

# KIC 005638429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005638429-01	OBS	No	0.687679	131.671919	15.2	4.273	8.3	9.2	2.53	7113	1.16	49331.98
005638429-02	OBS	No	149.991455	217.275195	589.0	5.116	9.5	8.9	2.53	7113	7.70	37.57
005638429-03	OBS	No	152.634865	162.385454	251.2	4.701	8.2	8.2	2.53	7113	4.08	36.71
005638429-04	OBS	No	64.884695	166.731715	121.2	3.206	9.3	3.8	2.53	7113	3.23	114.85
005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
005638429-06	OBS	No	64.886267	167.047687	198.0	3.307	9.1	5.1	2.53	7113	3.81	114.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005638429-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

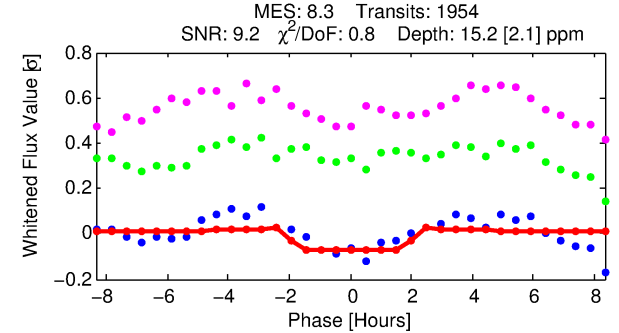
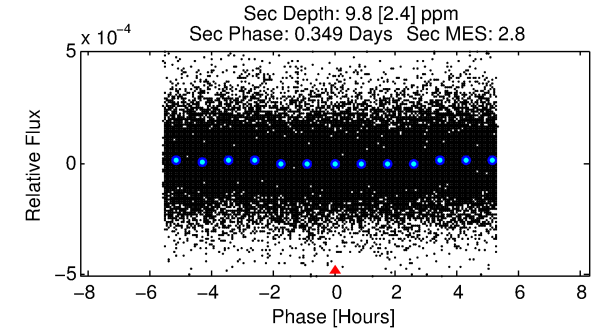
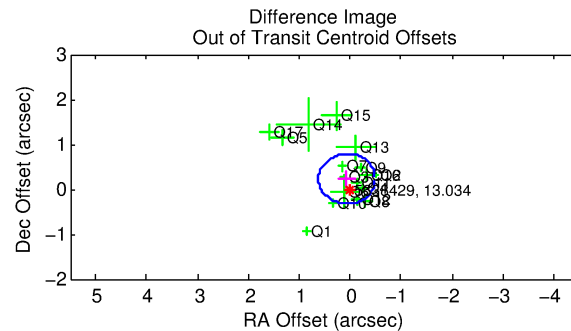
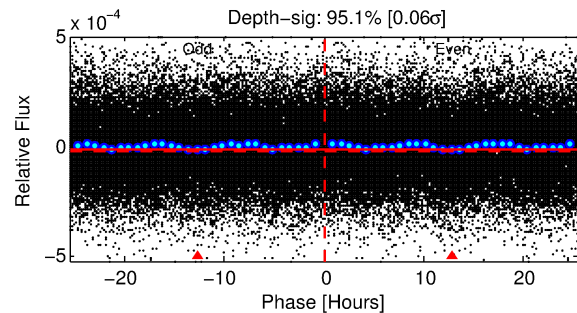
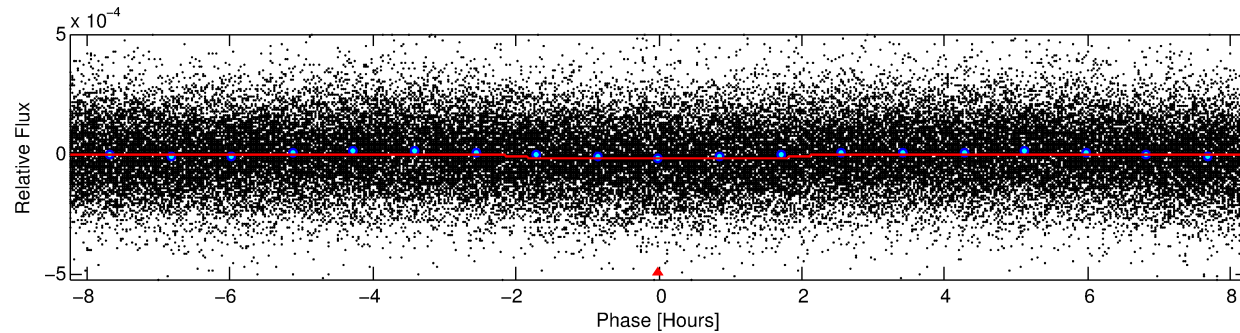
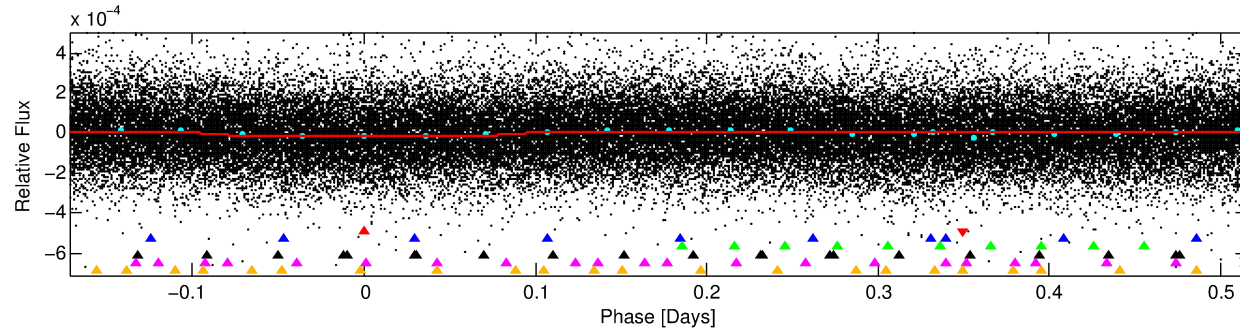
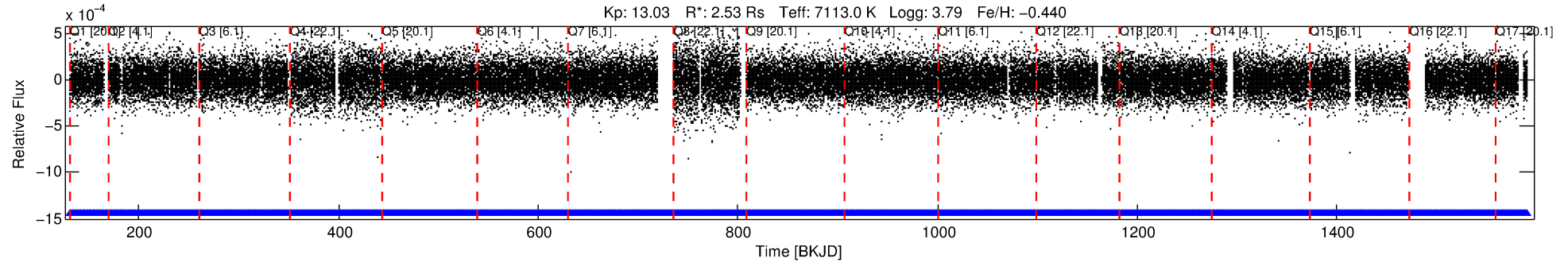
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-01

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 1 of 6 Period: 0.688 d



## DV Fit Results:

Period = 0.68768 [0.00001] d  
Epoch = 131.6719 [0.0038] BKJD  
Rp/R\* = 0.0042 [0.0020]  
a/R\* = 1.09 [0.48]  
b = 0.90 [0.60]  
Seff = 49331.98 [25300.65]  
Teq = 3800 [487] K  
Rp = 1.16 [0.67] Re  
a = 0.0173 [0.0054] AU  
Ag = 1.21 [1.32] [0.16 $\sigma$ ]  
Teffp = 6162 [1520] K [1.48 $\sigma$ ]

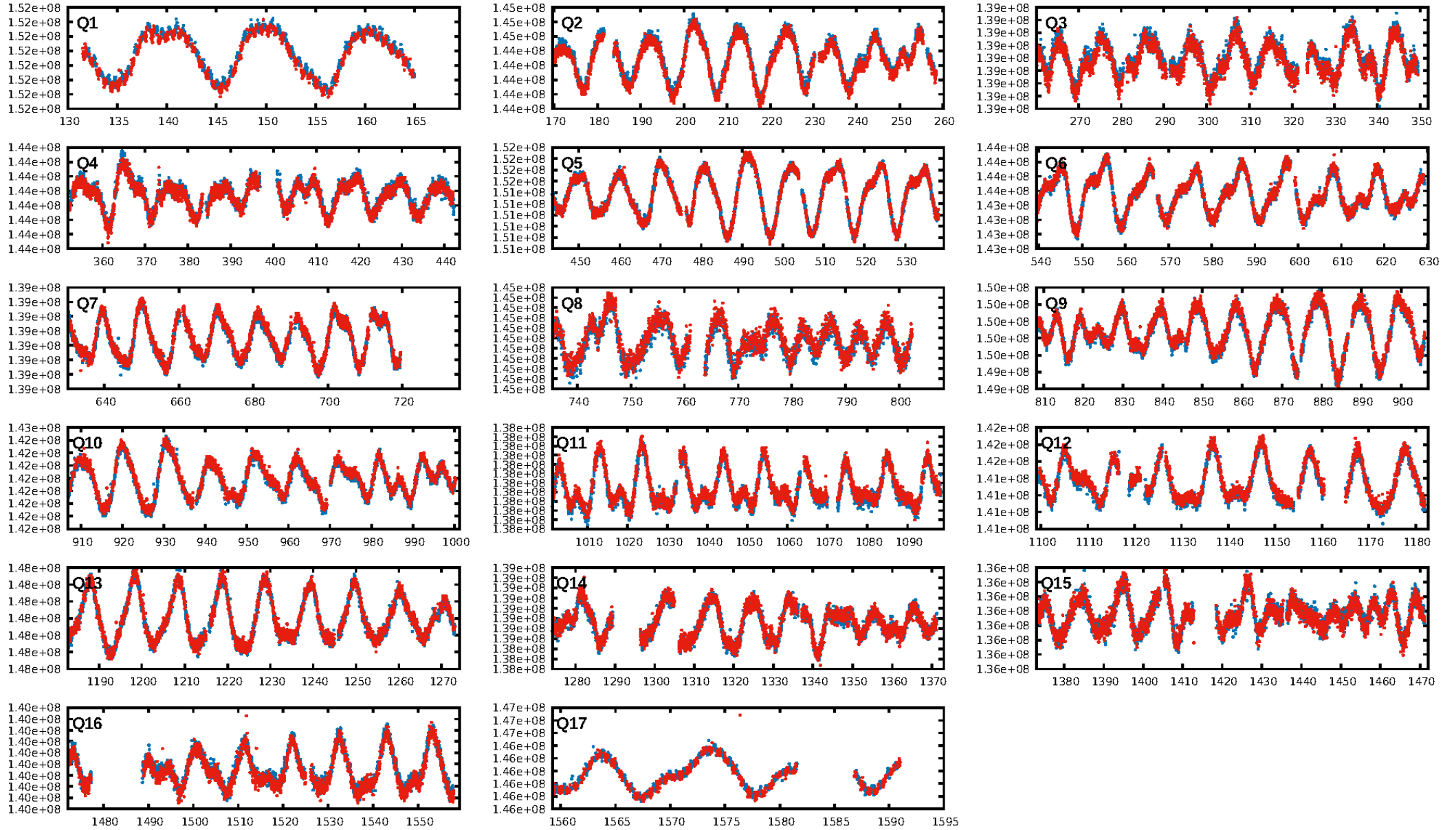
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [288.41 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 9.12e-12**  
RollingBand-fgt: 1.00 [1865/1865]  
GhostDiagnostic-chr: 1.195  
Centroid-sig: 45.4%  
Centroid-so: 0.501 arcsec [0.62 $\sigma$ ]  
OotOffset-rm: 0.237 arcsec [1.27 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.164 arcsec [0.87 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.47 [8/17]  
DiffImageOverlap-fno: 1.00 [17/17]

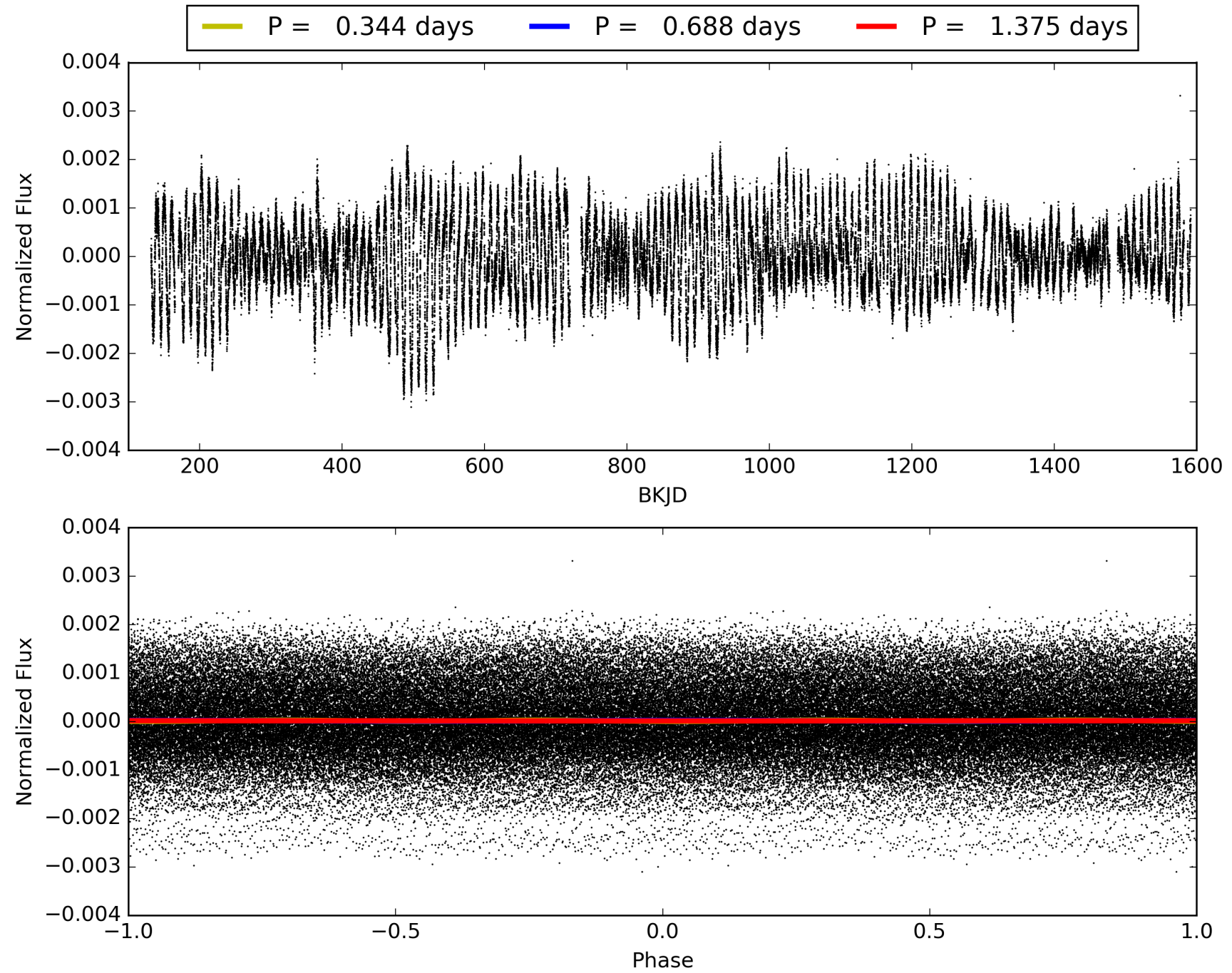
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:17 Z

