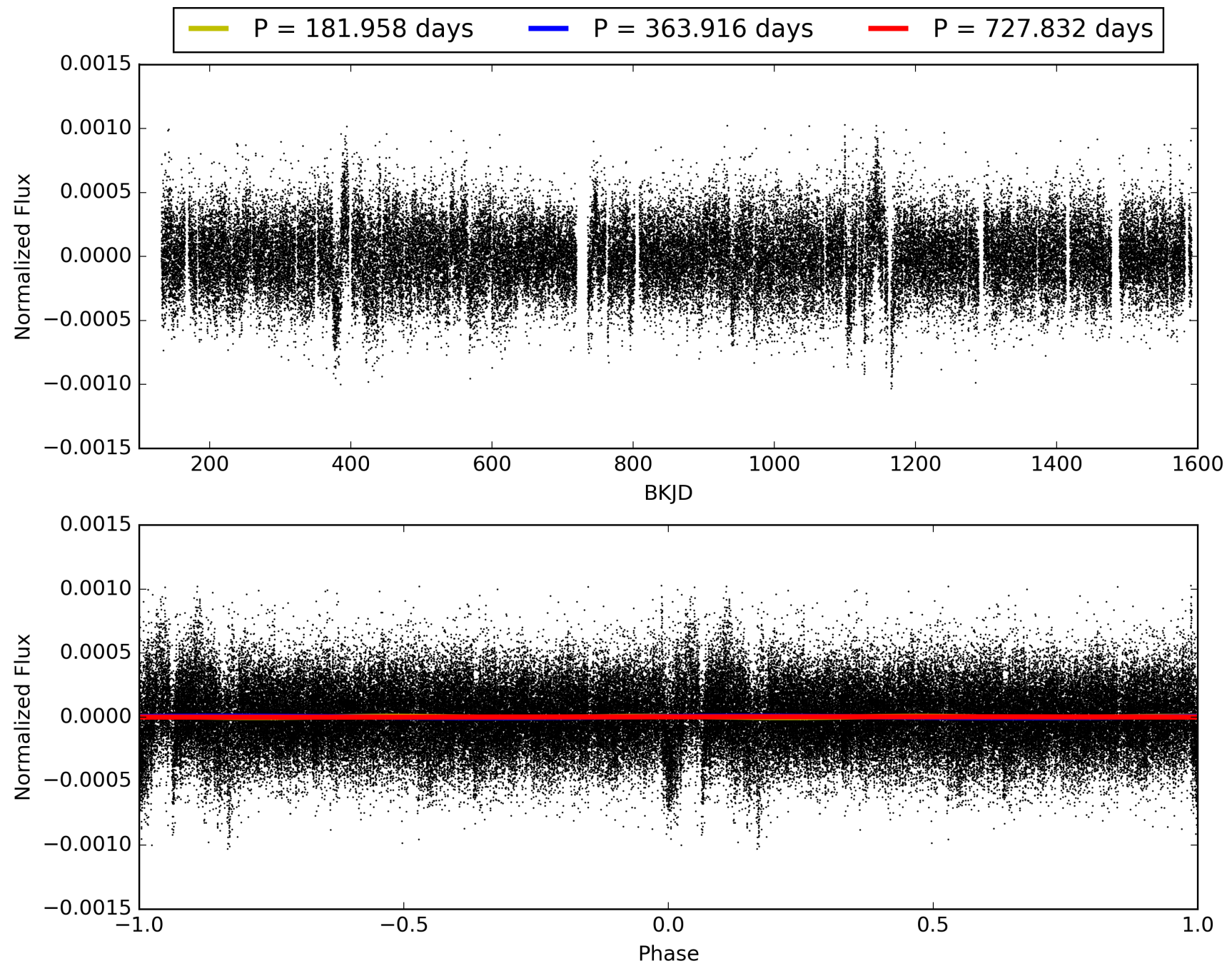
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:43 Z

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

# TCE 005302881-03, PDC Light Curves



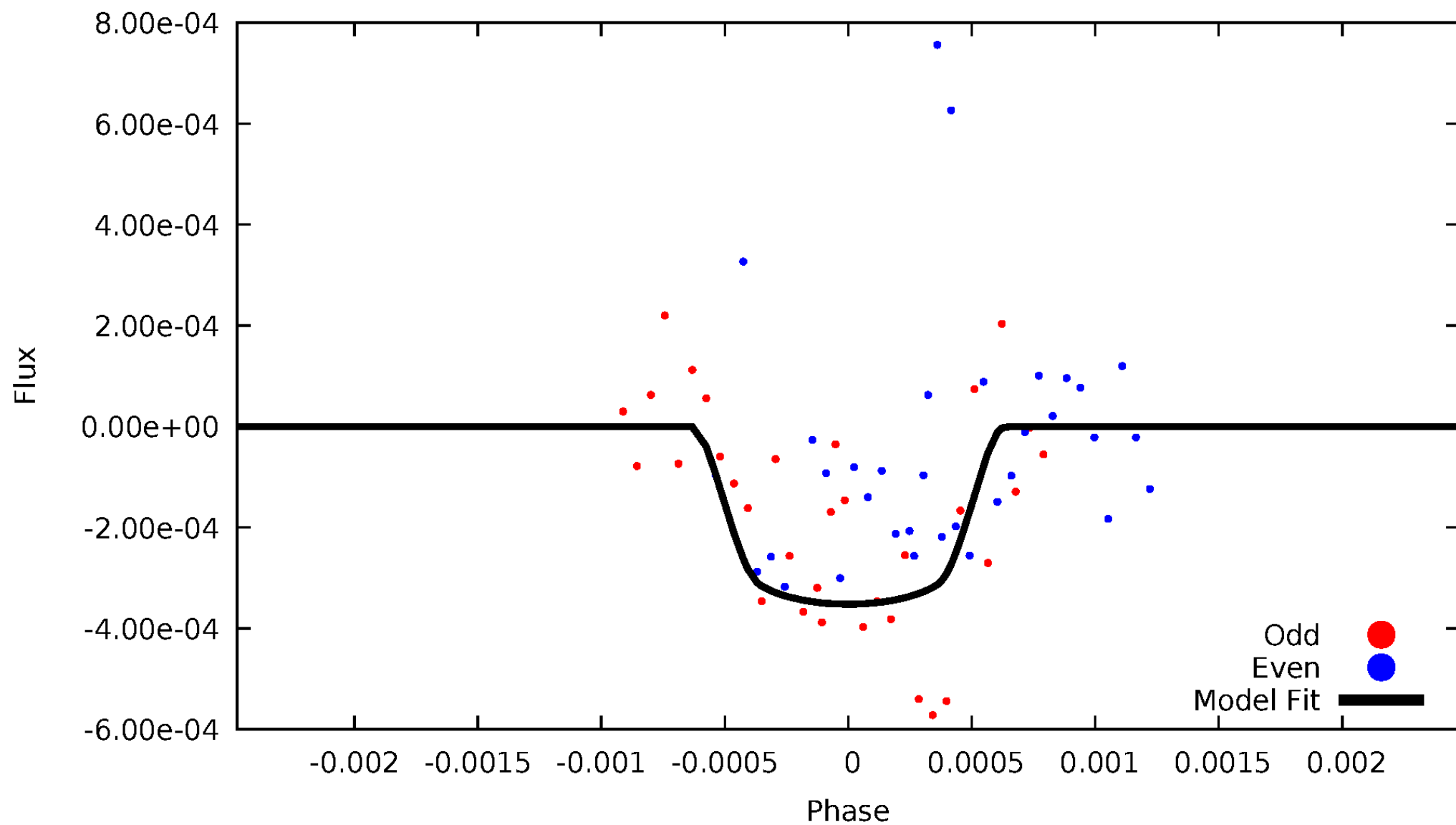
TCE 005302881-03





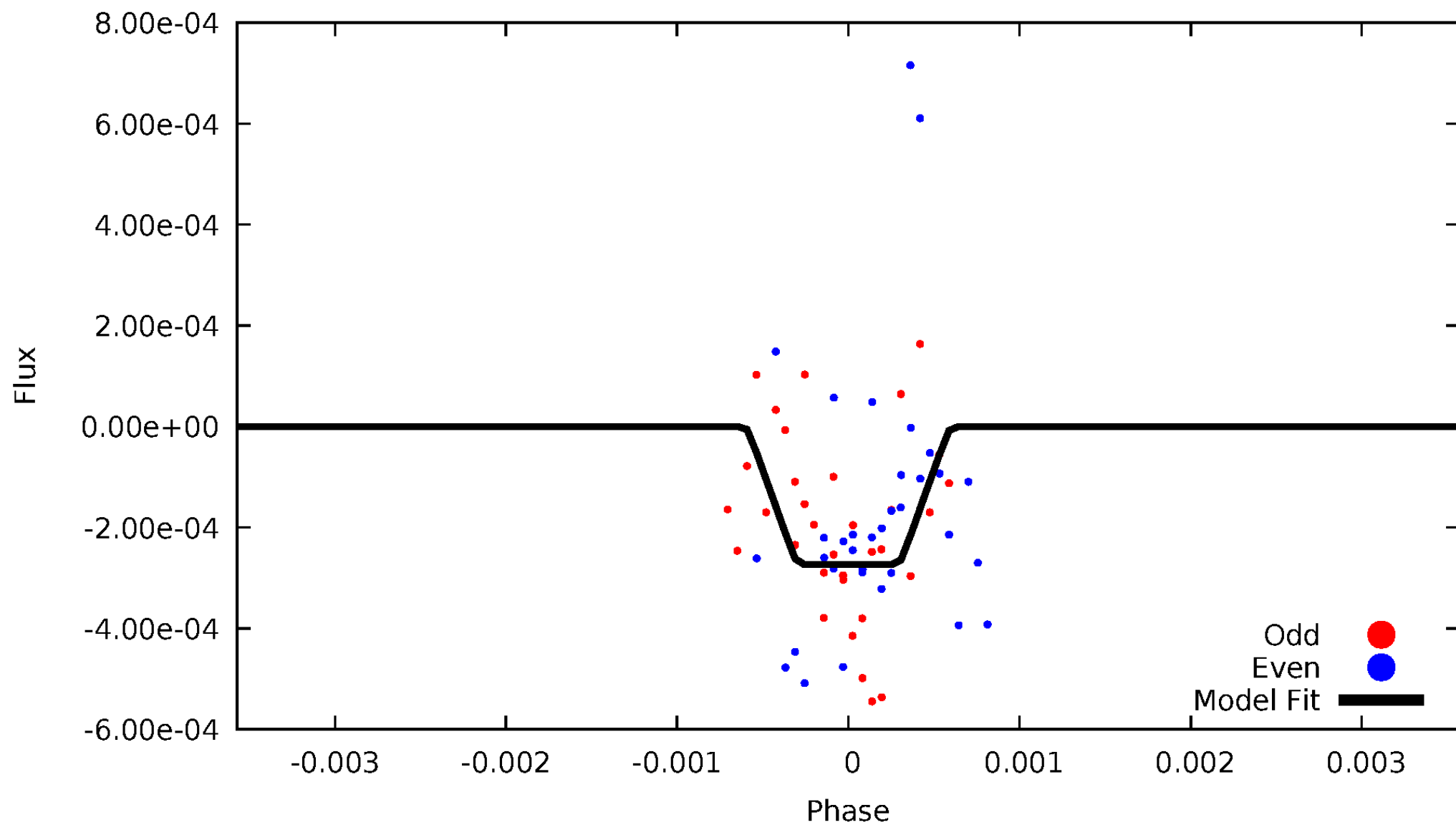
# DV Odd/Even

TCE 005302881-03



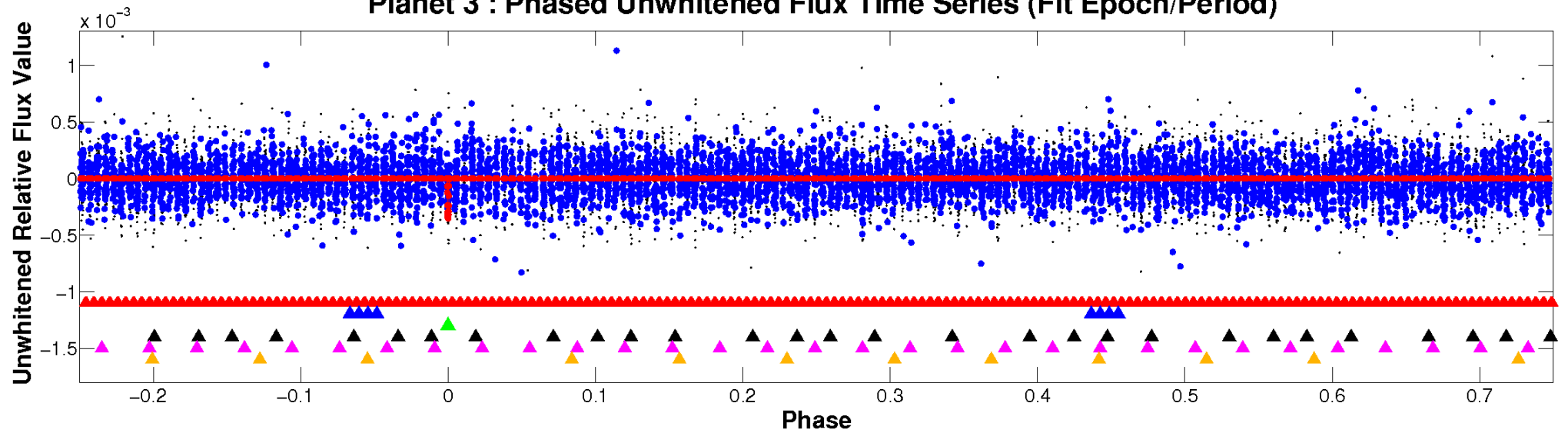
# ALT Odd/Even

TCE 005302881-03

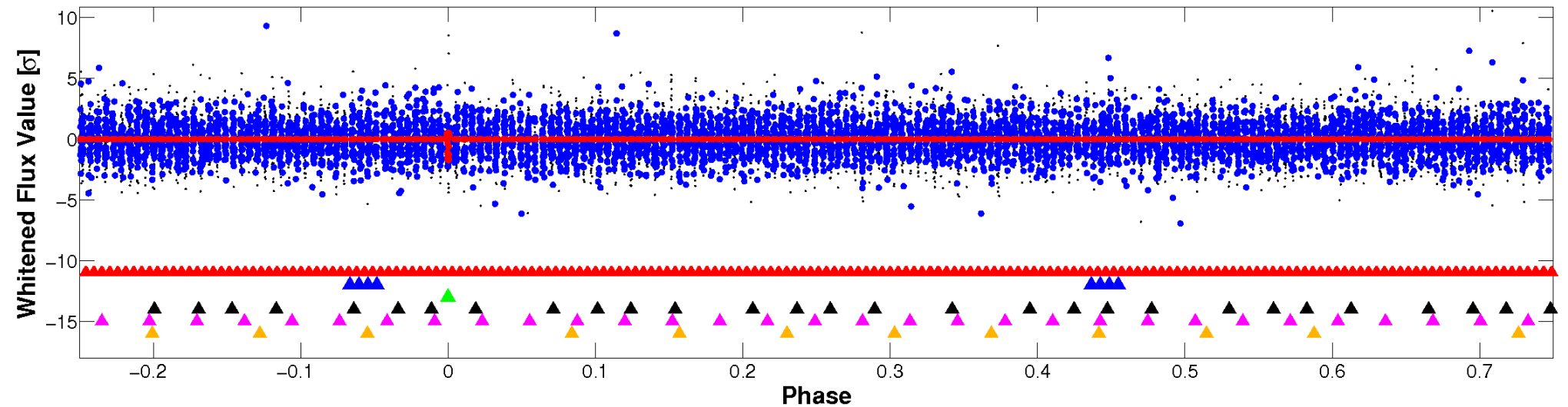


# Non-Whitened Vs. Whitened Light Curve

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

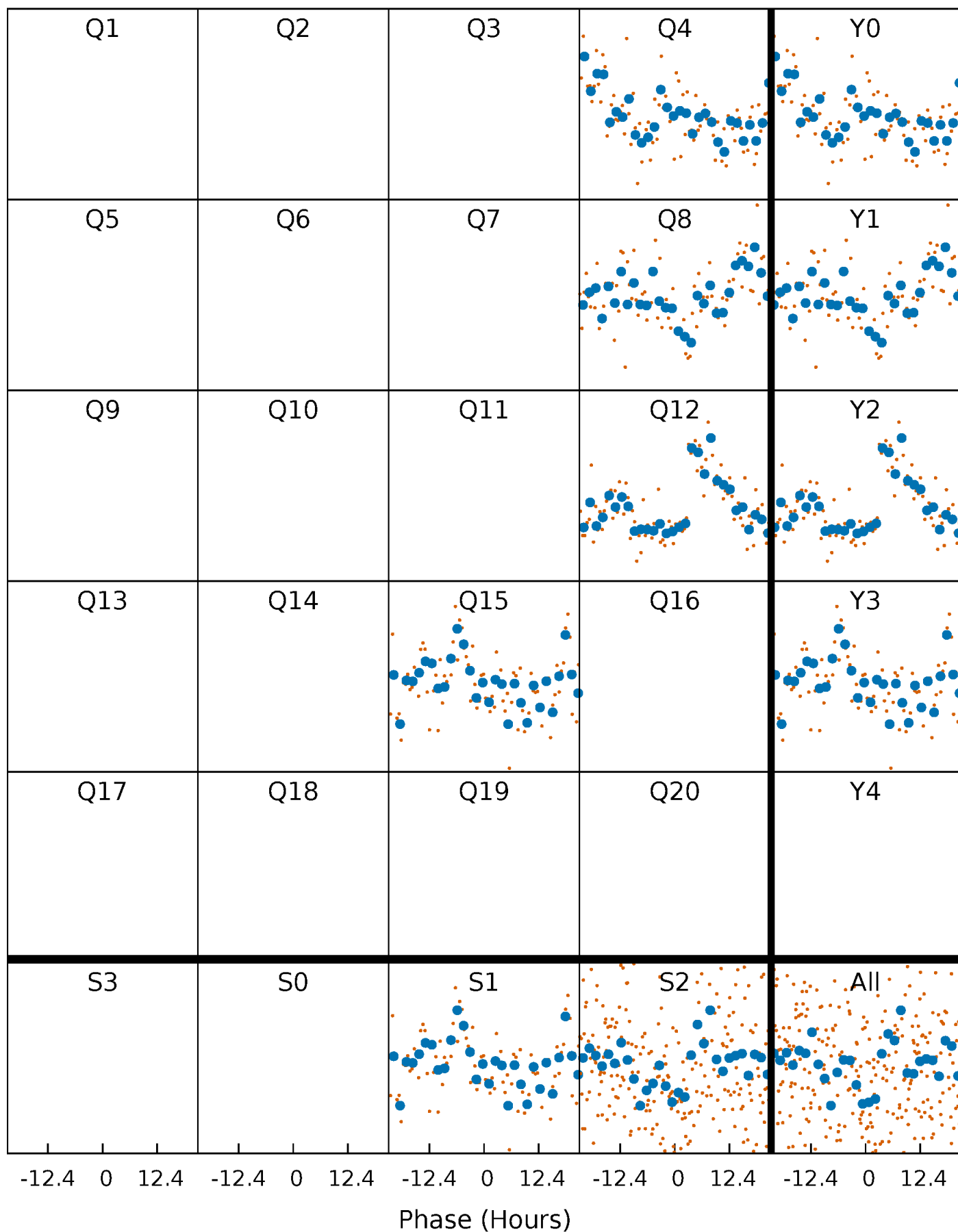


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



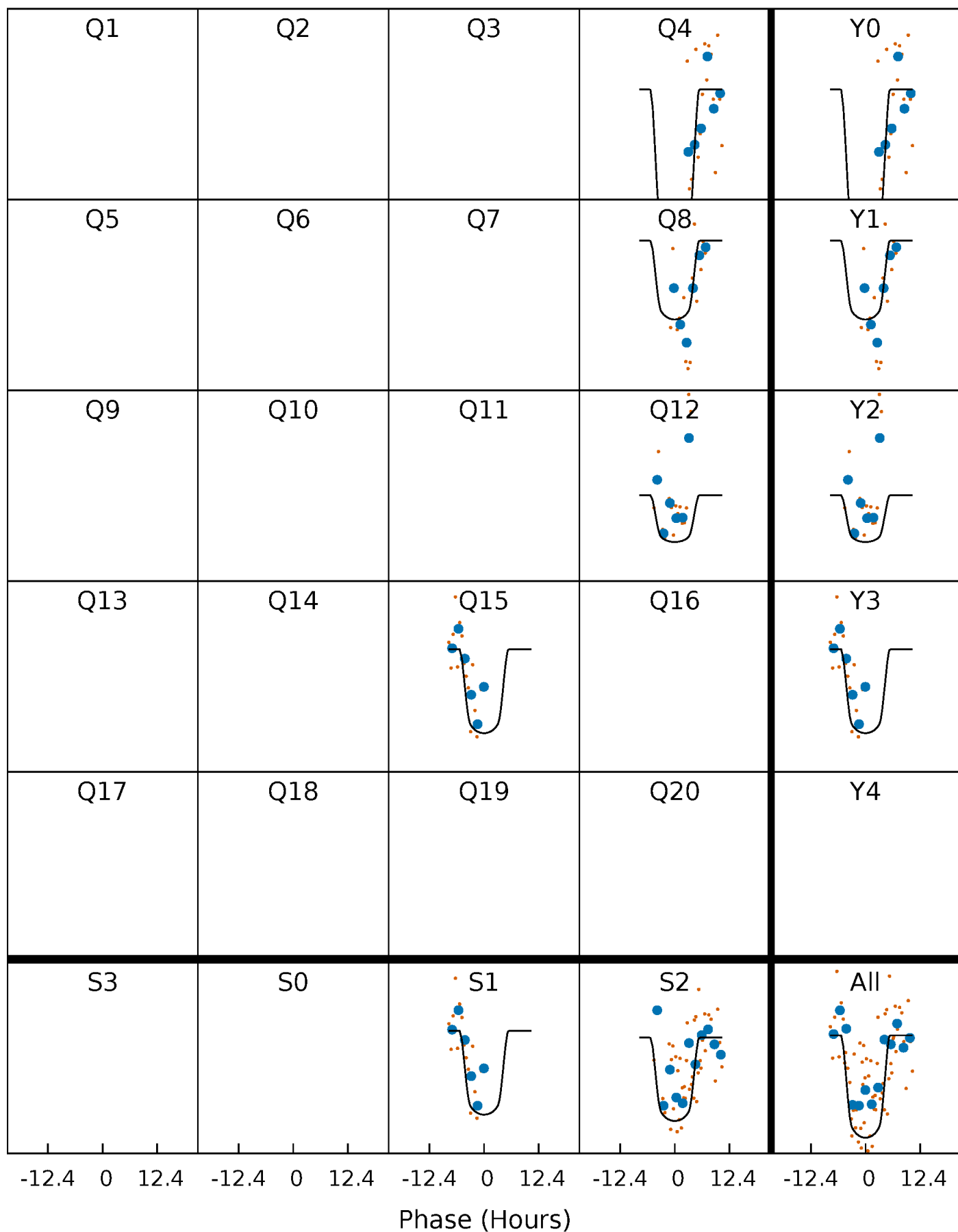
# PDC Quarter-Phased Transit Curves

TCE 005302881-03 P=363.915884 Days  $T_0=376.574365$  (BKJD)



# DV Quarter-Phased Transit Curves

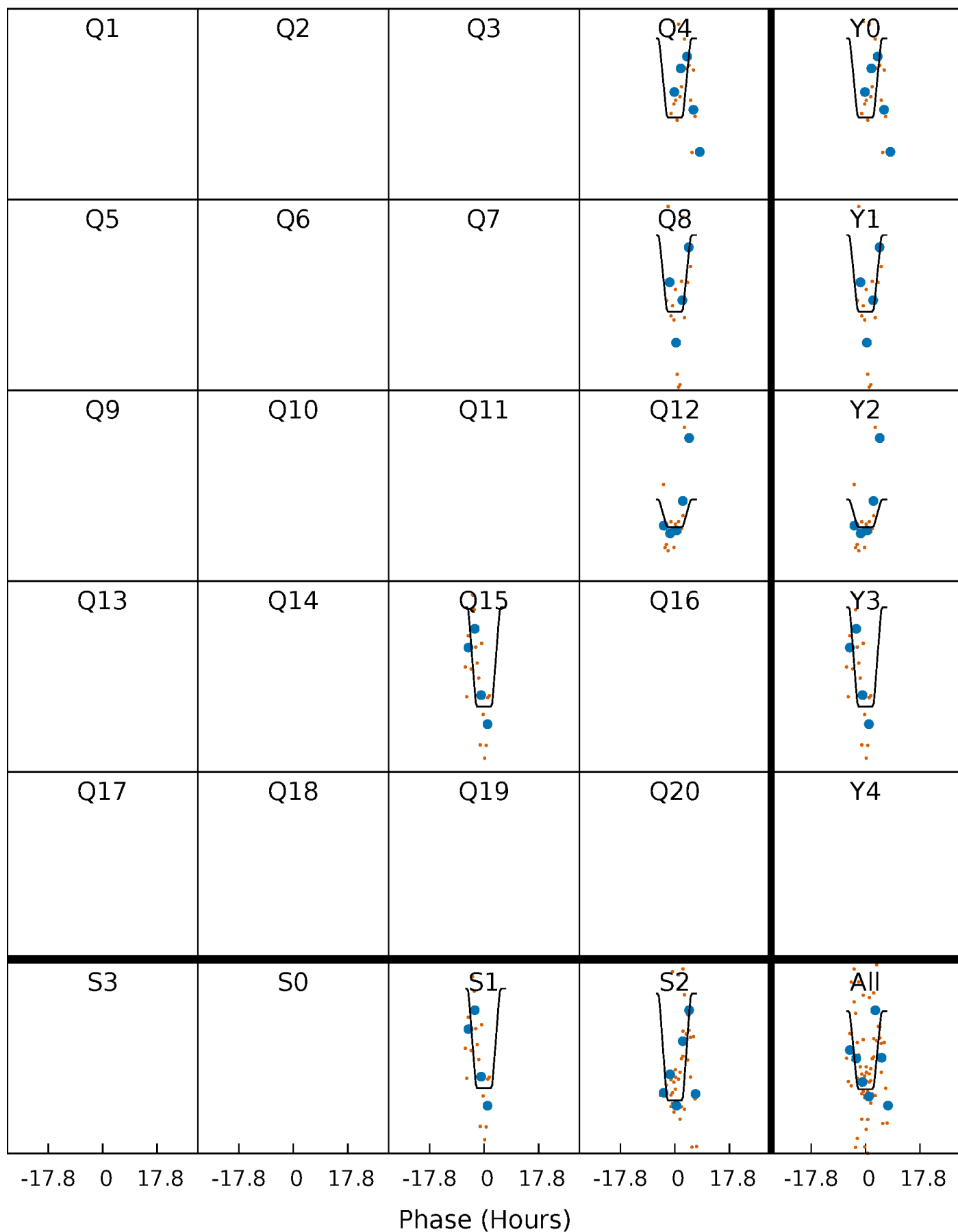
TCE 005302881-03     $P=363.915884$  Days     $T_0=376.574365$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

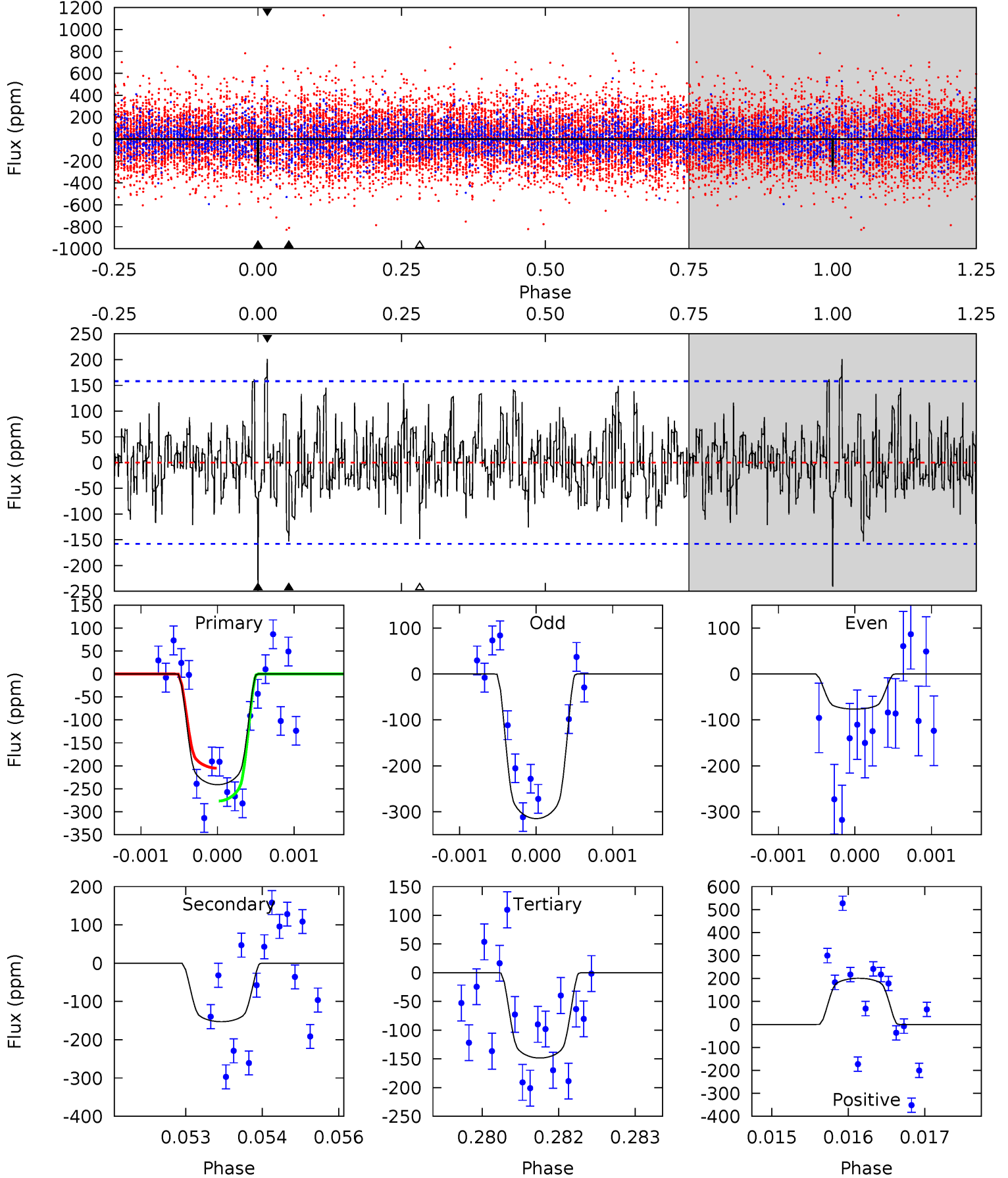
TCE 005302881-03 P=363.841234 Days  $T_0=376.722788$  (BKJD)



# DV Model-Shift Uniqueness Test

005302881-03,  $P = 363.915884$  Days,  $E = 12.658481$  Days

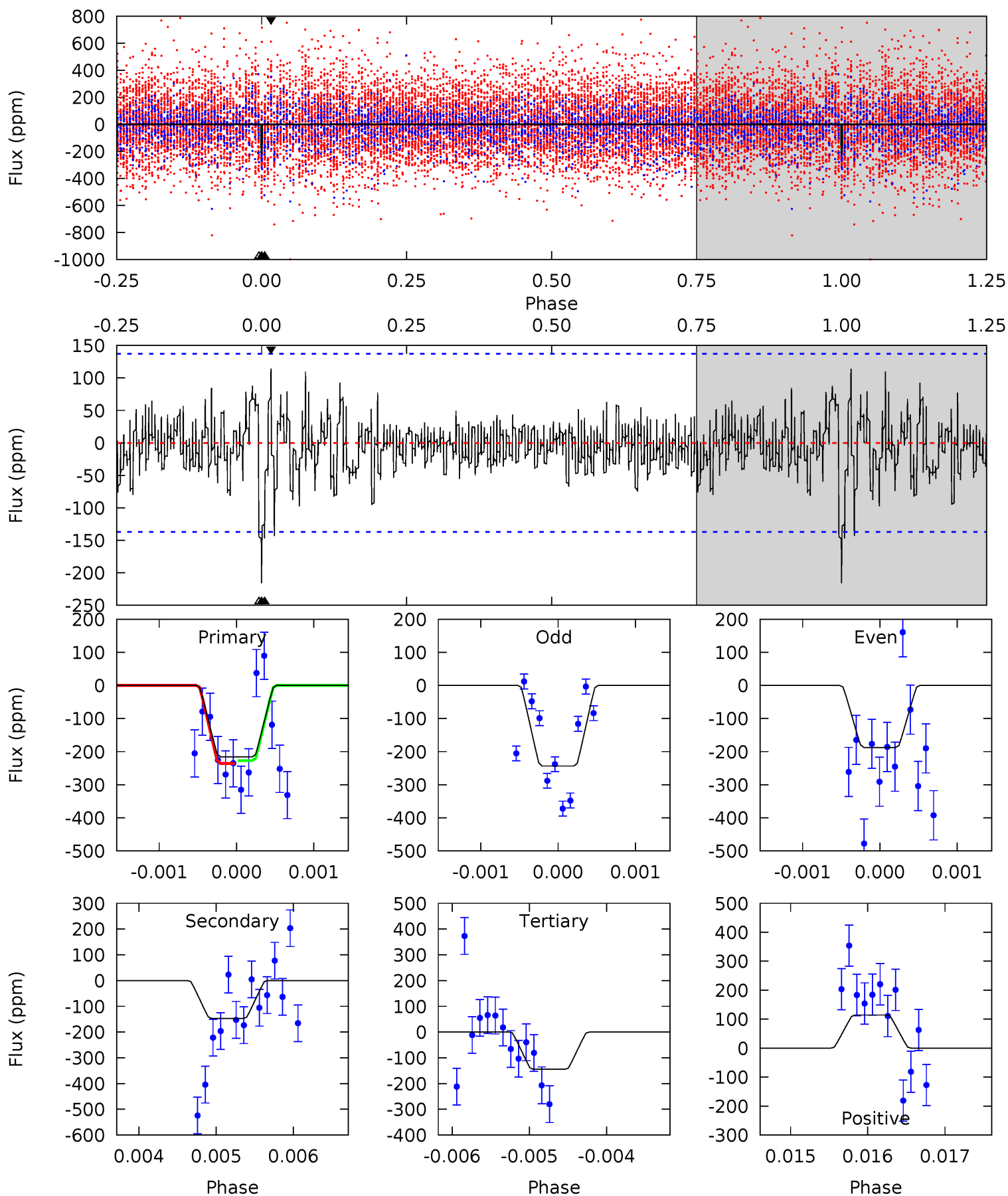
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.26	5.24	5.09	6.89	5.41	3.23	1.69	3.17	1.37	0.15	-1.65	4.19	1.00	0.45	1.23



# Alt Model-Shift Uniqueness Test

005302881-03, P = 363.841234 Days, E = 12.881554 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
8.52	5.81	5.71	4.52	5.41	3.23	1.21	2.81	4.00	0.09	1.29	1.11	0.94	0.35	0.17



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-153 \pm 29$	$8.75^{+1.75}_{-2.12}$	$711^{+45}_{-76}$	$4968^{+354}_{-321}$	$1540^{+1031}_{-539}$
Alt.	$-147 \pm 25$	$6.79^{+1.60}_{-1.61}$	$712^{+41}_{-69}$	$5490^{+511}_{-409}$	$2445^{+1754}_{-846}$

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

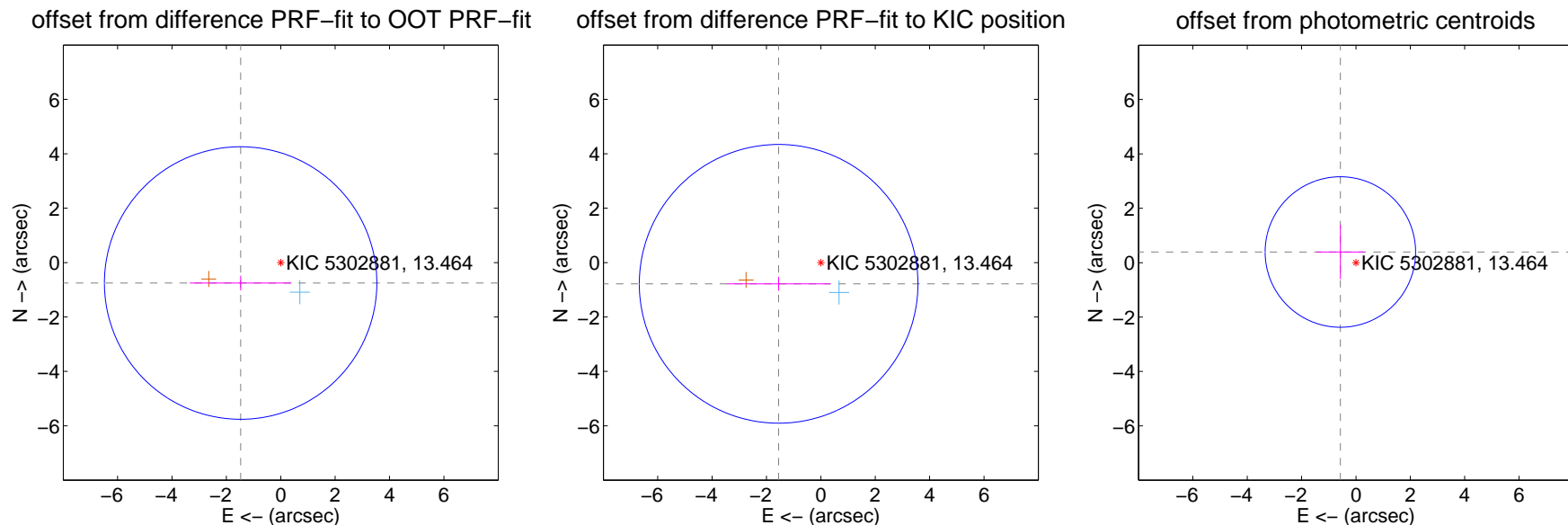
## DV Centroid Data

Supplemental centroid analysis for 005302881-03. Kepler magnitude: 13.46. Transit SNR 8.93