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

# TCE 005638429-01, PDC Light Curves



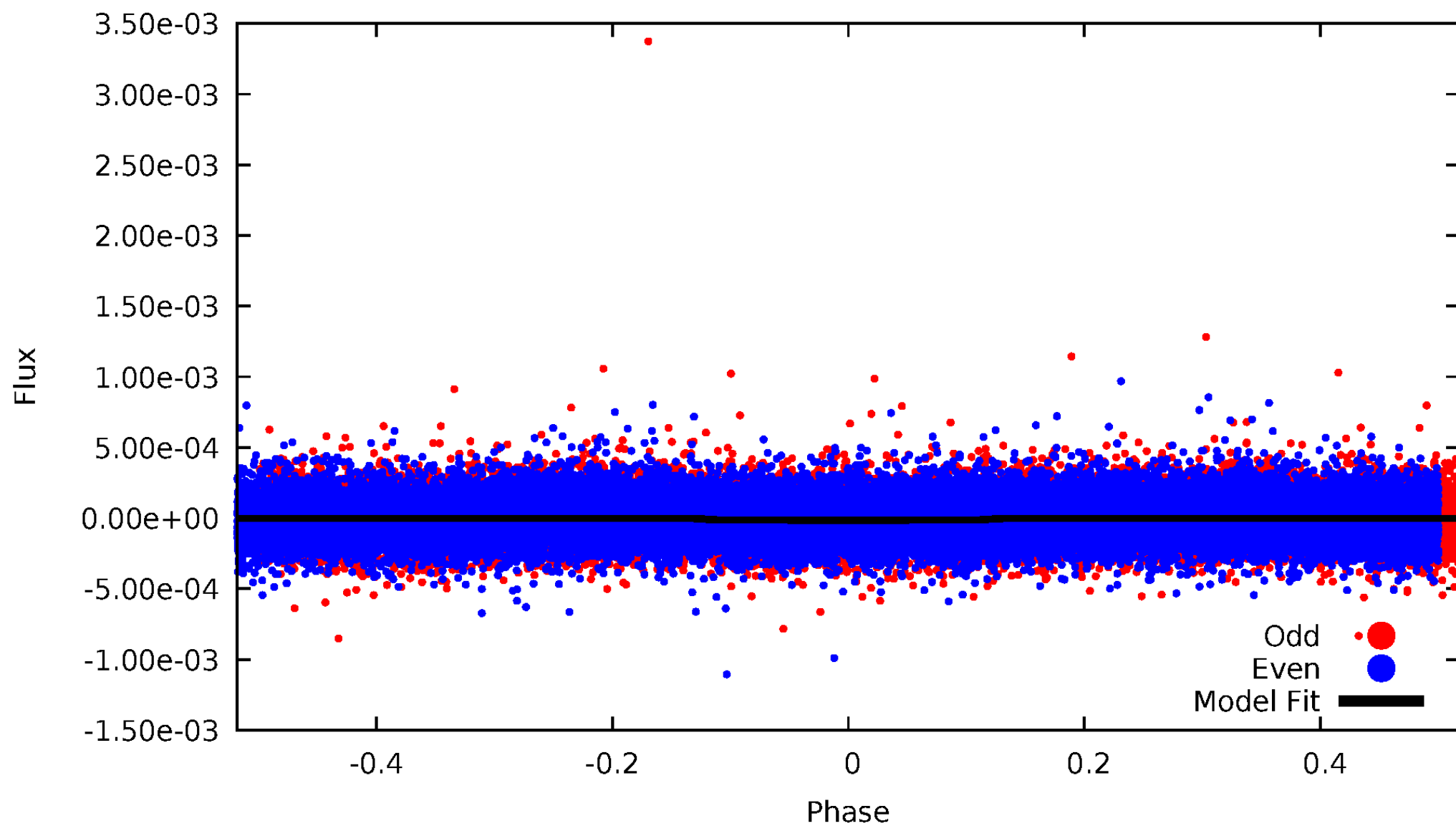
TCE 005638429-01





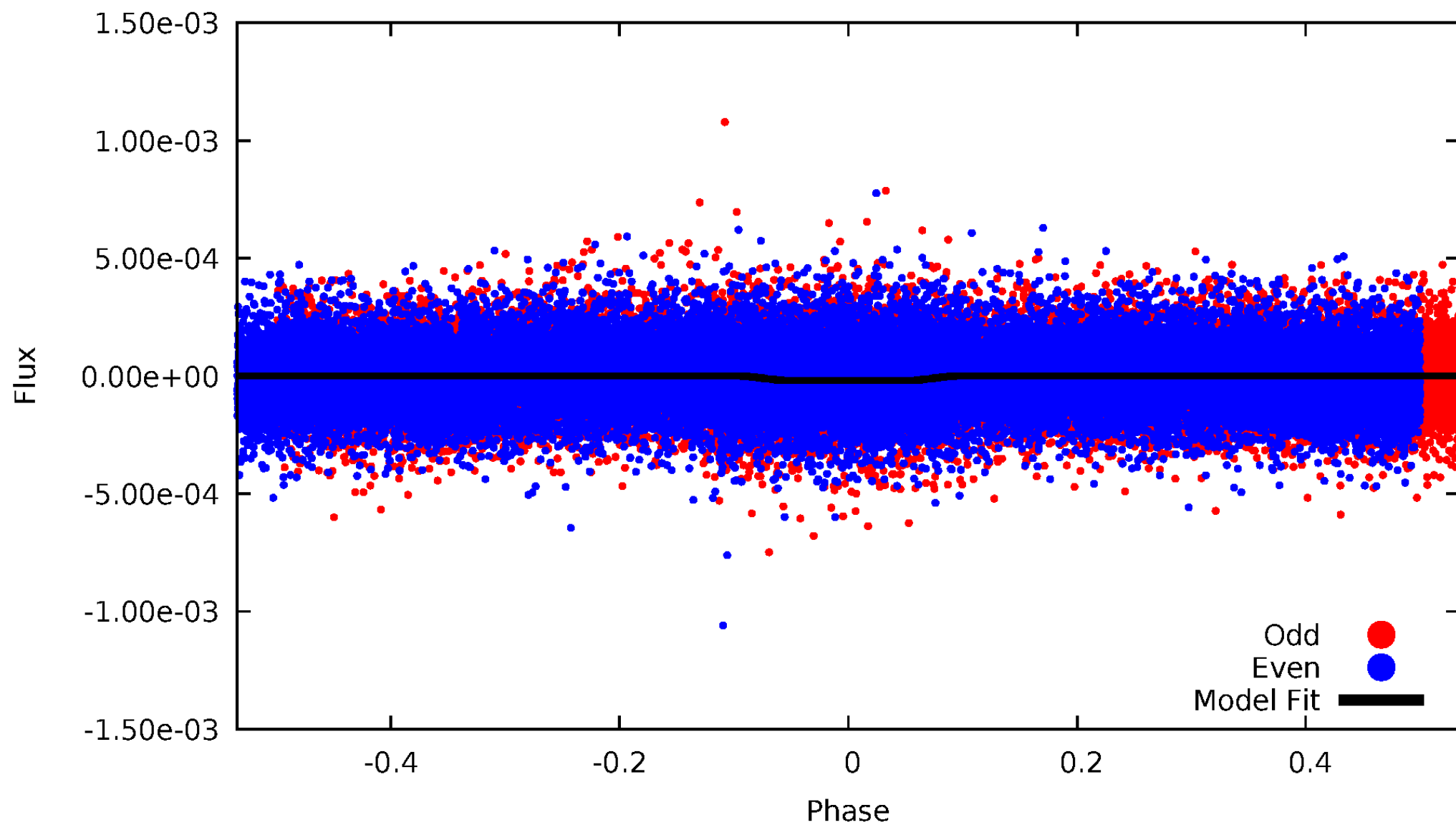
# DV Odd/Even

TCE 005638429-01

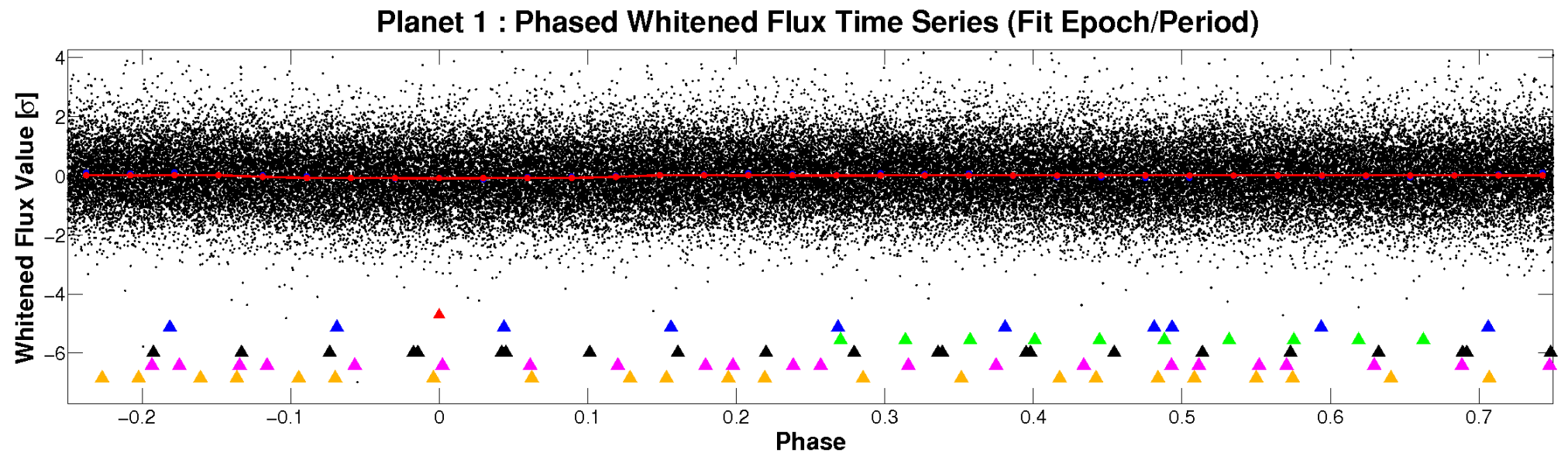
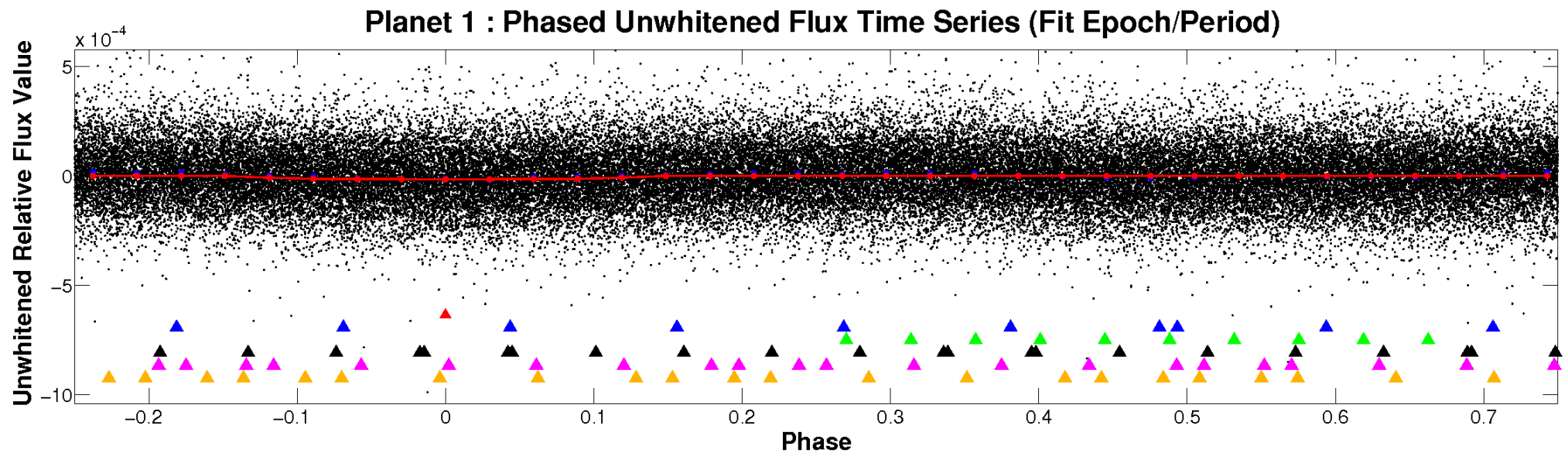


# ALT Odd/Even

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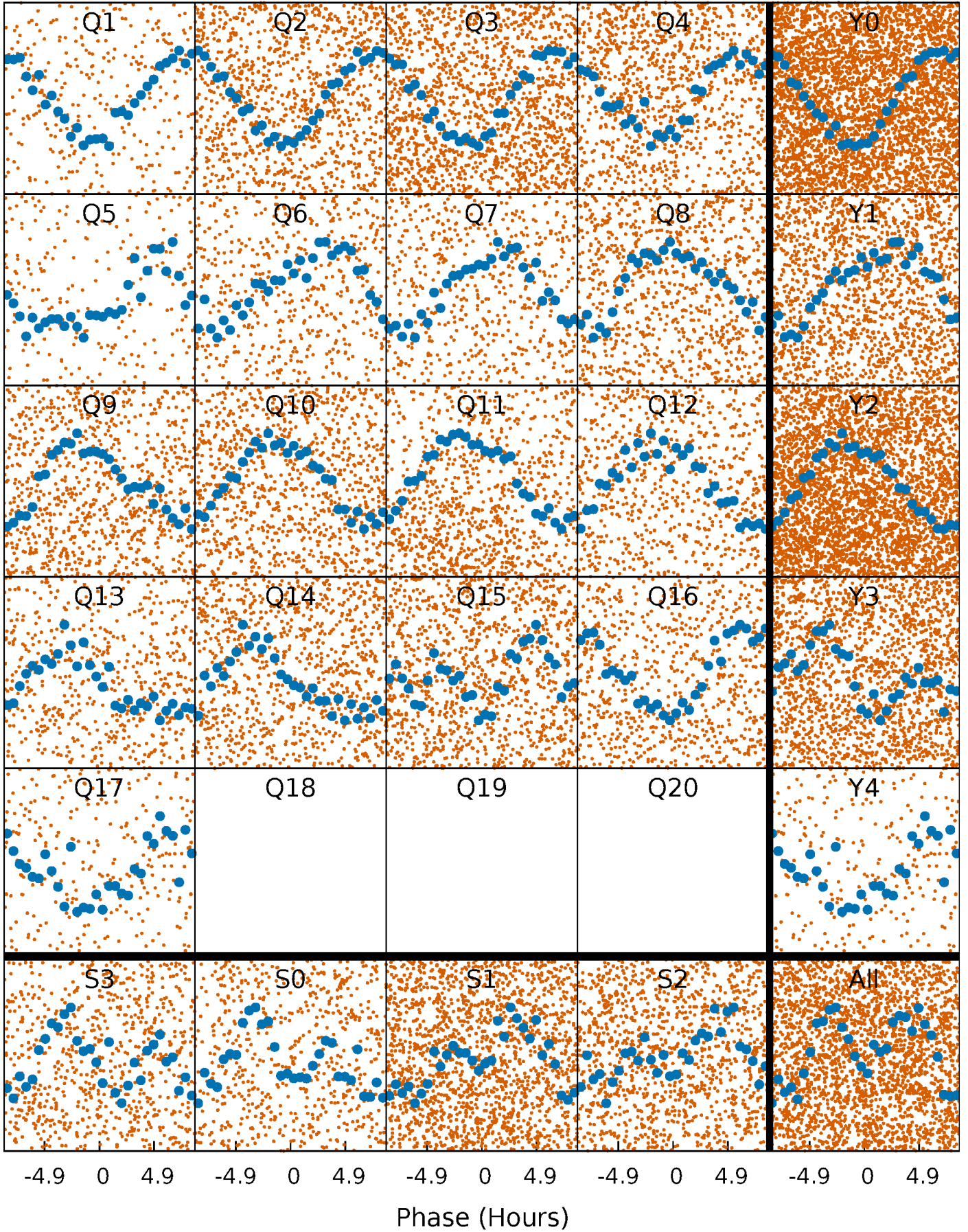


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

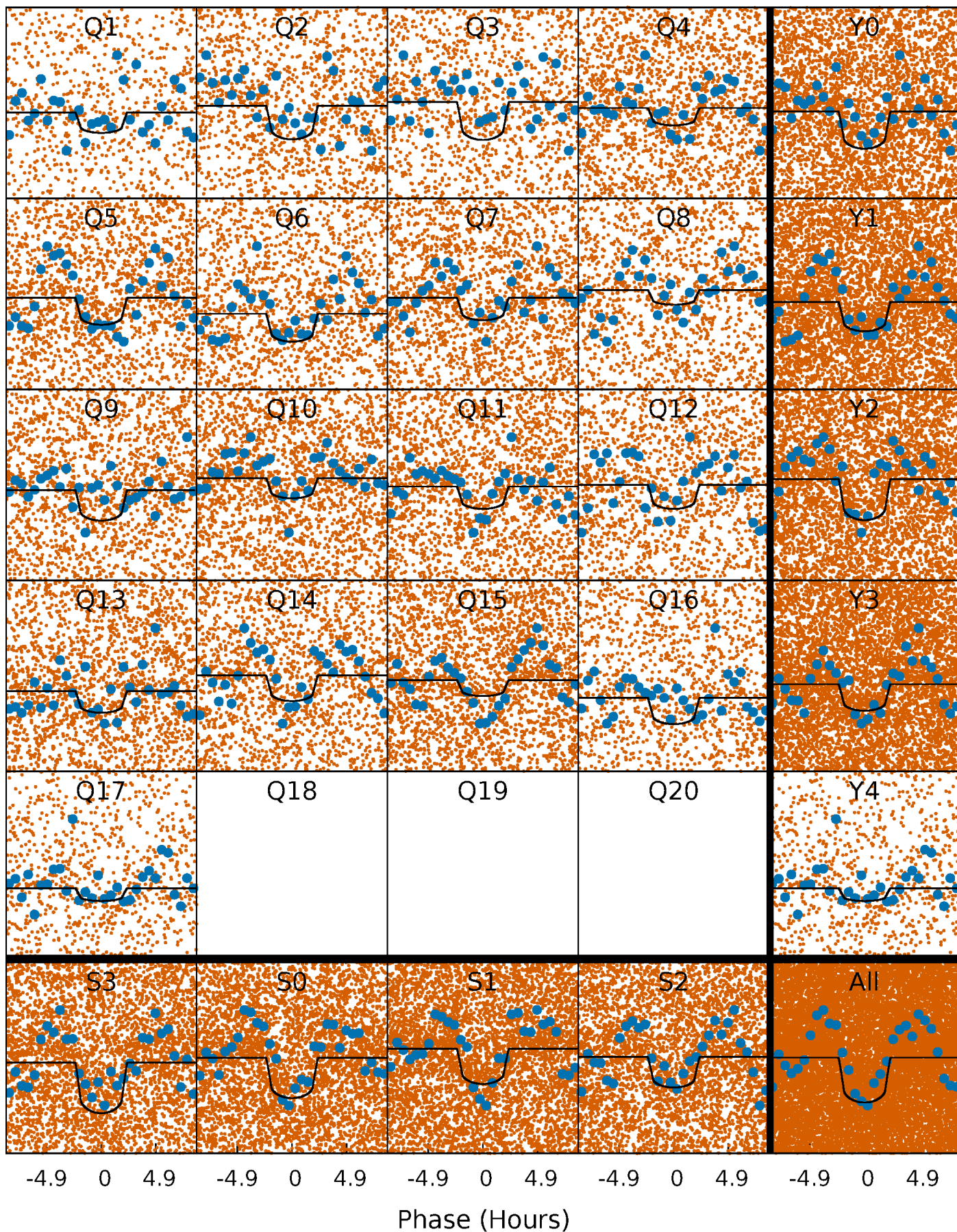
TCE 005638429-01   P= 0.687679 Days    $T_0=131.671919$  (BKJD)





# DV Quarter-Phased Transit Curves

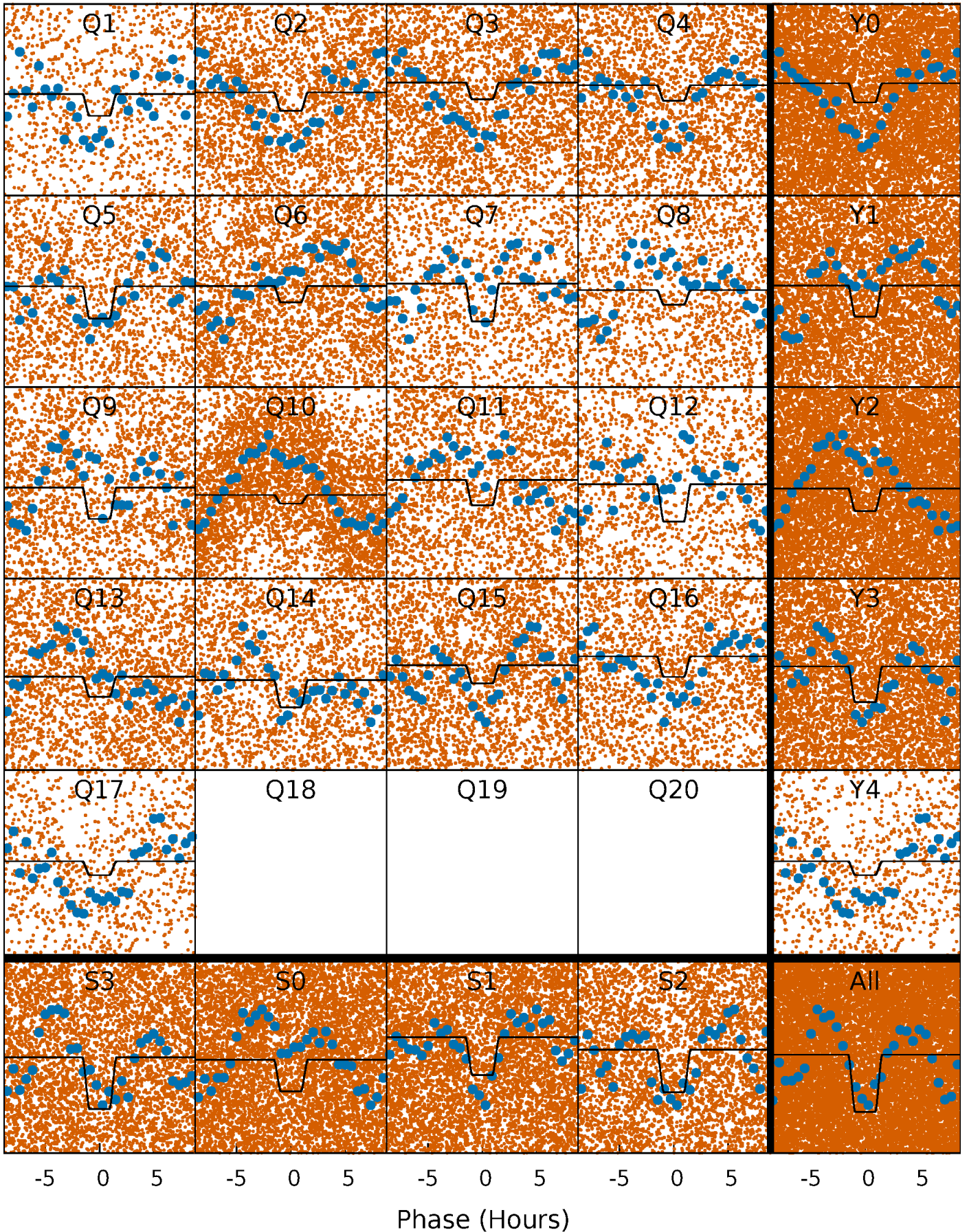
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# Alt. Detrend Quarter-Phased Transit Curves

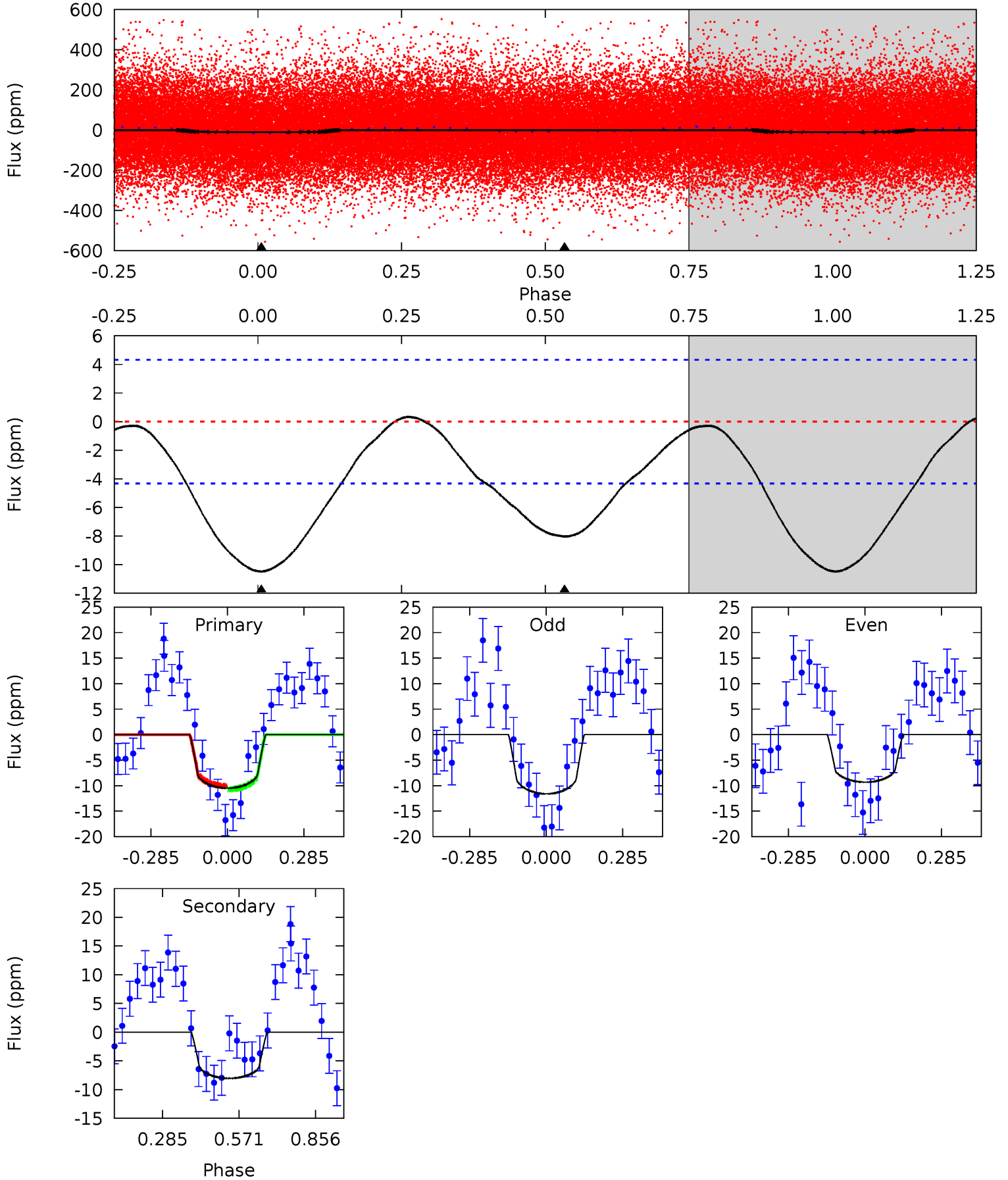
TCE 005638429-01 P= 0.687685 Days  $T_0=131.671393$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-01, P = 0.687679 Days, E = 130.984240 Days

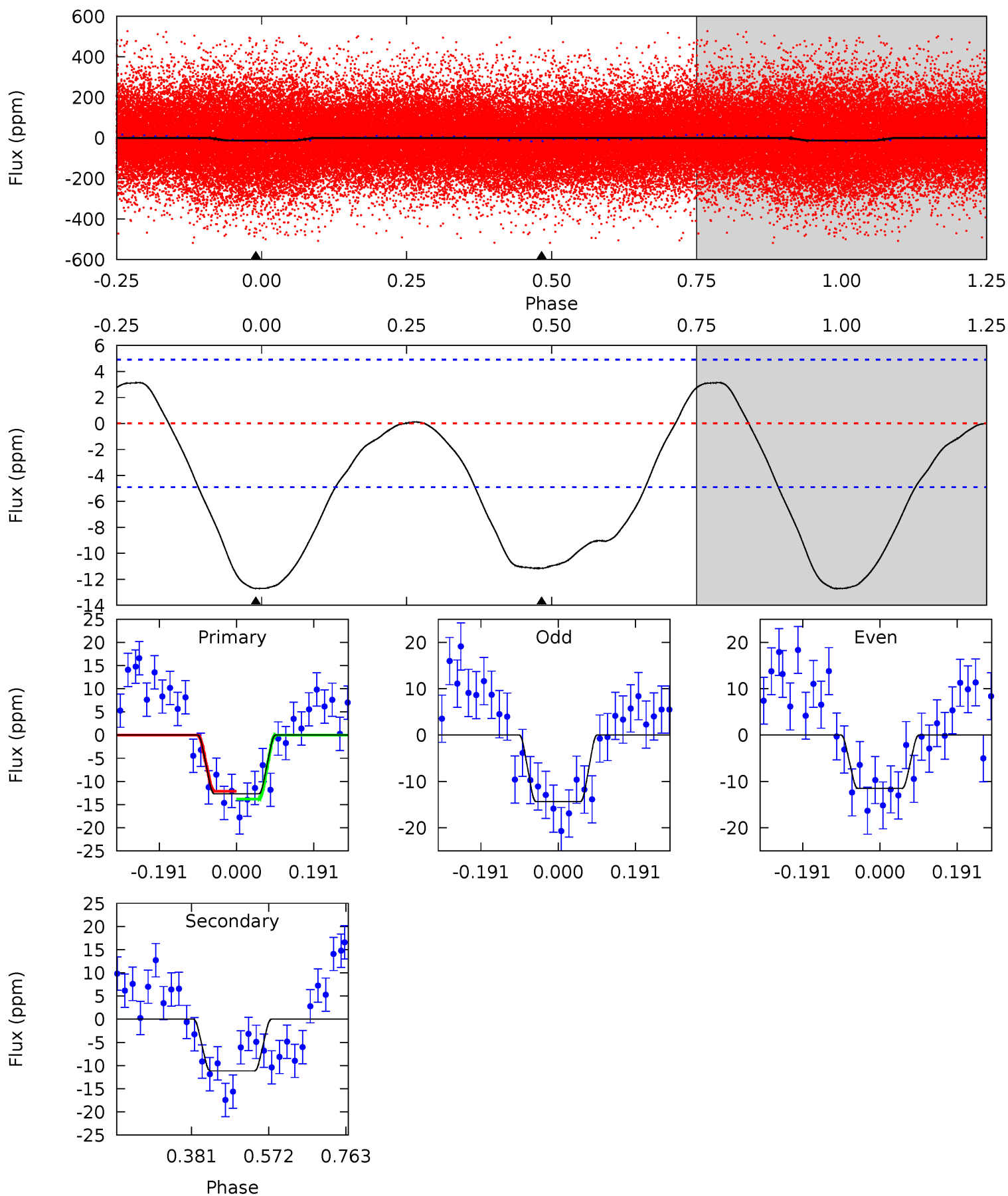
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	8.07	0	0	4.34	1.07	0.27	10.5	10.5	8.07	8.07	1.16	1.01	0.03	0.32



# Alt Model-Shift Uniqueness Test

005638429-01, P = 0.687685 Days, E = 130.983708 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
11.5	10.1	0	0	4.43	1.31	1.60	11.5	11.5	10.1	10.1	1.30	0.78	0.20	0.75





### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-8 \pm 1$	$1.11^{+0.60}_{-0.49}$	$5213^{+323}_{-416}$	$5332^{+2177}_{-1290}$	$1.067^{+2.350}_{-0.590}$
Alt.	$-11 \pm 1$	$1.07^{+0.65}_{-0.47}$	$5177^{+344}_{-423}$	$5901^{+2607}_{-1359}$	$1.572^{+3.468}_{-0.931}$

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

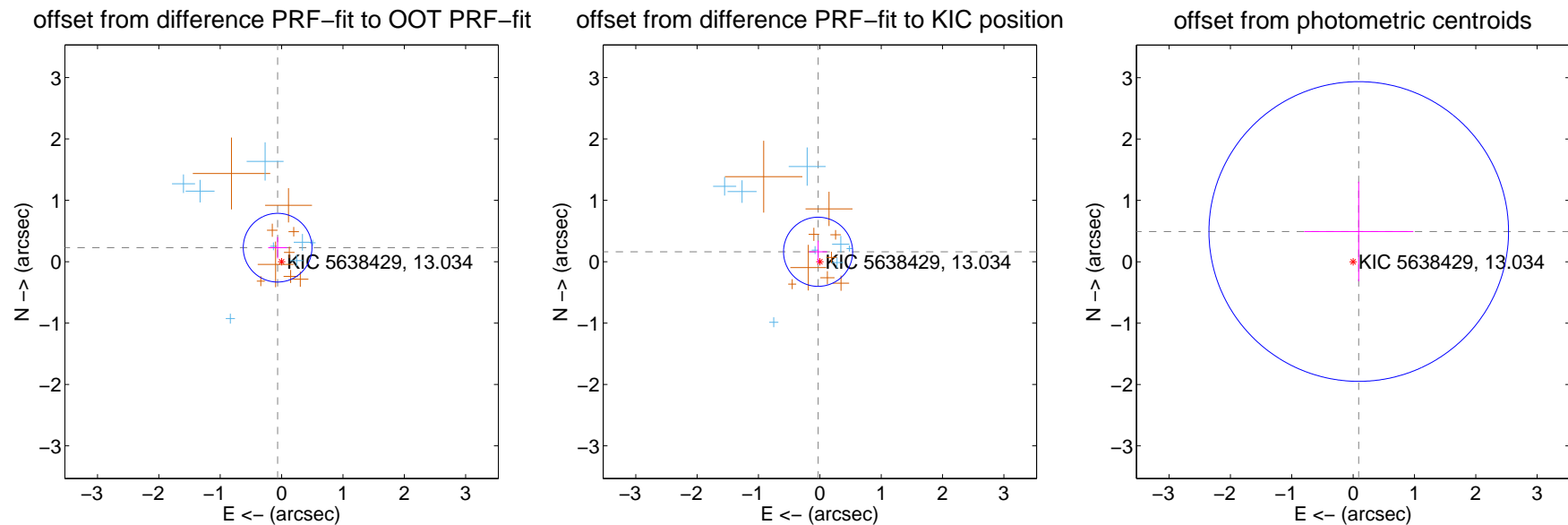
## DV Centroid Data

Supplemental centroid analysis for 005638429-01. Kepler magnitude: 13.03. Transit SNR 9.15

There are 8 quarters with good PRF difference image offsets

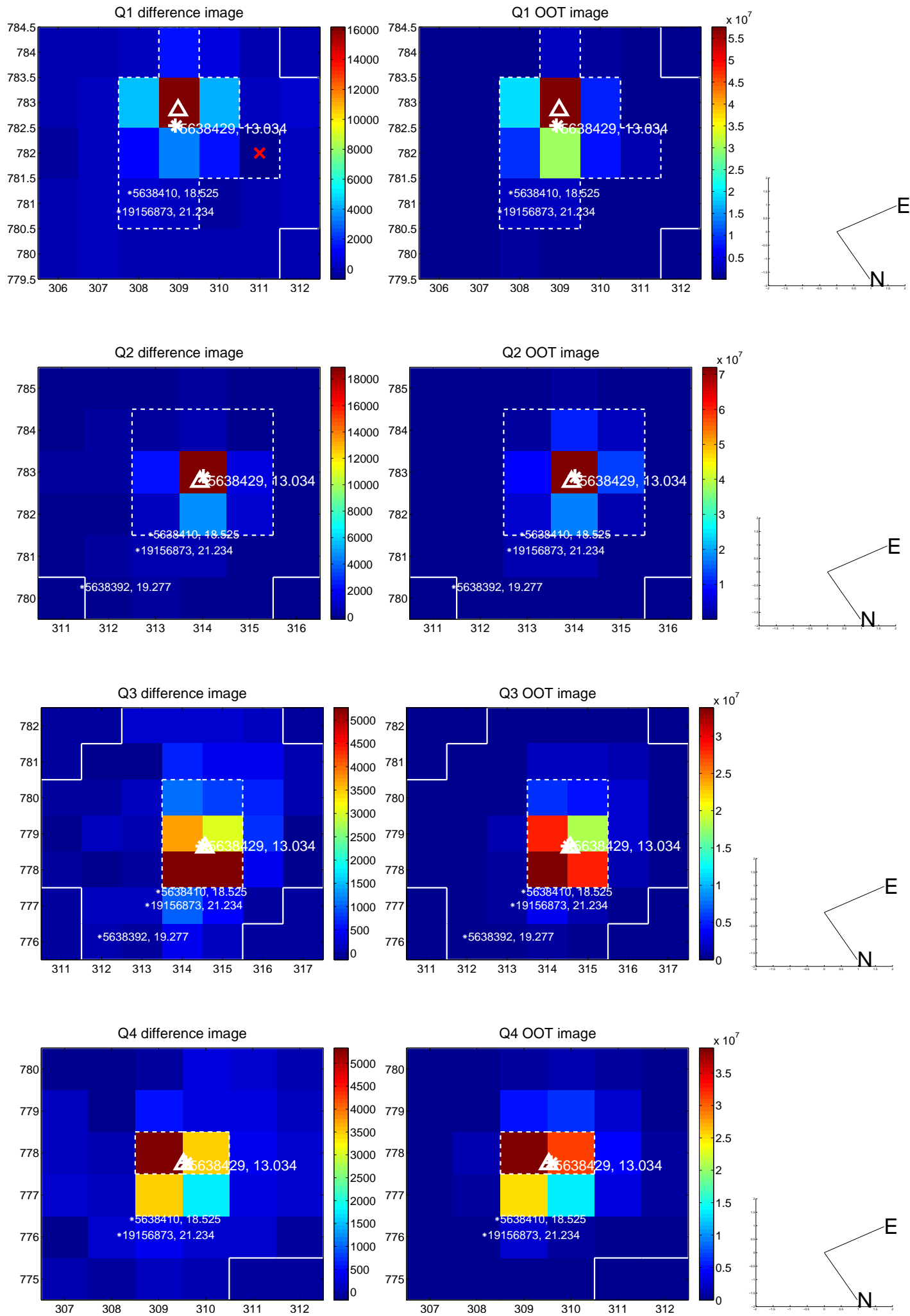
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.237 \pm 0.187$	1.27	$0.065 \pm 0.153$	$0.228 \pm 0.174$
PRF-fit source offset from KIC position	$0.164 \pm 0.188$	0.87	$0.028 \pm 0.146$	$0.161 \pm 0.180$
photometric centroid source offset	$0.50 \pm 0.81$	0.62	$-0.09 \pm 0.89$	$0.49 \pm 0.81$