There are 1 quarters with good PRF difference image offsets

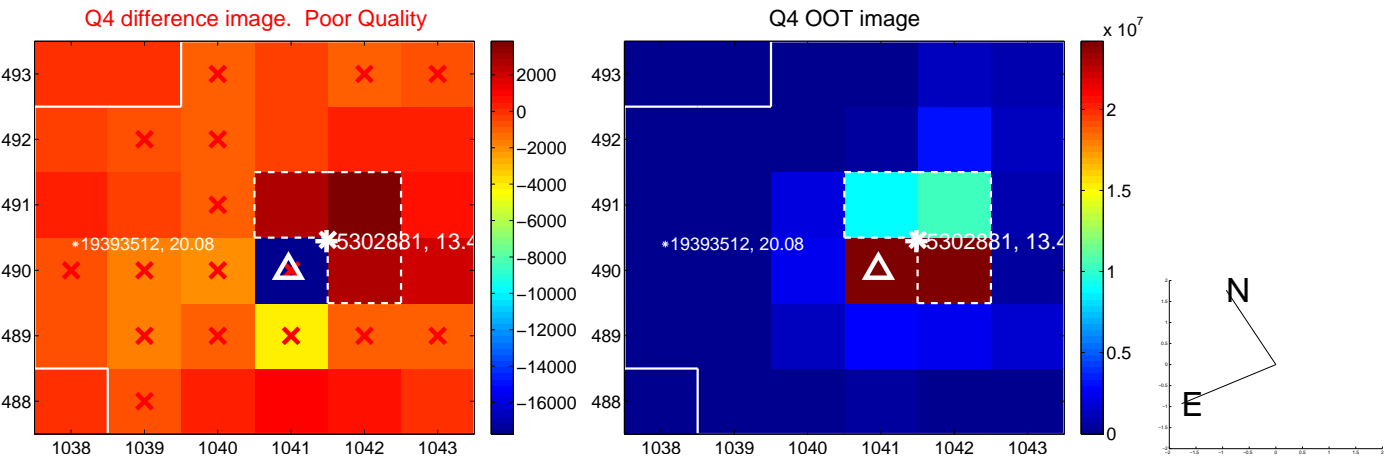
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.655 \pm 1.670$	0.99	$1.475 \pm 1.868$	$-0.751 \pm 0.269$
PRF-fit source offset from KIC position	$1.738 \pm 1.708$	1.02	$1.553 \pm 1.907$	$-0.780 \pm 0.256$
photometric centroid source offset	$0.70 \pm 0.92$	0.75	$0.57 \pm 0.89$	$0.39 \pm 1.00$



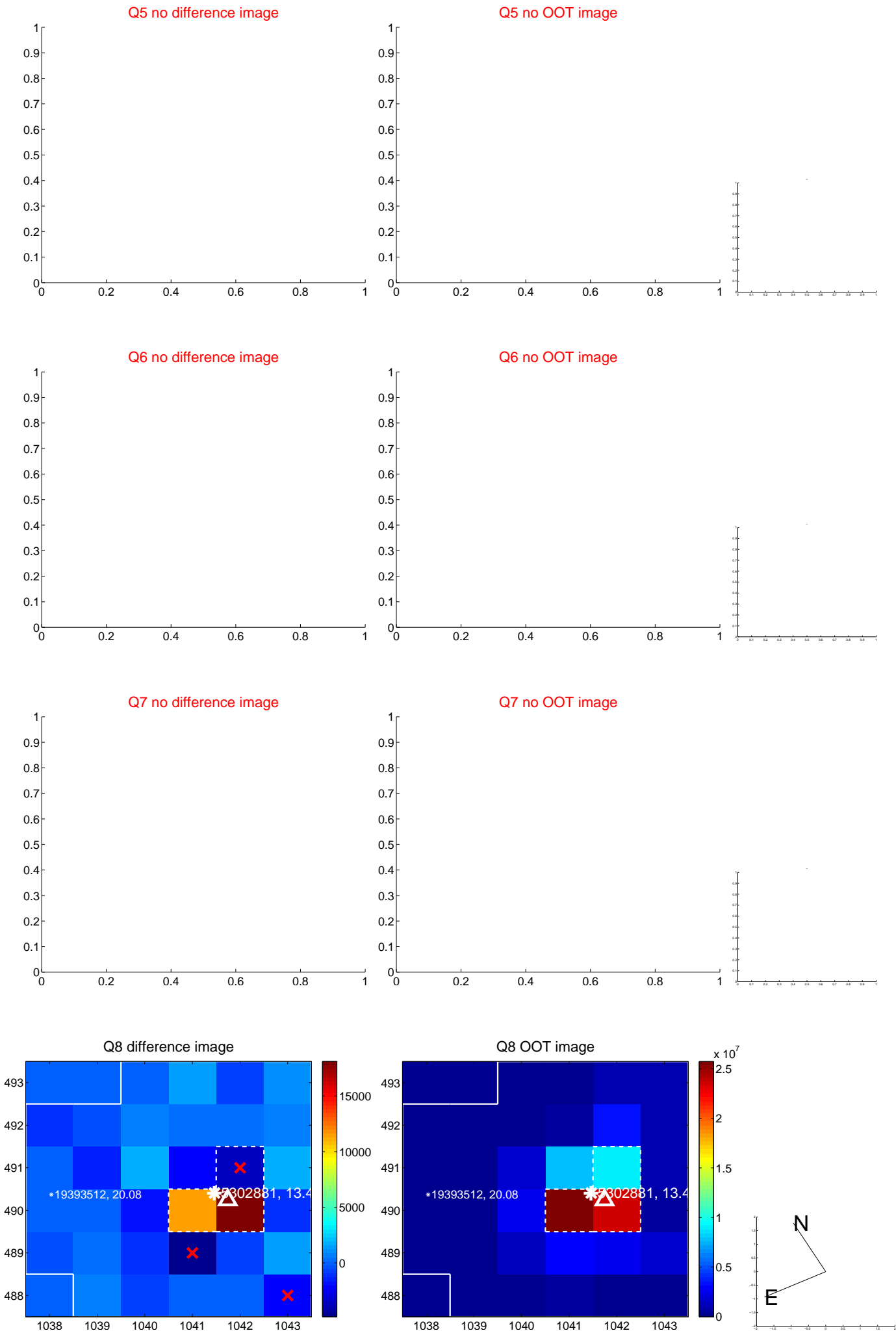
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

Q13 no difference image



Q13 no OOT image



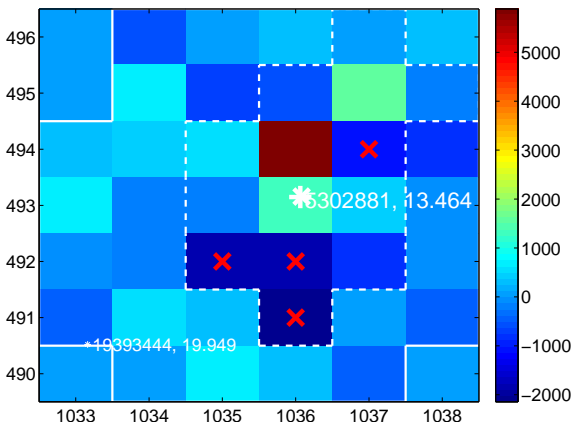
Q14 no difference image



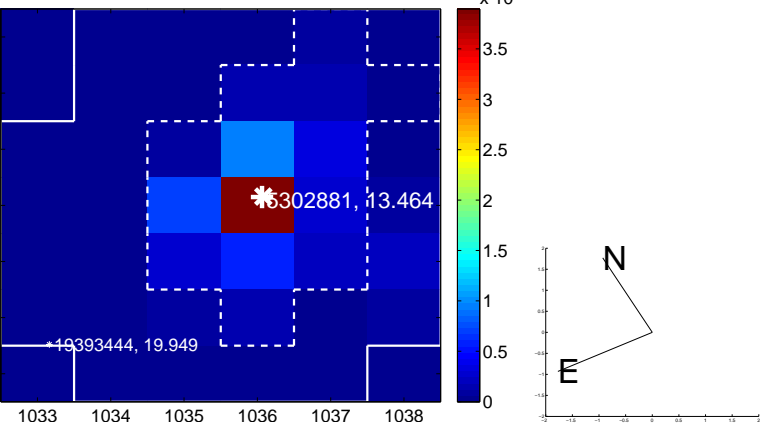
Q14 no OOT image



Q15 difference image. Poor Quality



Q15 OOT image



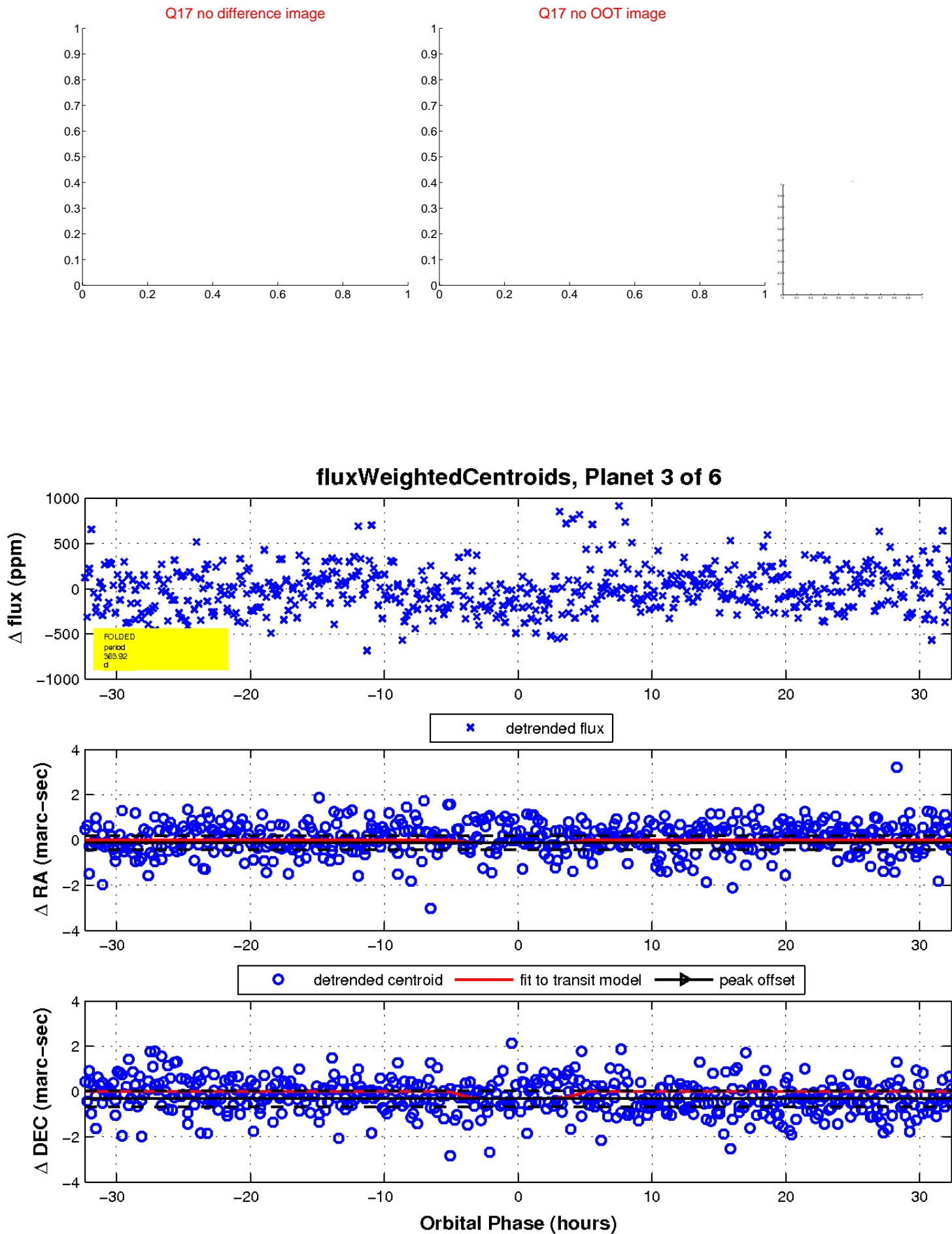
Q16 no difference image



Q16 no OOT image

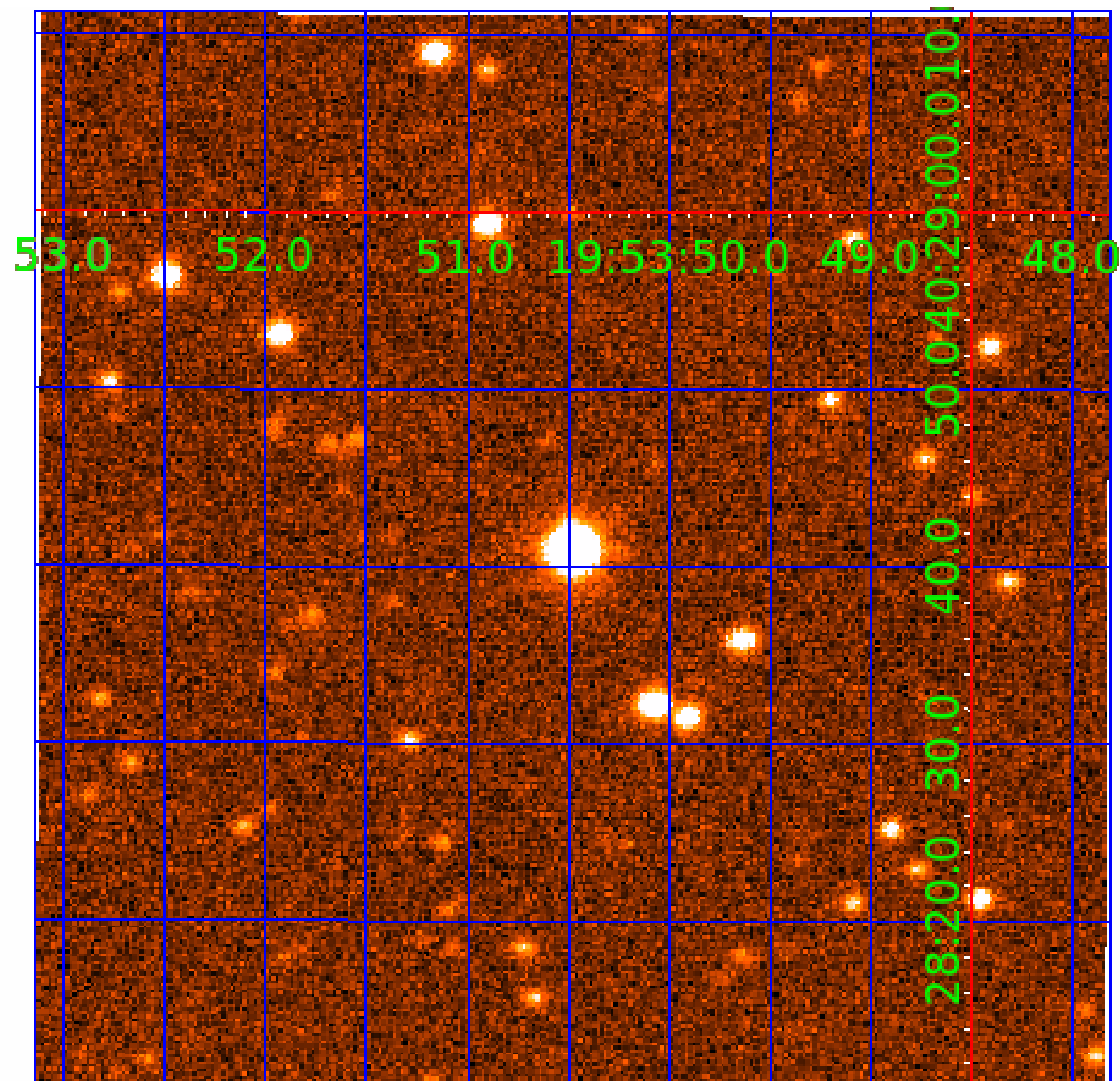


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
005302881-02	OBS	No	180.849404	178.169022	233.3	20.412	10.7	8.5	4.02	6413	7.61	43.95
005302881-03	OBS	No	363.915884	376.574365	352.3	10.811	8.7	8.9	4.02	6413	9.37	17.30
005302881-04	OBS	No	49.250942	175.481490	265.8	3.501	8.5	9.2	4.02	6413	8.35	249.01
005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

**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.

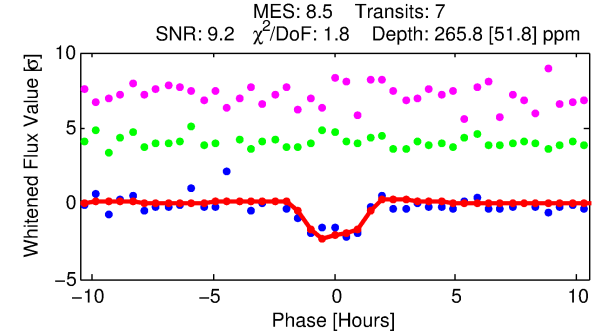
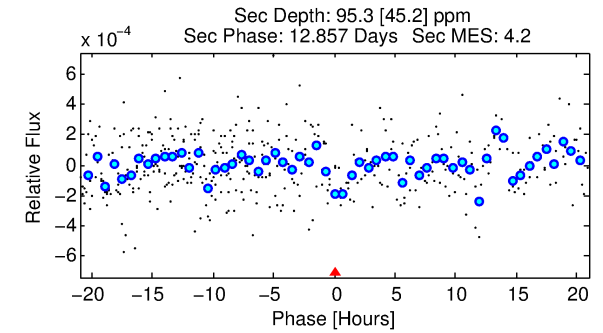
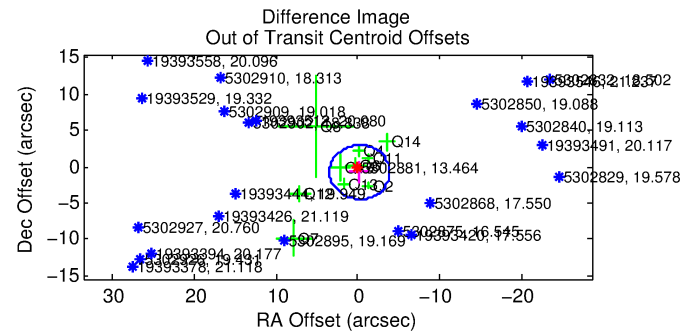
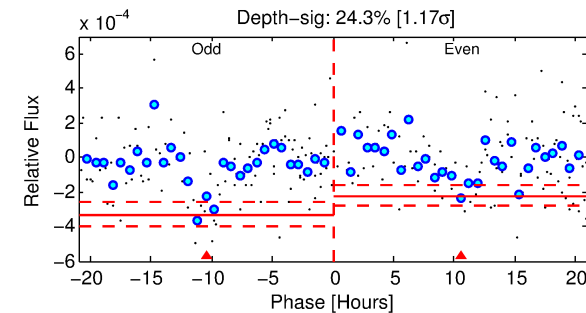
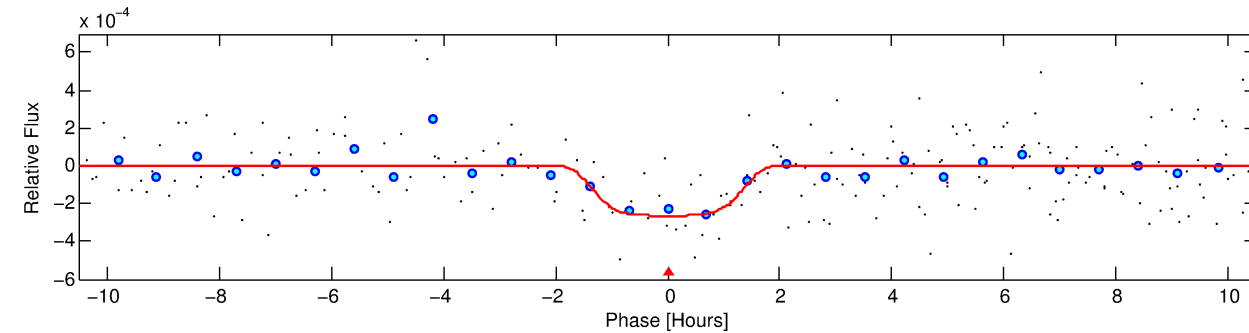
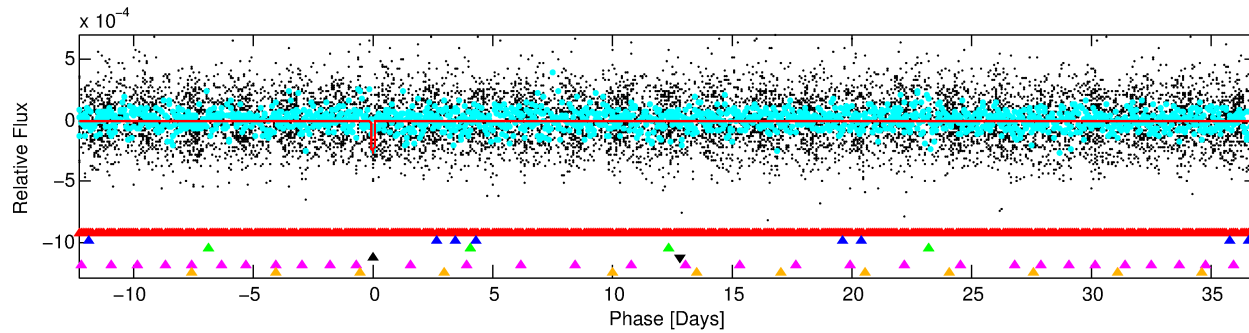
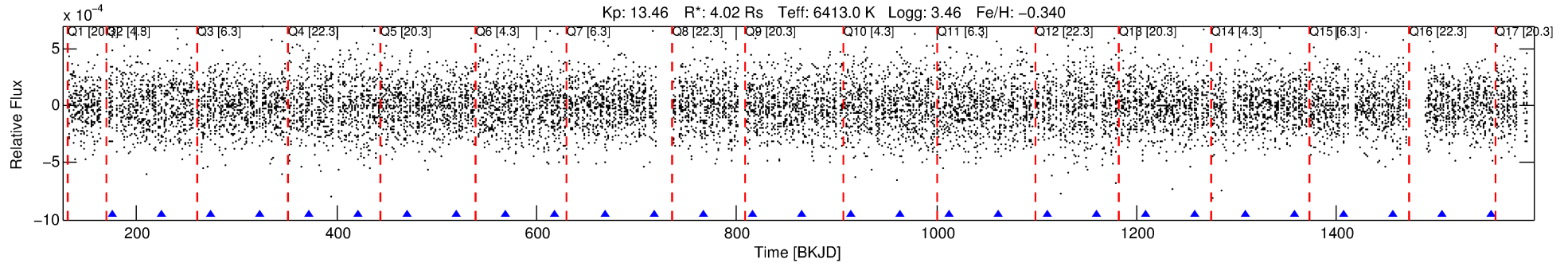
Ephemeris Match Information For 005302881-04

No Significant Match Found



# DV One-Page Summary

KIC: 5302881 Candidate: 4 of 6 Period: 49.251 d



## DV Fit Results:

Period = 49.25094 [0.00115] d  
Epoch = 175.4815 [0.0137] BKJD  
Rp/R\* = 0.0190 [0.0034]  
a/R\* = 34.99 [23.72]  
b = 0.97 [0.05]  
Seff = 249.01 [166.61]  
Teq = 1013 [169] K  
Rp = 8.35 [3.95] Re  
a = 0.3138 [0.1303] AU  
Ag = 74.00 [65.45] [1.12σ]  
Teffp = 4593 [693] K [5.02σ]

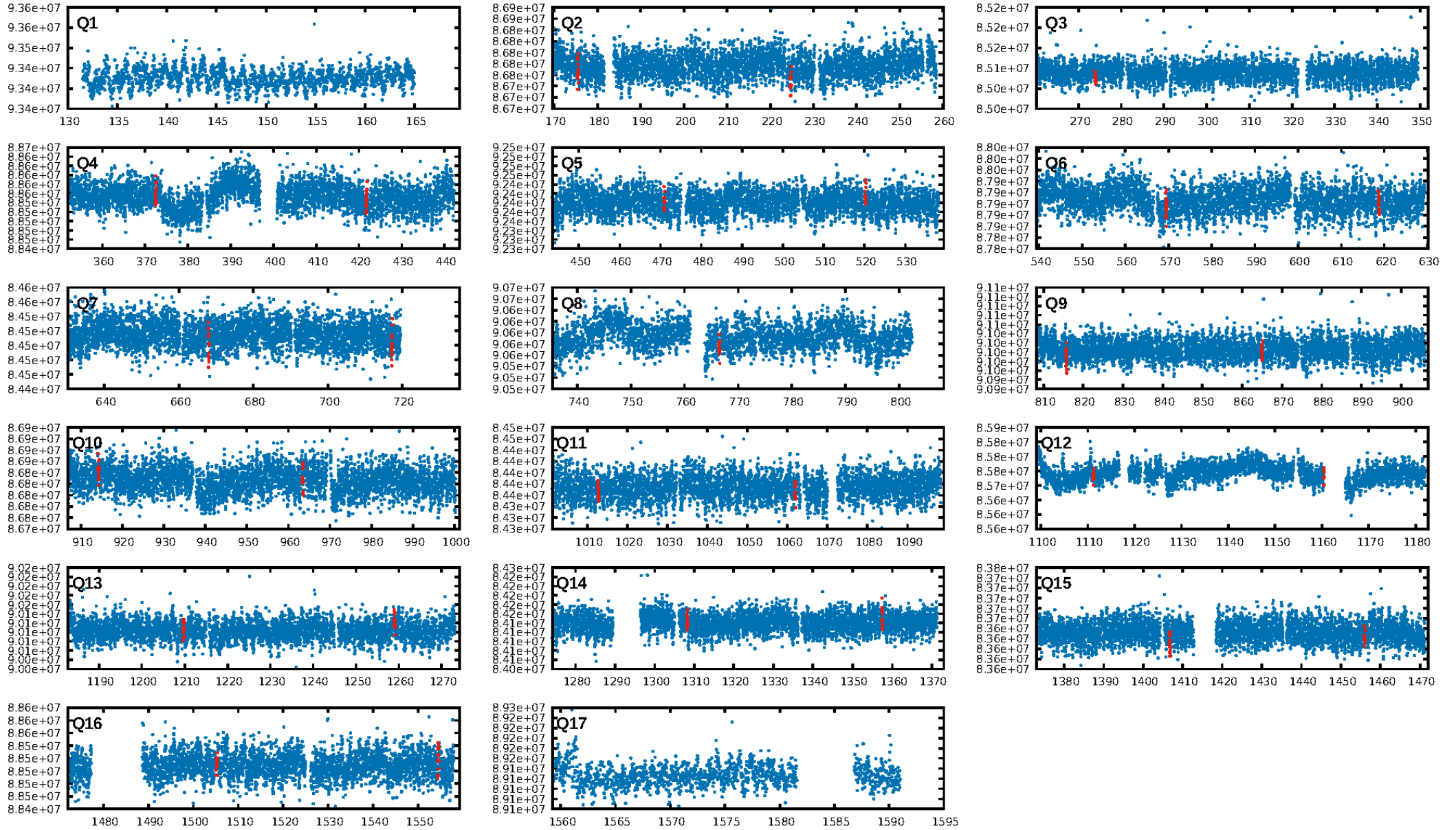
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [8.19σ]  
LongPeriod-sig: 100.0% [175.69σ]  
ModelChiSquare2-sig: 12.9%  
ModelChiSquareGof-sig: 98.8%  
**Bootstrap-pfa: 6.66e-08**  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 0.05843  
Centroid-sig: 30.2%  
Centroid-so: 1.006 arcsec [1.28σ]  
OotOffset-rm: 0.780 arcsec [0.63σ]  
KicOffset-rm: 0.741 arcsec [0.60σ]  
OotOffset-st: 3/3/3/1 [10]  
KicOffset-st: 3/3/3/1 [10]  
DiffImageQuality-fgm: 0.30 [3/10]  
DiffImageOverlap-fno: 0.47 [7/15]

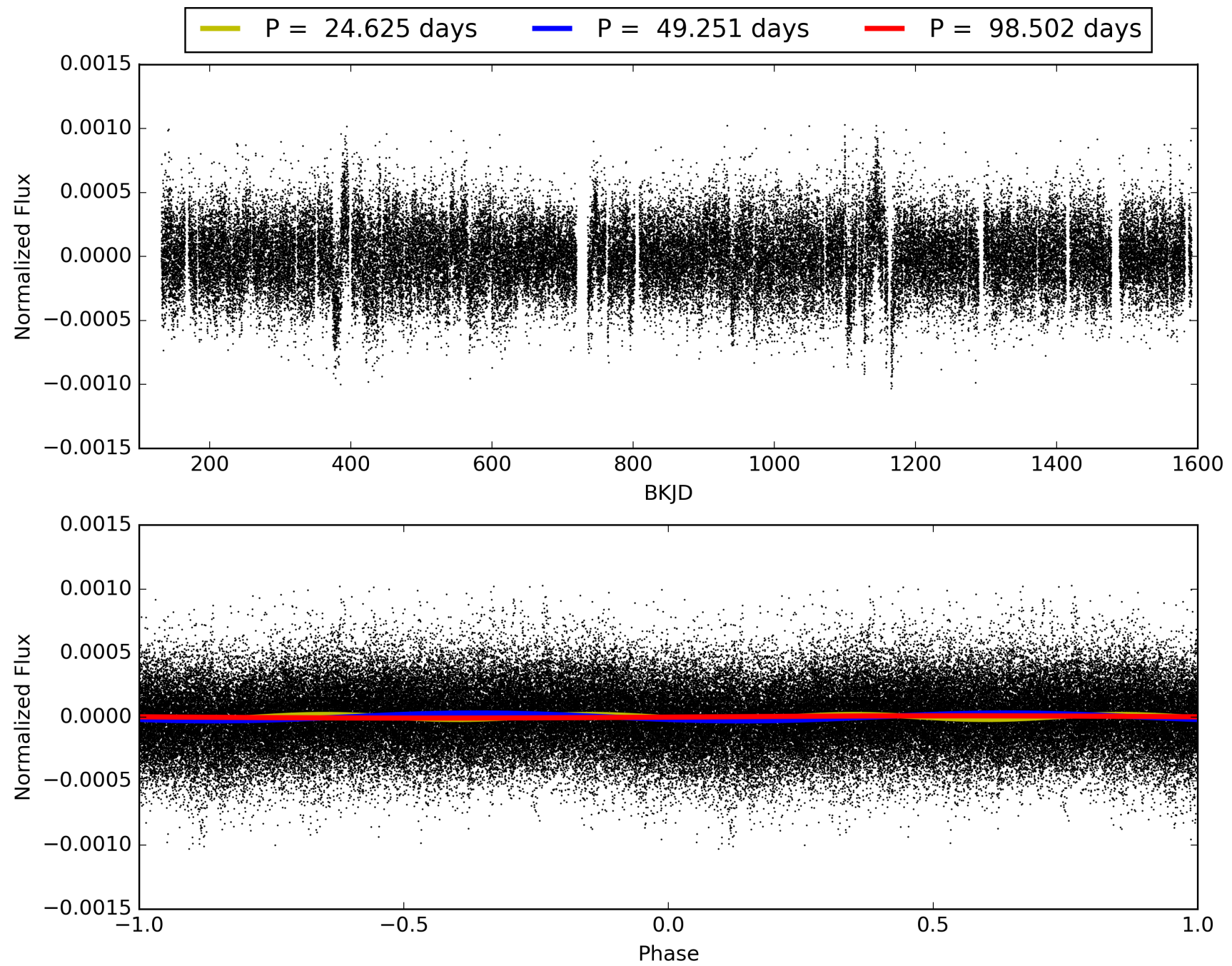
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:47 Z

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

# TCE 005302881-04, PDC Light Curves

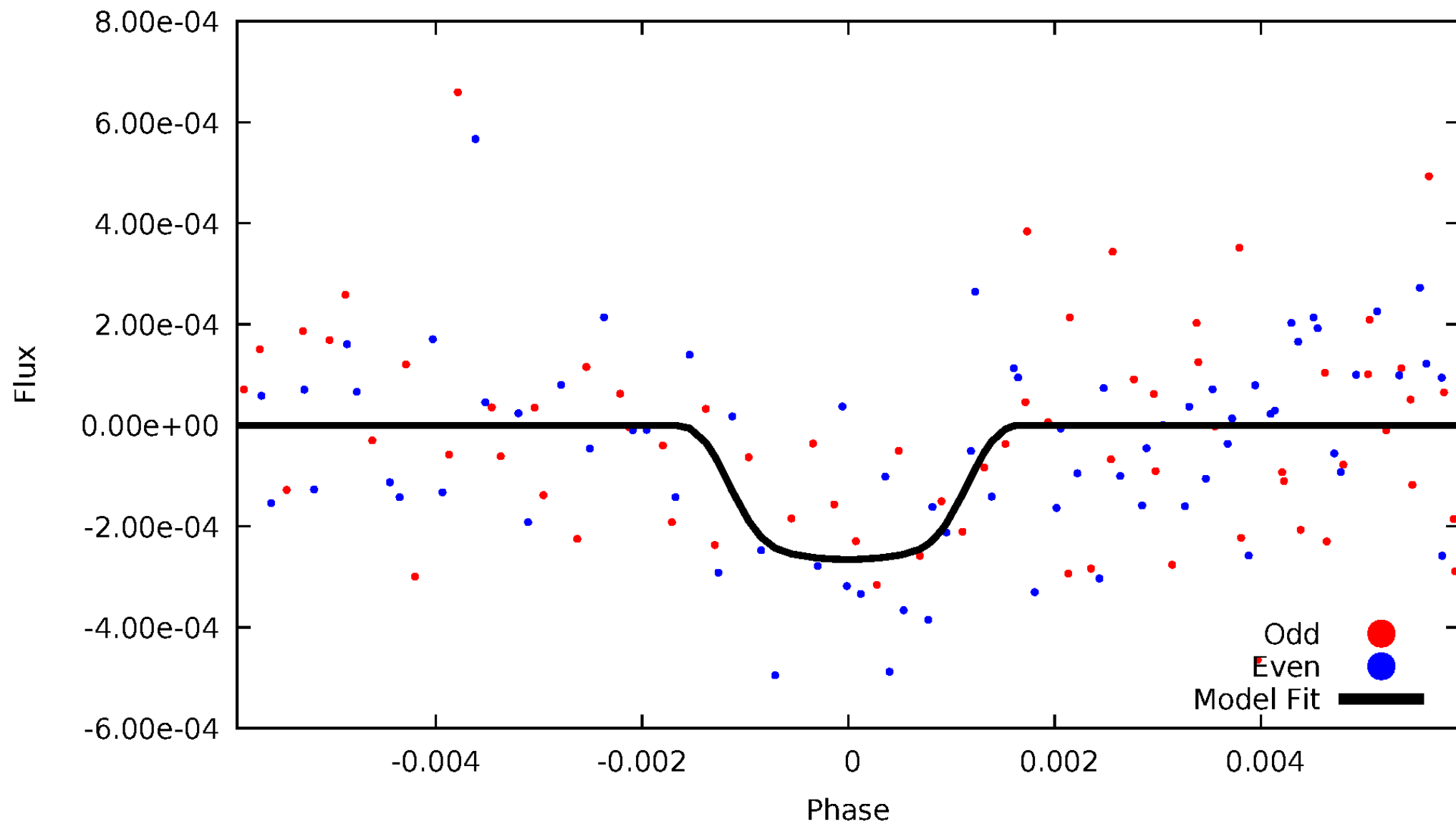


TCE 005302881-04



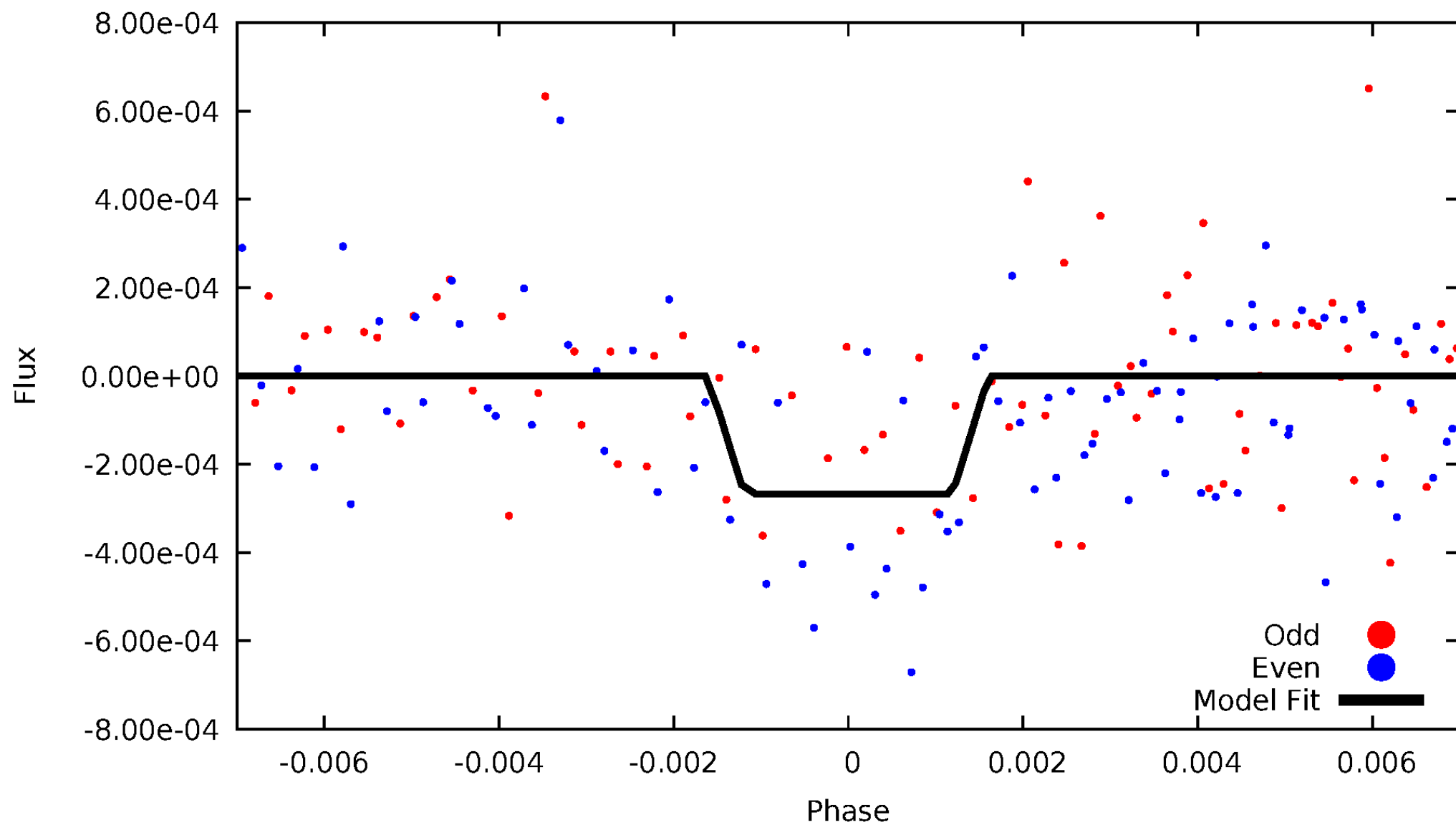
# DV Odd/Even

TCE 005302881-04



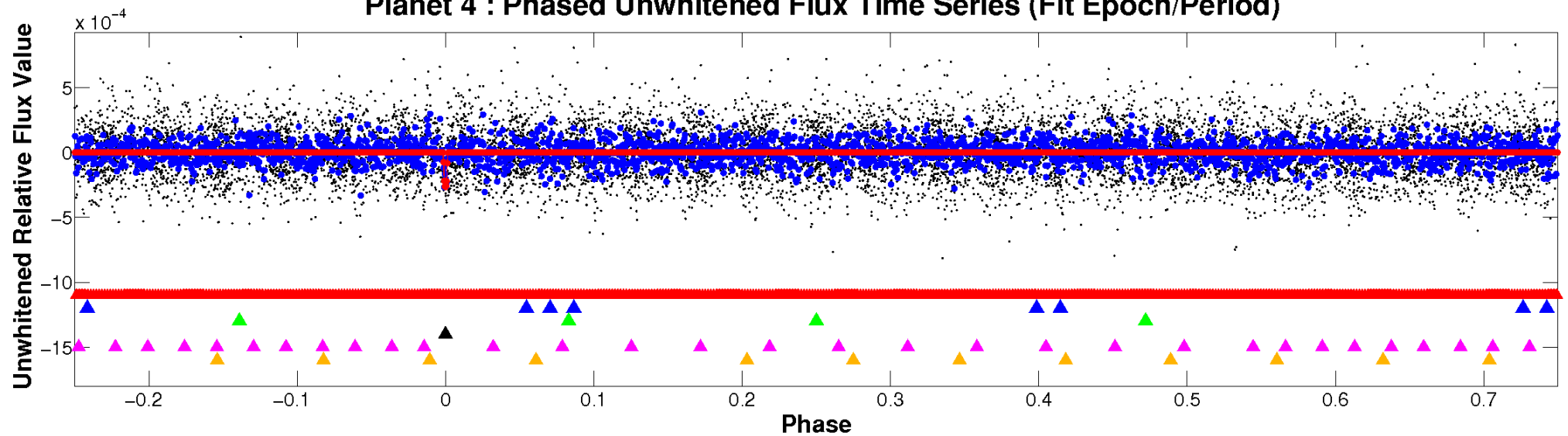
# ALT Odd/Even

TCE 005302881-04

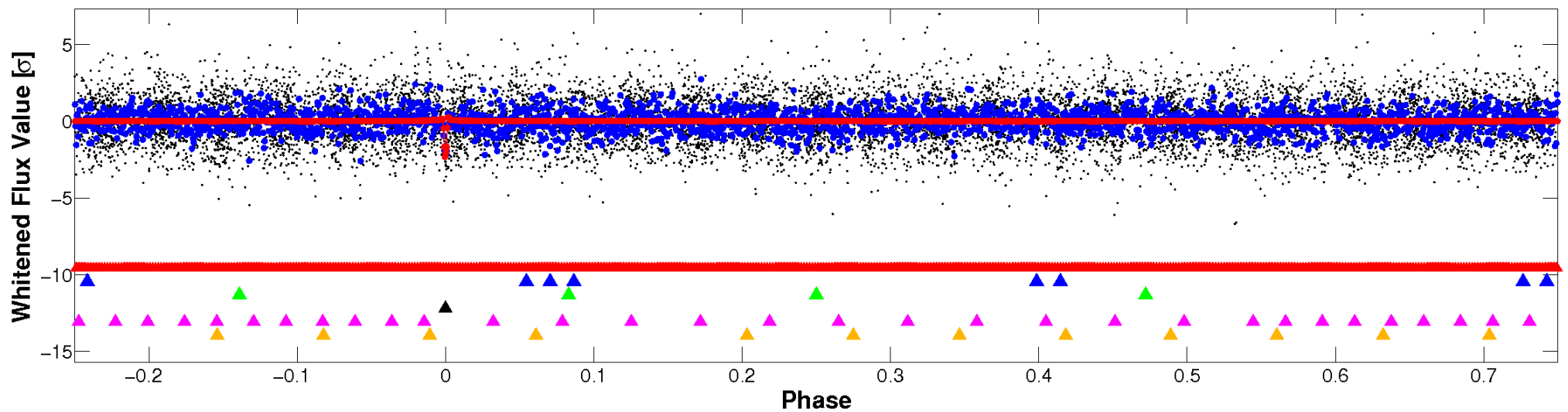


# Non-Whitened Vs. Whitened Light Curve

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



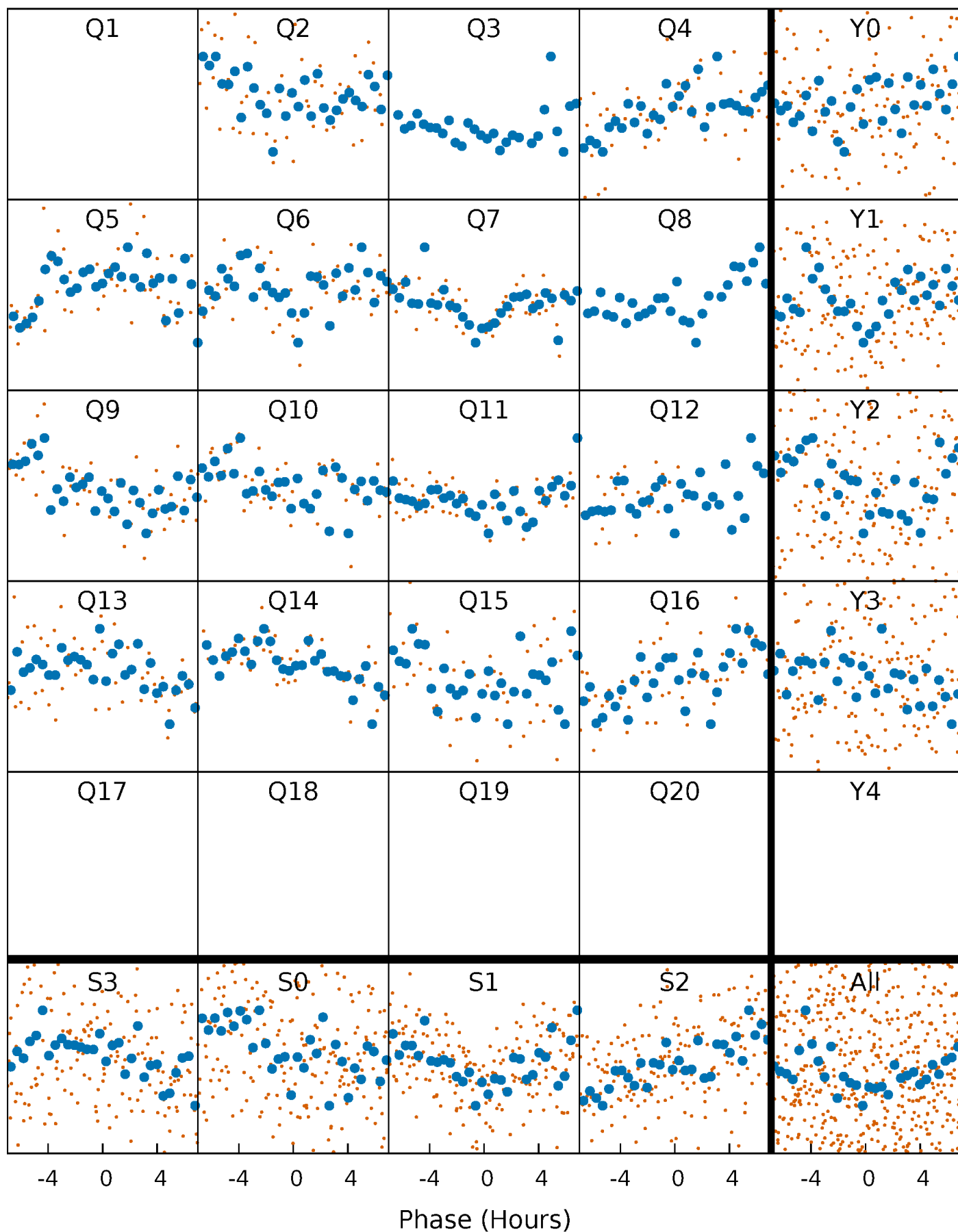
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

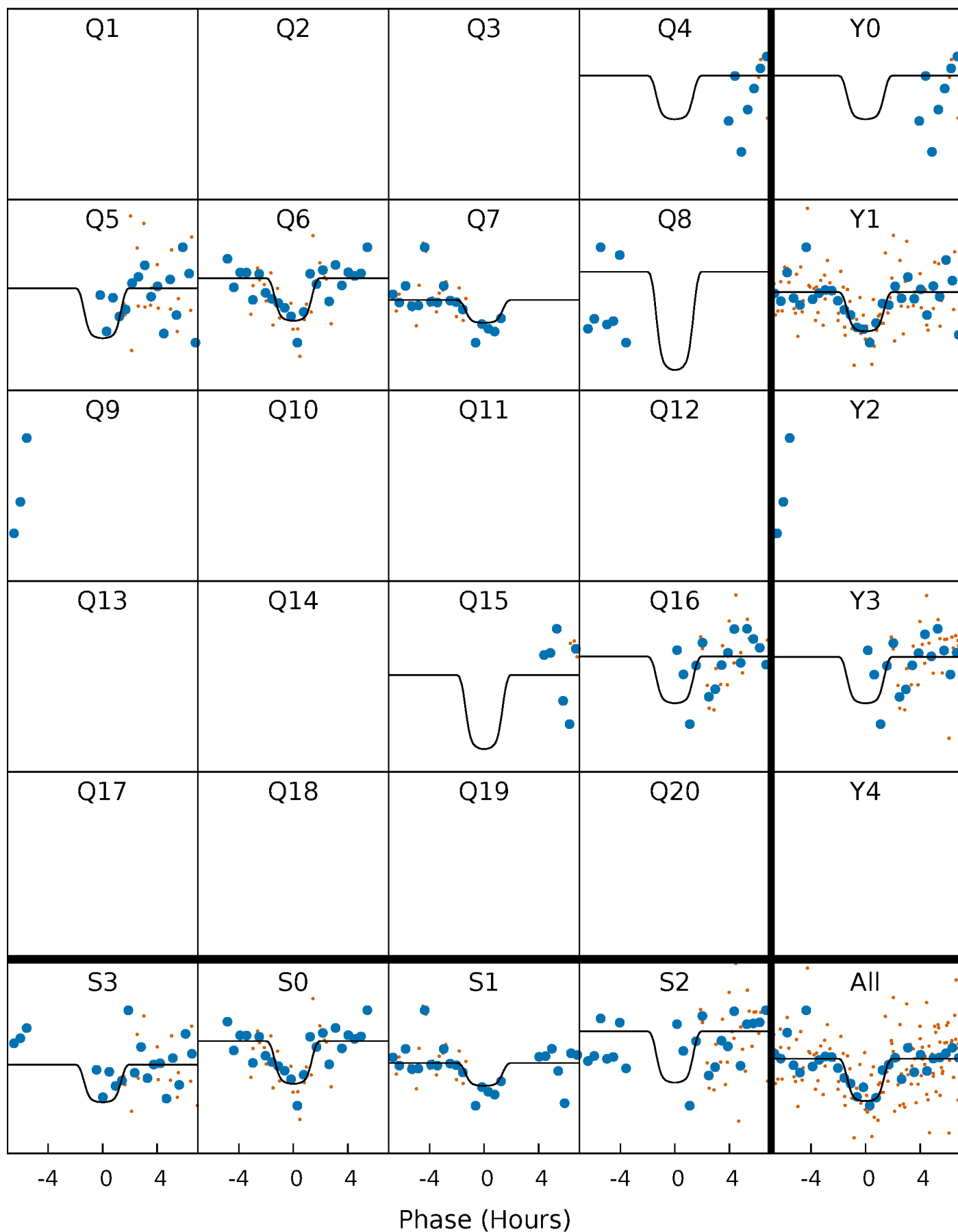
TCE 005302881-04   P= 49.250942 Days    $T_0=175.481491$  (BKJD)





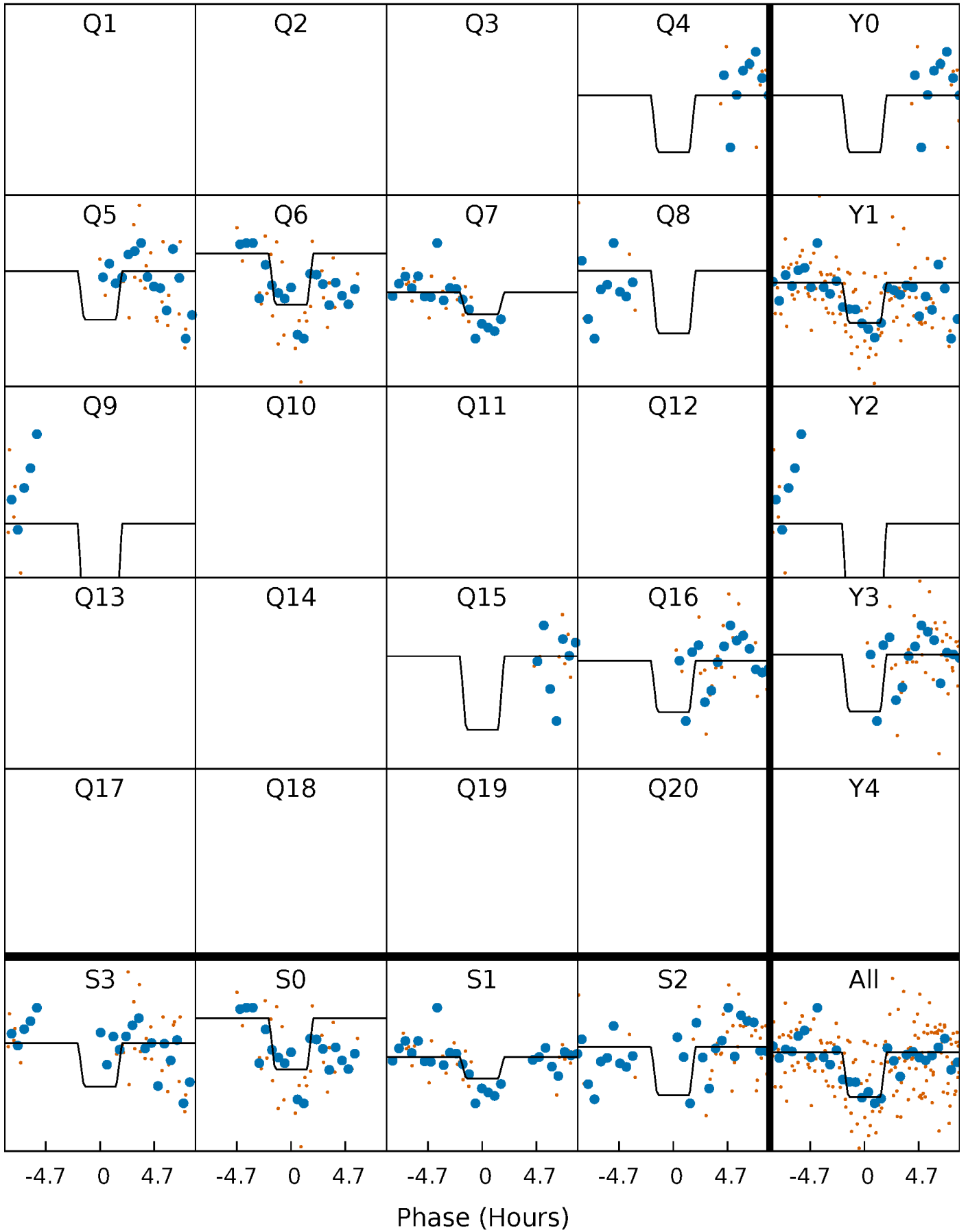
# DV Quarter-Phased Transit Curves

TCE 005302881-04   P= 49.250942 Days    $T_0=175.481491$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

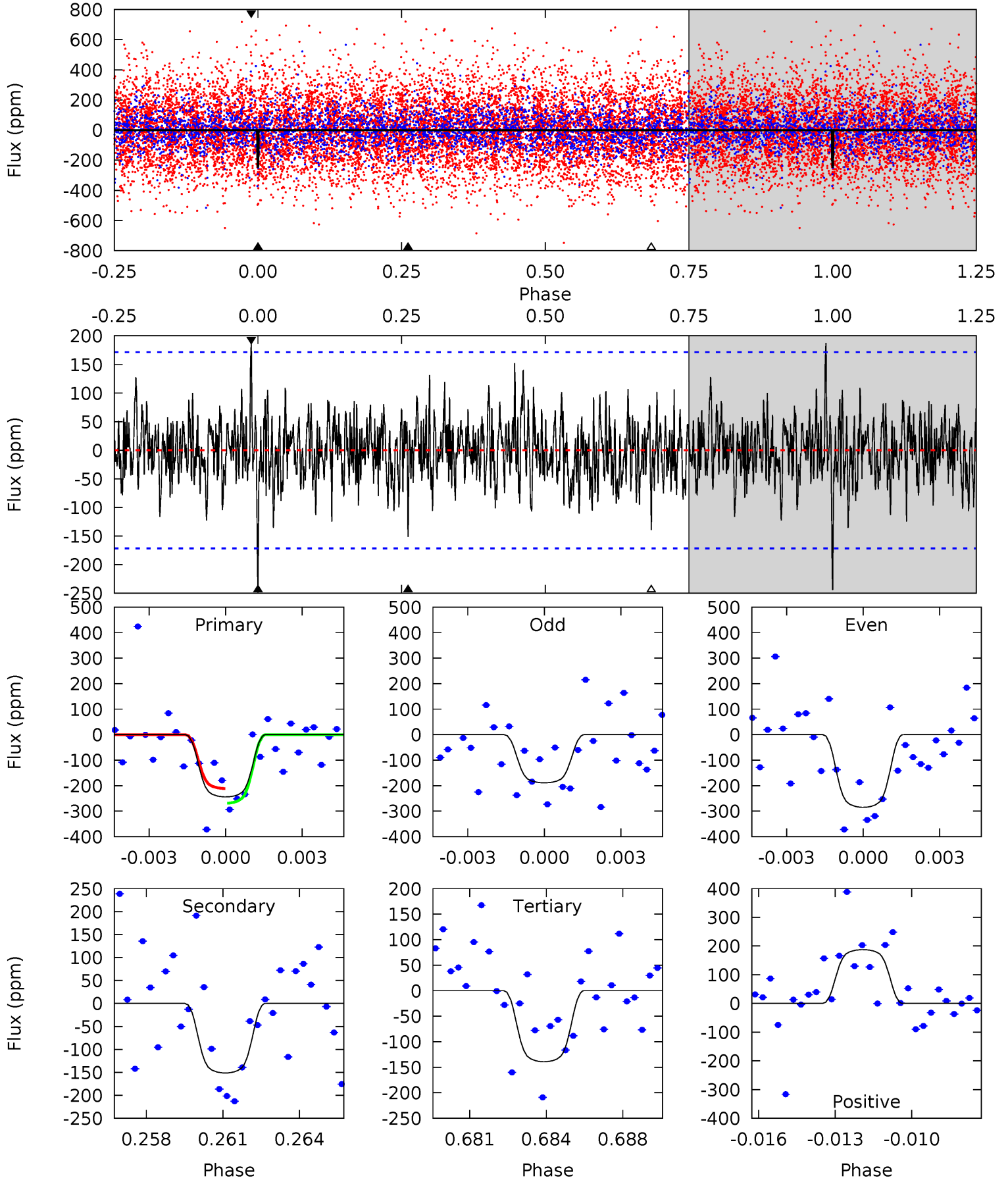
TCE 005302881-04     $P = 49.251067$  Days     $T_0 = 175.464646$  (BKJD)



# DV Model-Shift Uniqueness Test

005302881-04, P = 49.250942 Days, E = 126.230549 Days

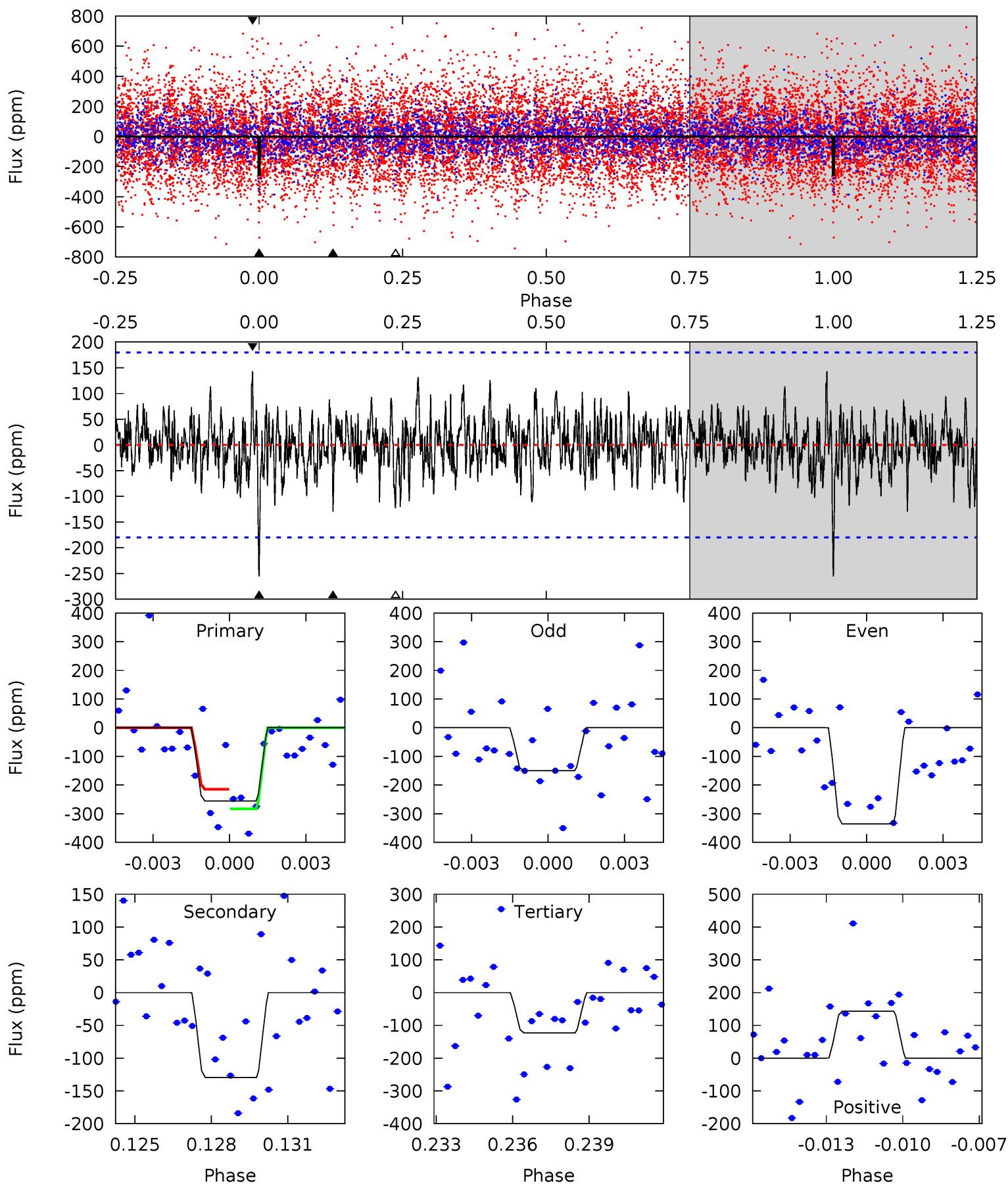
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.46	4.63	4.26	5.73	5.24	2.95	1.35	3.20	1.73	0.37	-1.10	1.46	1.02	0.43	0.87



# Alt Model-Shift Uniqueness Test

005302881-04, P = 49.251067 Days, E = 126.213579 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
7.45	3.77	3.58	4.17	5.24	2.94	1.18	3.87	3.28	0.19	-0.40	2.72	0.99	0.36	0.98



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-151 \pm 33$	$7.80^{+2.05}_{-2.10}$	$1384^{+94}_{-144}$	$5177^{+596}_{-442}$	$128^{+114}_{-47}$
Alt.	$-129 \pm 34$	$6.72^{+1.82}_{-1.83}$	$1385^{+86}_{-135}$	$5335^{+715}_{-544}$	$152^{+137}_{-65}$

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

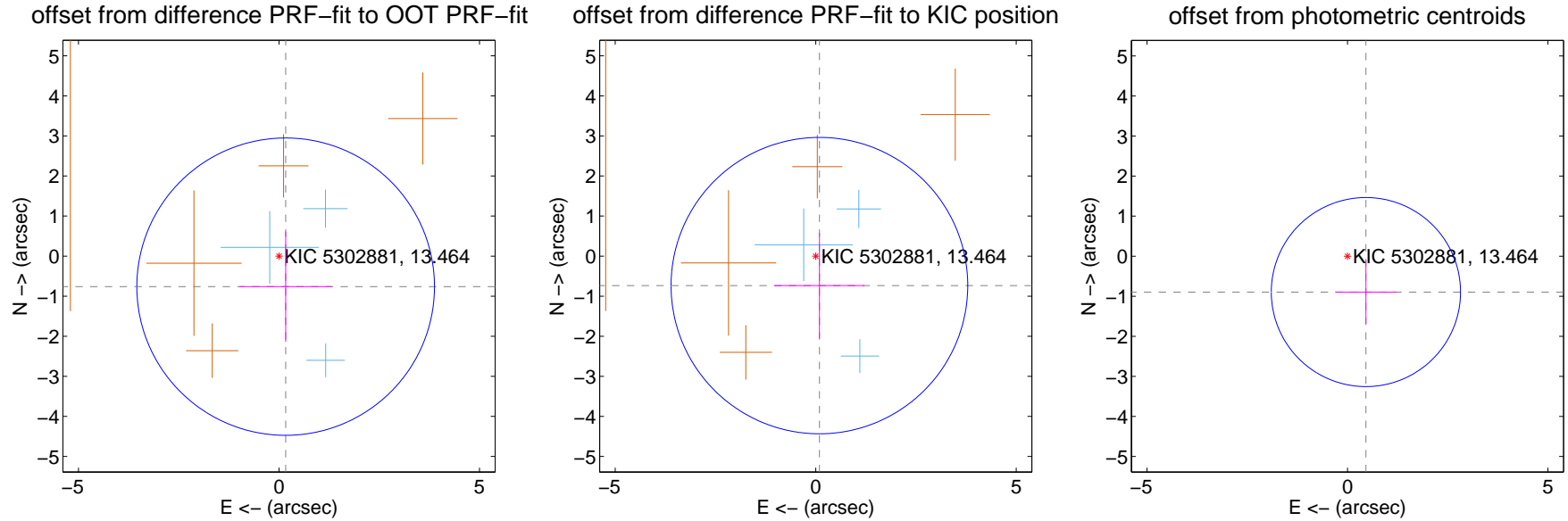
## DV Centroid Data

Supplemental centroid analysis for 005302881-04. Kepler magnitude: 13.46. Transit SNR 9.18

There are 3 quarters with good PRF difference image offsets

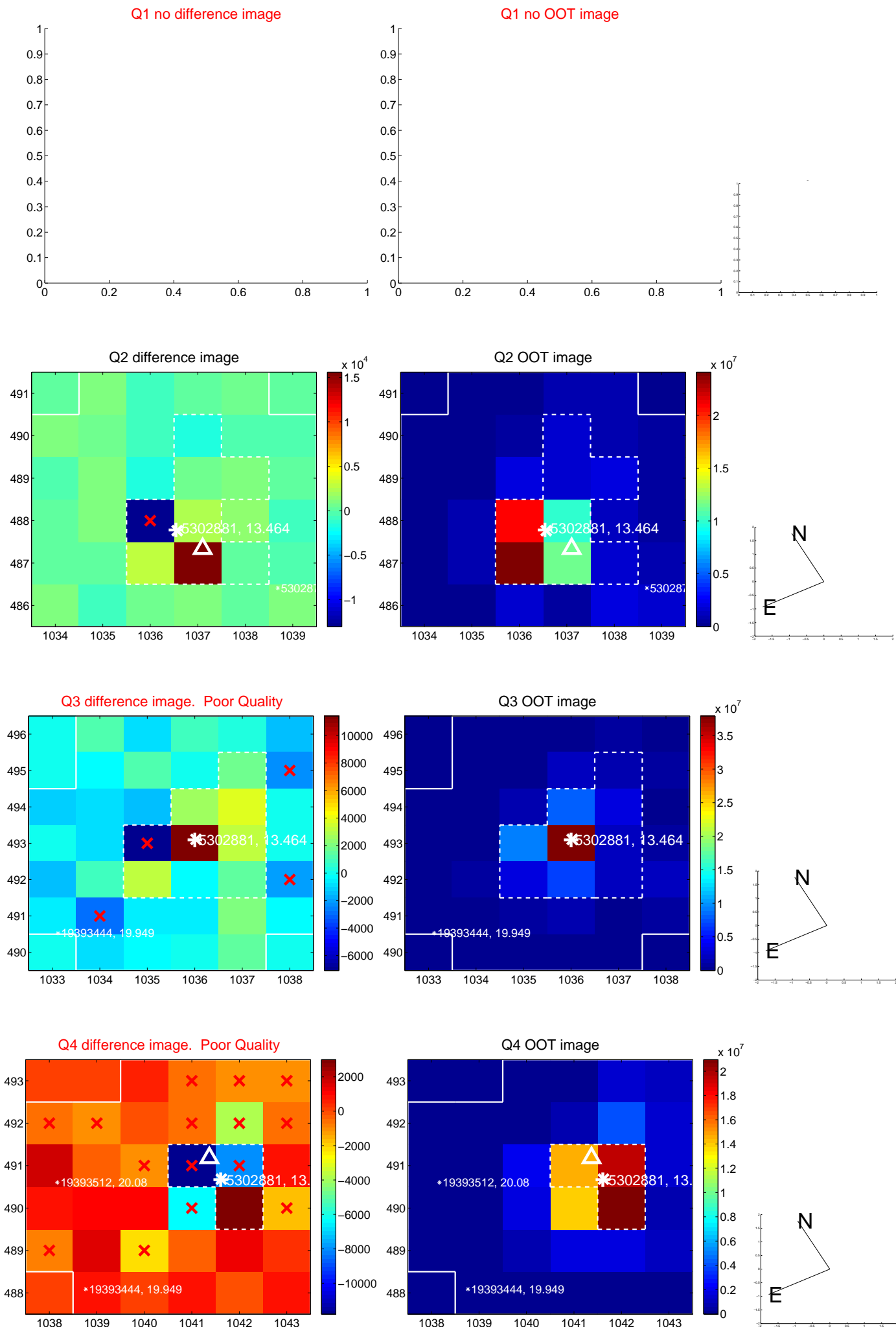
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.780 \pm 1.237$	0.63	$-0.166 \pm 1.152$	$-0.762 \pm 1.378$
PRF-fit source offset from KIC position	$0.741 \pm 1.233$	0.60	$-0.092 \pm 1.124$	$-0.736 \pm 1.318$
photometric centroid source offset	$1.01 \pm 0.79$	1.28	$-0.46 \pm 0.76$	$-0.90 \pm 0.79$