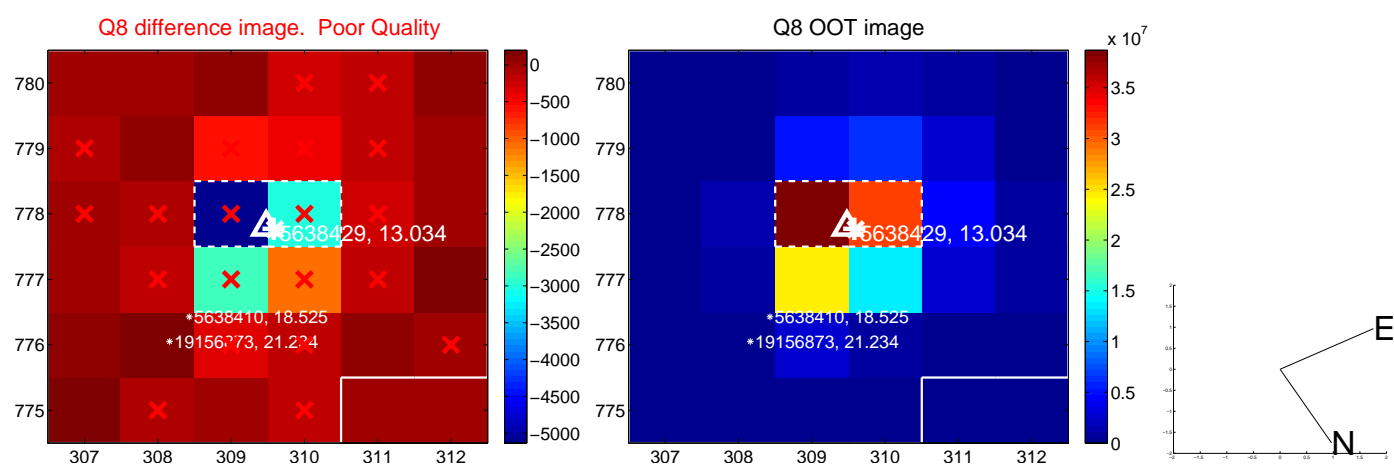
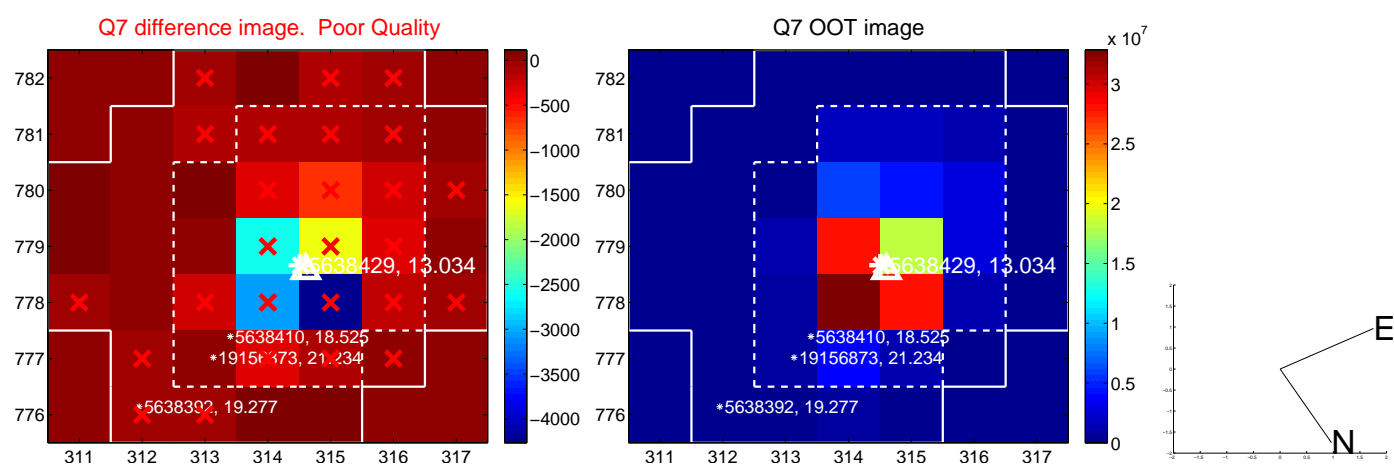
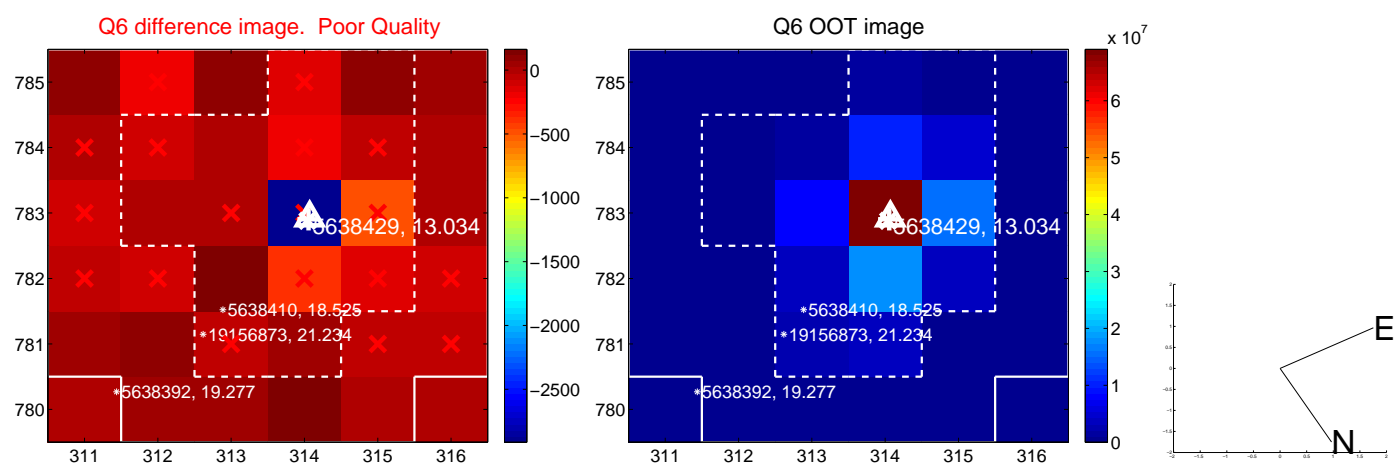
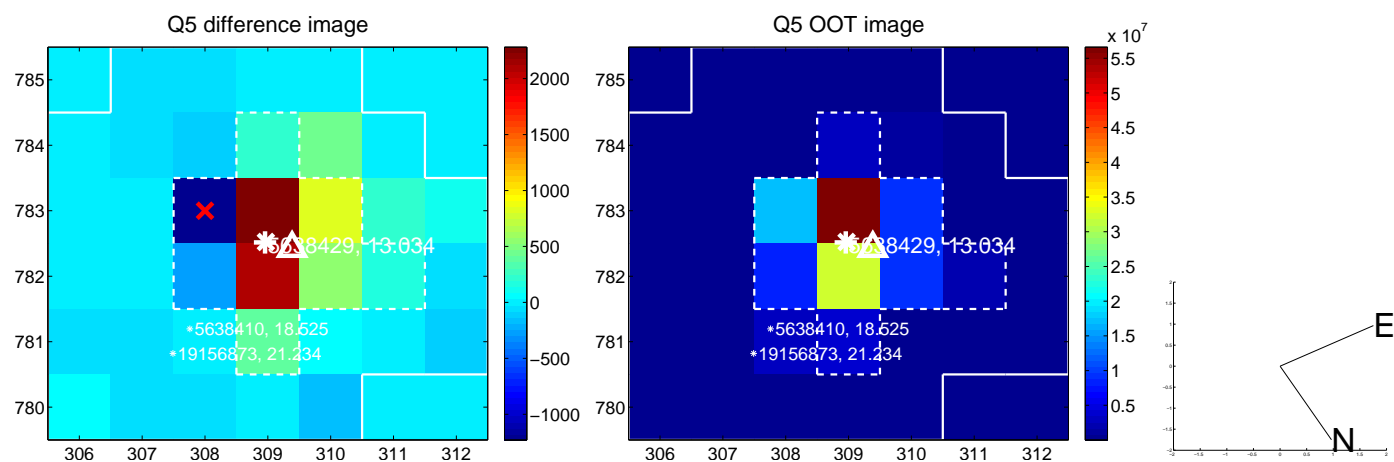


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

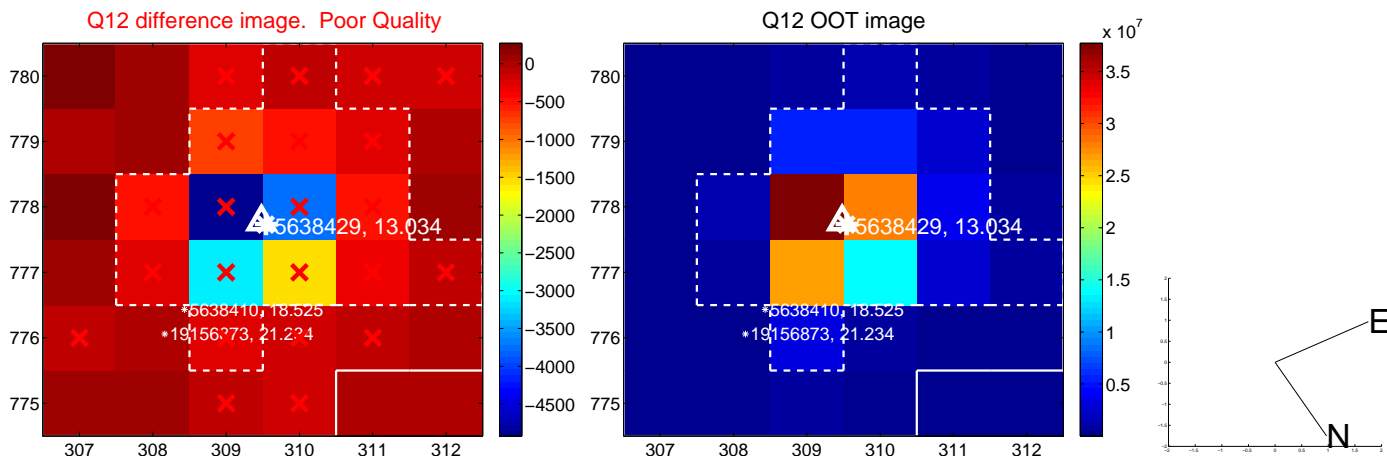
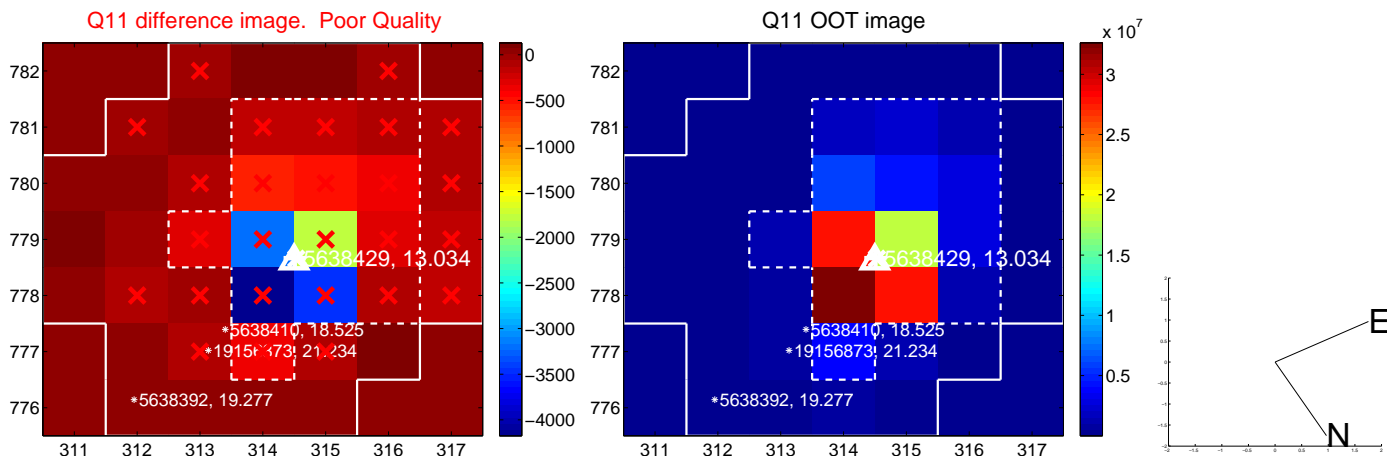
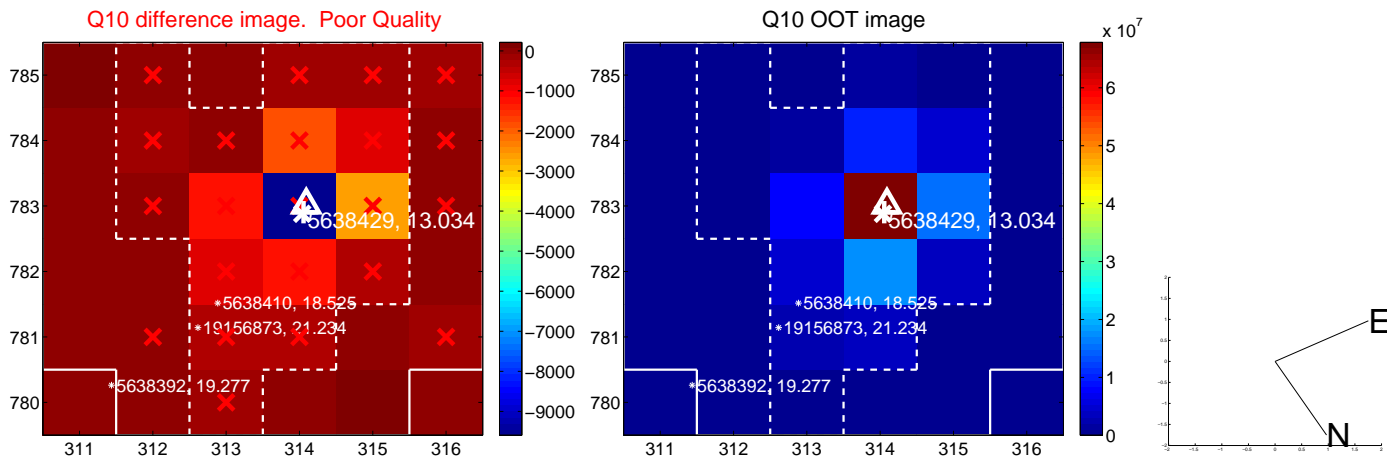
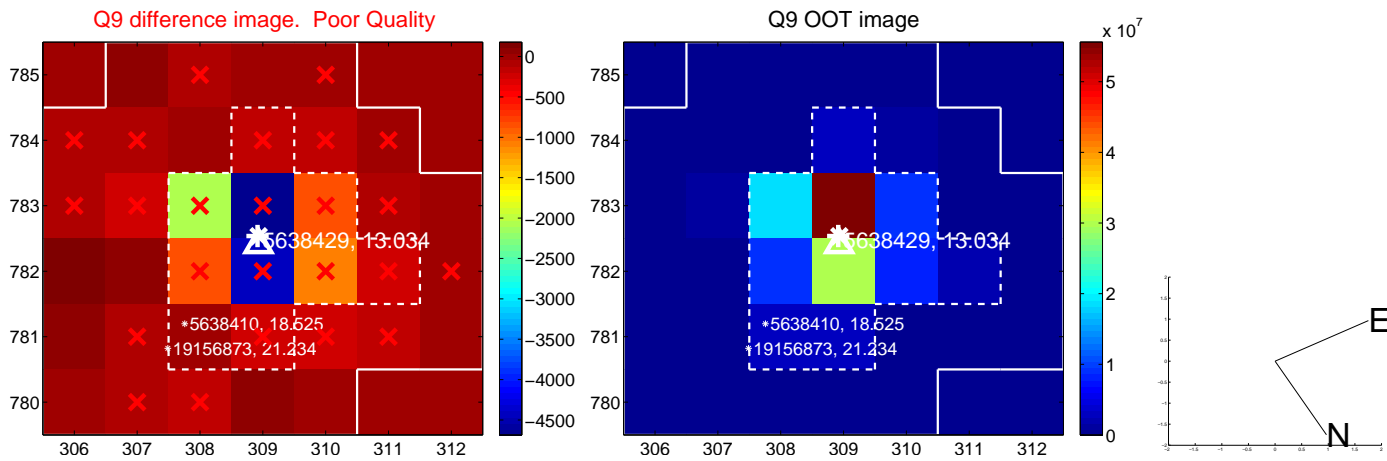