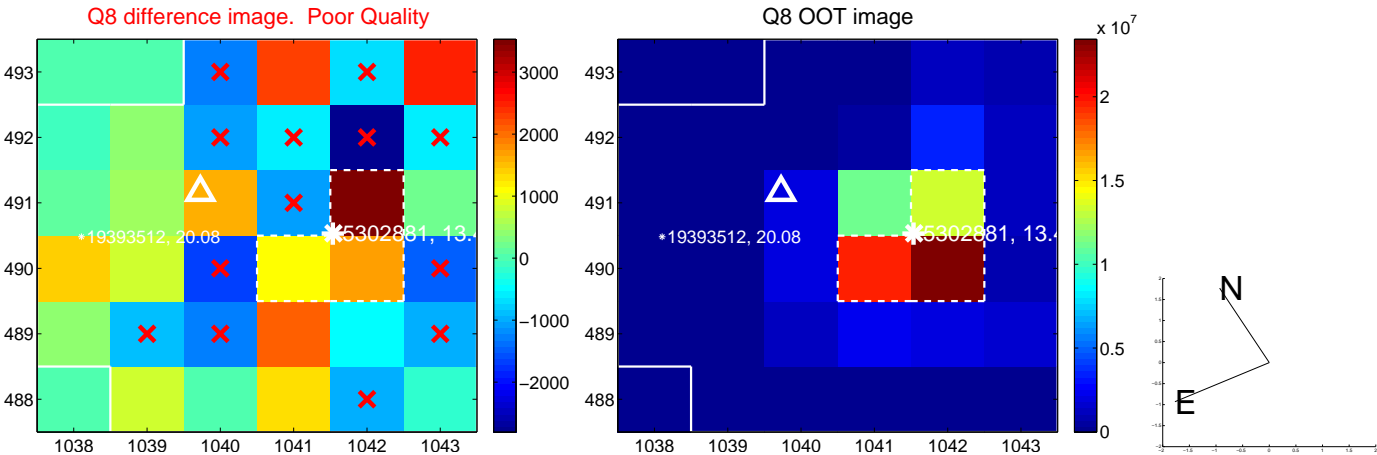
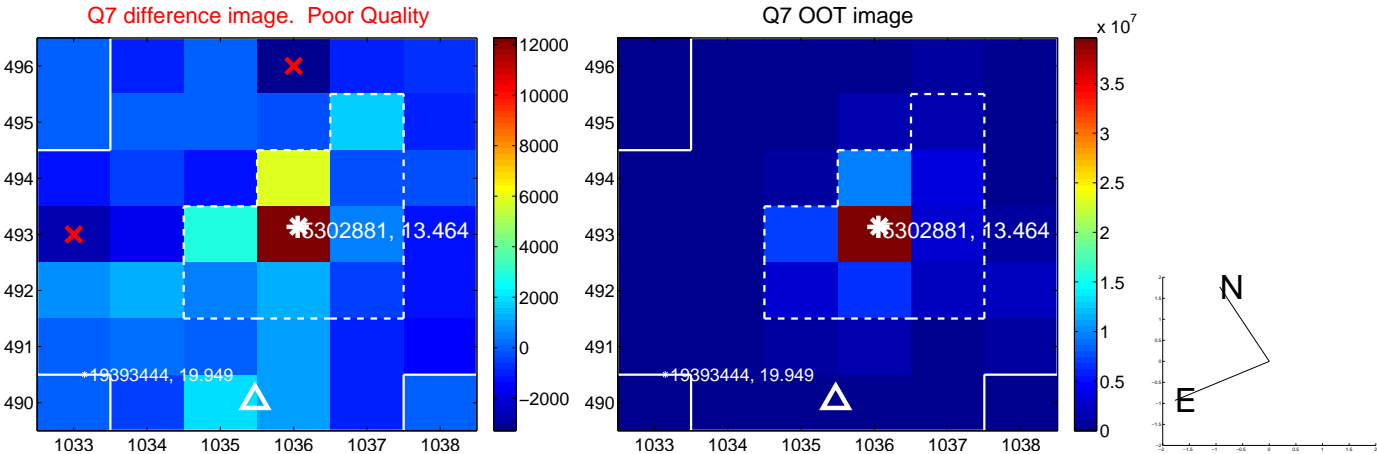
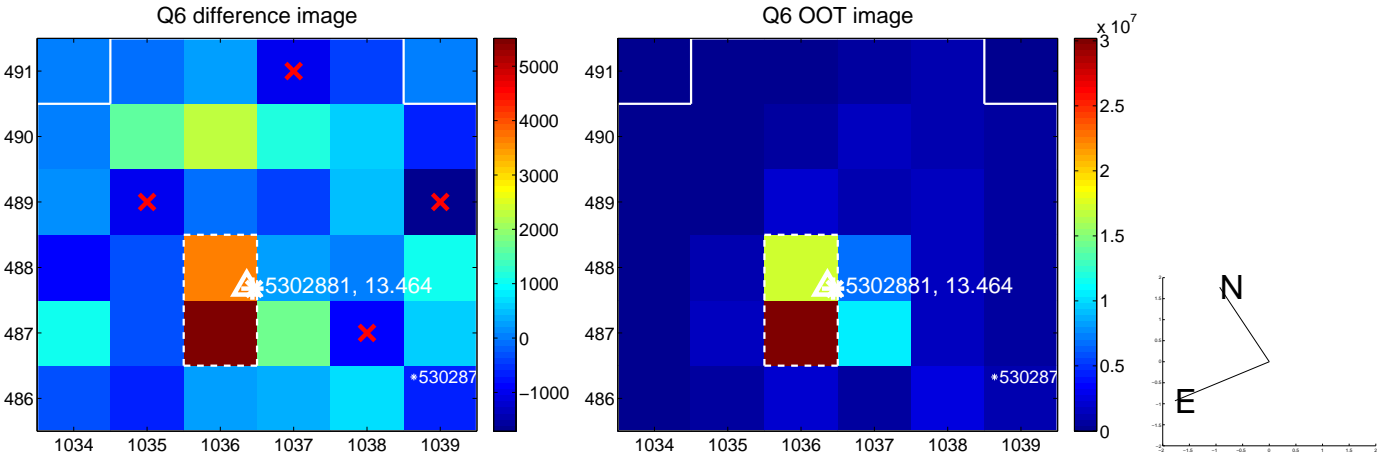
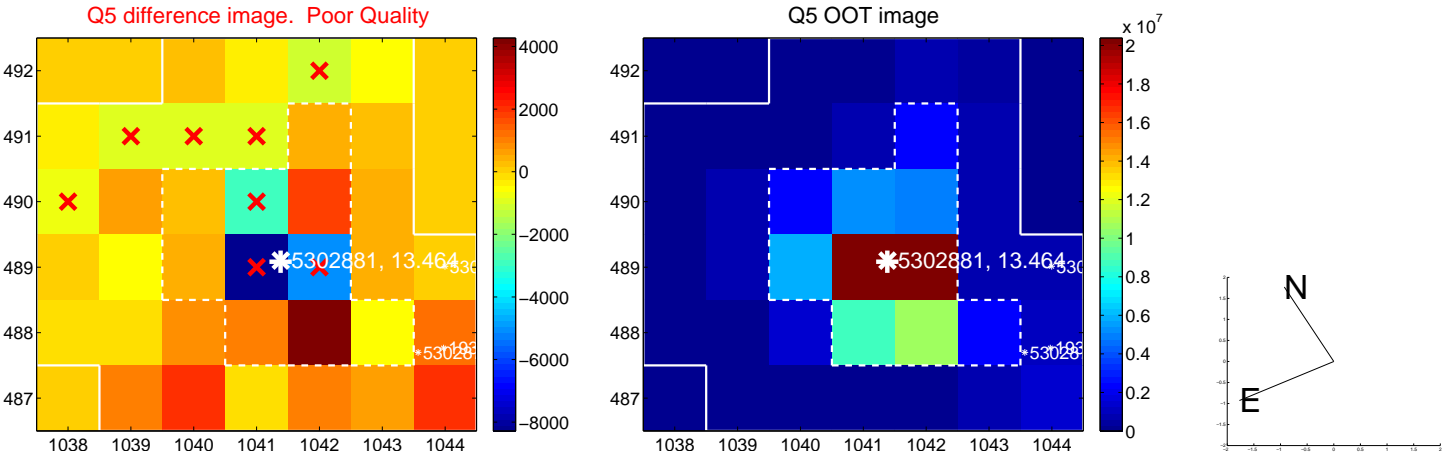
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

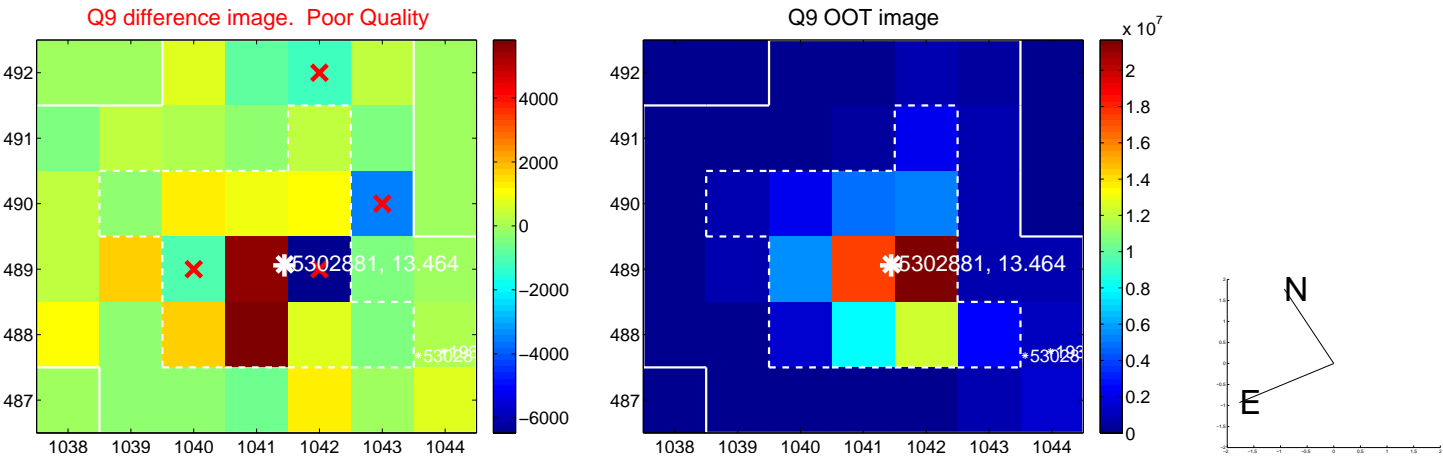




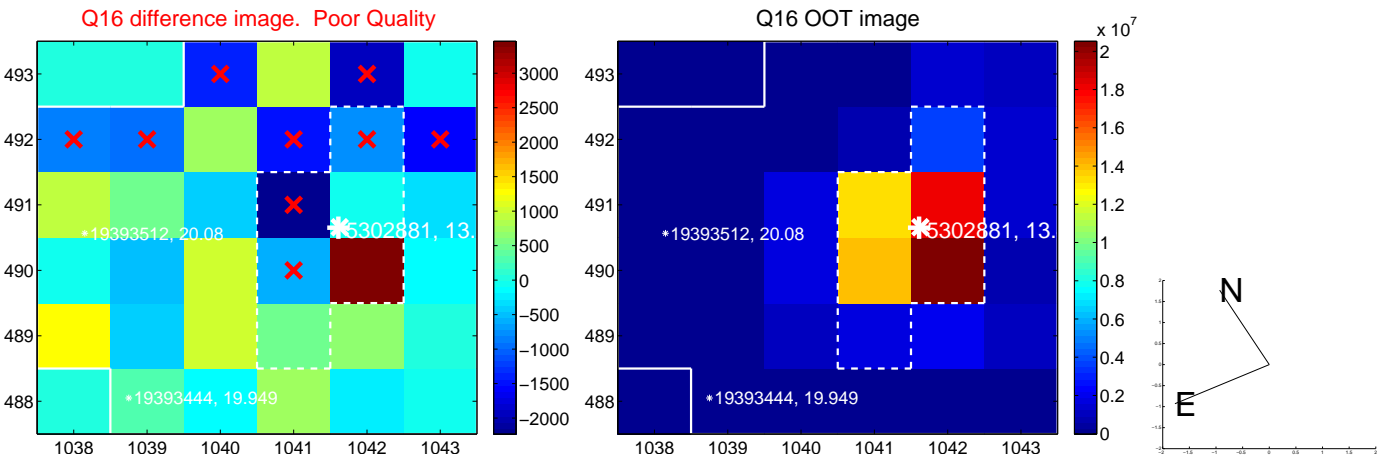
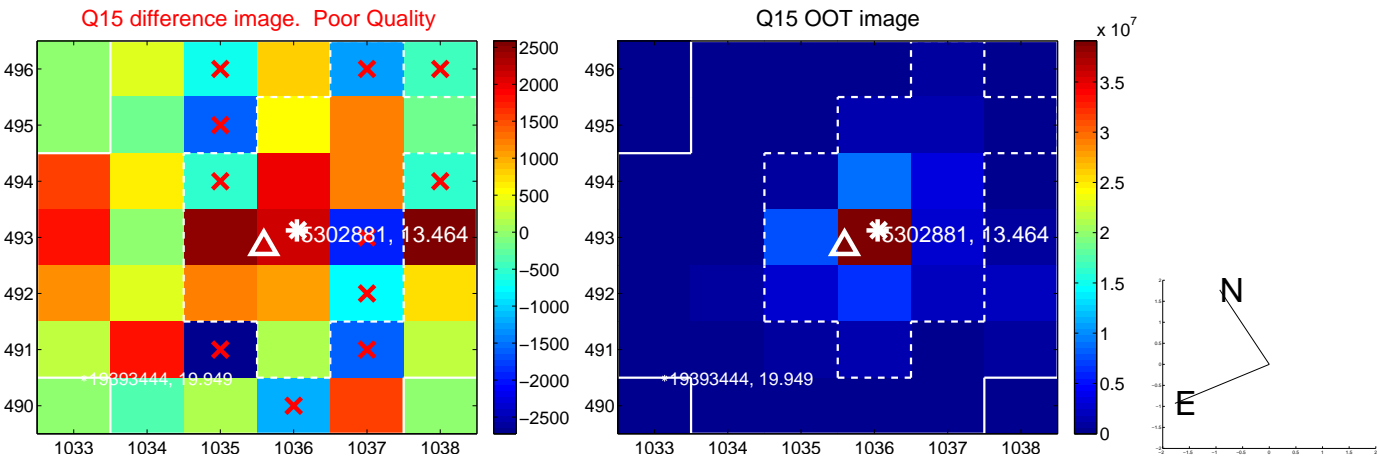
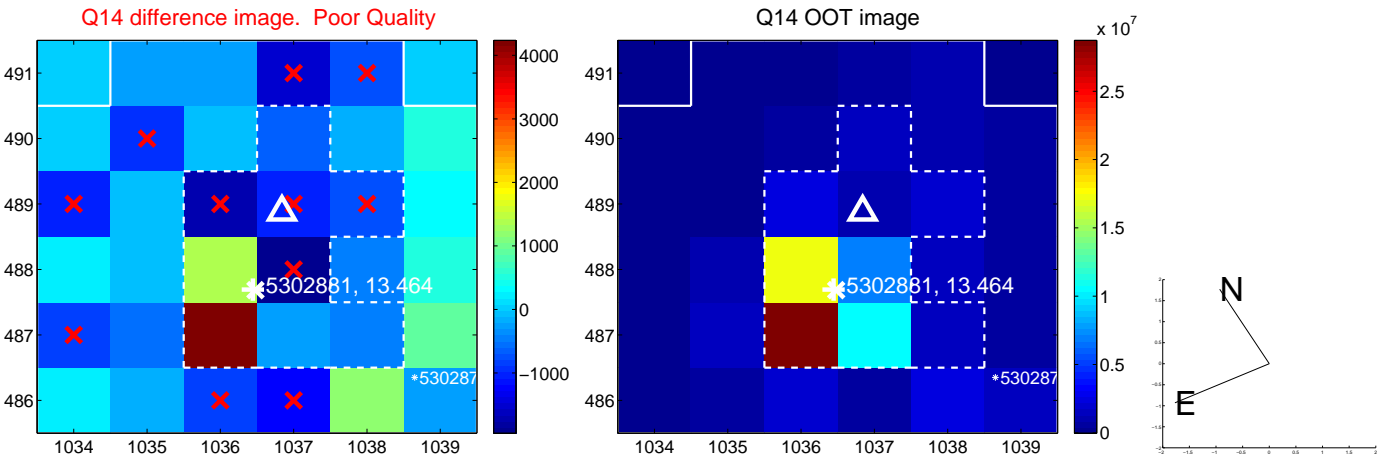
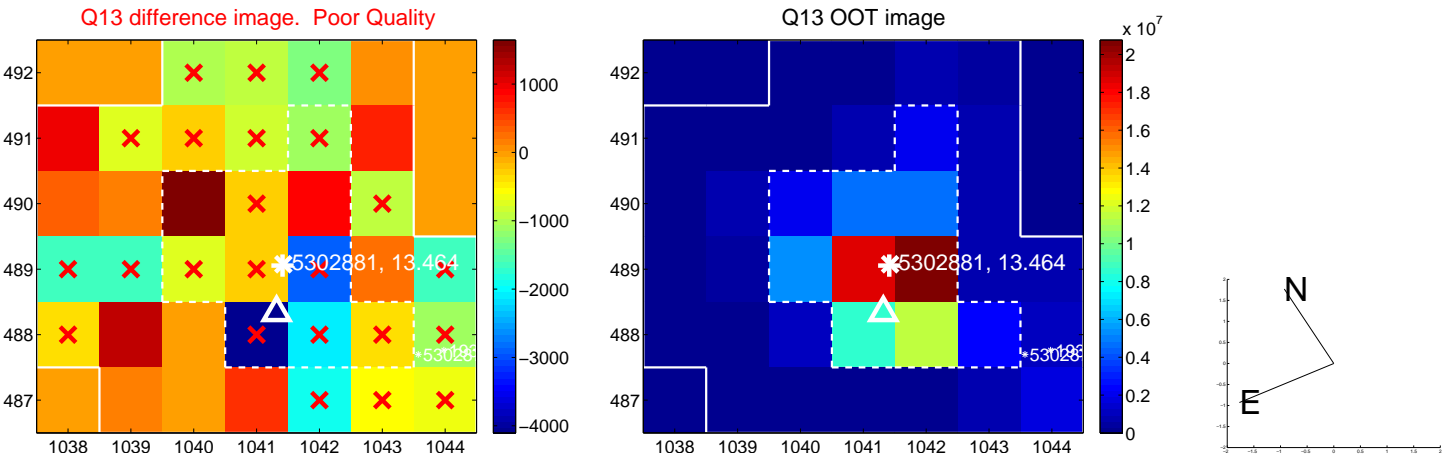
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



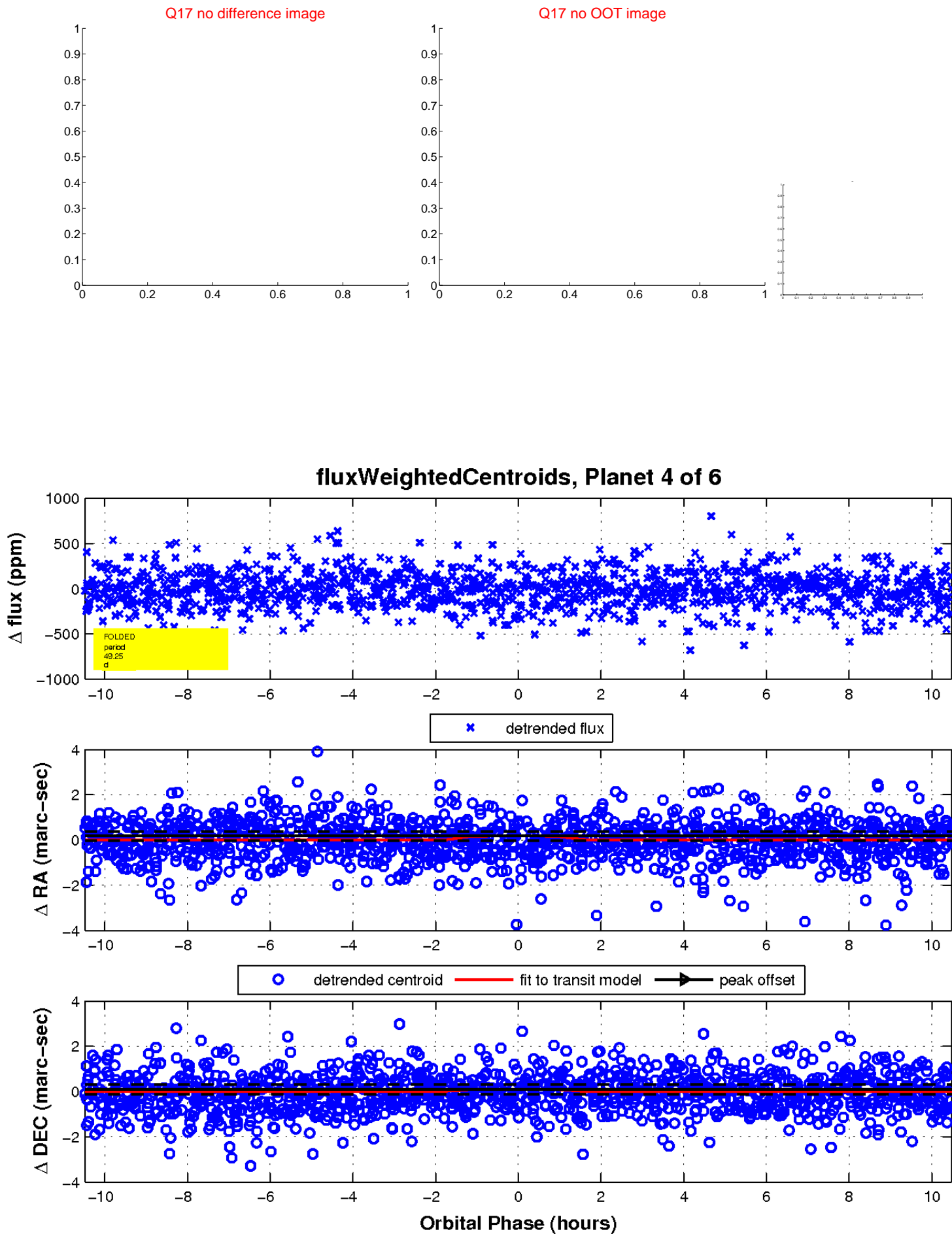
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

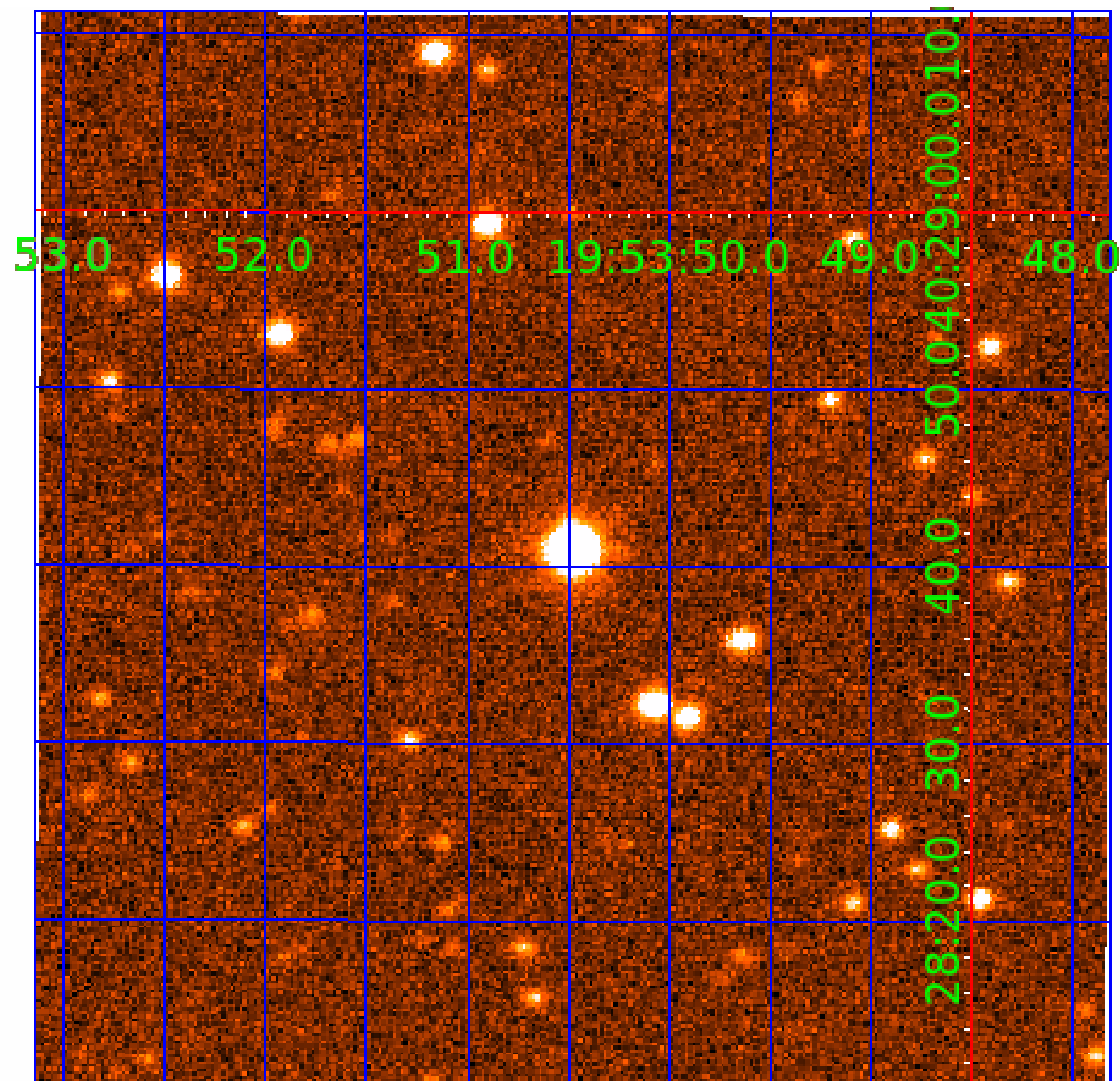


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
005302881-02	OBS	No	180.849404	178.169022	233.3	20.412	10.7	8.5	4.02	6413	7.61	43.95
005302881-03	OBS	No	363.915884	376.574365	352.3	10.811	8.7	8.9	4.02	6413	9.37	17.30
005302881-04	OBS	No	49.250942	175.481490	265.8	3.501	8.5	9.2	4.02	6413	8.35	249.01
005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

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

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

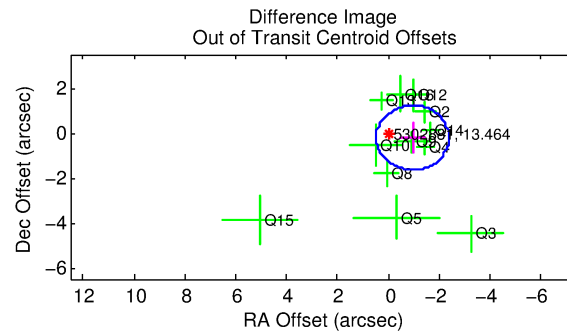
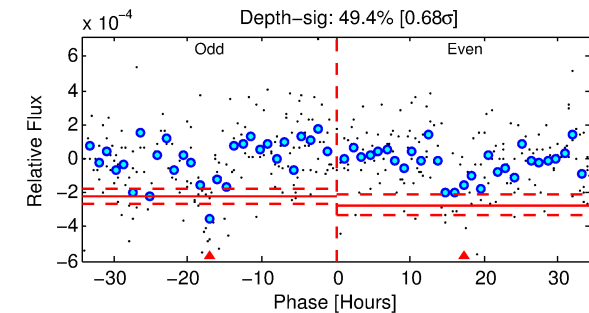
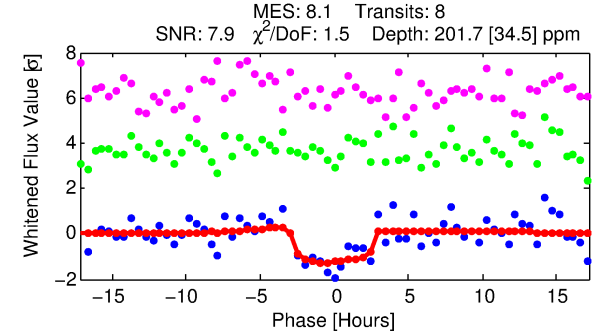
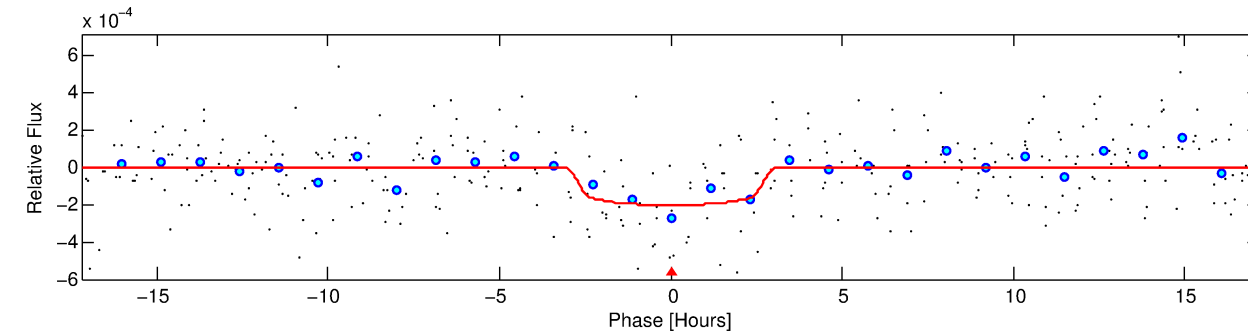
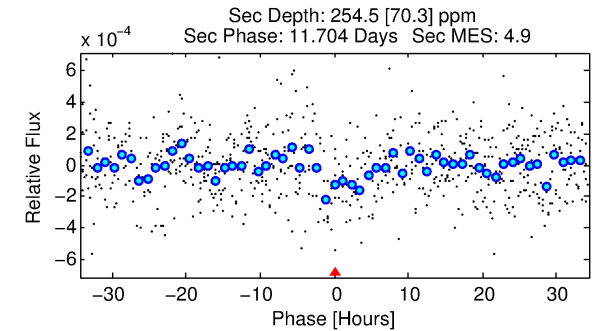
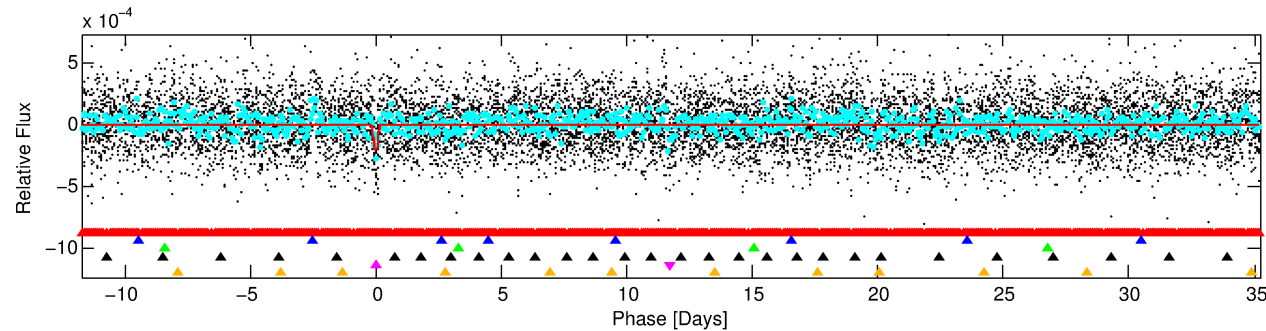
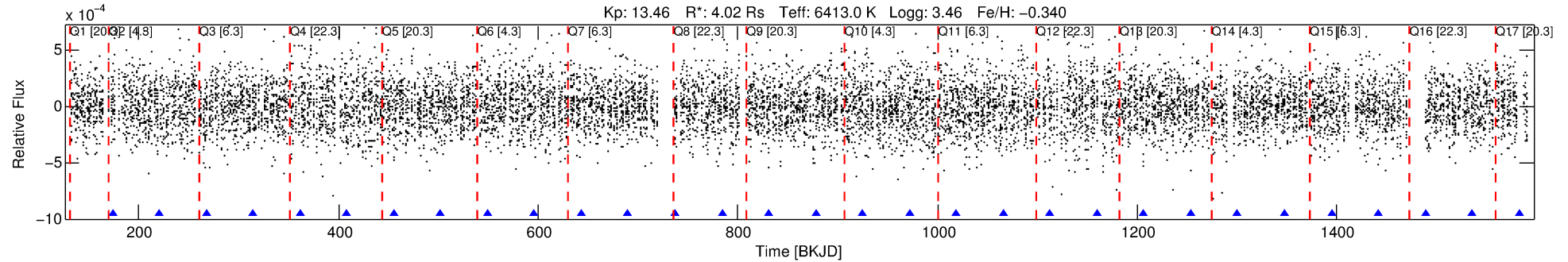
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005302881-05

No Significant Match Found

# DV One-Page Summary

KIC: 5302881 Candidate: 5 of 6 Period: 46.957 d



## DV Fit Results:

Period = 46.95680 [0.00163] d  
Epoch = 173.6989 [0.0231] BKJD  
Rp/R\* = 0.0146 [0.0078]  
a/R\* = 35.84 [104.54]  
b = 0.84 [1.05]  
Seff = 265.36 [177.55]  
Teq = 1029 [172] K  
Rp = 6.41 [4.44] Re  
a = 0.3039 [0.1262] AU  
Ag = 314.31 [404.30] [0.77σ]  
Teffp = 6700 [1862] K [3.03σ]

## DV Diagnostic Results:

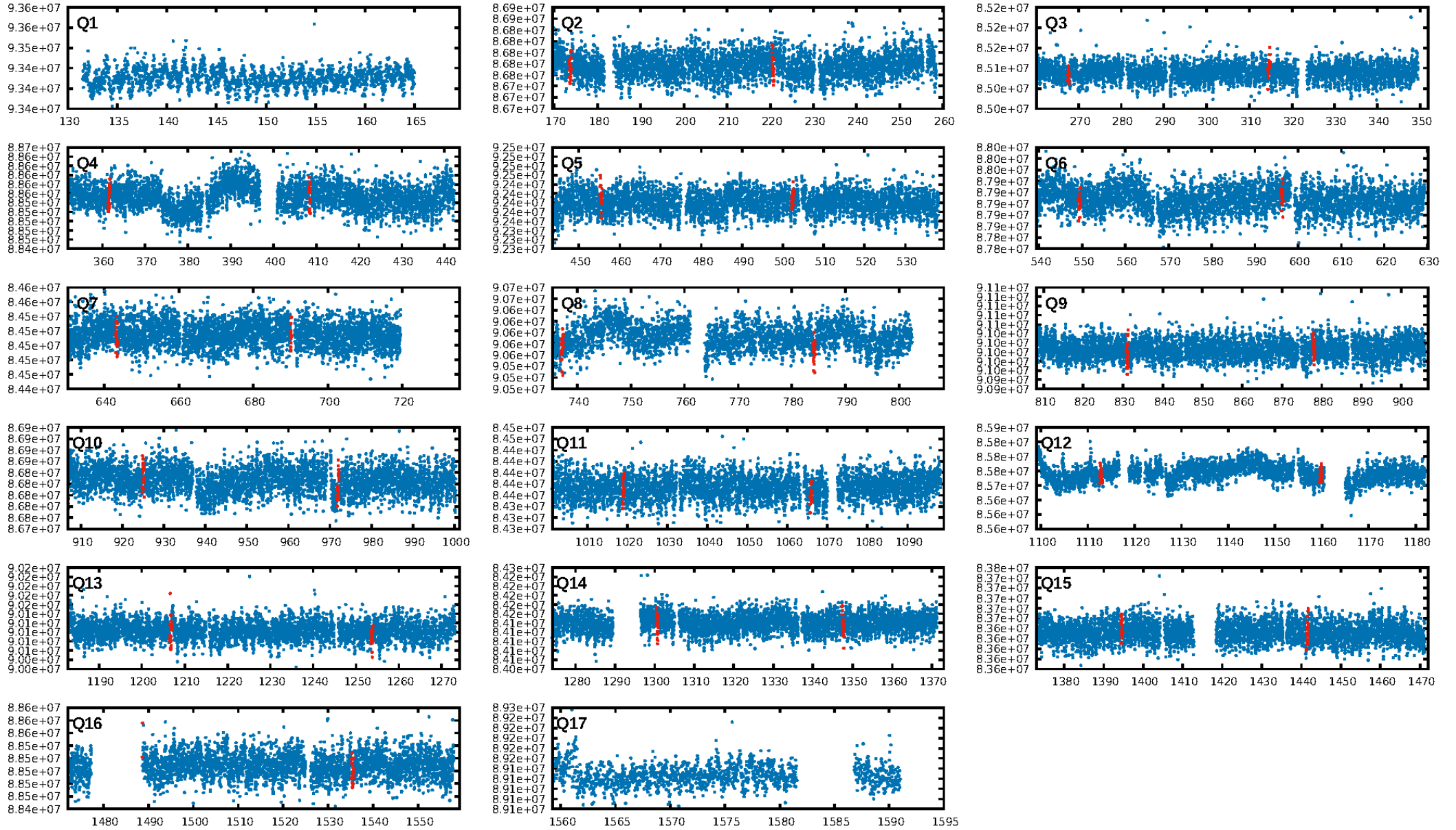
ShortPeriod-sig: 100.0% [77.60σ]  
LongPeriod-sig: 100.0% [8.19σ]  
ModelChiSquare2-sig: 5.7%  
ModelChiSquareGof-sig: 99.1%  
**Bootstrap-pfa: 1.54e-08**  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: -0.8188  
Centroid-sig: 41.7%  
Centroid-so: 0.589 arcsec [0.80σ]  
OotOffset-rm: 0.979 arcsec [2.06σ]  
KicOffset-rm: 0.904 arcsec [1.63σ]  
OotOffset-st: 3/2/4/3 [12]  
KicOffset-st: 3/2/4/3 [12]  
DiffImageQuality-fgm: 0.58 [7/12]  
DiffImageOverlap-fno: 0.27 [4/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:51 Z