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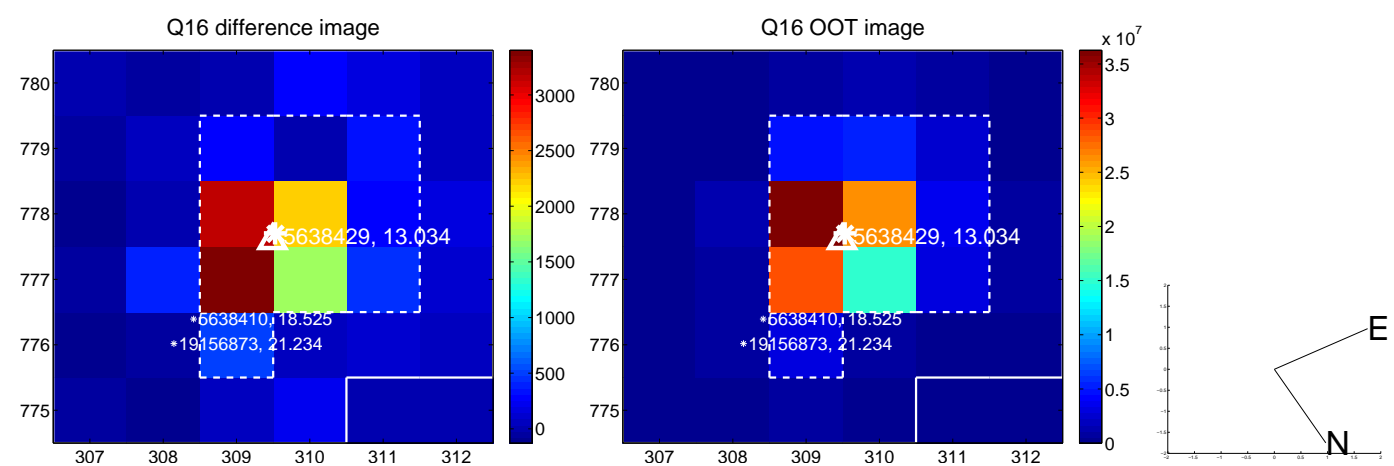
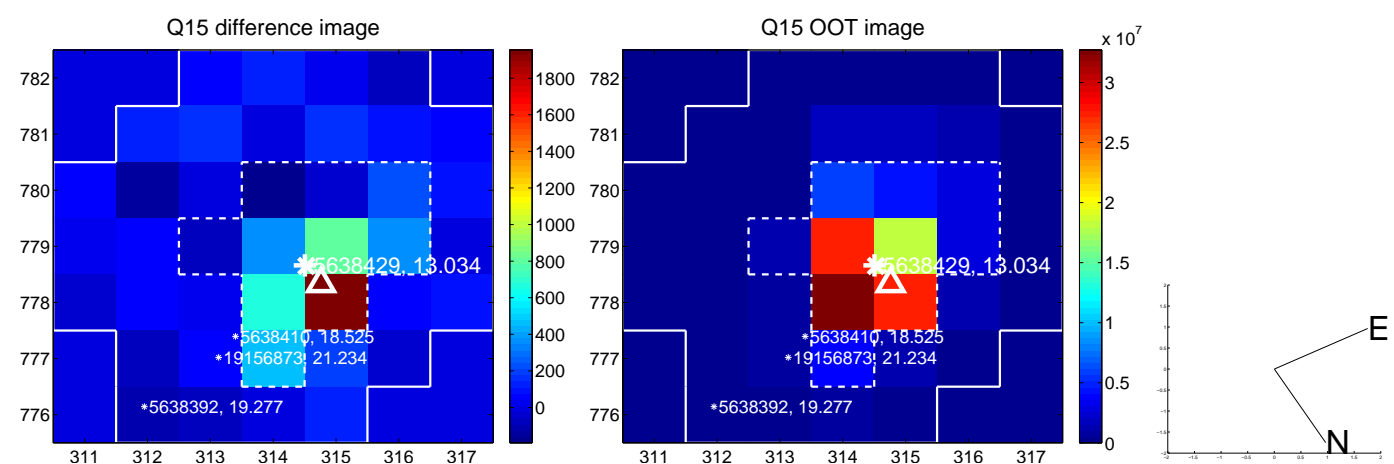
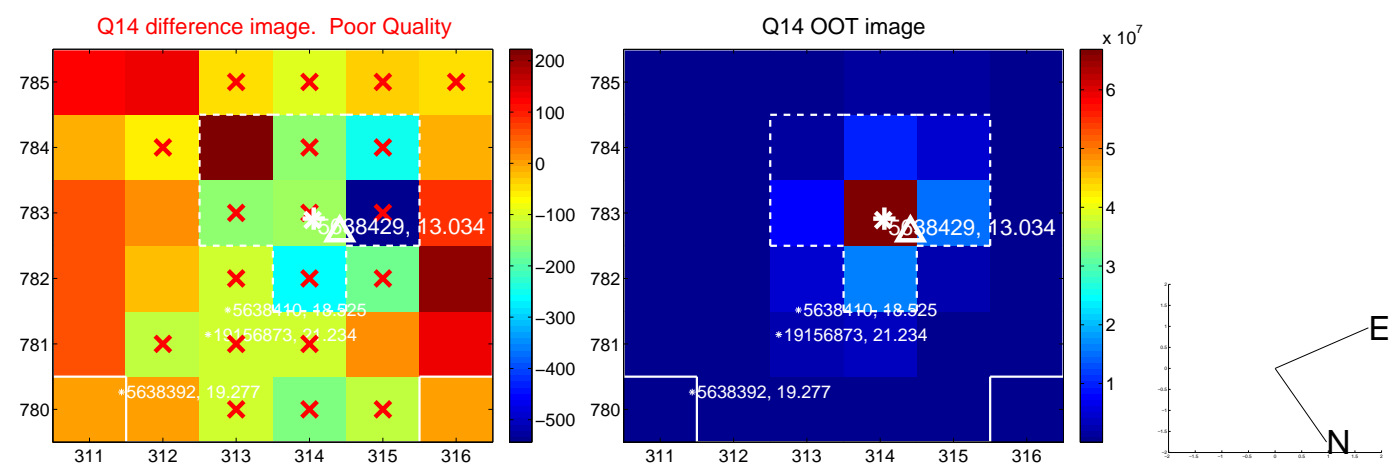
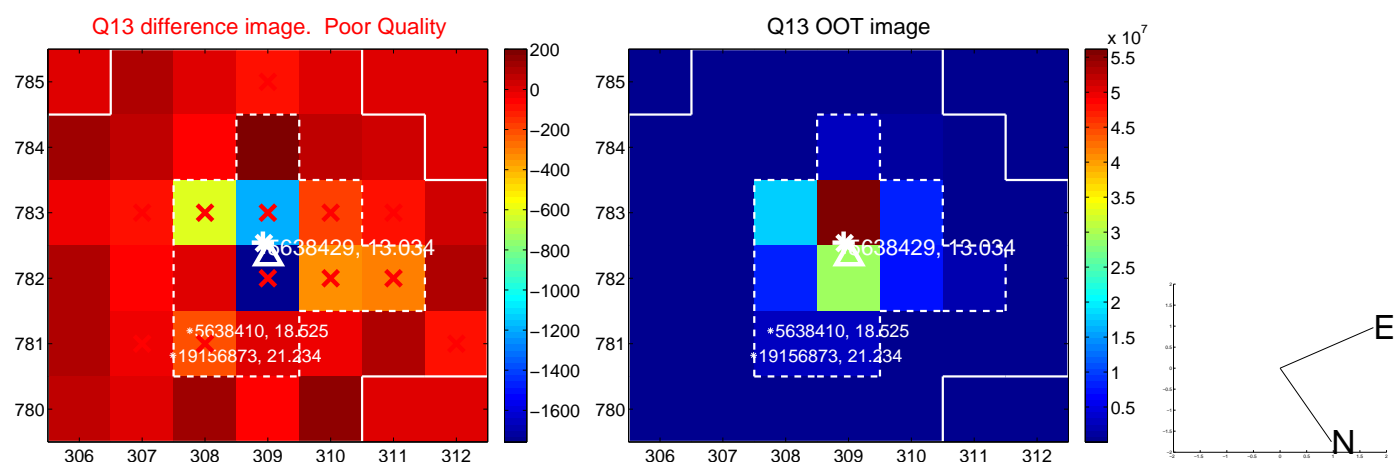




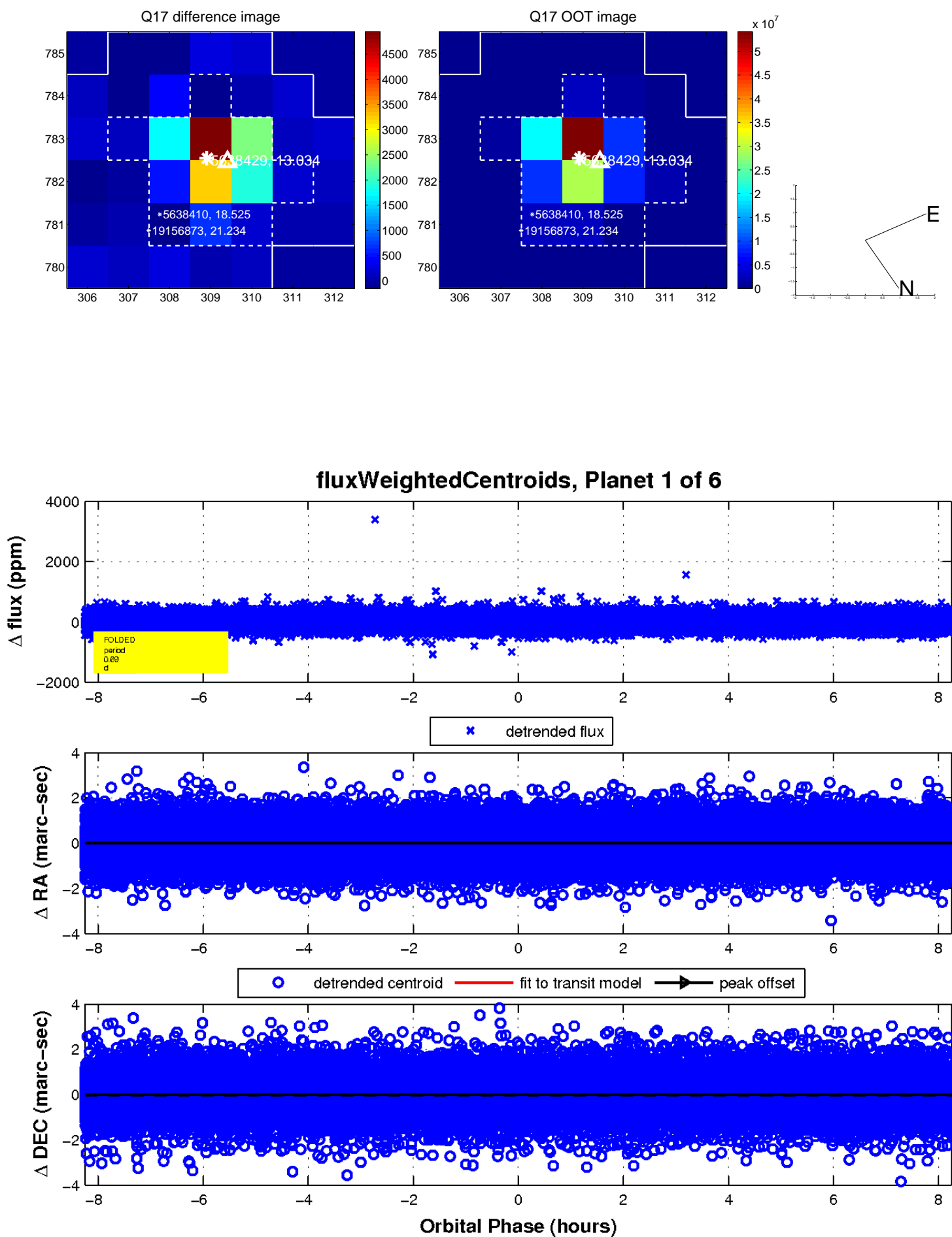
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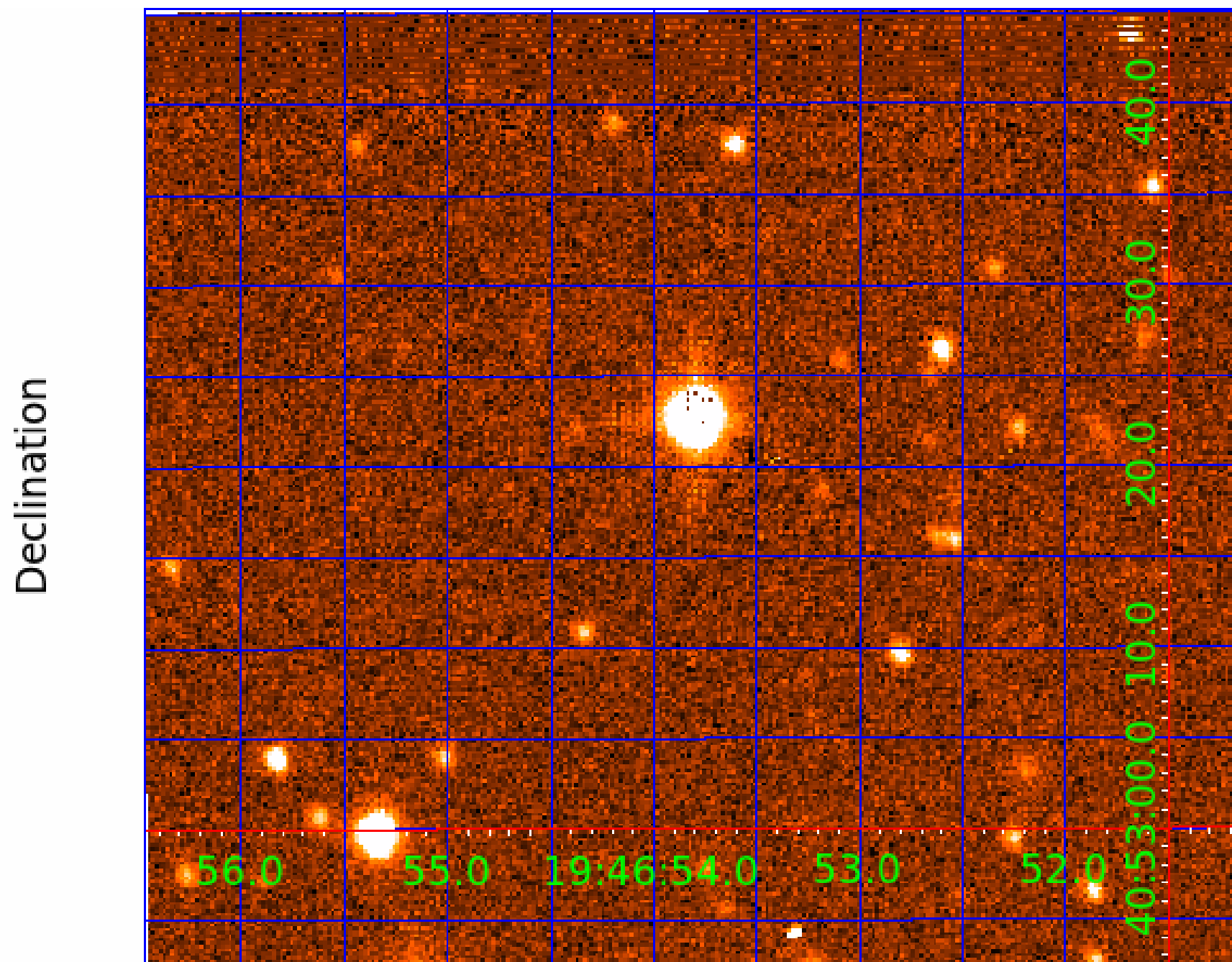
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 005638429

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
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## Robovetter Results

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005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

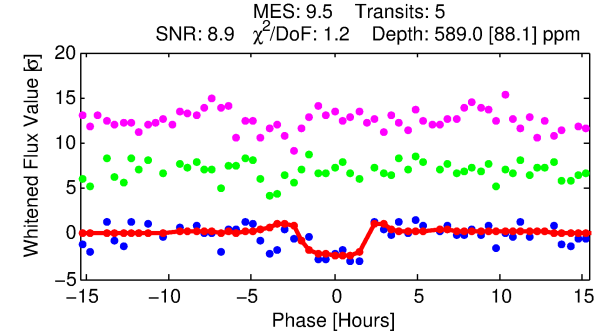
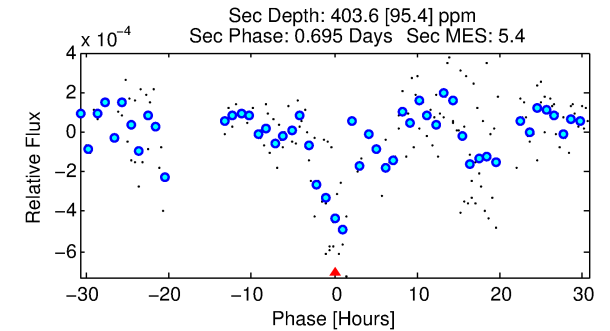
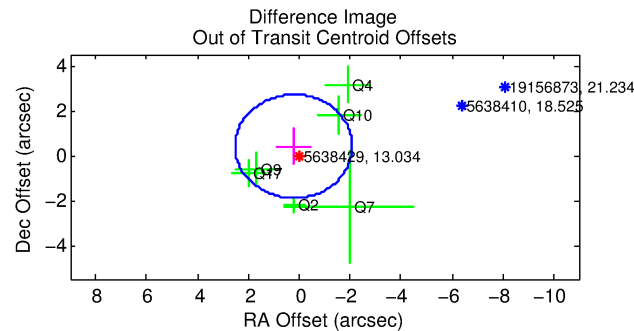
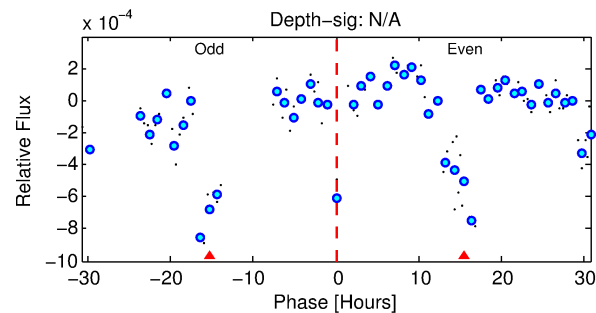
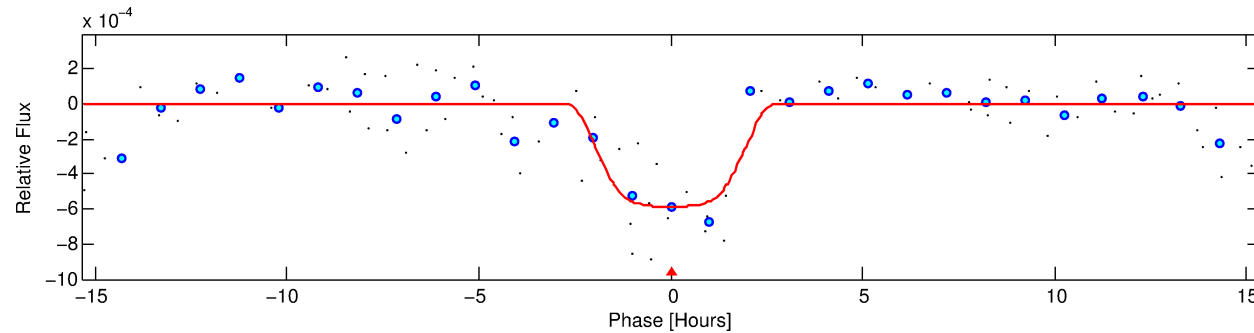
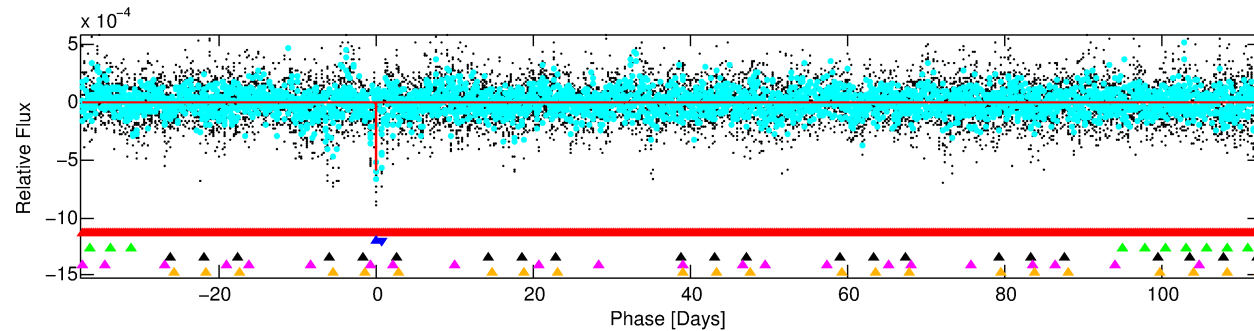
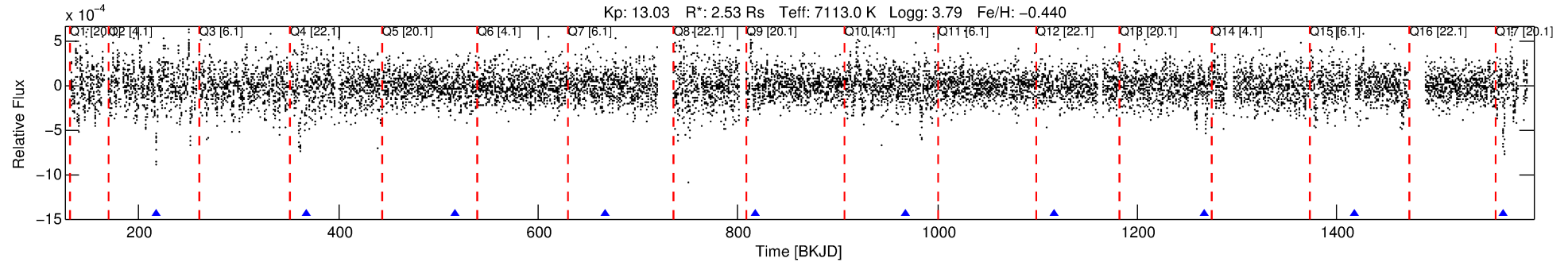
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-02