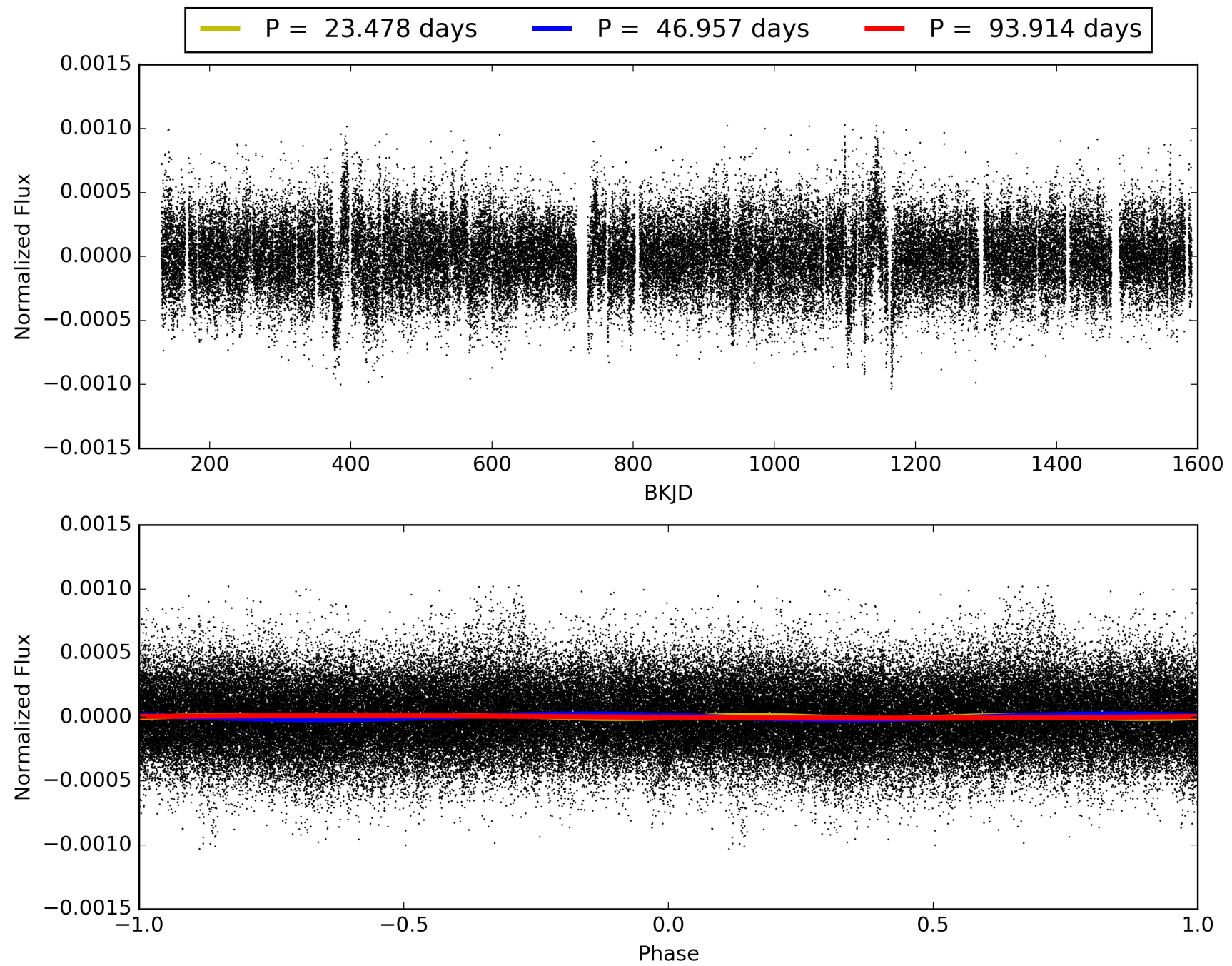
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005302881-05, PDC Light Curves

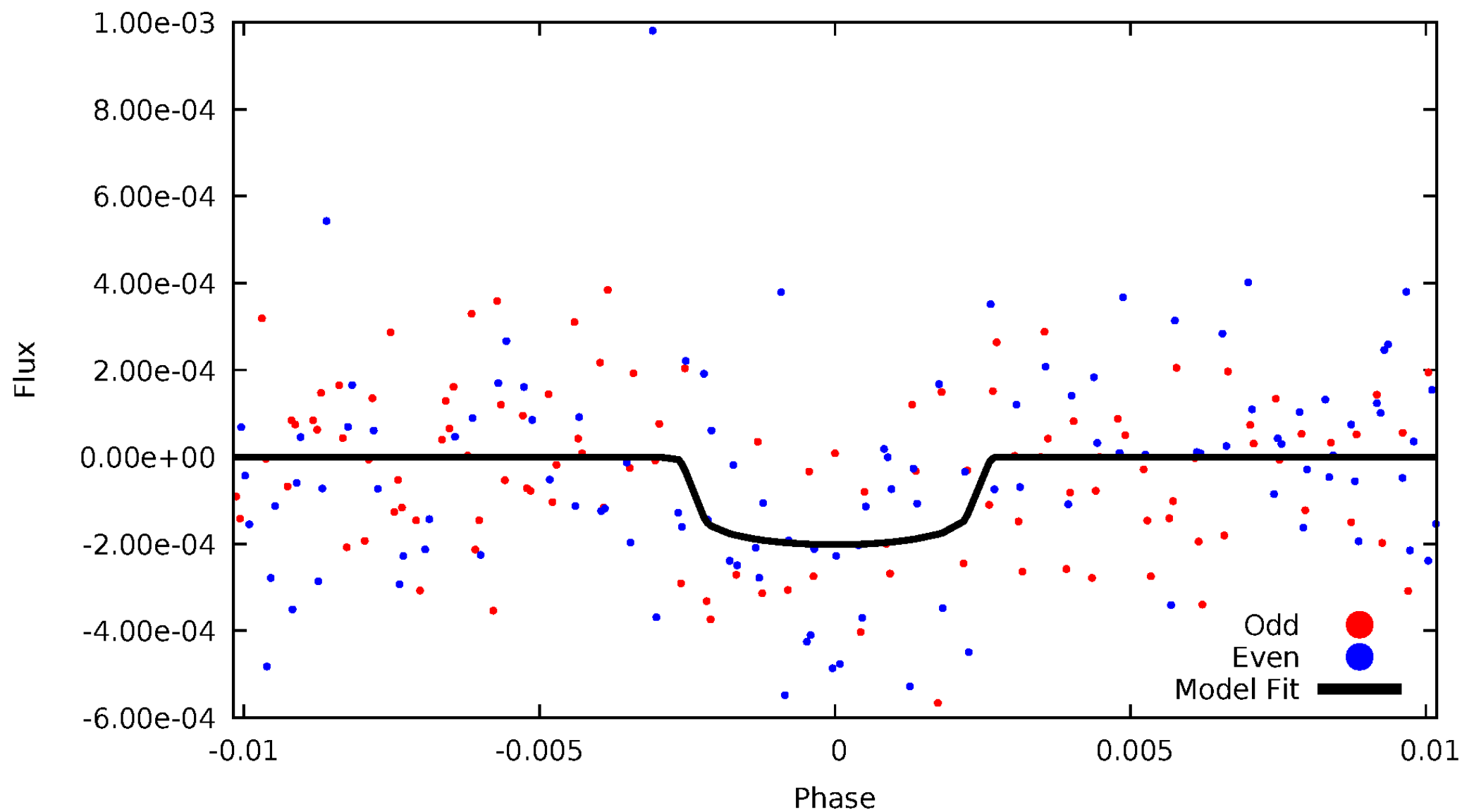


TCE 005302881-05



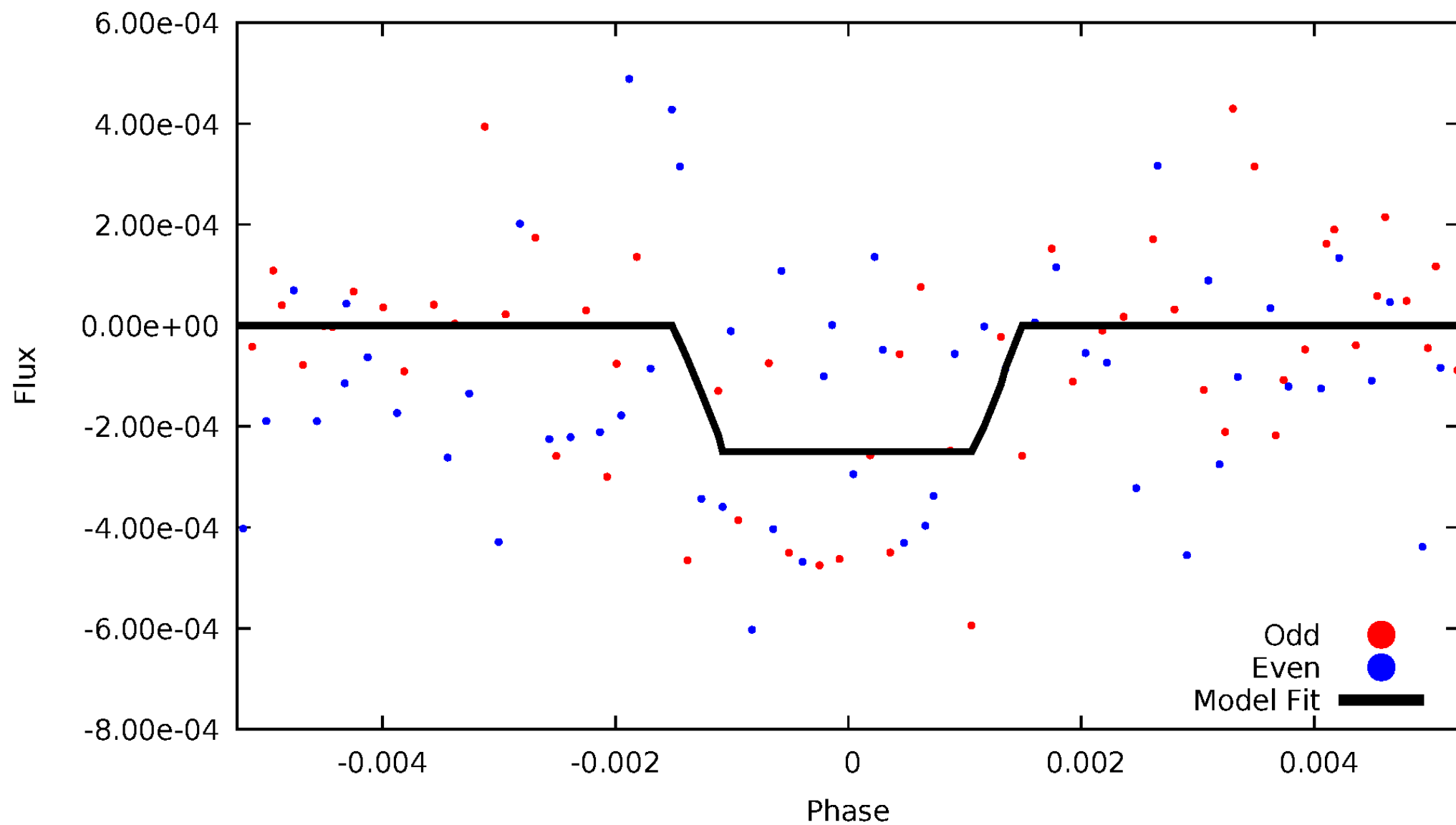
# DV Odd/Even

TCE 005302881-05

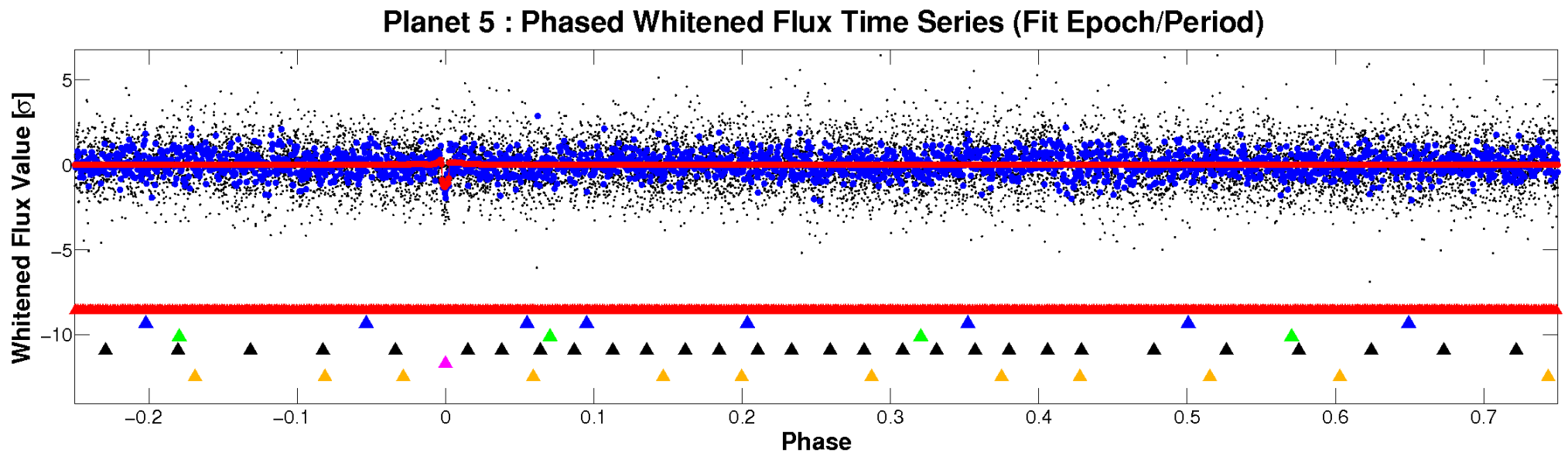
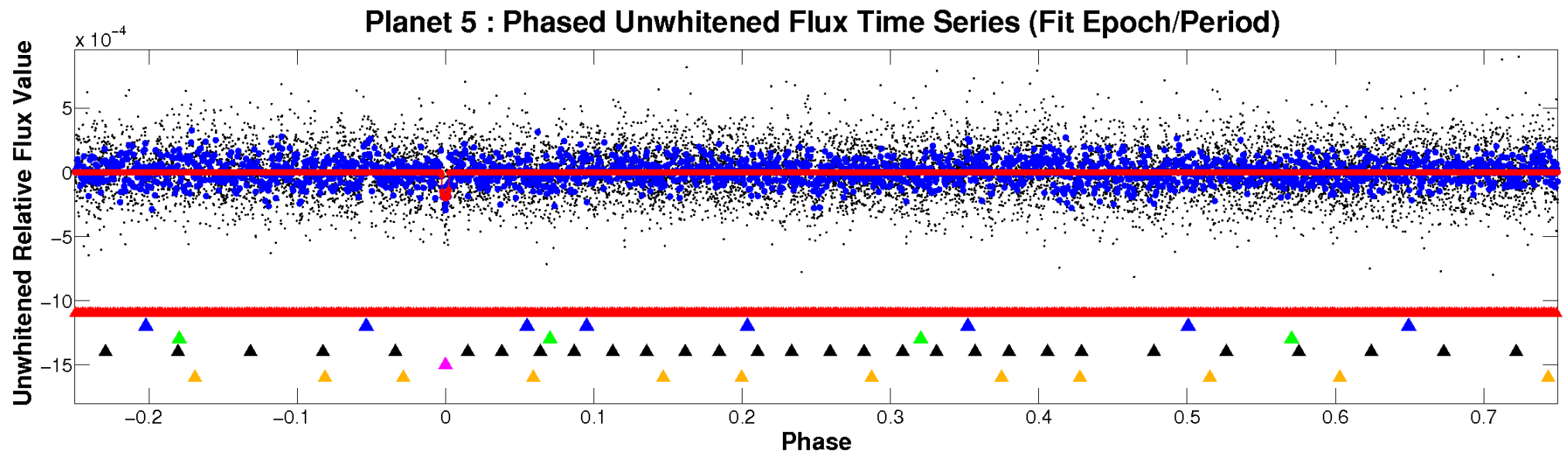


# ALT Odd/Even

TCE 005302881-05

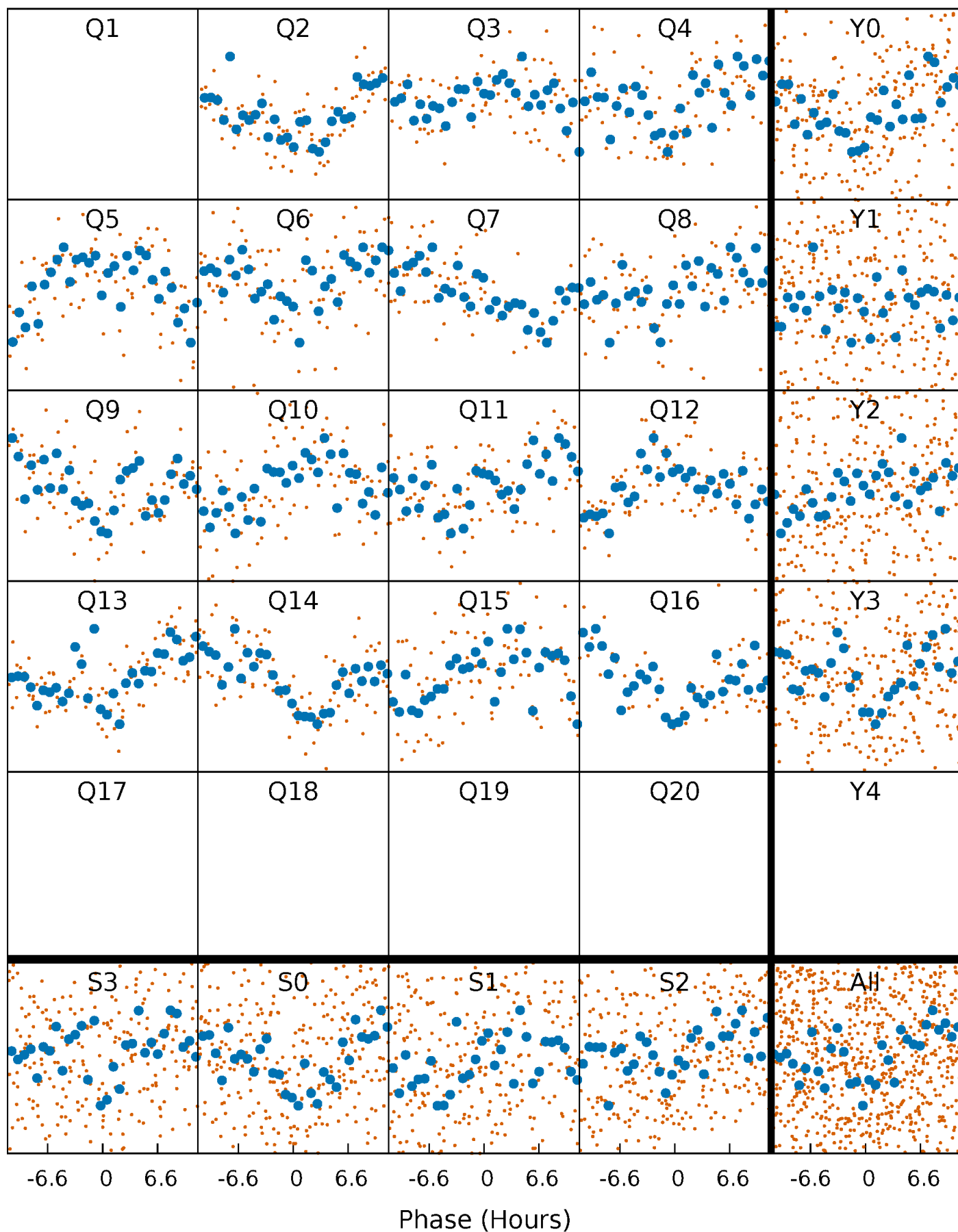


# Non-Whitened Vs. Whitened Light Curve



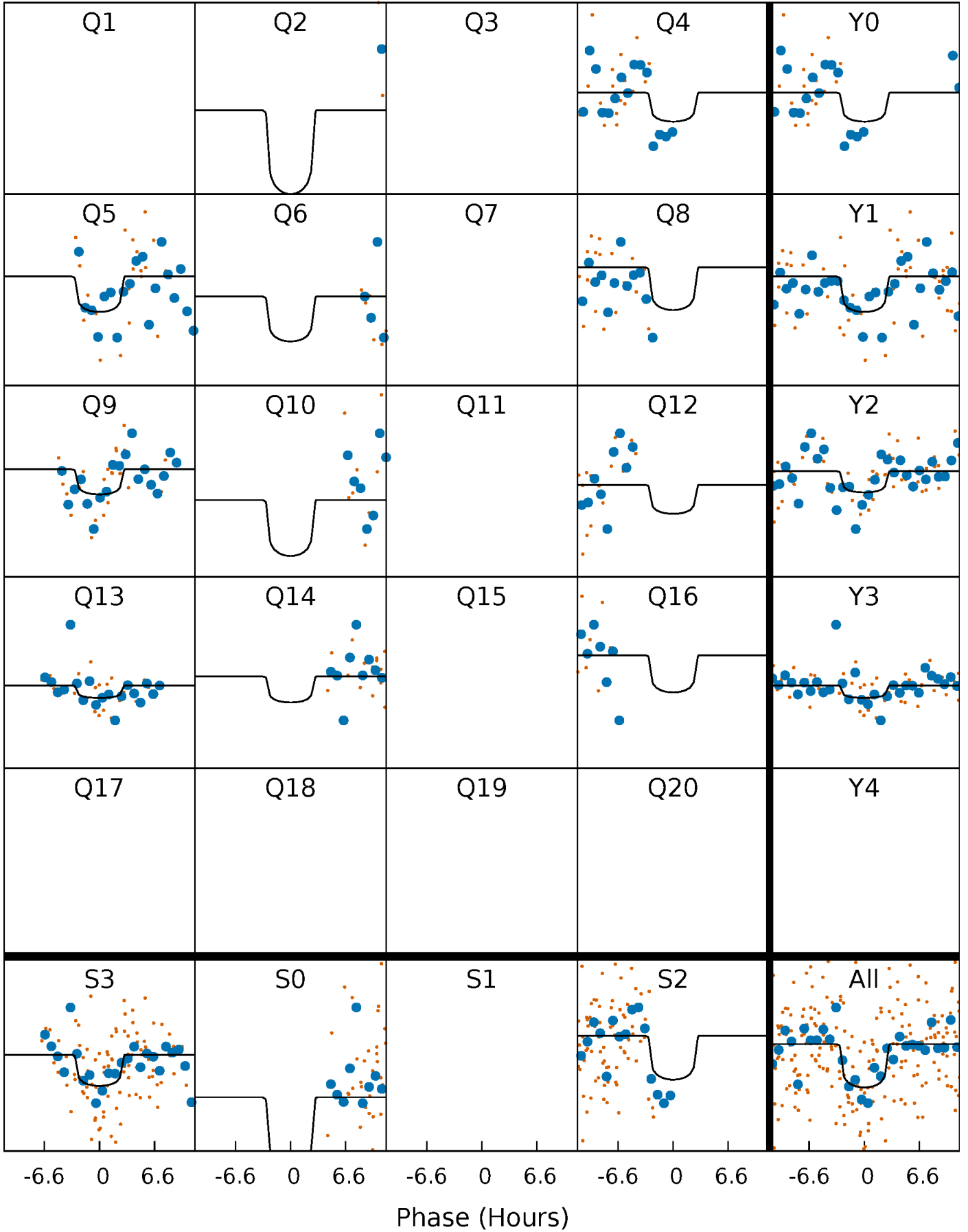
# PDC Quarter-Phased Transit Curves

TCE 005302881-05   P= 46.956797 Days    $T_0=173.698922$  (BKJD)



# DV Quarter-Phased Transit Curves

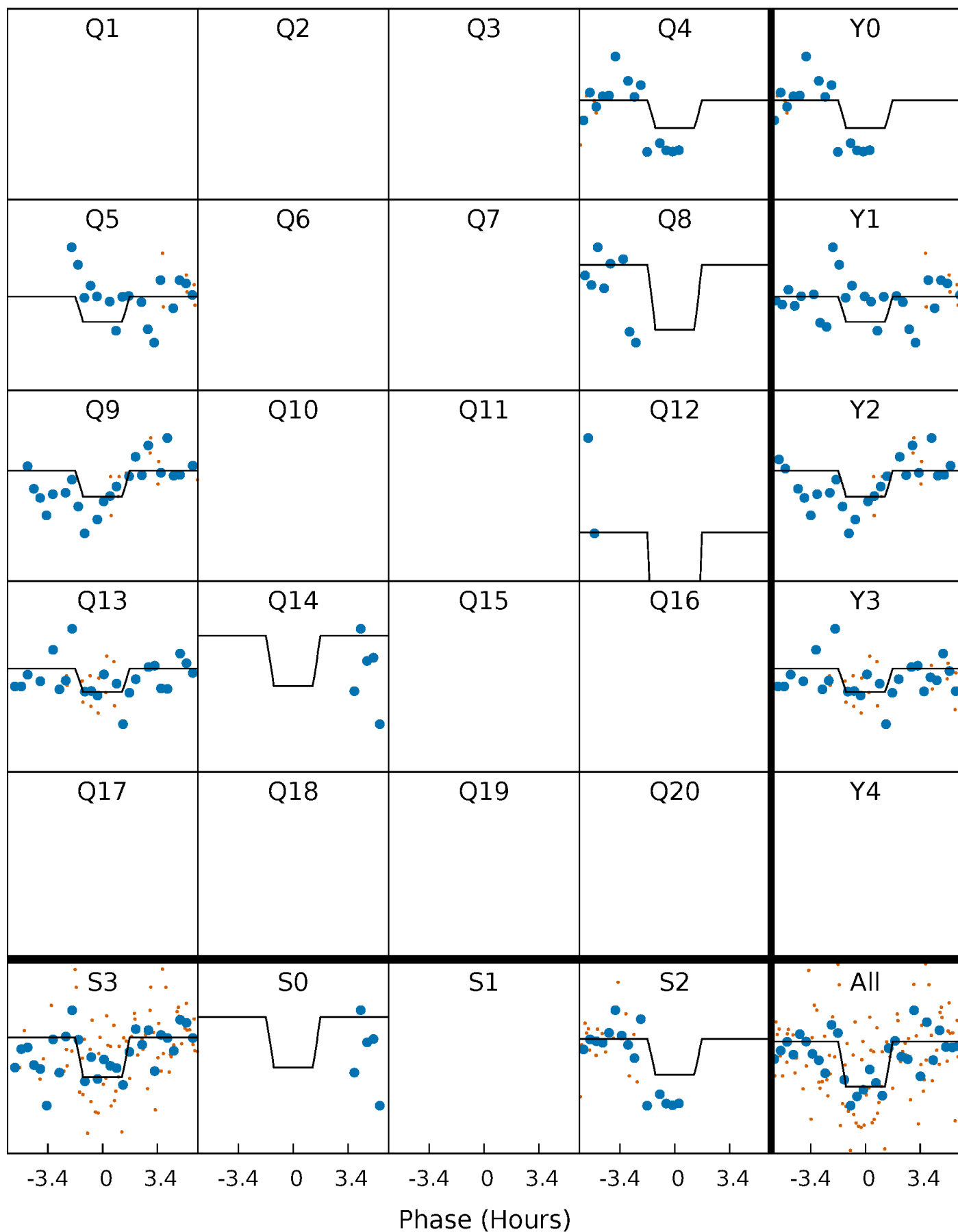
TCE 005302881-05   P= 46.956797 Days    $T_0=173.698922$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

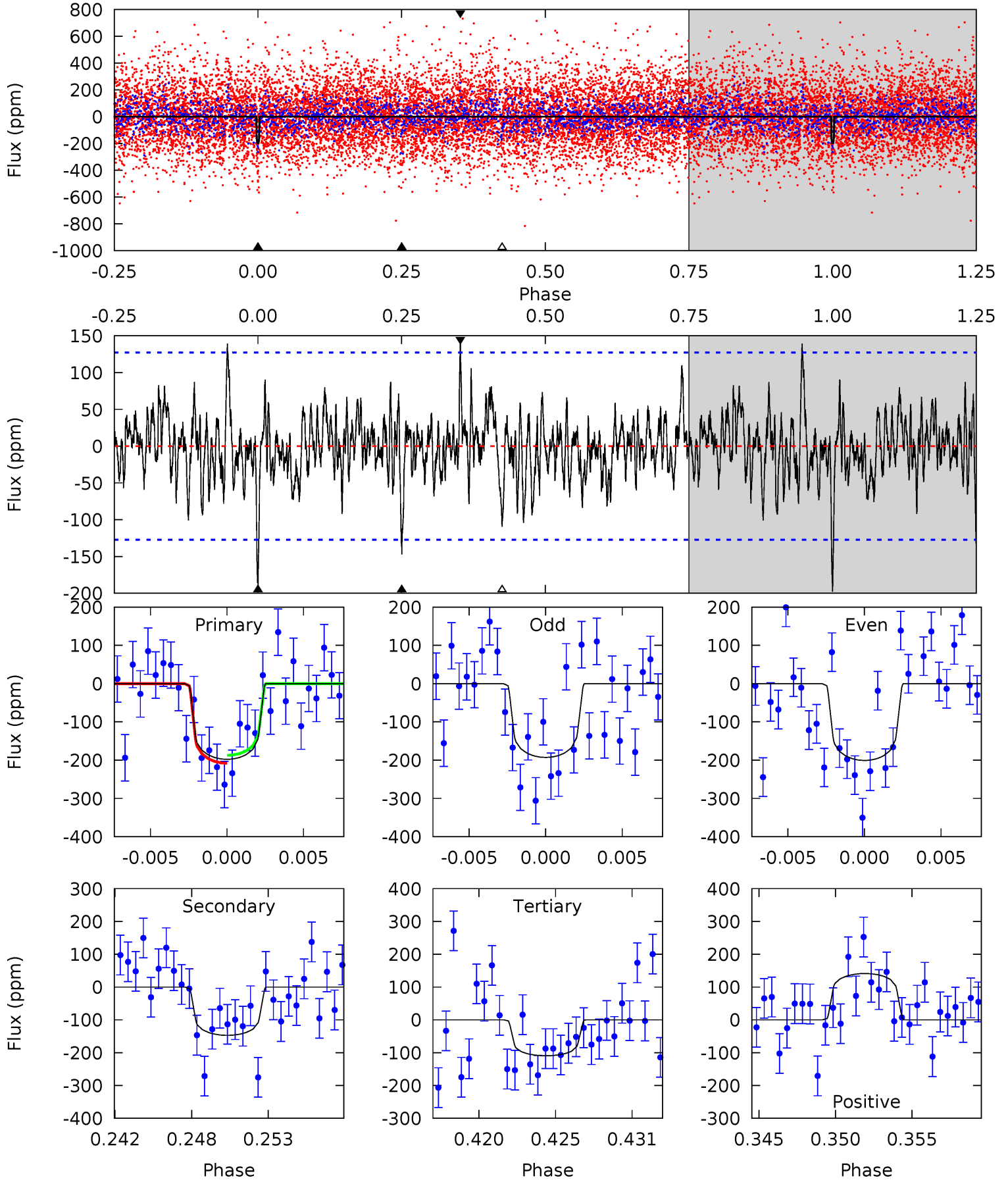
TCE 005302881-05     $P = 46.960463$  Days     $T_0 = 173.646604$  (BKJD)



# DV Model-Shift Uniqueness Test

005302881-05,  $P = 46.956797$  Days,  $E = 126.742125$  Days

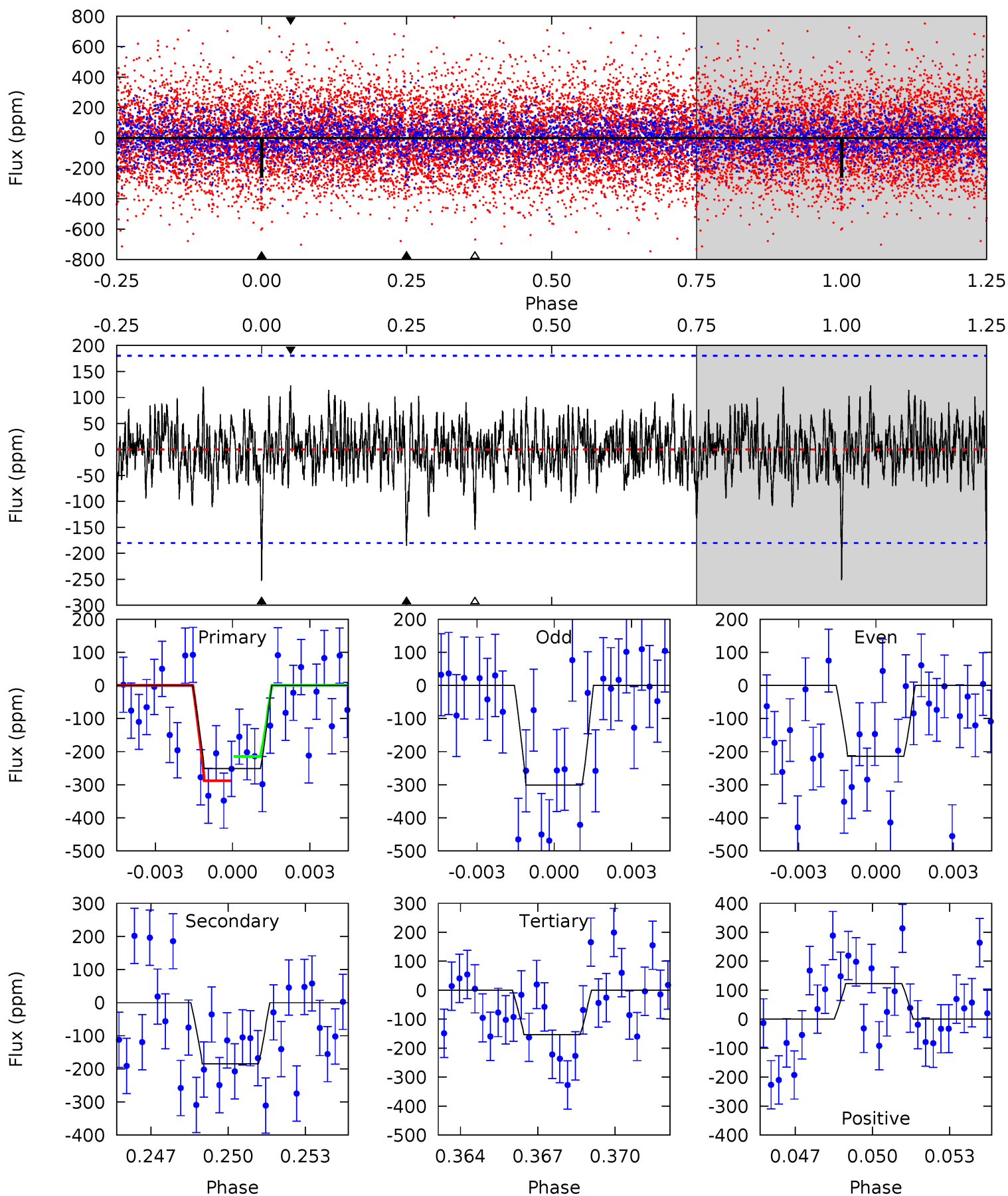
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.99	5.95	4.42	5.71	5.14	2.78	1.41	3.57	2.29	1.52	0.24	0.16	1.19	0.42	0.42



# Alt Model-Shift Uniqueness Test

005302881-05, P = 46.960463 Days, E = 126.686141 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
7.33	5.40	4.48	3.58	5.26	2.97	1.14	2.85	3.75	0.92	1.82	1.26	1.06	0.33	1.07



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-147 \pm 25$	$5.97^{+3.48}_{-3.22}$	$1404^{+88}_{-144}$	$5781^{+2971}_{-1026}$	$207^{+757}_{-126}$
Alt.	$-185 \pm 34$	$6.31^{+3.55}_{-3.04}$	$1406^{+89}_{-151}$	$5906^{+2653}_{-965}$	$233^{+679}_{-140}$

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

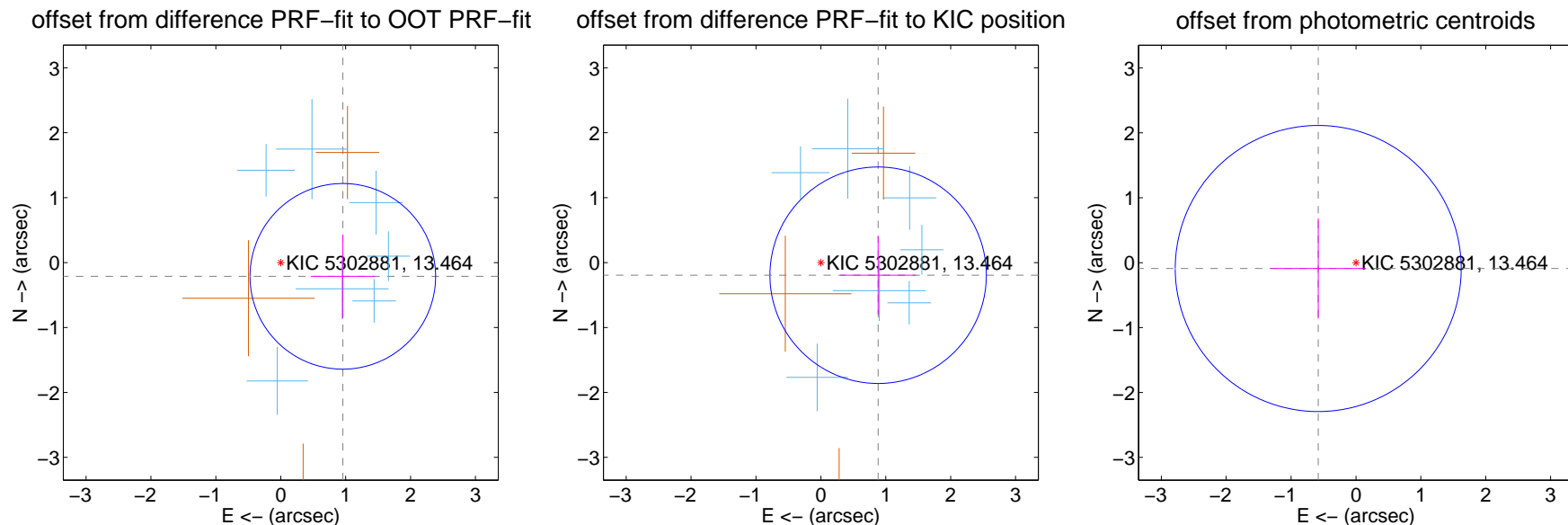
## DV Centroid Data

Supplemental centroid analysis for 005302881-05. Kepler magnitude: 13.46. Transit SNR 7.94

There are 7 quarters with good PRF difference image offsets

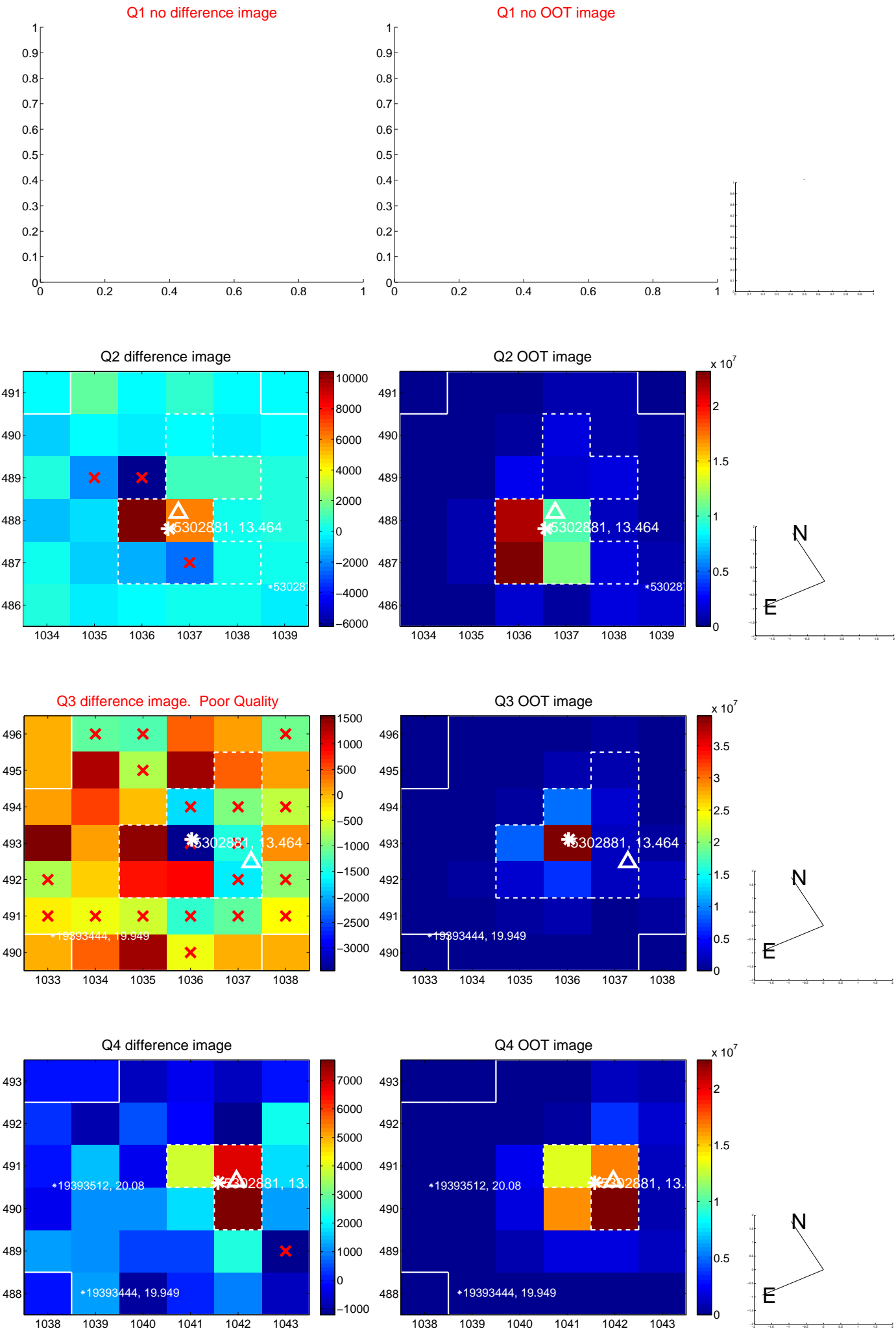
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.979 \pm 0.477$	2.06	$-0.956 \pm 0.494$	$-0.212 \pm 0.646$
PRF-fit source offset from KIC position	$0.904 \pm 0.556$	1.63	$-0.882 \pm 0.584$	$-0.195 \pm 0.602$
photometric centroid source offset	$0.59 \pm 0.73$	0.80	$0.58 \pm 0.73$	$-0.09 \pm 0.77$

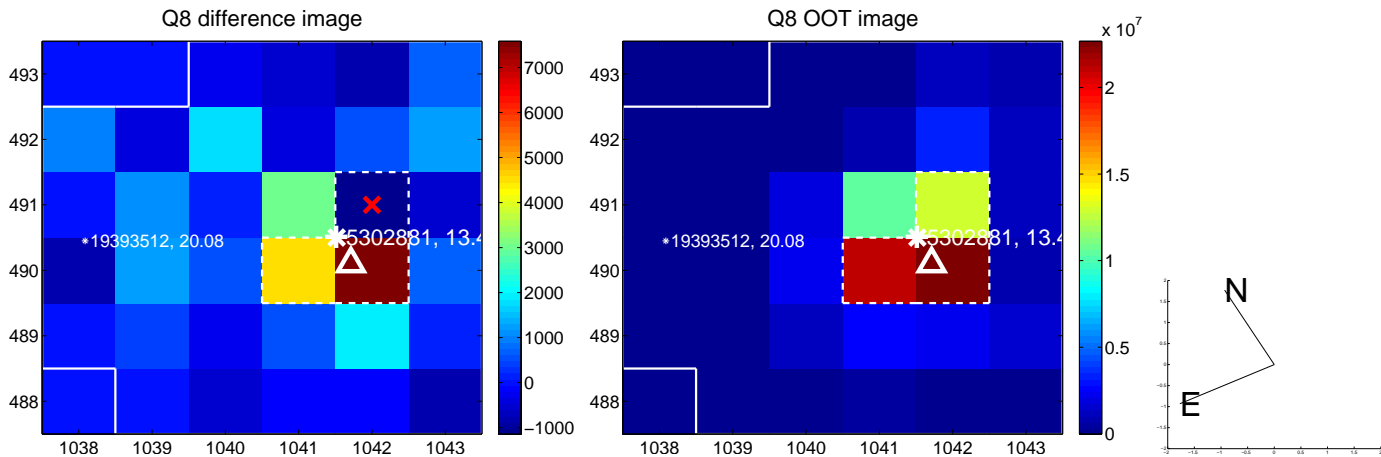
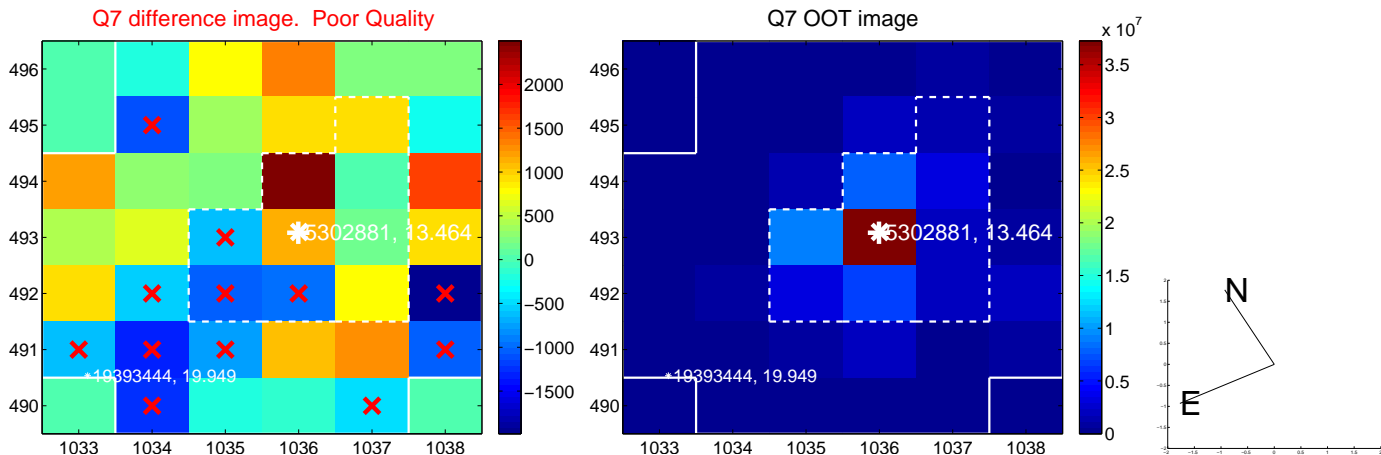
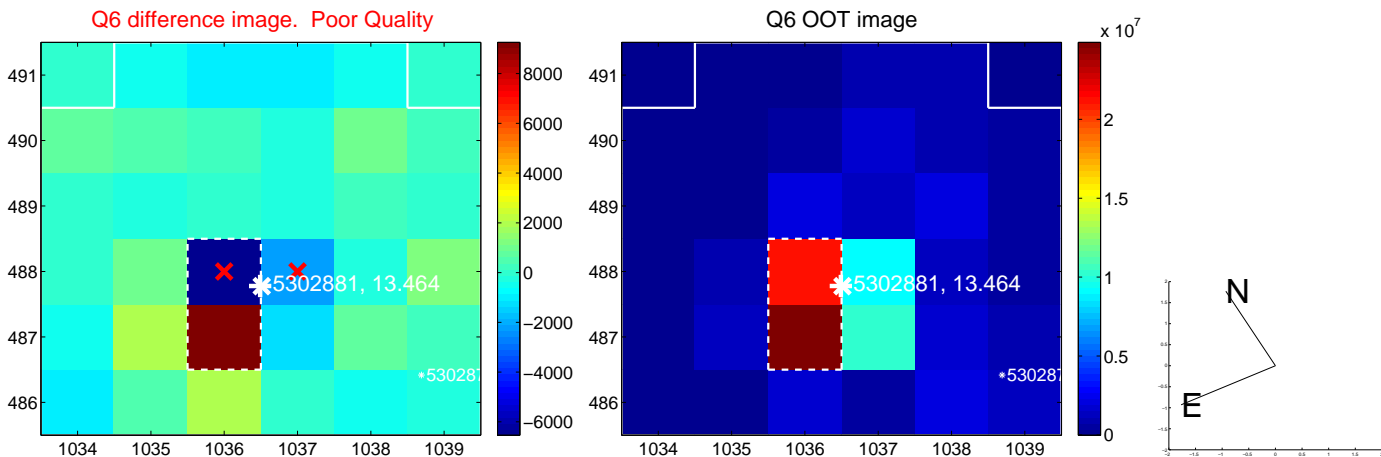
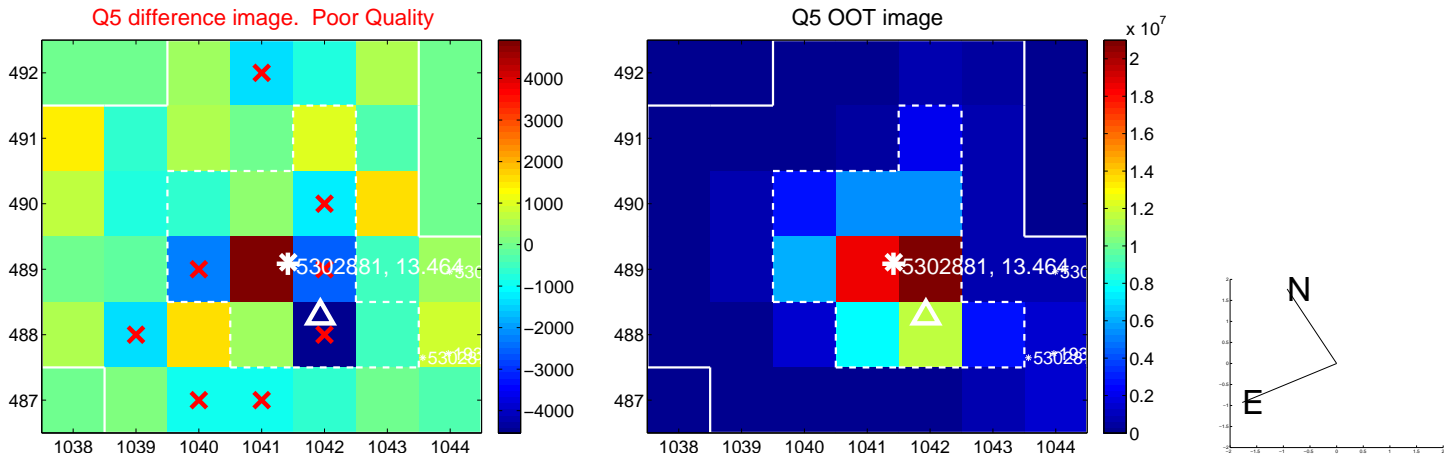


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

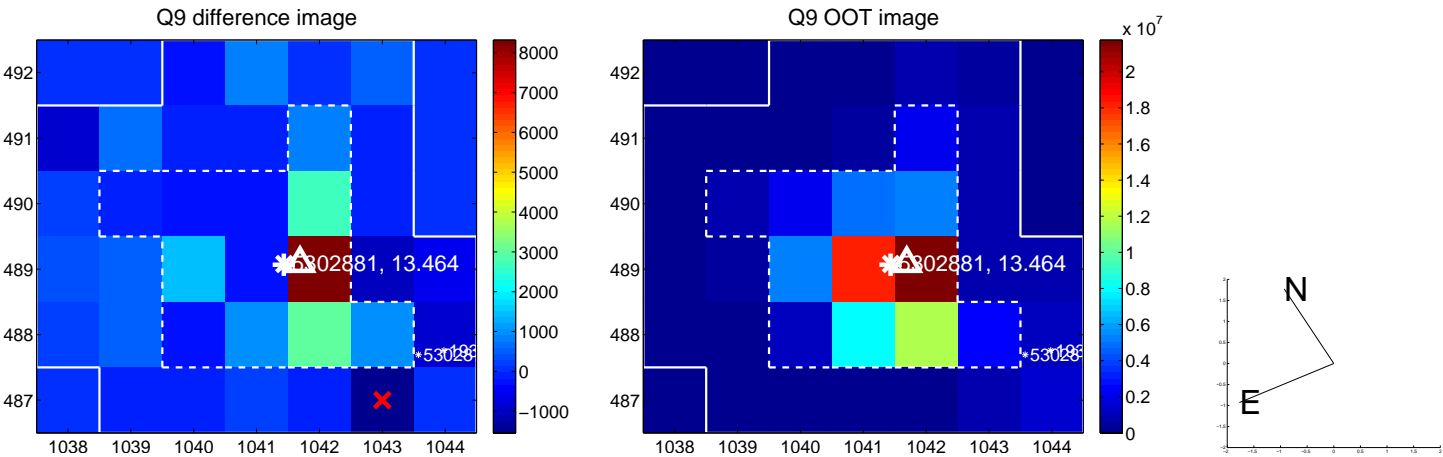
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

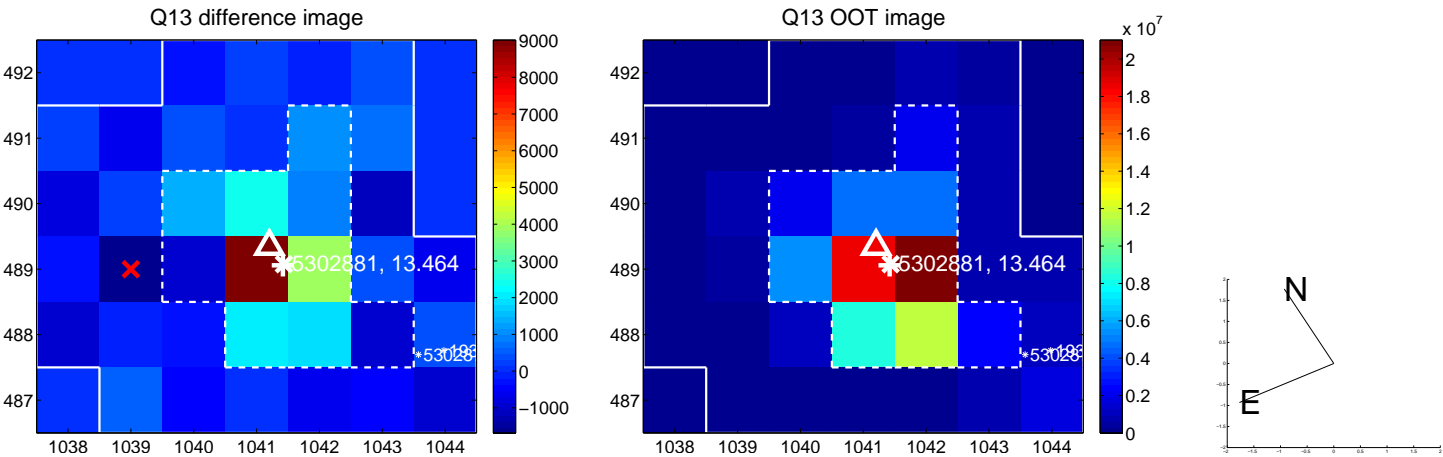


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

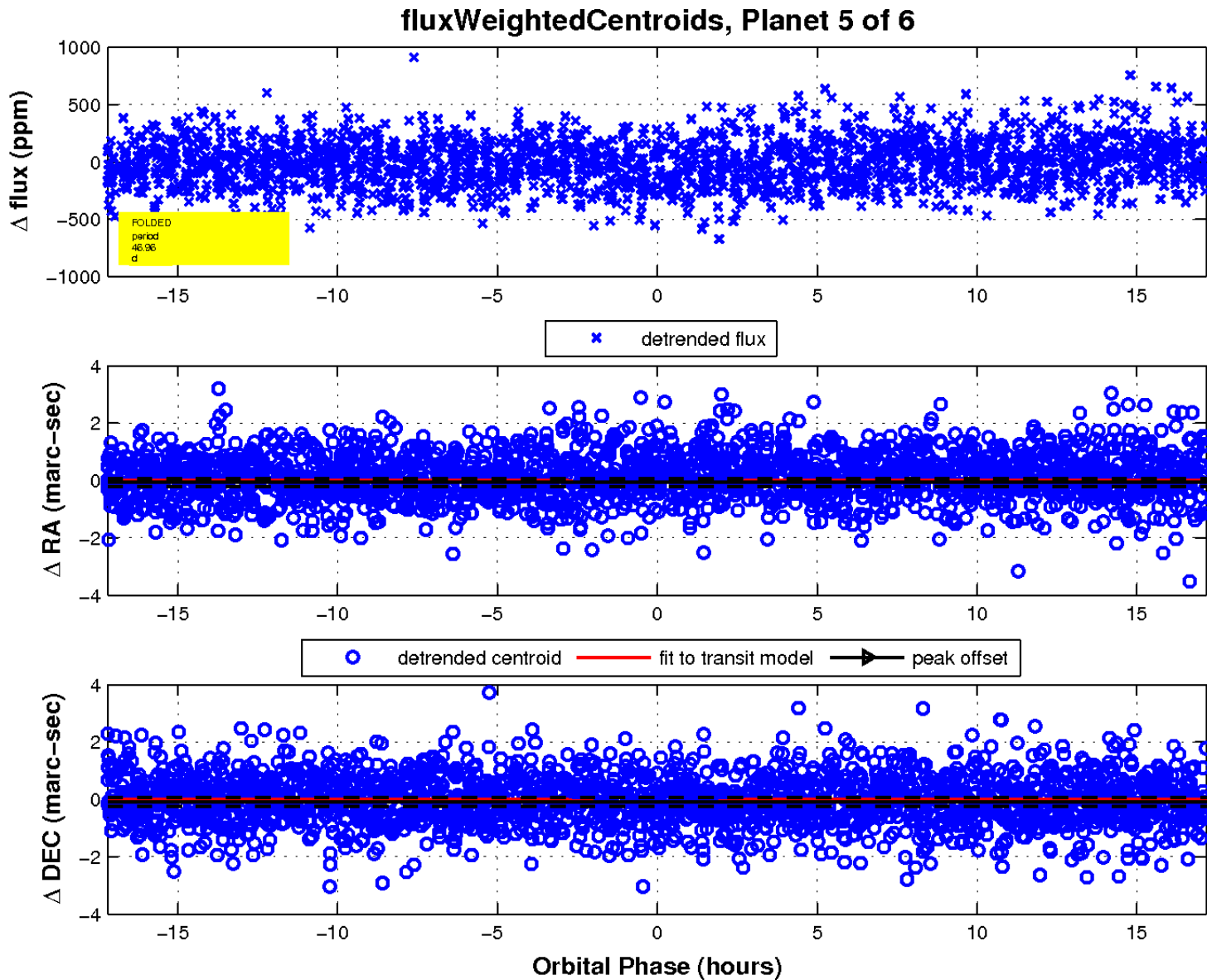
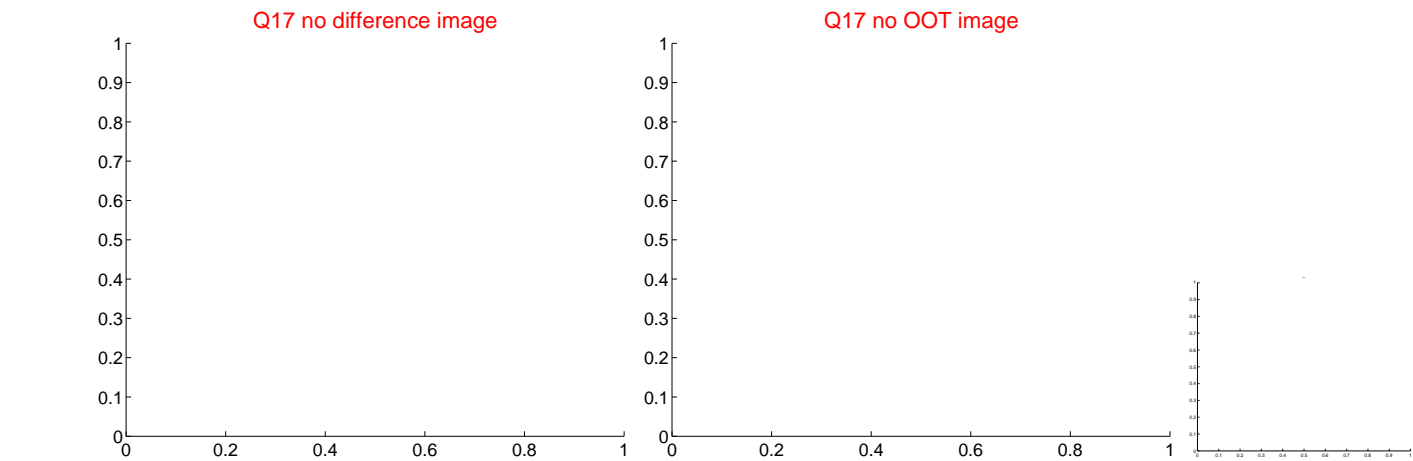




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

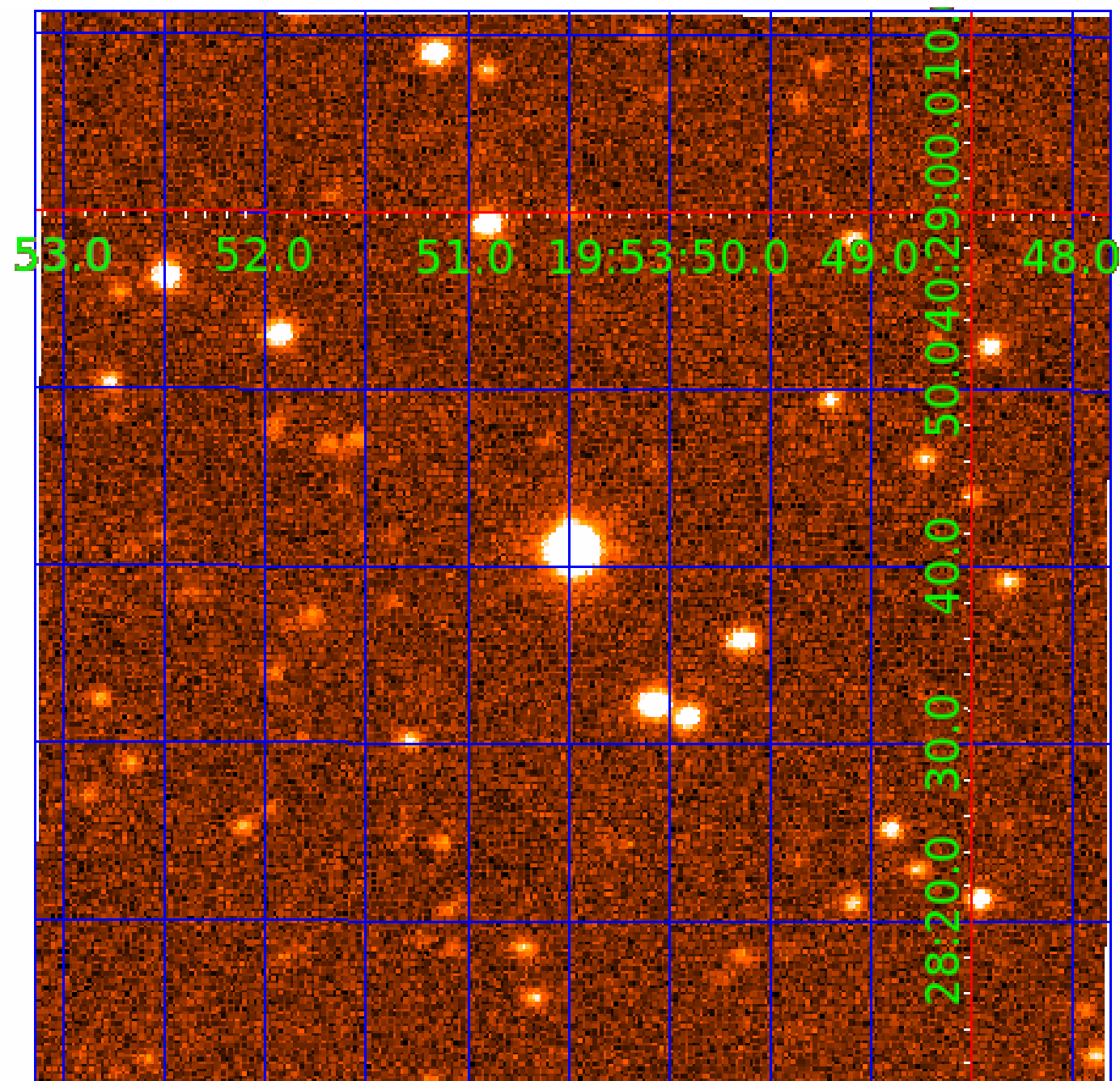


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005302881

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005302881-01	OBS	No	1.966326	132.033929	0.0	12.678	9.2	0.0	4.02	6413	0.05	18248.48
005302881-02	OBS	No	180.849404	178.169022	233.3	20.412	10.7	8.5	4.02	6413	7.61	43.95
005302881-03	OBS	No	363.915884	376.574365	352.3	10.811	8.7	8.9	4.02	6413	9.37	17.30
005302881-04	OBS	No	49.250942	175.481490	265.8	3.501	8.5	9.2	4.02	6413	8.35	249.01
005302881-05	OBS	No	46.956797	173.698922	201.7	5.735	8.1	7.9	4.02	6413	6.42	265.36
005302881-06	OBS	No	130.159872	146.828269	178.8	10.484	7.7	7.2	4.02	6413	5.92	68.15

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005302881-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005302881-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005302881-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005302881-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST
005302881-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
005302881-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET

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

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

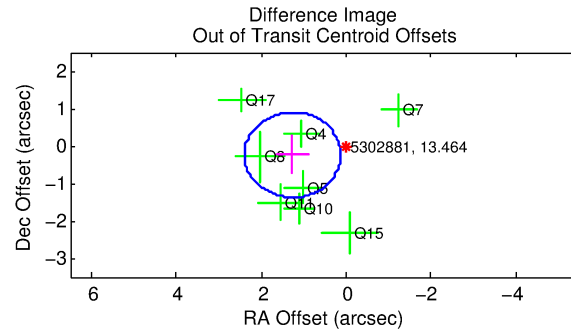
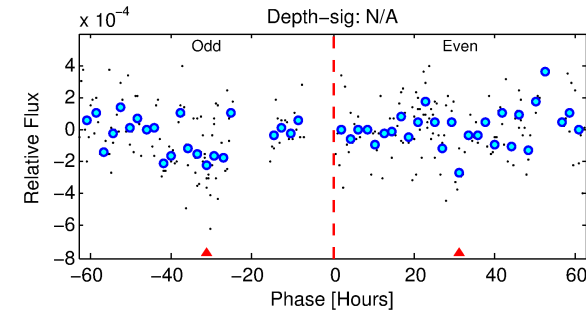
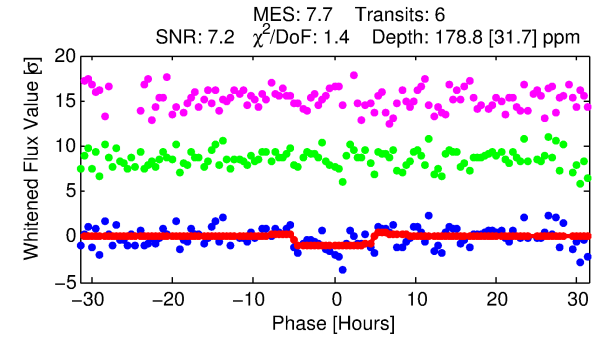
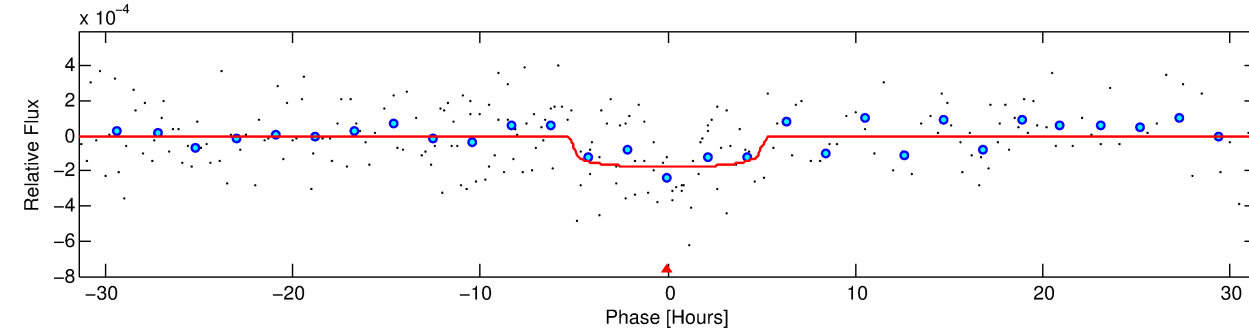
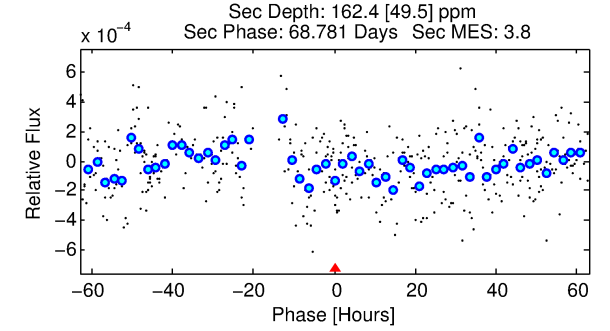
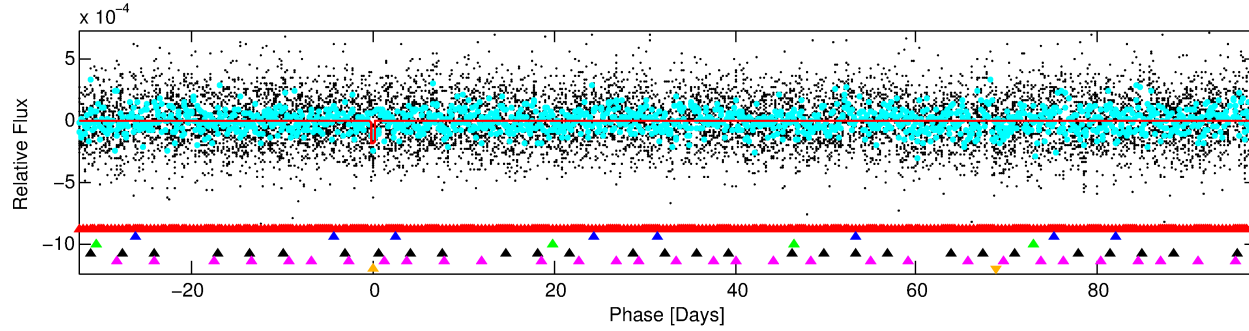
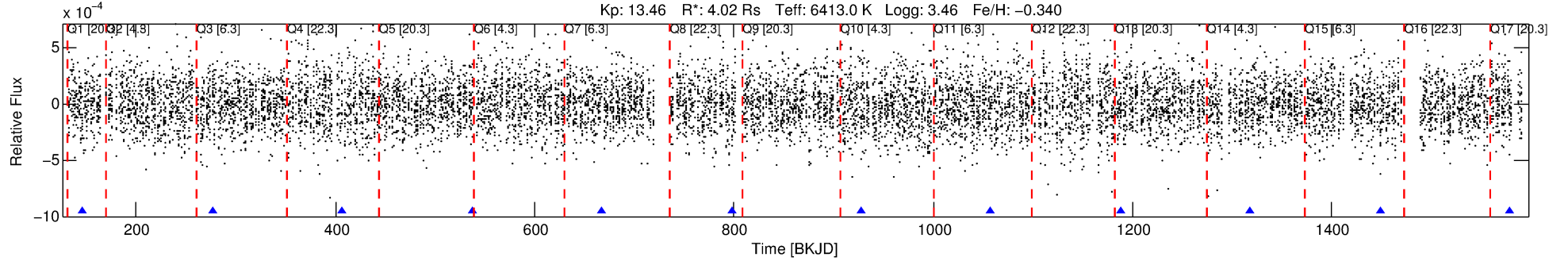
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005302881-06

No Significant Match Found

# DV One-Page Summary

KIC: 5302881 Candidate: 6 of 6 Period: 130.160 d



## DV Fit Results:

Period = 130.15987 [0.00355] d  
Epoch = 146.8283 [0.0289] BKJD  
Rp/R\* = 0.0135 [0.0097]  
a/R\* = 59.94 [234.83]  
b = 0.79 [1.87]  
Seff = 68.15 [45.60]  
Teq = 733 [123] K  
Rp = 5.92 [4.97] Re  
a = 0.5998 [0.2491] AU  
Ag = 916.28 [1470.17] [0.62σ]  
Teffp = 6232 [2288] K [2.40σ]

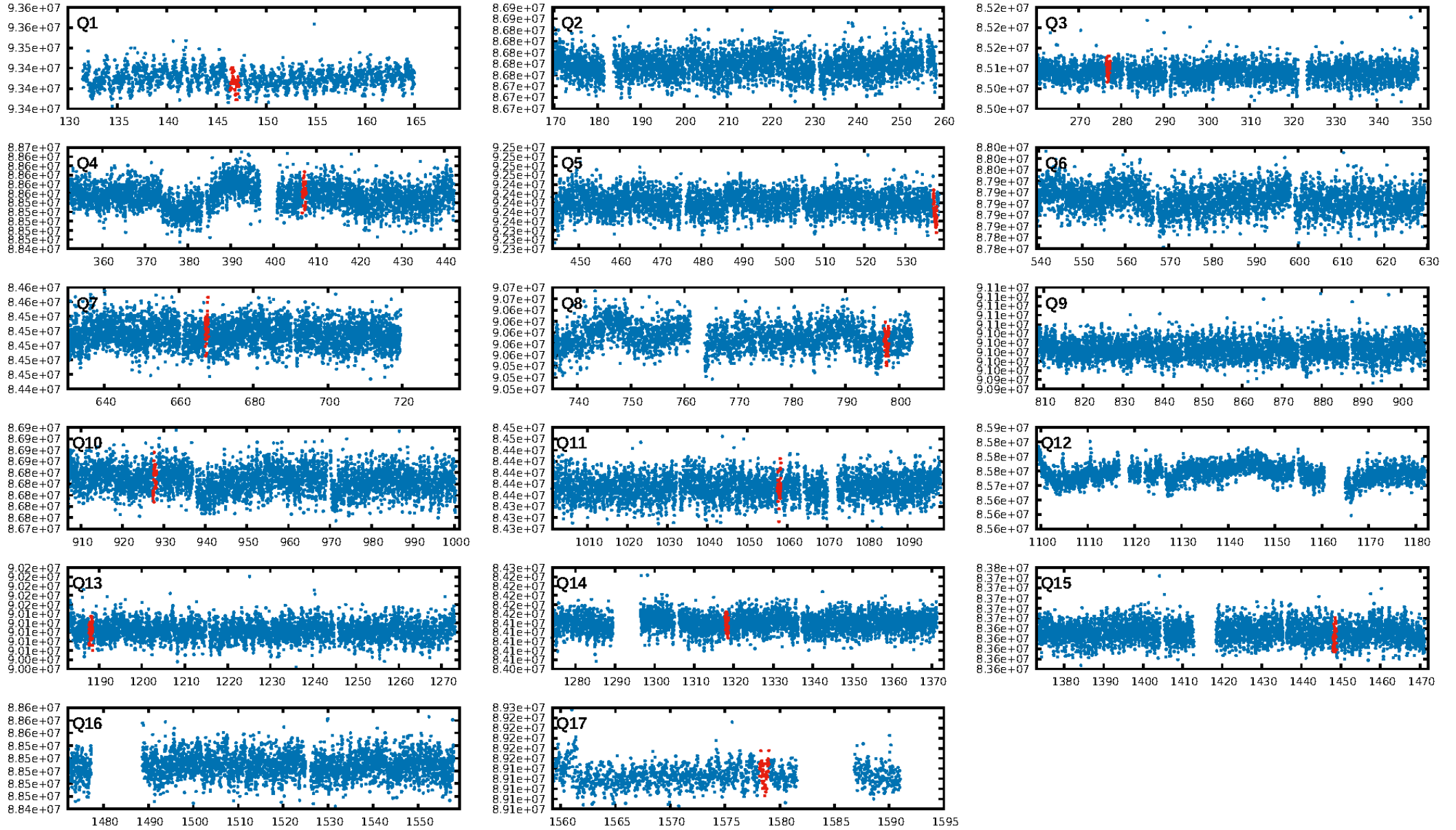
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [175.69σ]  
LongPeriod-sig: 100.0% [53.02σ]  
ModelChiSquare2-sig: 4.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.09e-06**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.984  
Centroid-sig: 45.6%  
Centroid-so: 1.191 arcsec [1.12σ]  
**OotOffset-rm: 1.282 arcsec [3.39σ]**  
**KicOffset-rm: 1.331 arcsec [3.39σ]**  
OotOffset-st: 1/3/2/2 [8]  
KicOffset-st: 1/3/2/2 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.00 [0/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 00:26:54 Z