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 2 of 6 Period: 149.991 d



## DV Fit Results:

Period = 149.99146 [0.00352] d  
Epoch = 217.2752 [0.0146] BKJD  
Rp/R\* = 0.0278 [0.0026]  
a/R\* = 83.11 [20.06]  
b = 0.96 [0.02]  
Seff = 37.57 [19.27]  
Teff = 631 [81] K  
Rp = 7.70 [2.71] Re  
a = 0.6261 [0.1974] AU  
Ag = 1469.51 [847.41] [1.73σ]  
Teffp = 6043 [500] K [10.68σ]

## DV Diagnostic Results:

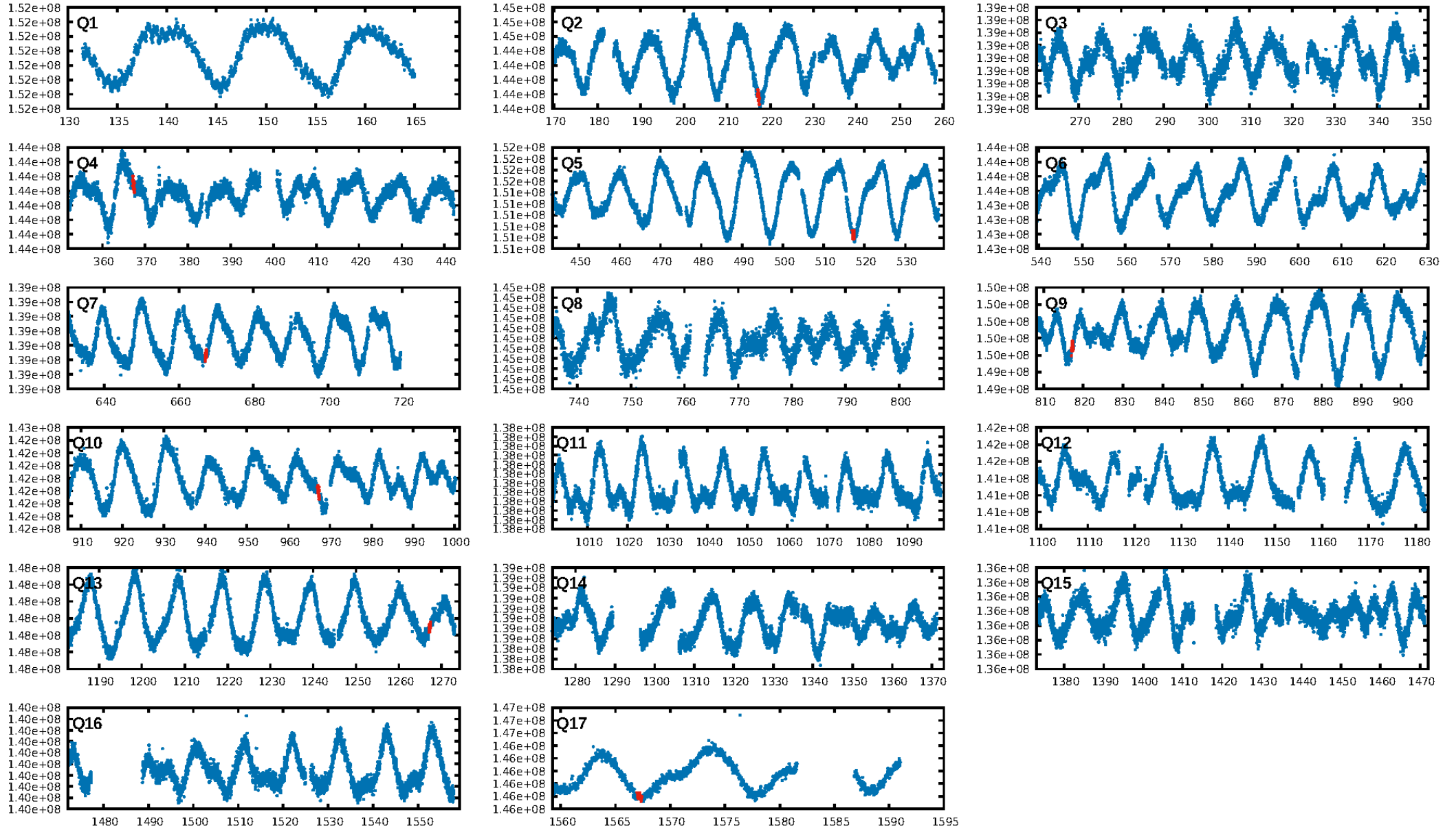
ShortPeriod-sig: 100.0% [330.90σ]  
LongPeriod-sig: 100.0% [9.13σ]  
ModelChiSquare2-sig: 13.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 8.13e-14  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.6963  
Centroid-sig: 41.1%  
Centroid-so: 0.298 arcsec [0.85σ]  
OotOffset-rm: 0.463 arcsec [0.60σ]  
KicOffset-rm: 0.490 arcsec [0.67σ]  
OotOffset-st: 2/1/1/2 [6]  
KicOffset-st: 2/1/1/2 [6]  
DiffImageQuality-fgm: 0.00 [0/6]  
DiffImageOverlap-fno: 0.00 [0/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:28 Z

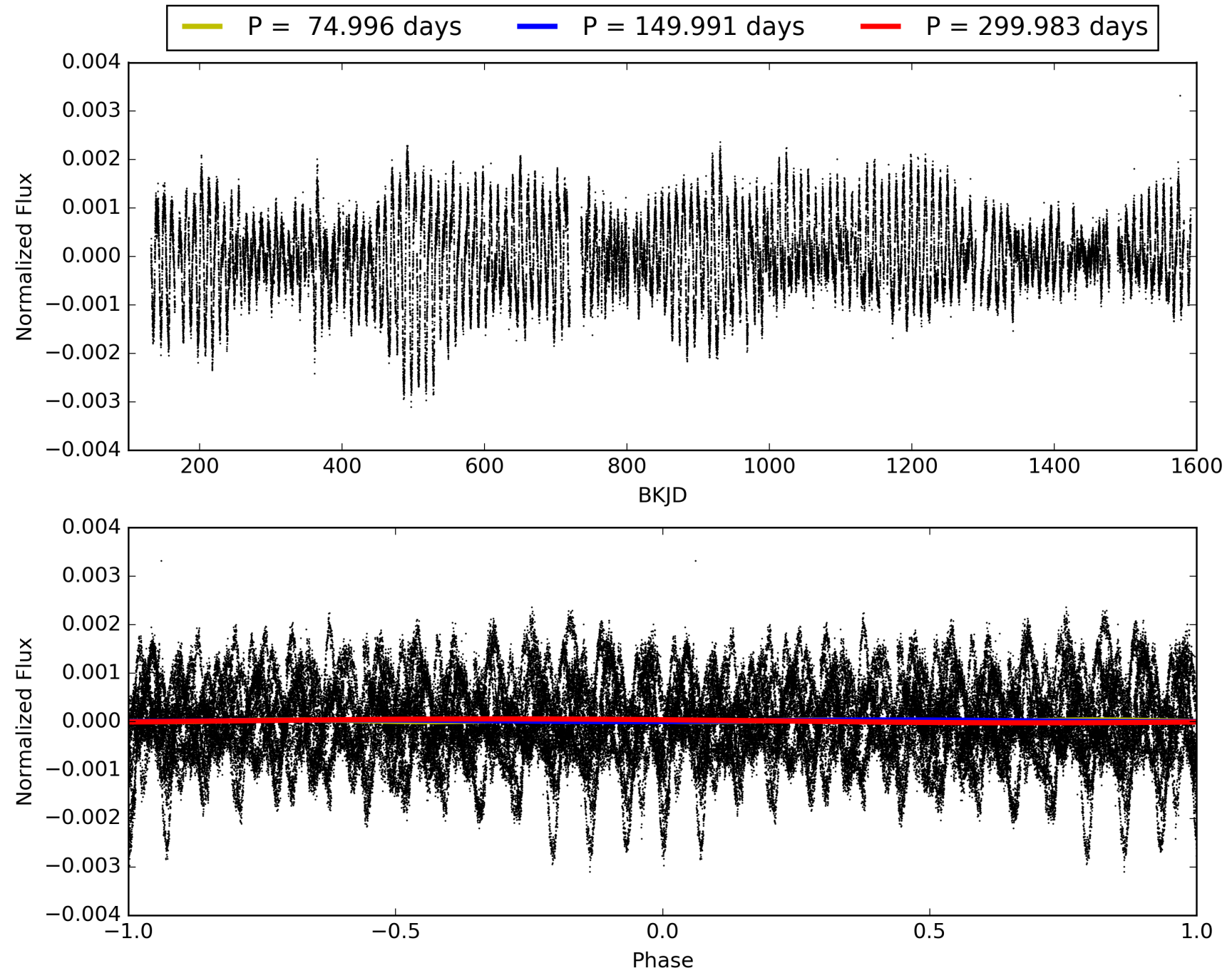
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005638429-02, PDC Light Curves