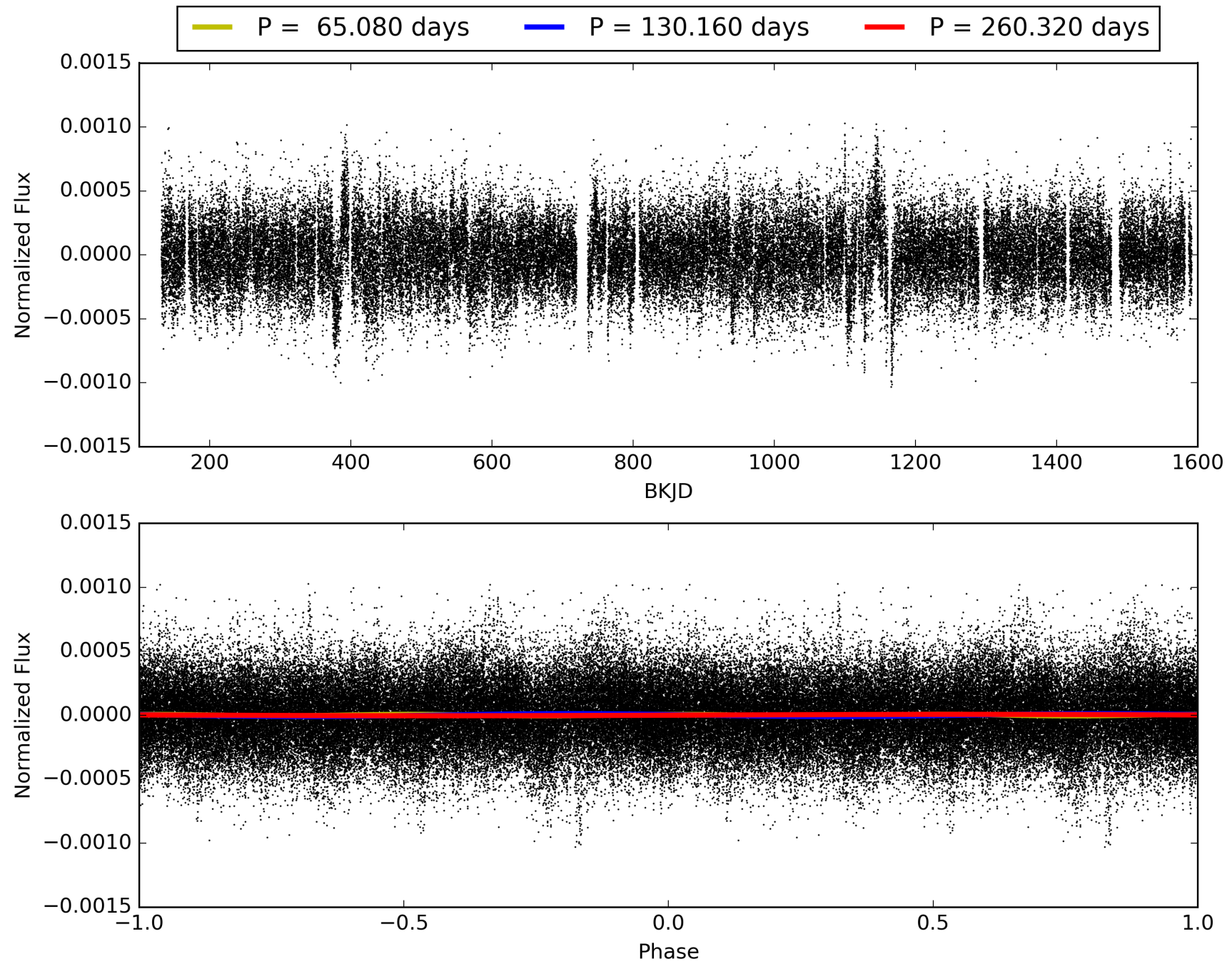
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005302881-06, PDC Light Curves



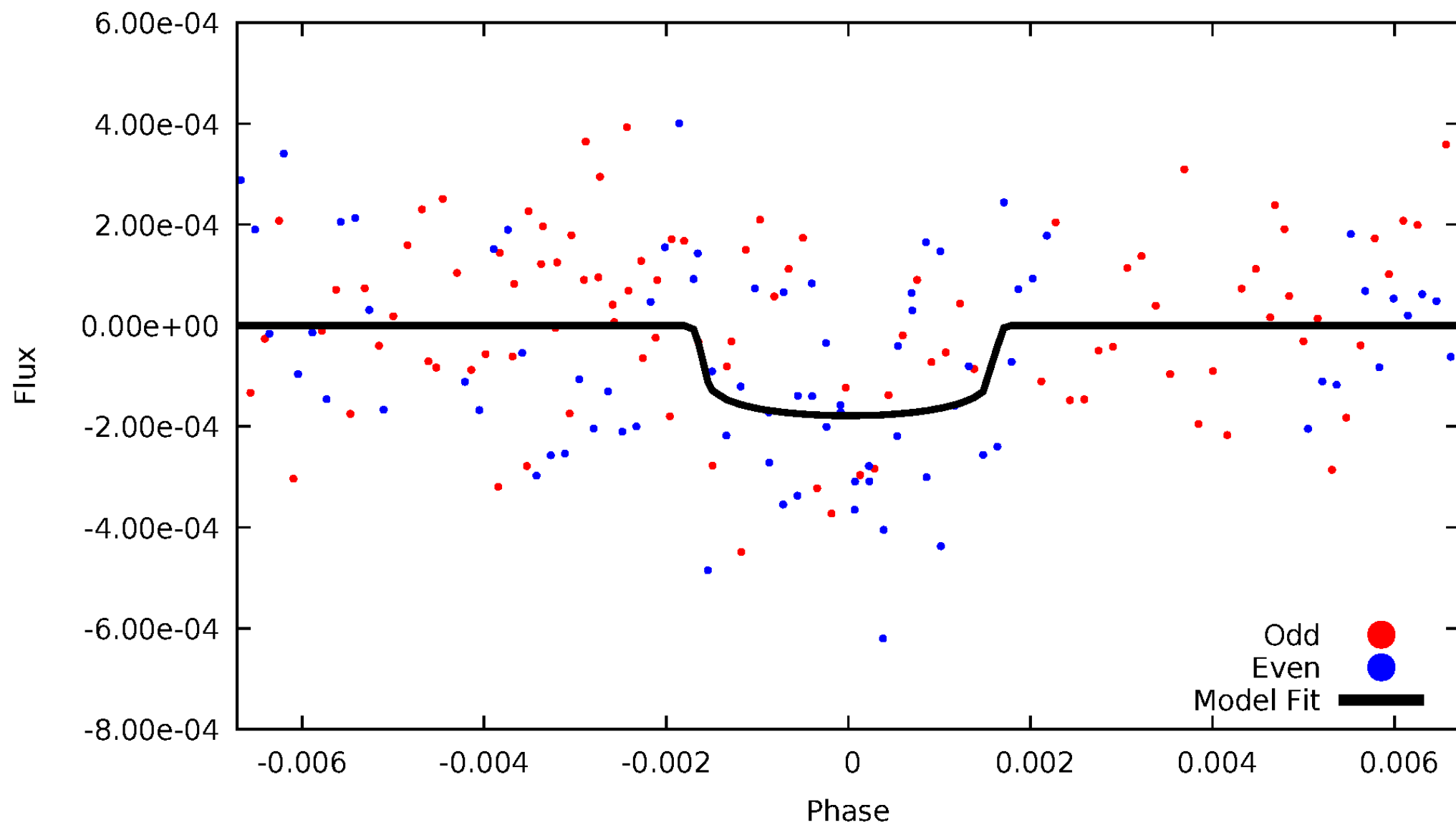


TCE 005302881-06



# DV Odd/Even

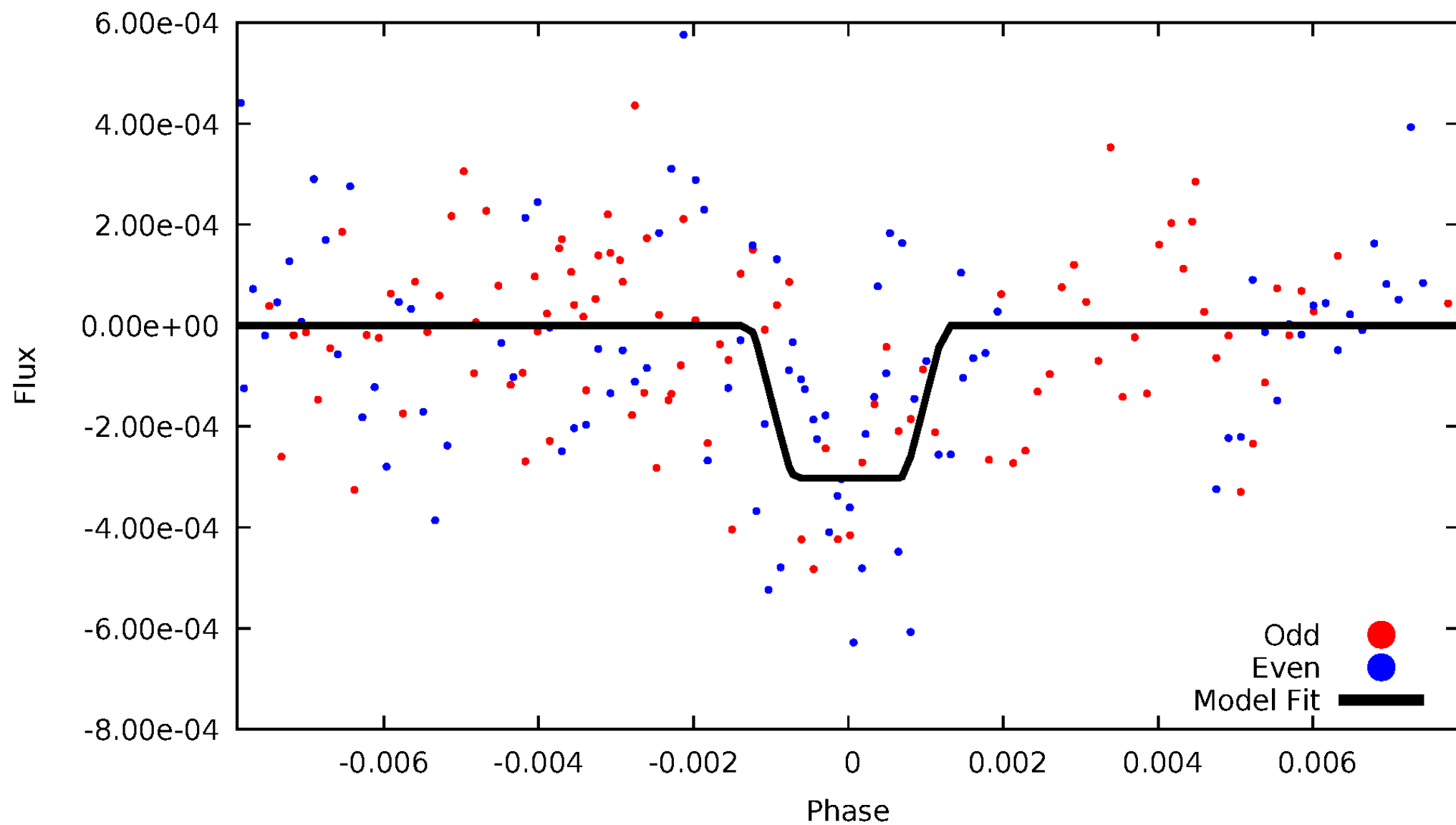
TCE 005302881-06





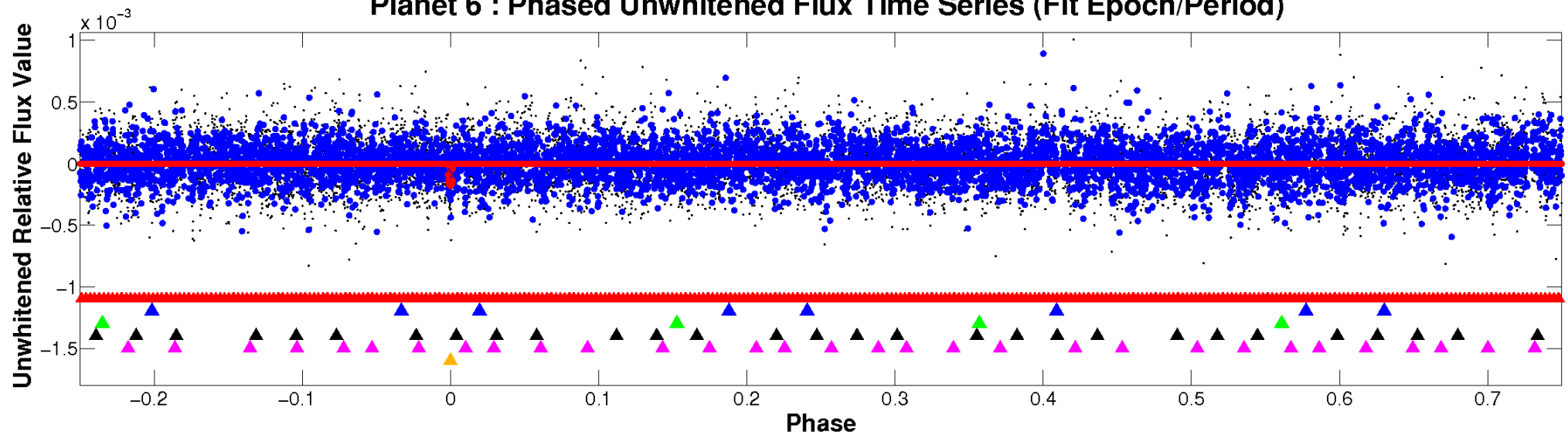
# ALT Odd/Even

TCE 005302881-06

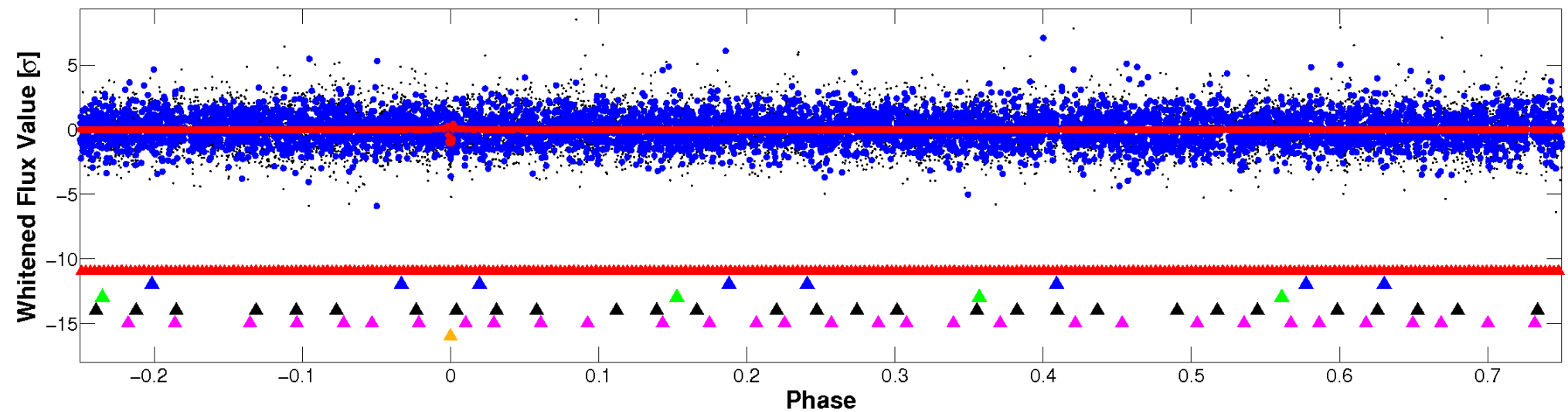


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

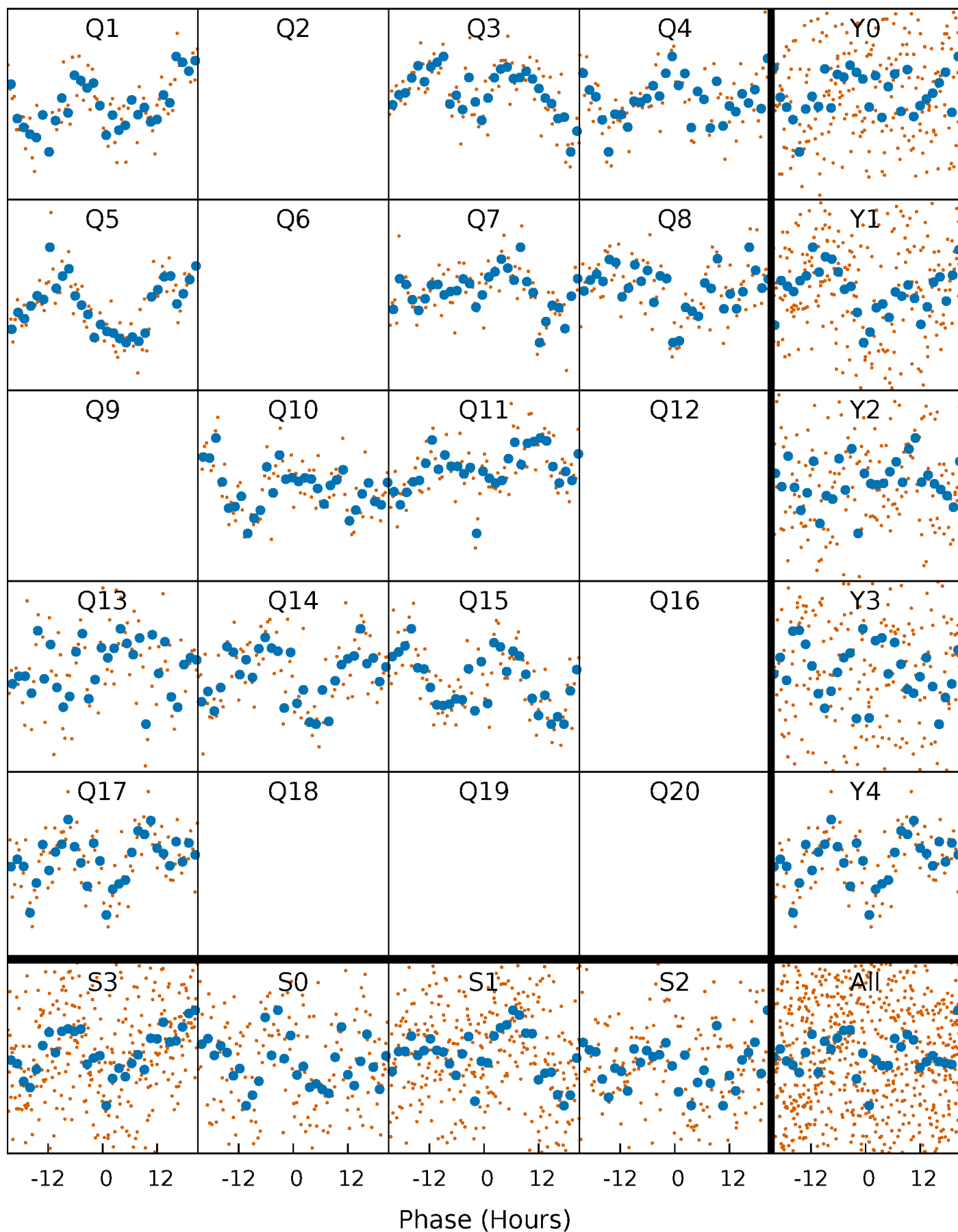


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



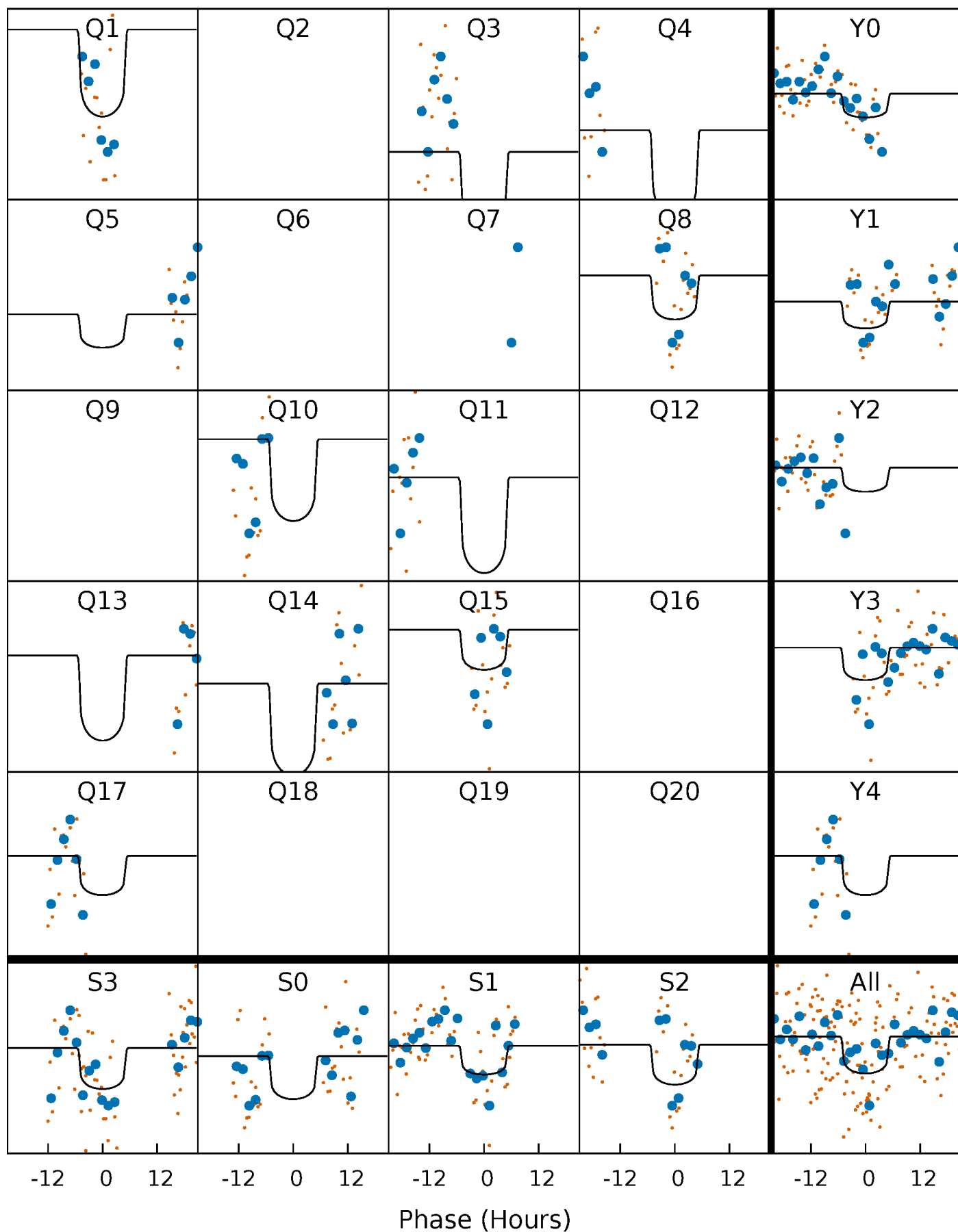
# PDC Quarter-Phased Transit Curves

TCE 005302881-06   P=130.159872 Days    $T_0=146.828269$  (BKJD)



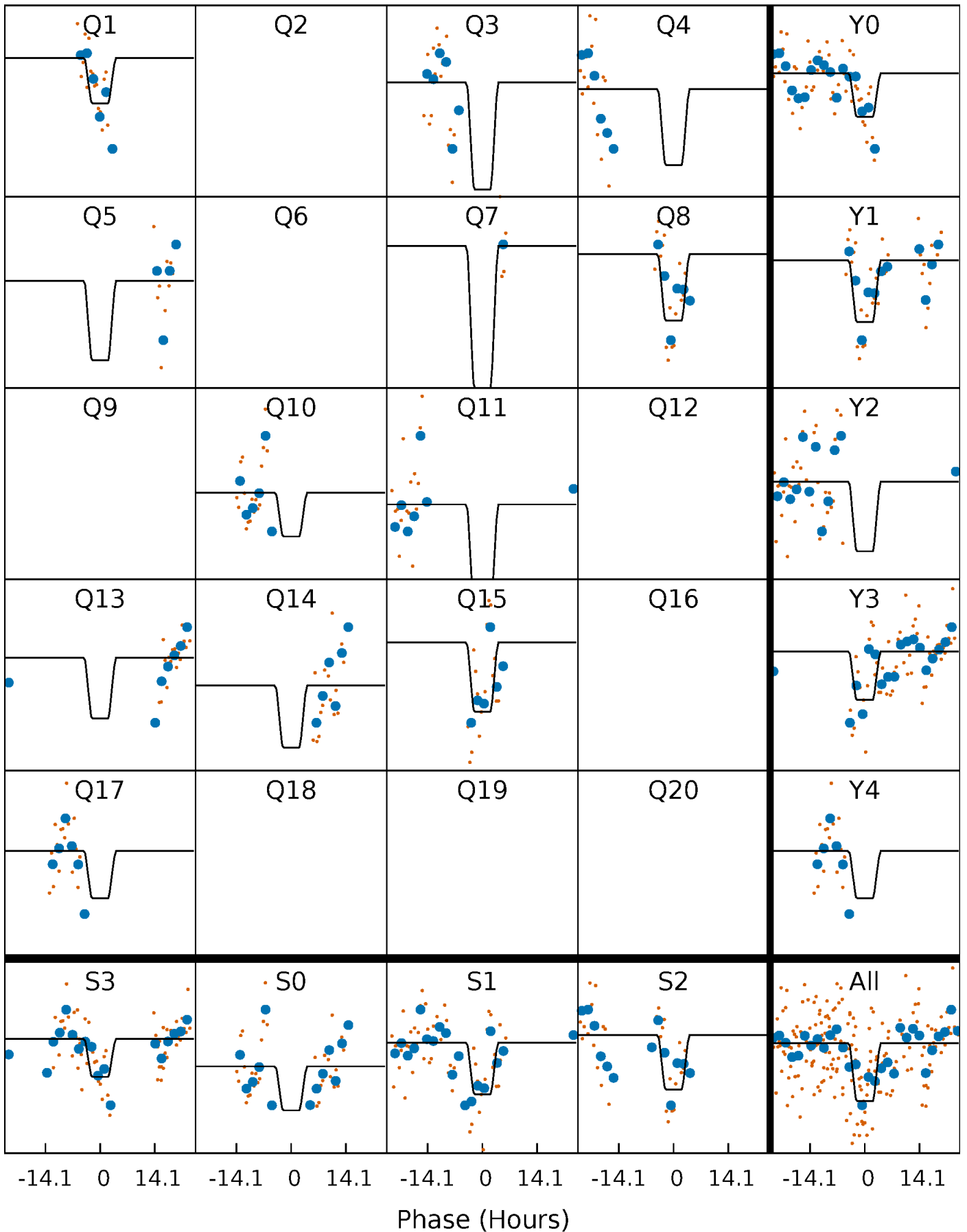
# DV Quarter-Phased Transit Curves

TCE 005302881-06 P=130.159872 Days  $T_0=146.828269$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

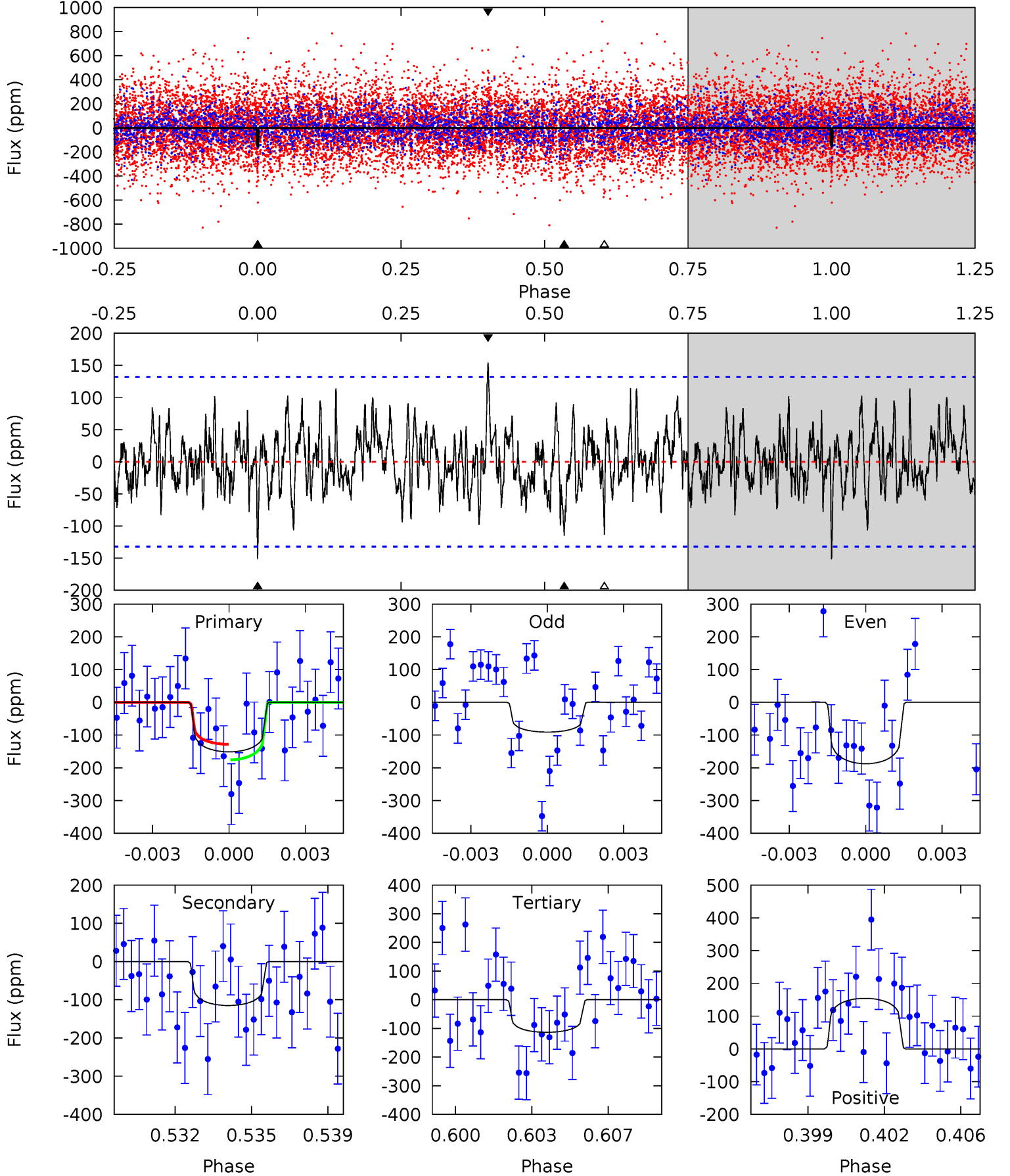
TCE 005302881-06 P=130.161214 Days  $T_0=146.855881$  (BKJD)



# DV Model-Shift Uniqueness Test

005302881-06, P = 130.159872 Days, E = 16.668397 Days

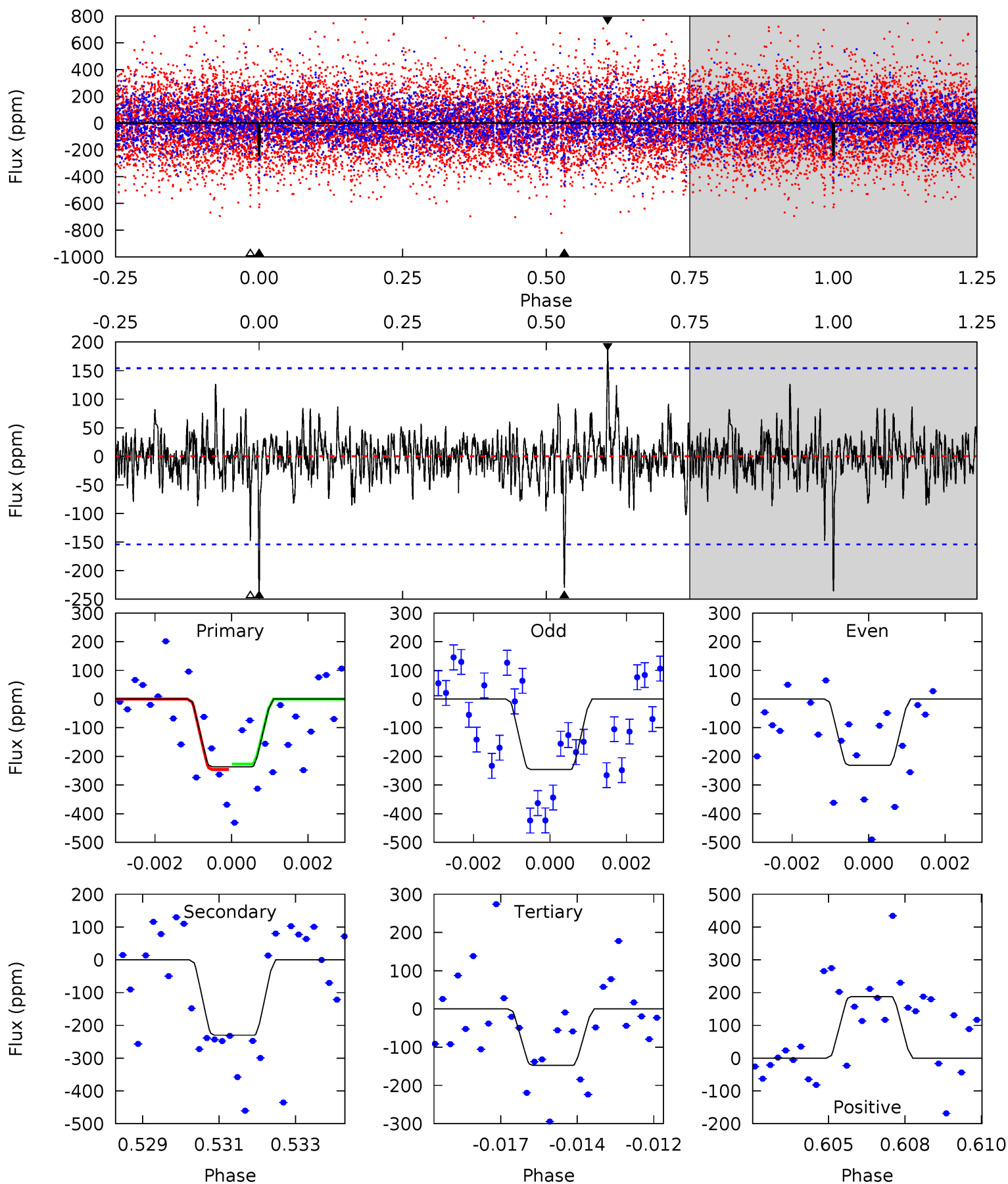
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.98	4.55	4.49	6.11	5.23	2.93	1.55	1.49	-0.12	0.06	-1.55	1.87	1.64	0.51	0.95