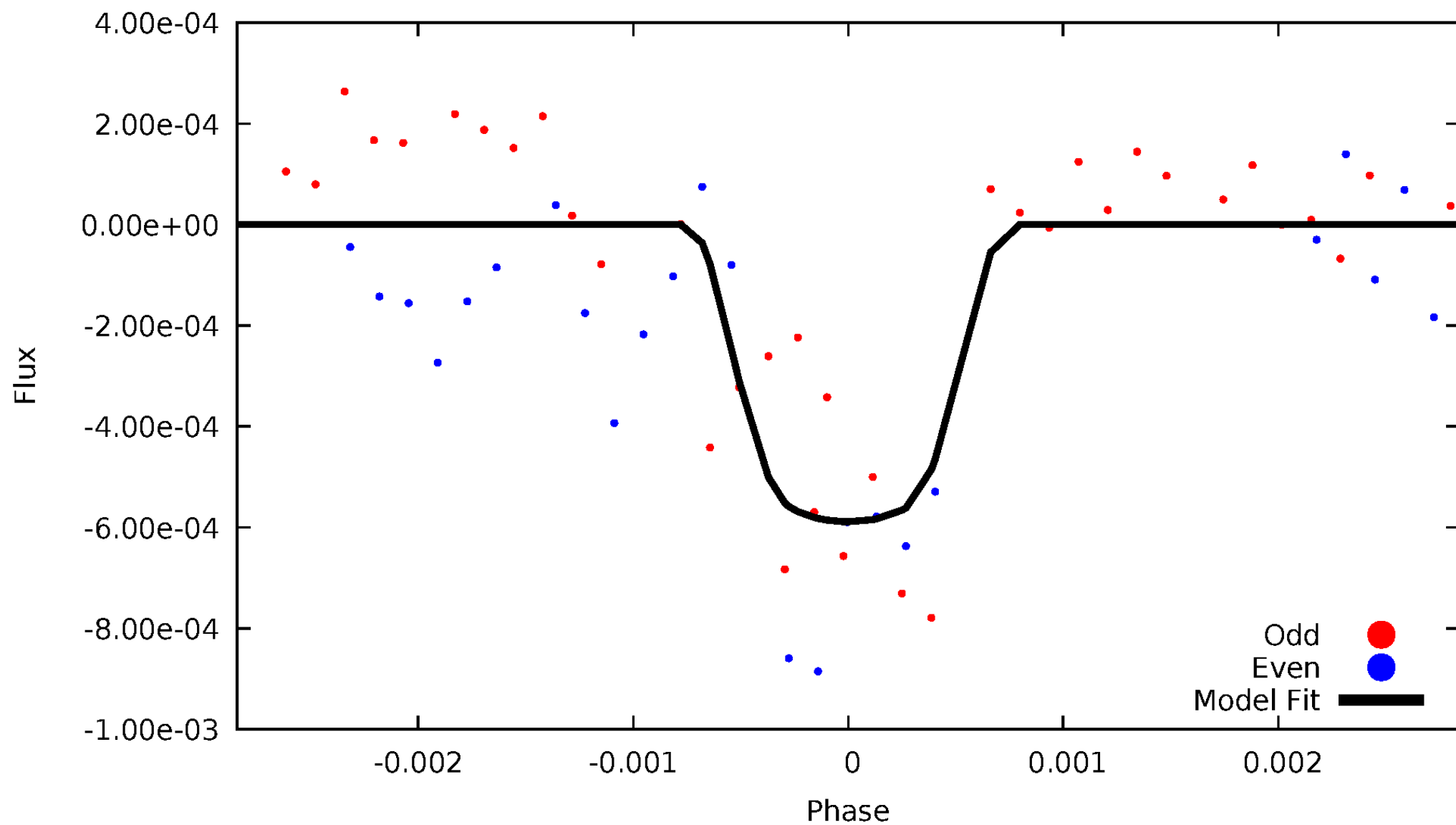


TCE 005638429-02



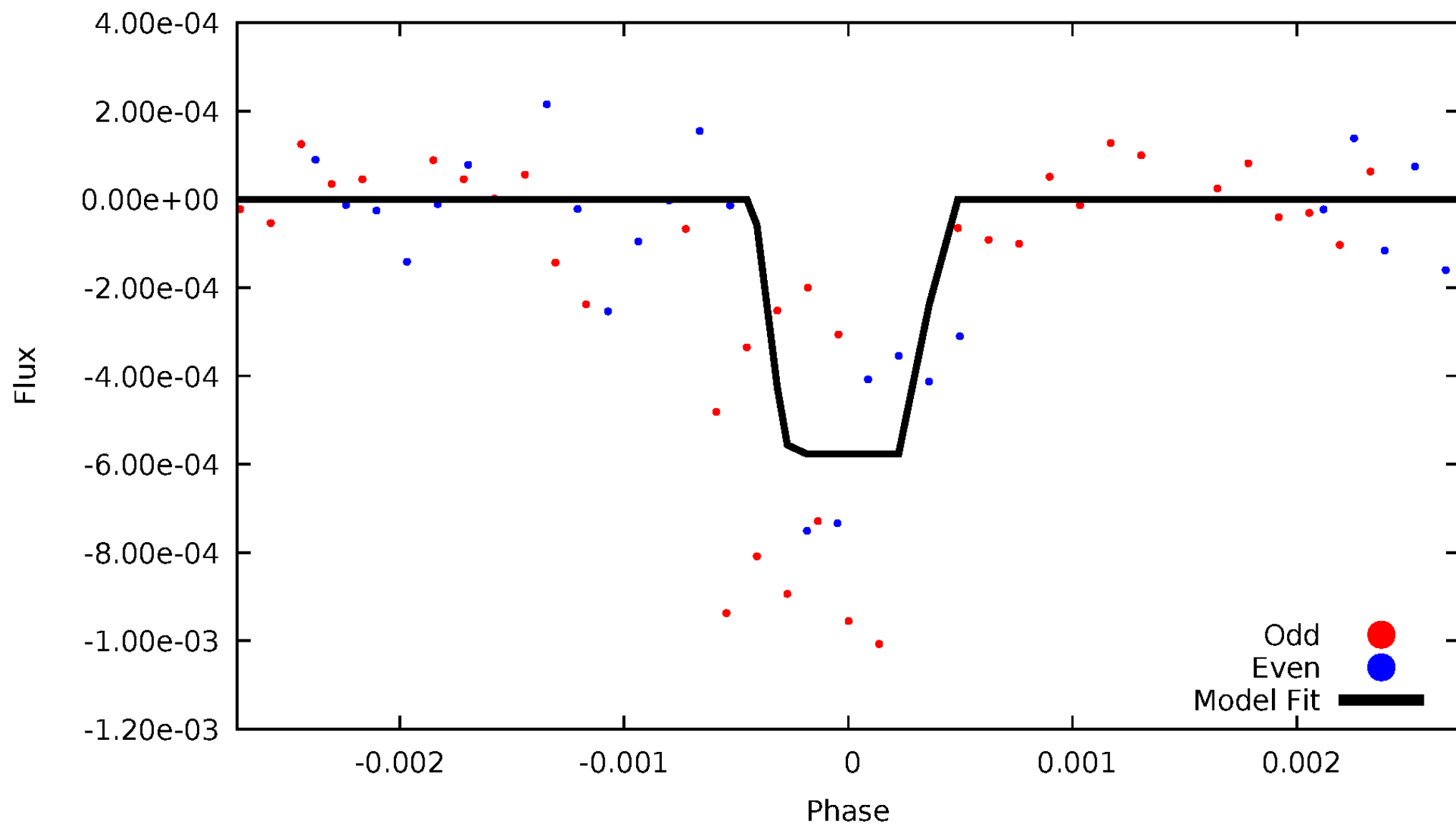
# DV Odd/Even

TCE 005638429-02



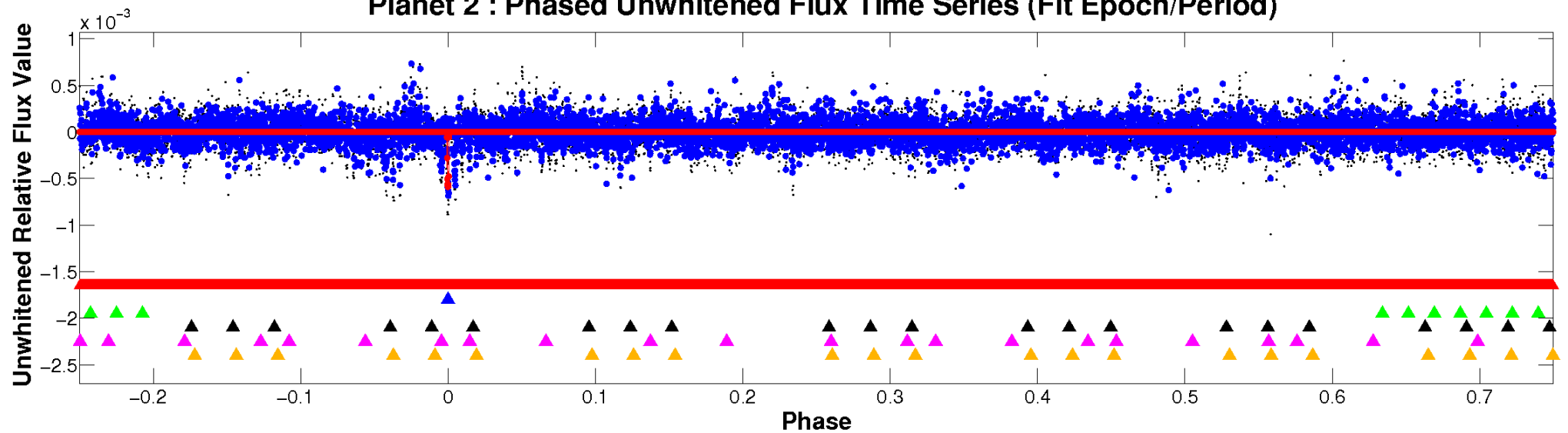
# ALT Odd/Even

TCE 005638429-02

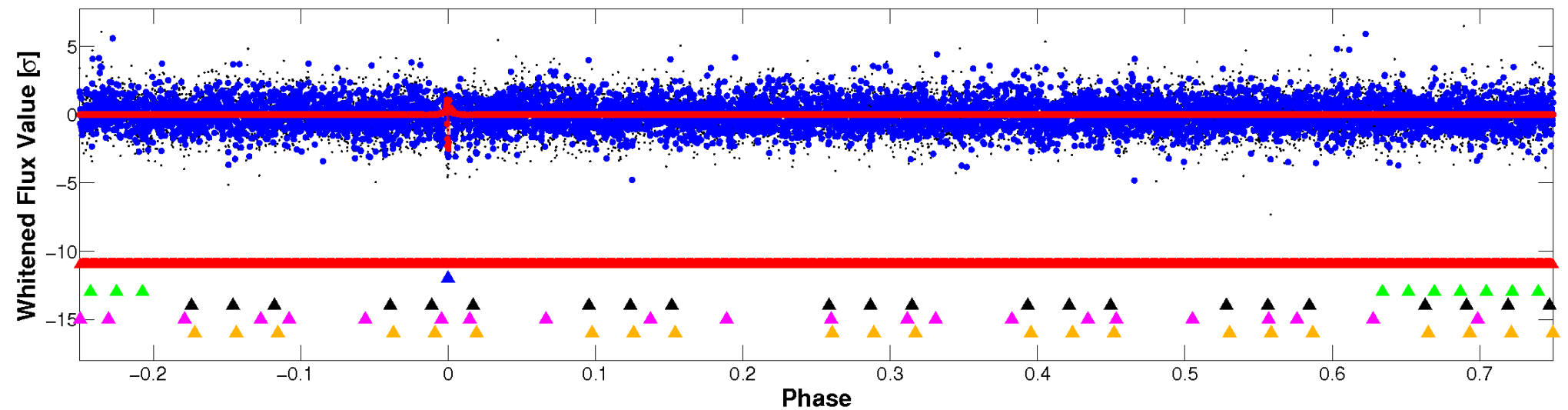


# Non-Whitened Vs. Whitened Light Curve

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

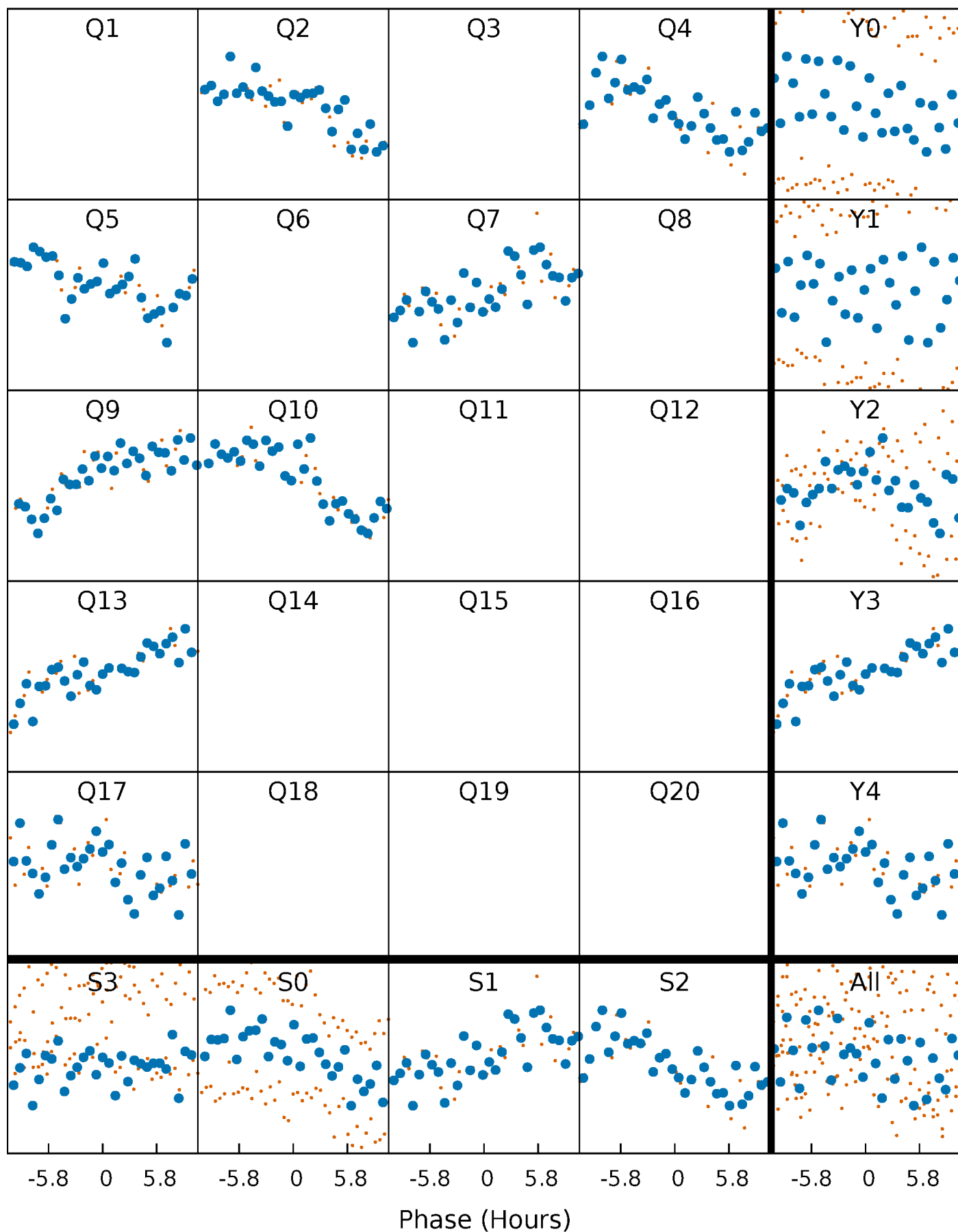


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

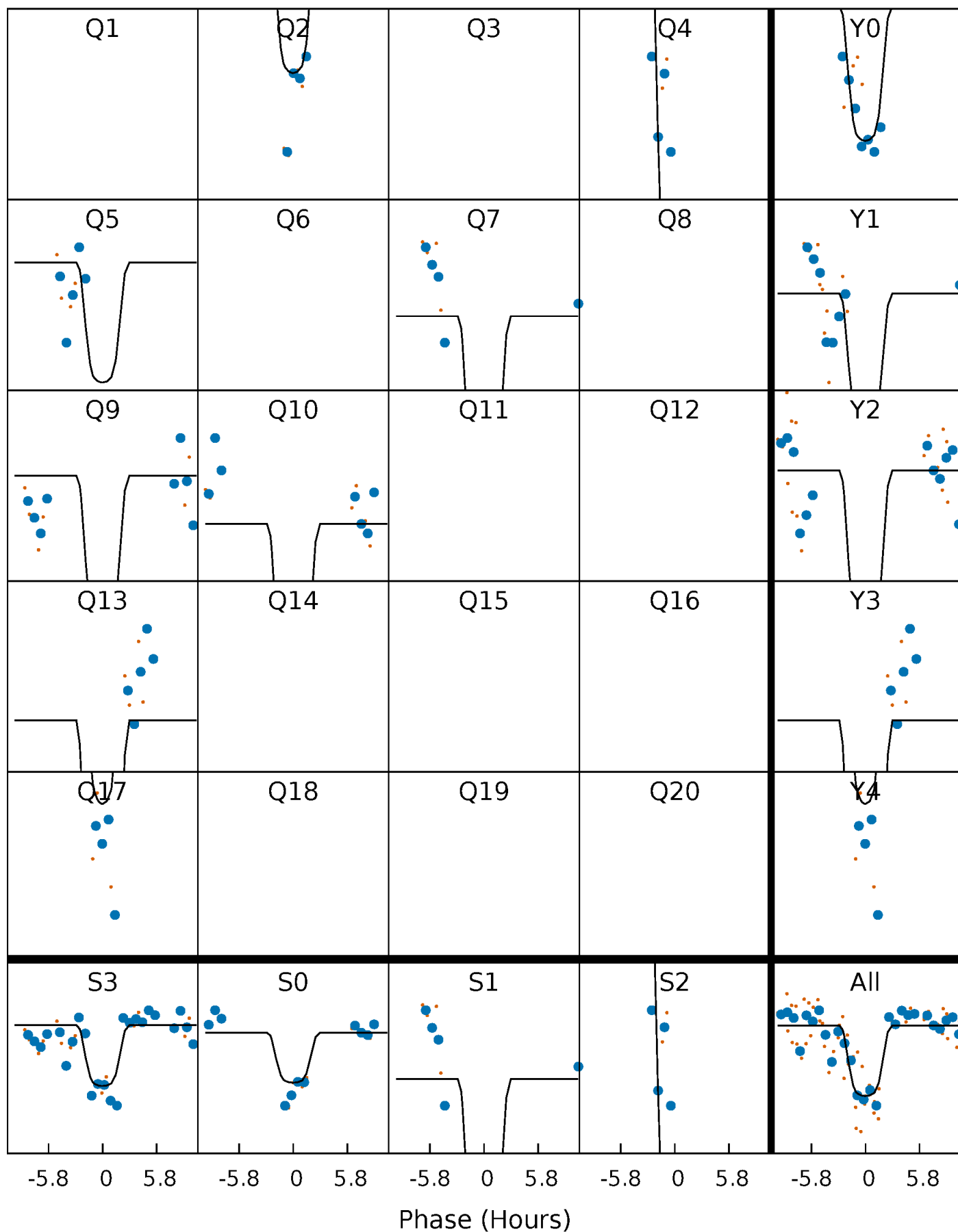
TCE 005638429-02     $P=149.991455$  Days     $T_0=217.275195$  (BKJD)





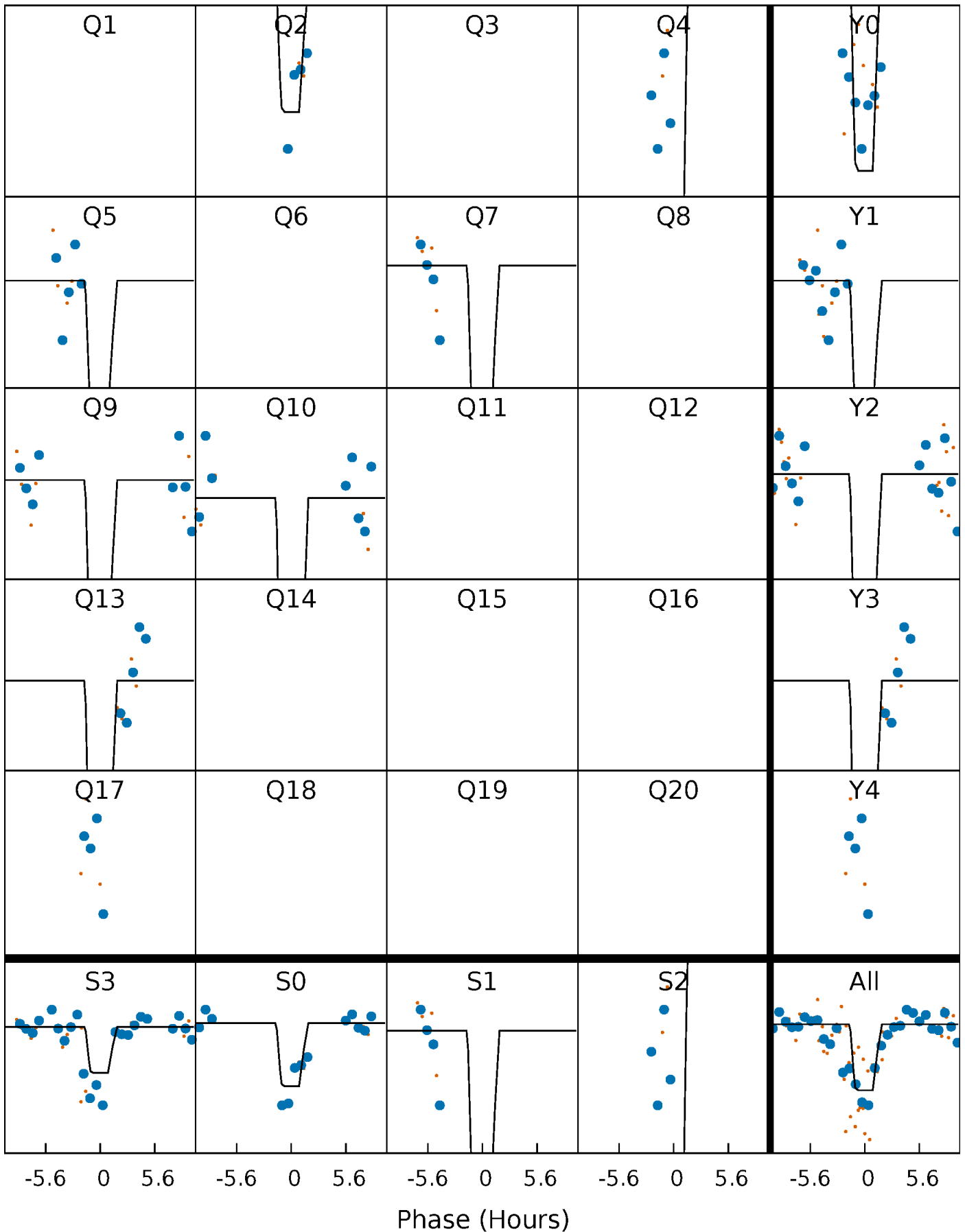
# DV Quarter-Phased Transit Curves

TCE 005638429-02   P=149.991455 Days    $T_0=217.275195$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

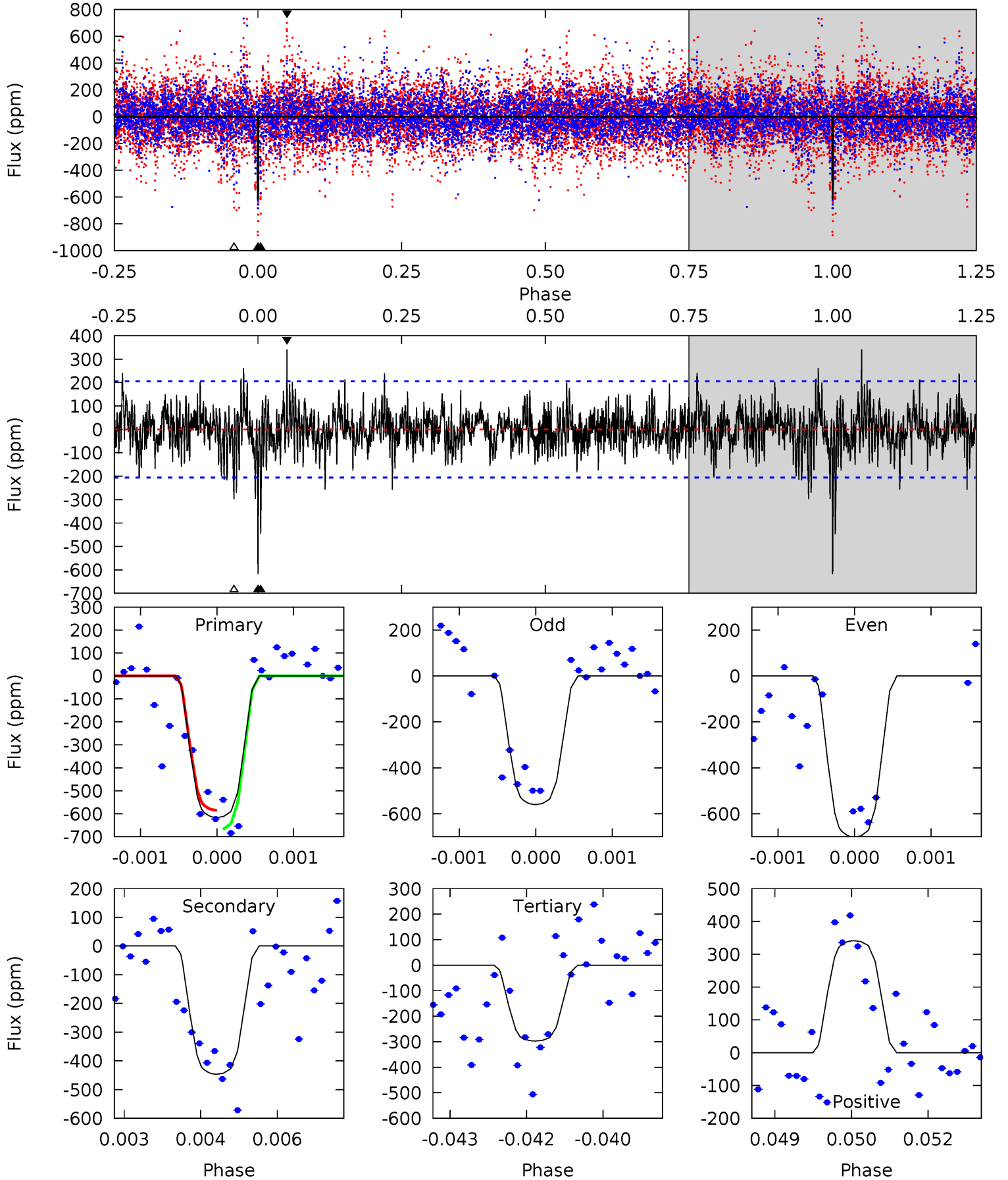
TCE 005638429-02 P=149.997152 Days  $T_0=217.261287$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-02, P = 149.991455 Days, E = 67.283740 Days