# Alt Model-Shift Uniqueness Test

005302881-06, P = 130.161214 Days, E = 16.694667 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
8.12	7.90	5.07	6.45	5.29	3.04	1.12	3.05	1.66	2.83	1.45	0.24	0.96	0.44	0.33



### Stellar Parameters For KIC 005302881

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6413^{+174}_{-194}$	$3.459^{+0.384}_{-0.096}$	$-0.340^{+0.400}_{-0.300}$	$4.022^{+0.588}_{-1.765}$	$1.699^{+0.193}_{-0.450}$	$0.037^{+0.123}_{-0.011}$
	+3%/-3%	+11%/-3%	+118%/-88%	+15%/-44%	+11%/-26%	+335%/-31%
Source	PHO1	FLK73	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 005302881-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-115 \pm 25$	$5.69^{+4.37}_{-3.35}$	$1005^{+63}_{-103}$	$5538^{+3221}_{-1096}$	$686^{+3402}_{-464}$
Alt.	$-230 \pm 29$	$7.14^{+4.05}_{-3.79}$	$1008^{+61}_{-105}$	$5963^{+2685}_{-1033}$	$875^{+3061}_{-520}$

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



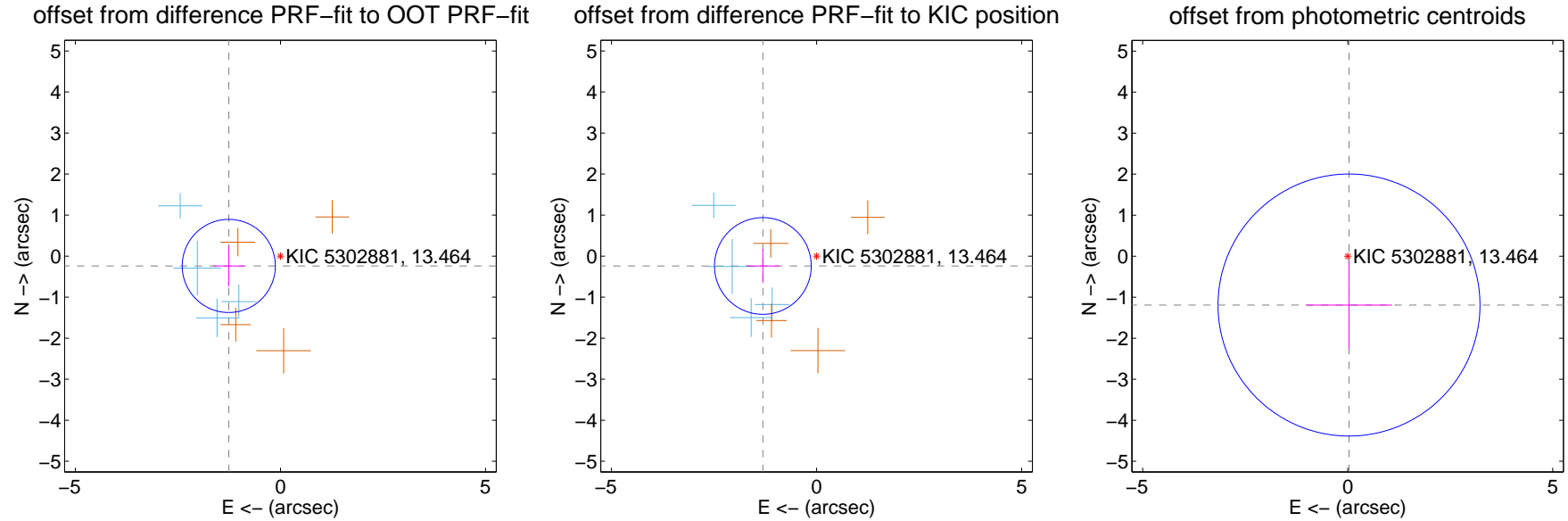
## DV Centroid Data

Supplemental centroid analysis for 005302881-06. Kepler magnitude: 13.46. Transit SNR 7.16

There are 4 quarters with good PRF difference image offsets

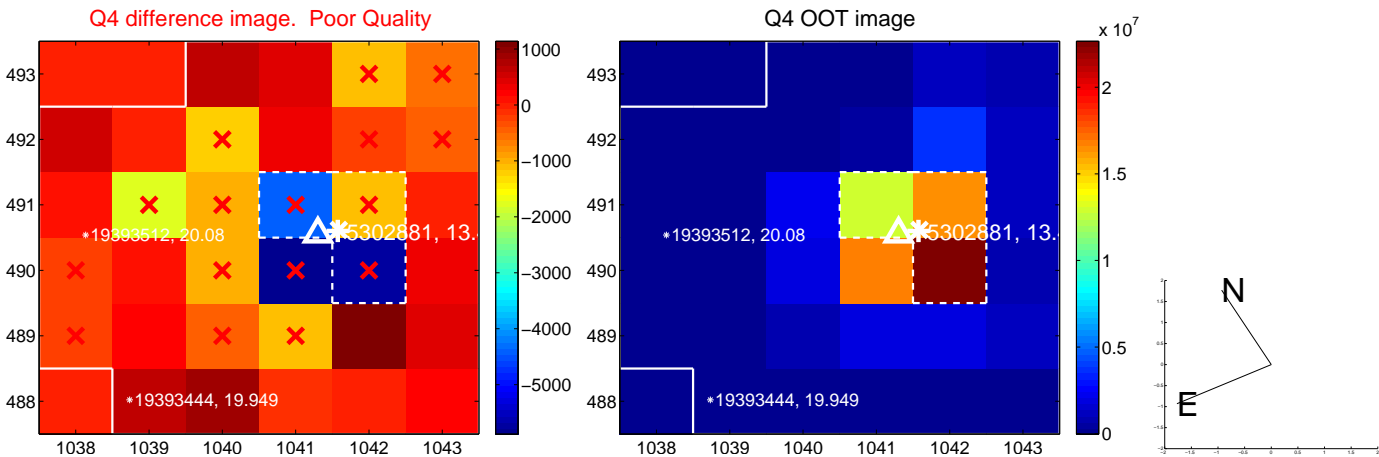
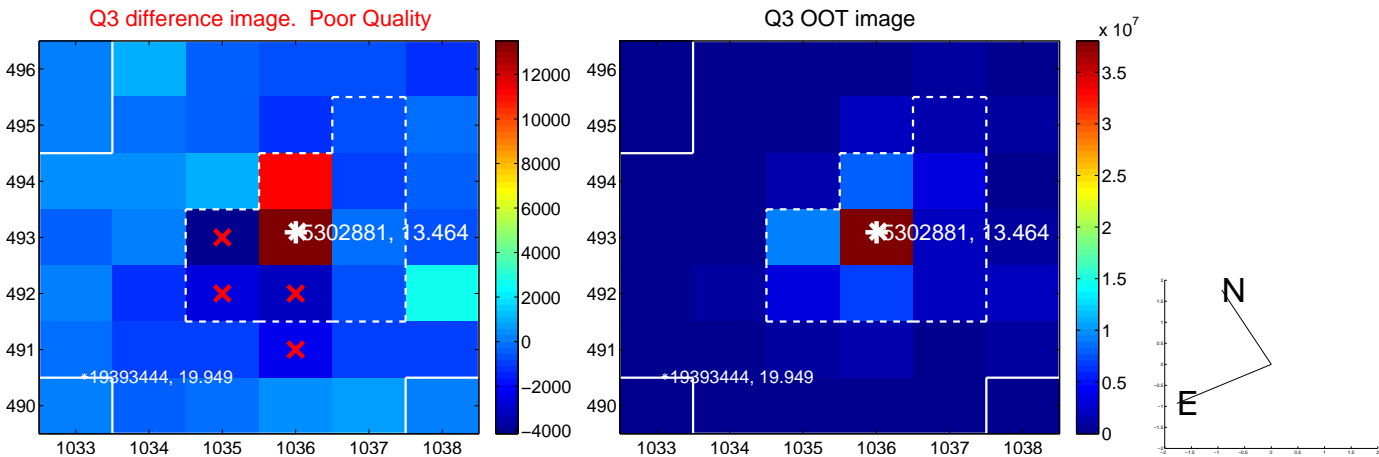
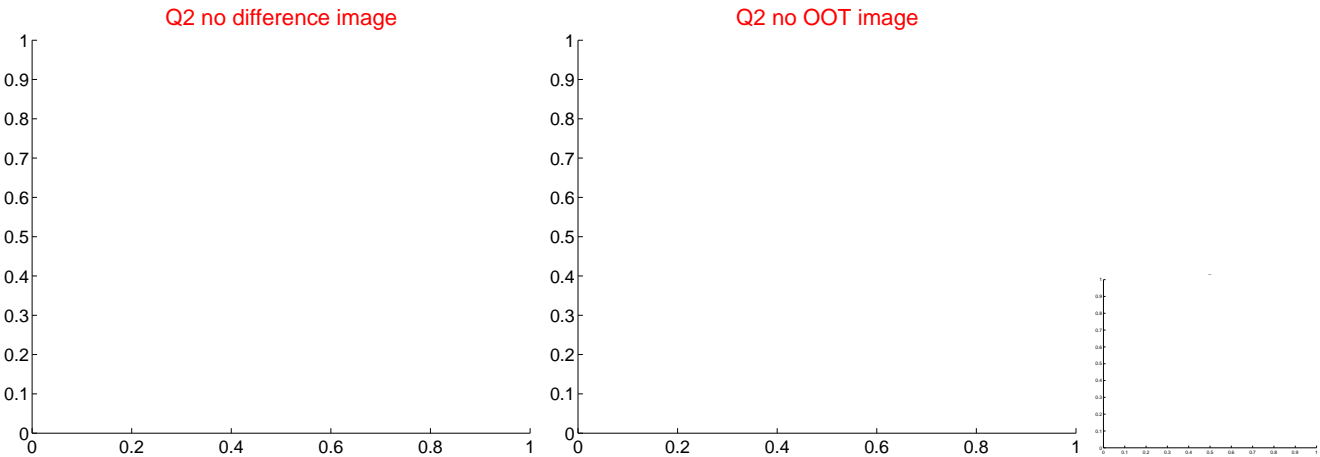
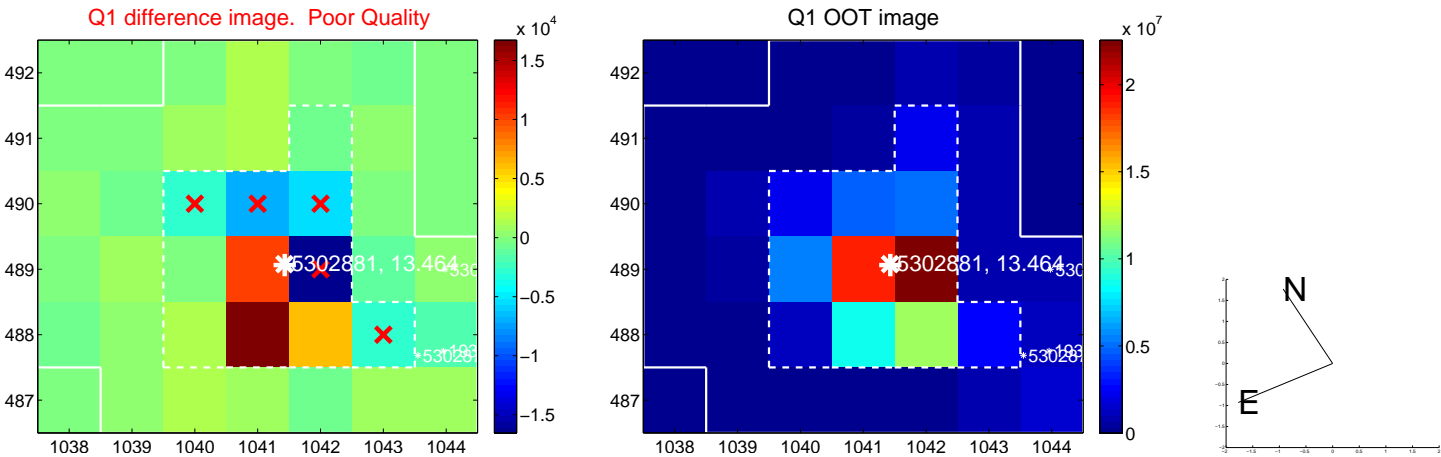
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.282 \pm 0.378$	<b>3.39</b>	$1.260 \pm 0.380$	$-0.239 \pm 0.499$
PRF-fit source offset from KIC position	$1.331 \pm 0.393$	<b>3.39</b>	$1.309 \pm 0.398$	$-0.240 \pm 0.412$
photometric centroid source offset	$1.19 \pm 1.06$	1.12	$-0.03 \pm 1.05$	$-1.19 \pm 1.06$

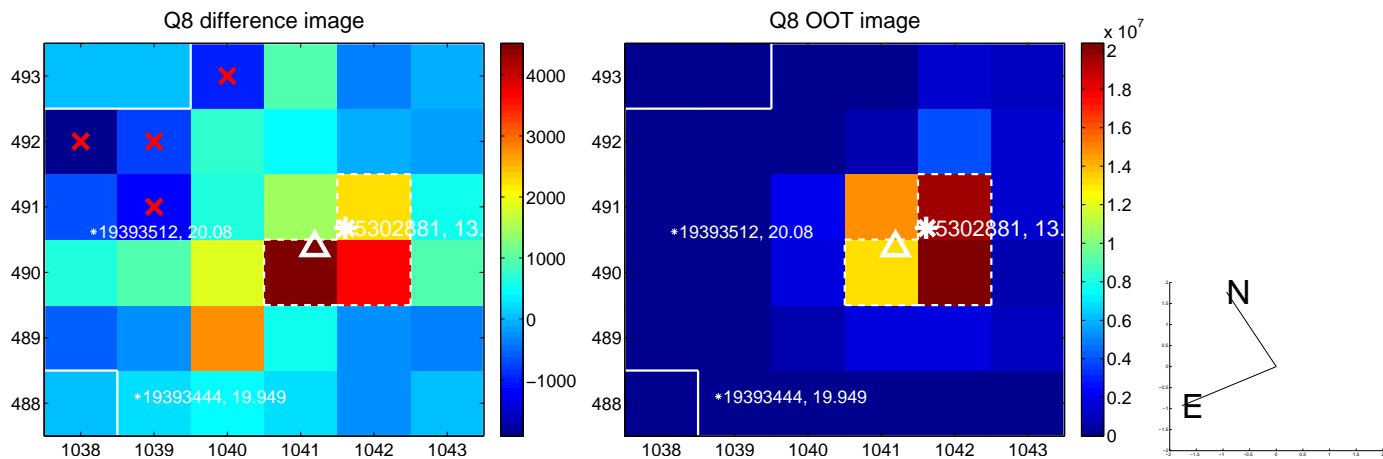
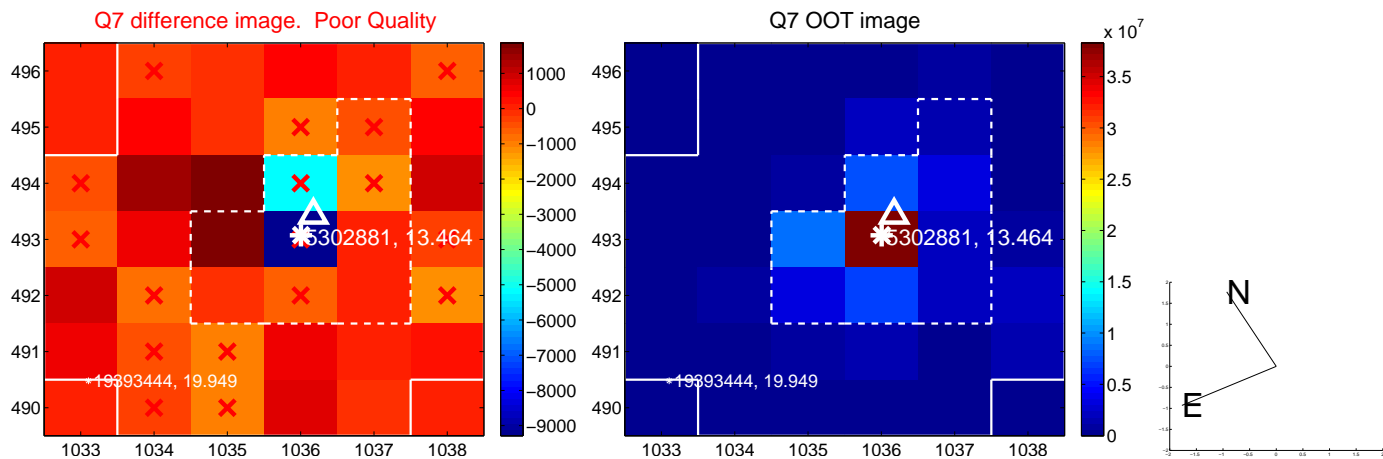
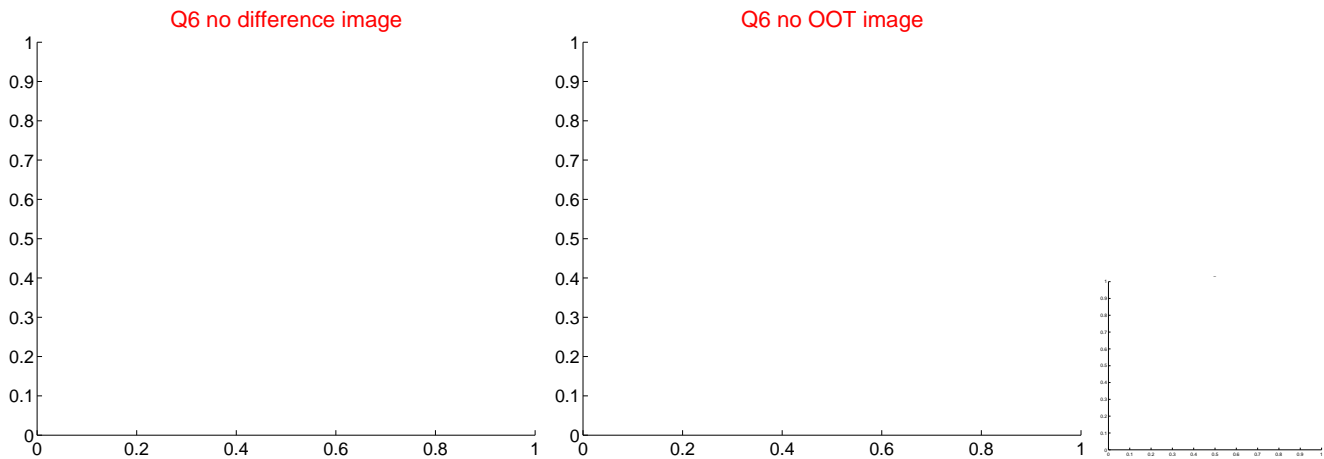
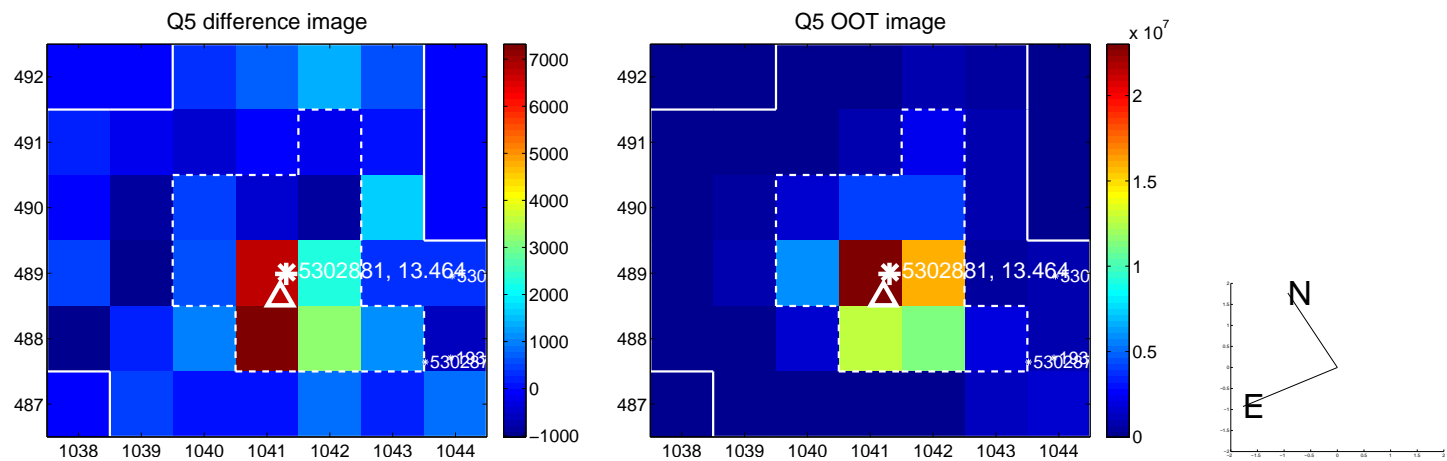


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

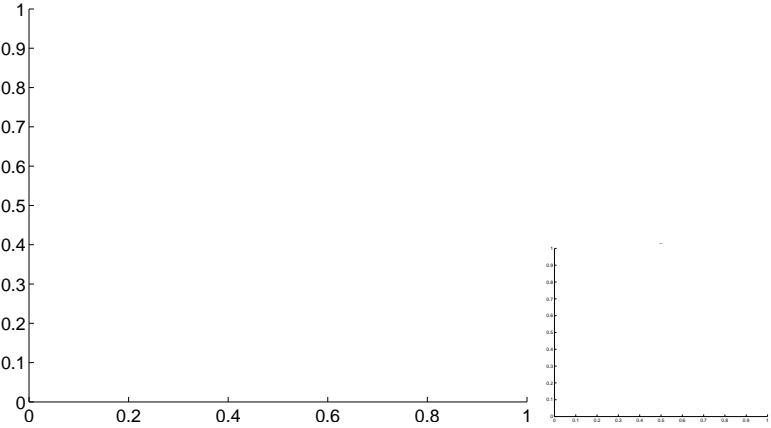


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

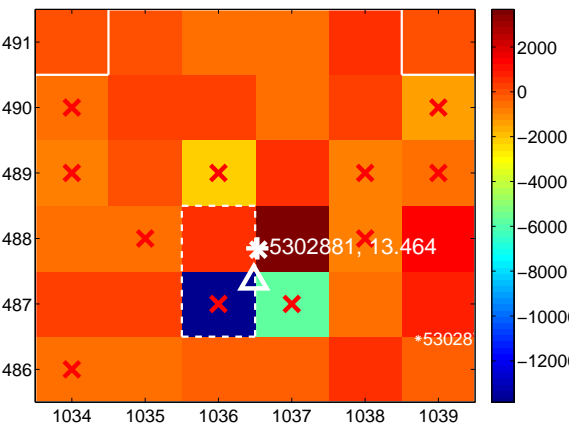
Q9 no difference image



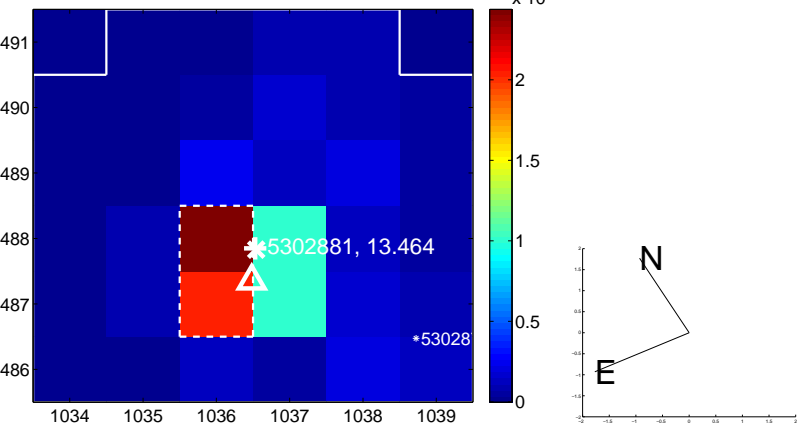
Q9 no OOT image



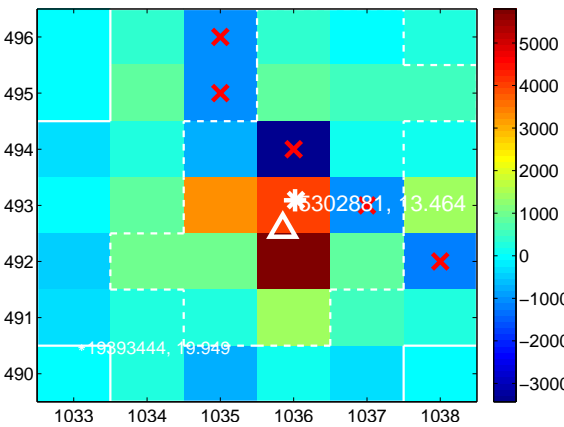
Q10 difference image. Poor Quality



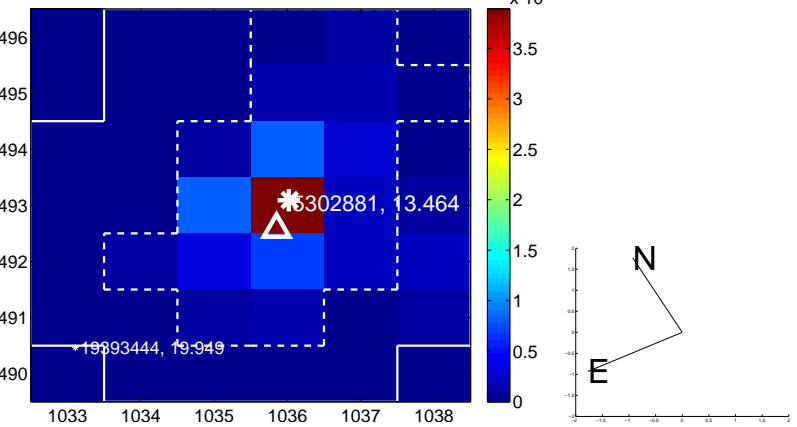
Q10 OOT image



Q11 difference image



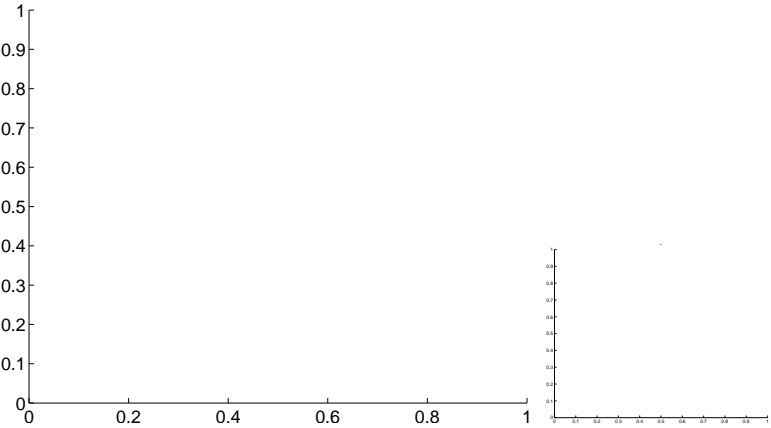
Q11 OOT image



Q12 no difference image



Q12 no OOT image



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

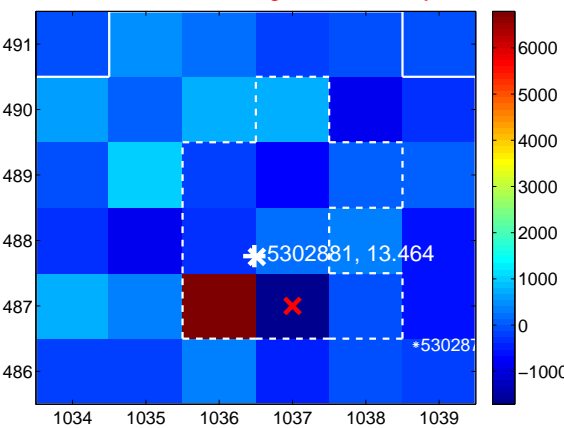
Q13 no difference image



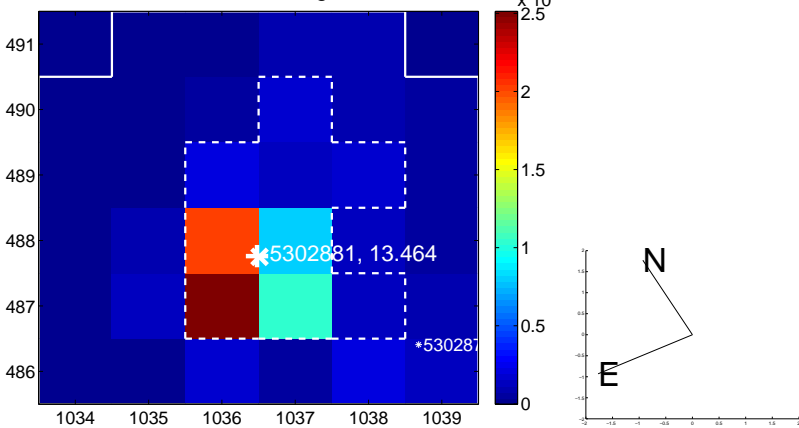
Q13 no OOT image



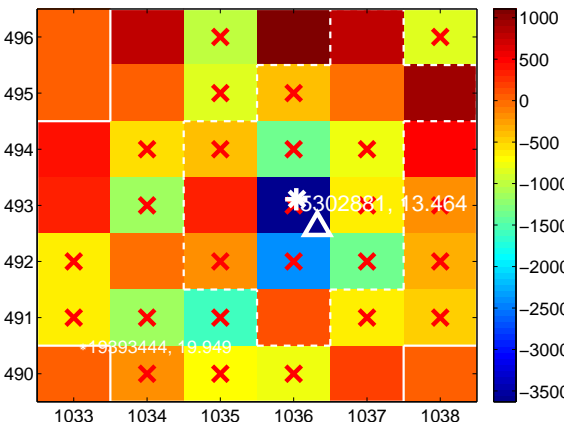
Q14 difference image. Poor Quality



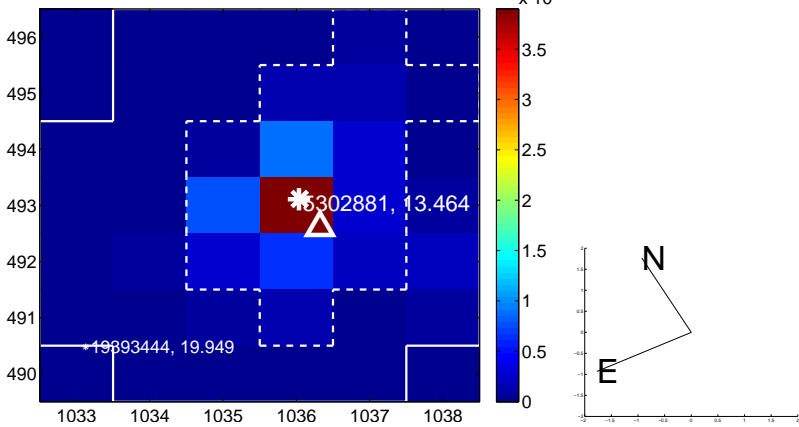
Q14 OOT image



Q15 difference image. Poor Quality



Q15 OOT image



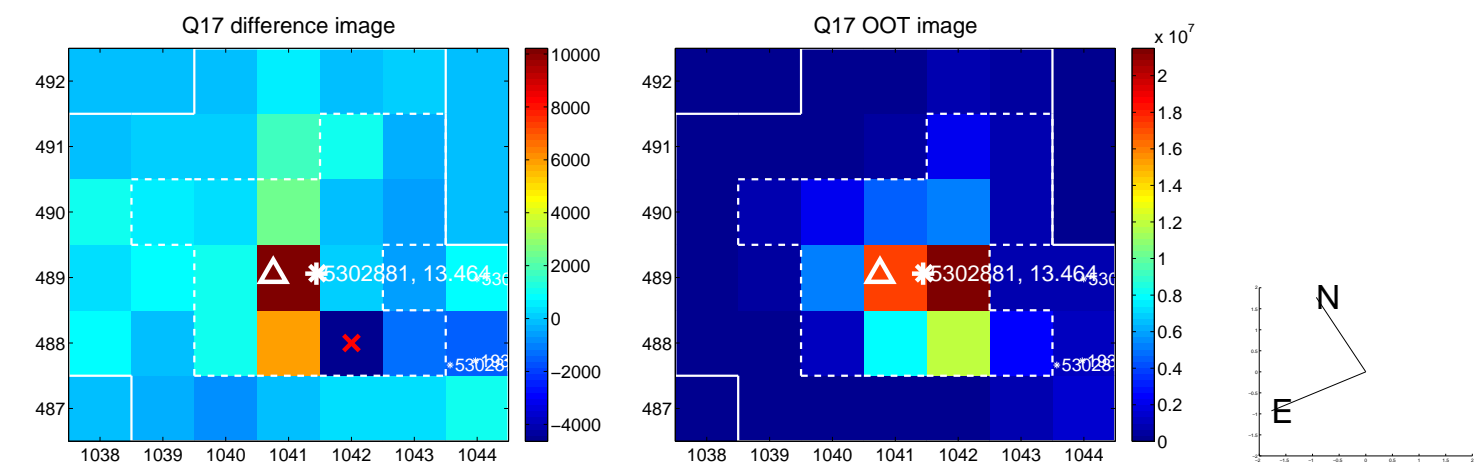
Q16 no difference image



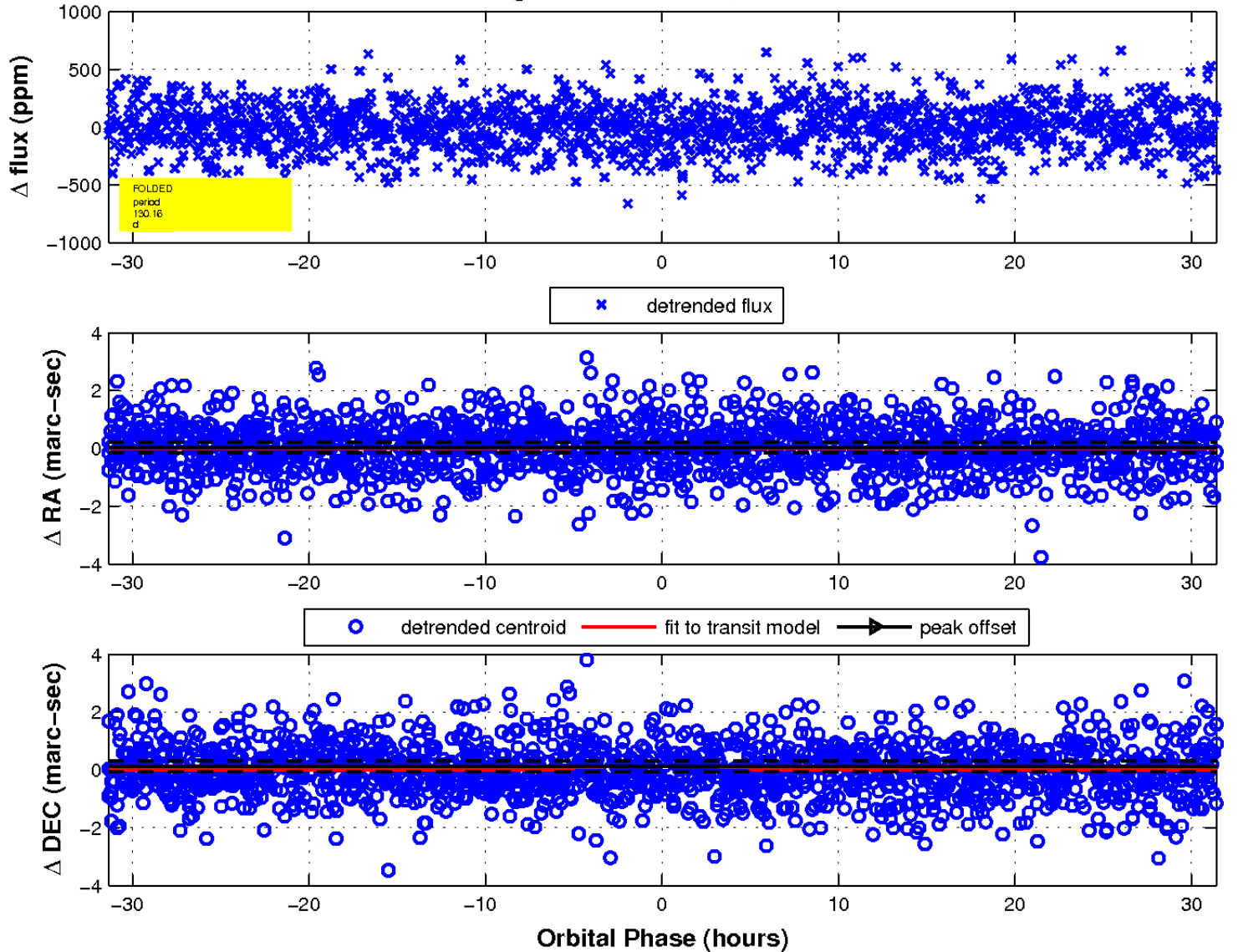
Q16 no OOT image



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



fluxWeightedCentroids, Planet 6 of 6



UKIRT Image

Declination