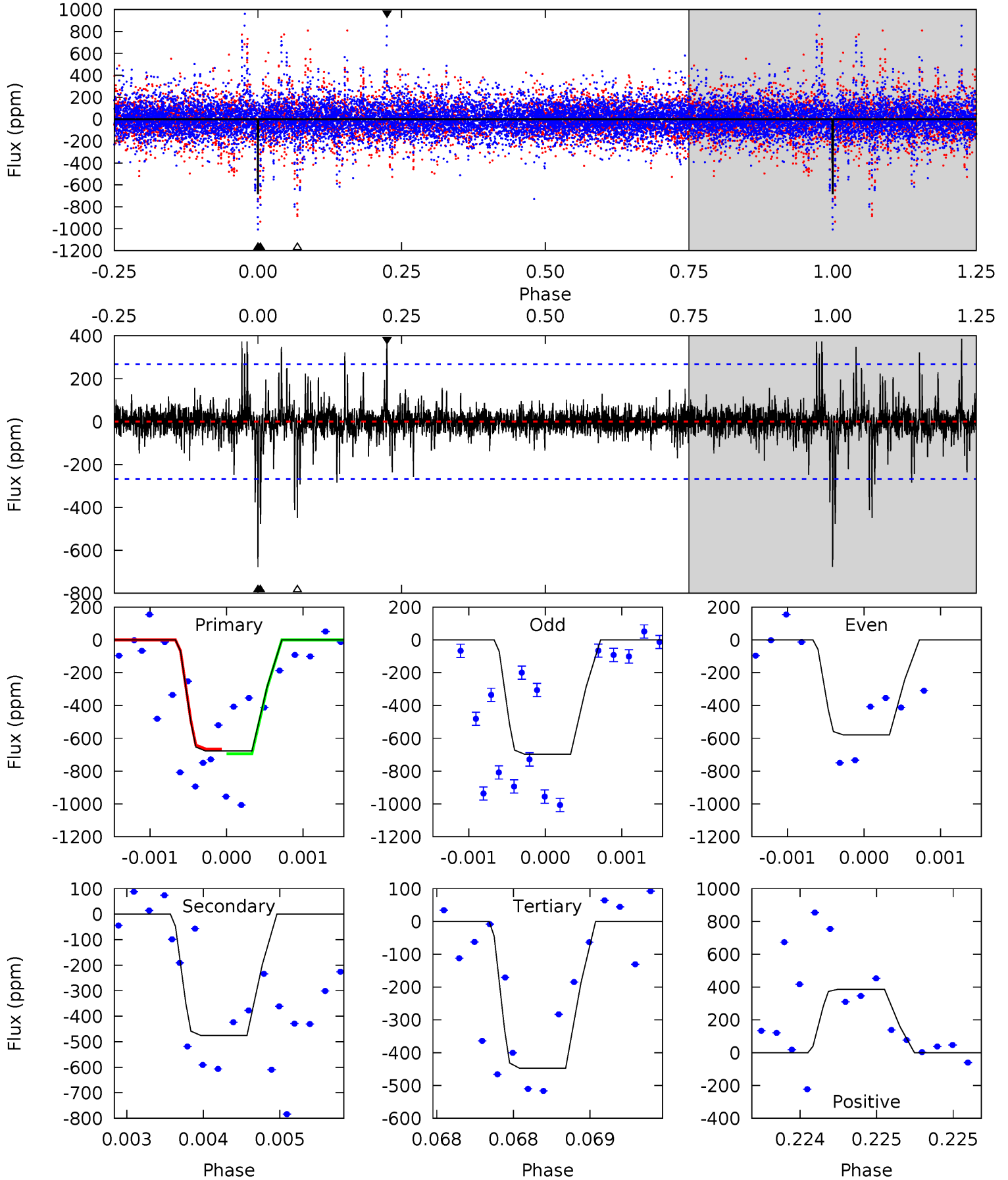
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.1	11.7	7.77	8.92	5.39	3.19	1.85	8.36	7.21	3.90	2.75	1.81	0.93	0.36	1.04



# Alt Model-Shift Uniqueness Test

005638429-02, P = 149.997152 Days, E = 67.264135 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
14.0	9.83	9.24	7.99	5.52	3.40	1.21	4.76	6.01	0.58	1.83	1.31	1.02	0.36	0.29





### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-447 \pm 38$	$7.42^{+1.26}_{-1.44}$	$866^{+54}_{-80}$	$6108^{+393}_{-343}$	$1763^{+857}_{-472}$
Alt.	$-475 \pm 48$	$6.37^{+1.15}_{-1.24}$	$860^{+56}_{-77}$	$6714^{+520}_{-427}$	$2538^{+1422}_{-697}$

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

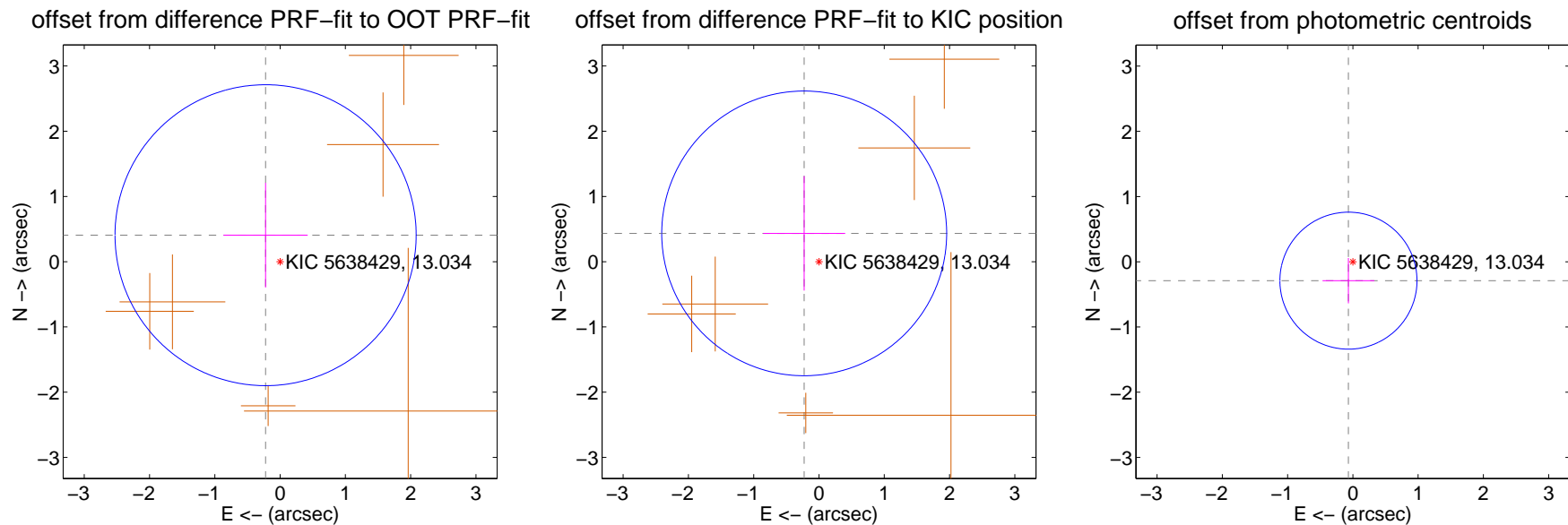
## DV Centroid Data

Supplemental centroid analysis for 005638429-02. Kepler magnitude: 13.03. Transit SNR 8.92

There are 0 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	$0.463 \pm 0.769$	0.60	$0.222 \pm 0.645$	$0.406 \pm 0.802$
PRF-fit source offset from KIC position	$0.490 \pm 0.727$	0.67	$0.227 \pm 0.628$	$0.434 \pm 0.876$
photometric centroid source offset	$0.30 \pm 0.35$	0.85	$0.07 \pm 0.40$	$-0.29 \pm 0.35$



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.

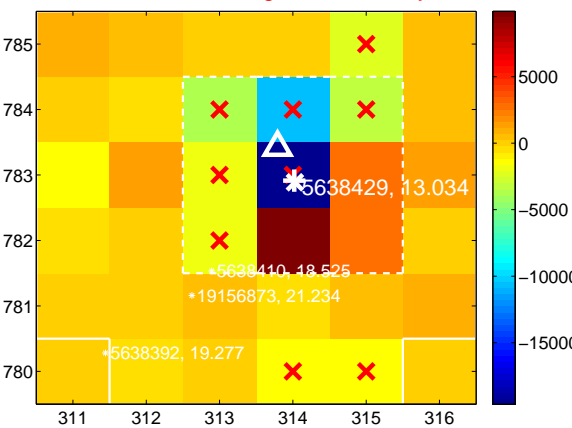
Q1 no difference image



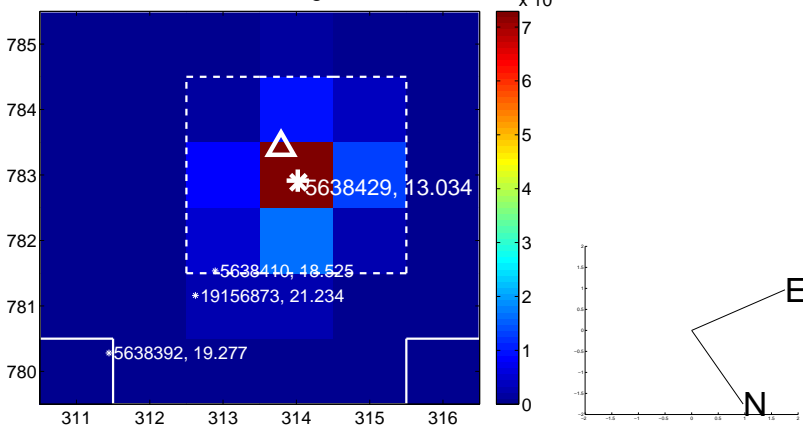
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



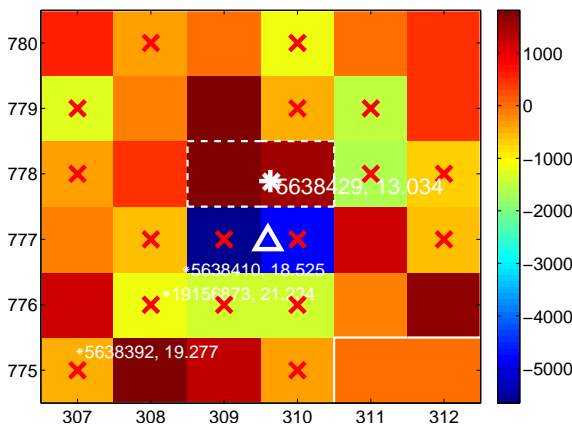
Q3 no difference image



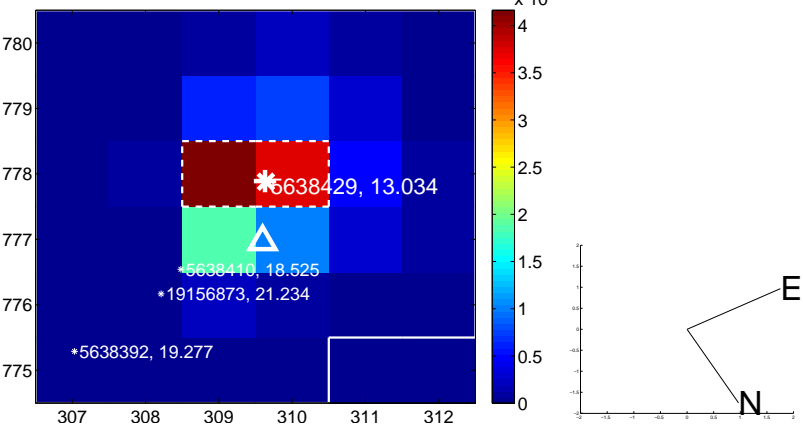
Q3 no OOT image



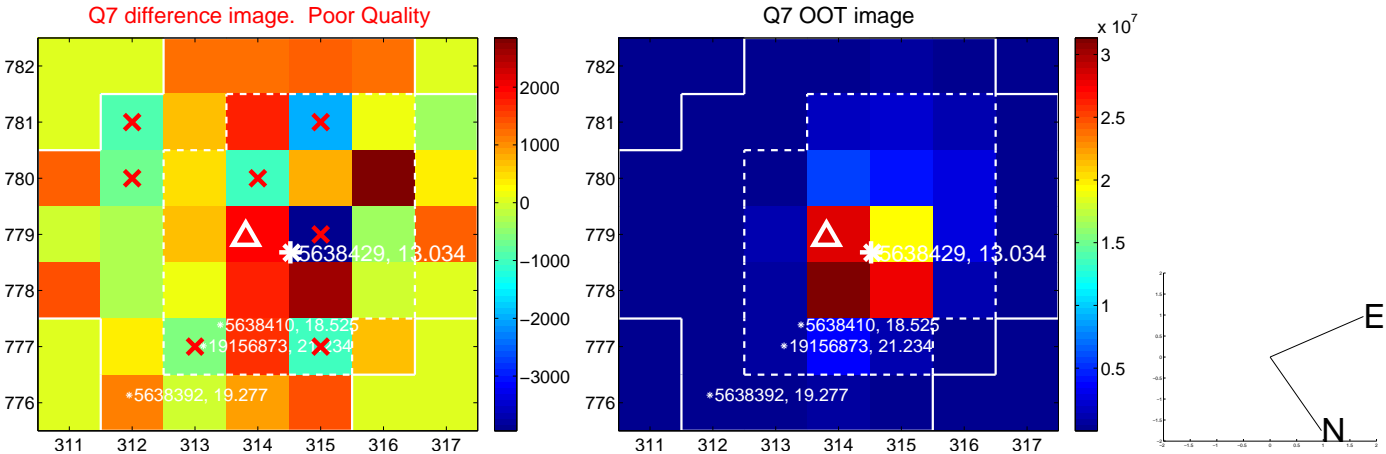
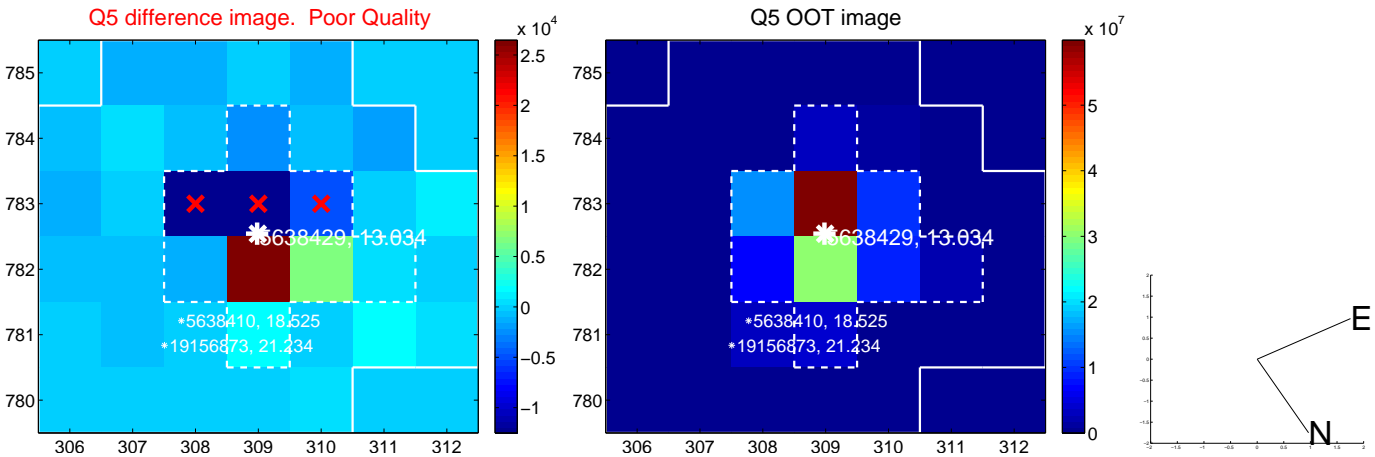
Q4 difference image. Poor Quality



Q4 OOT image

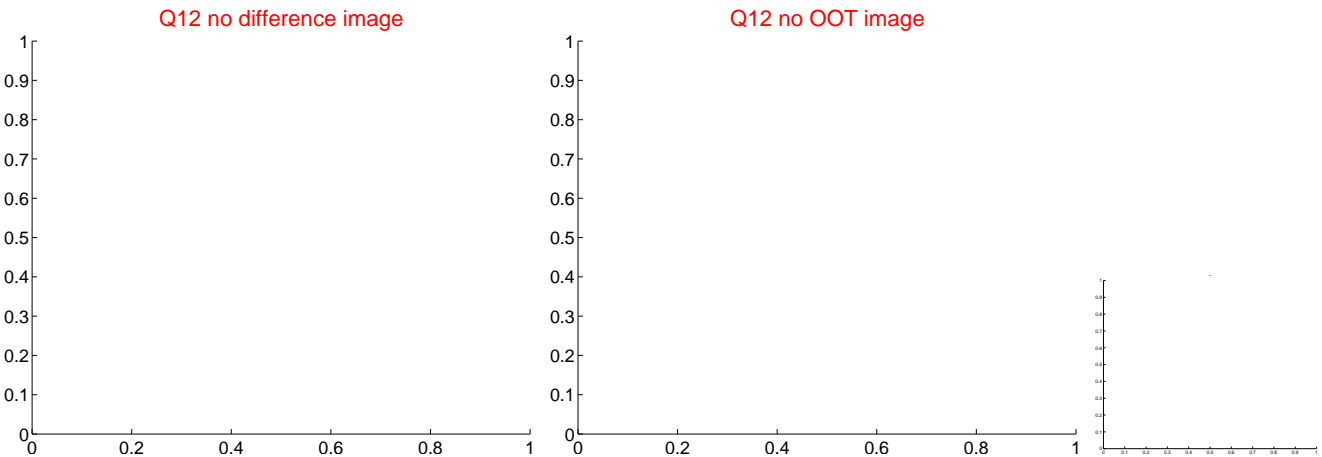
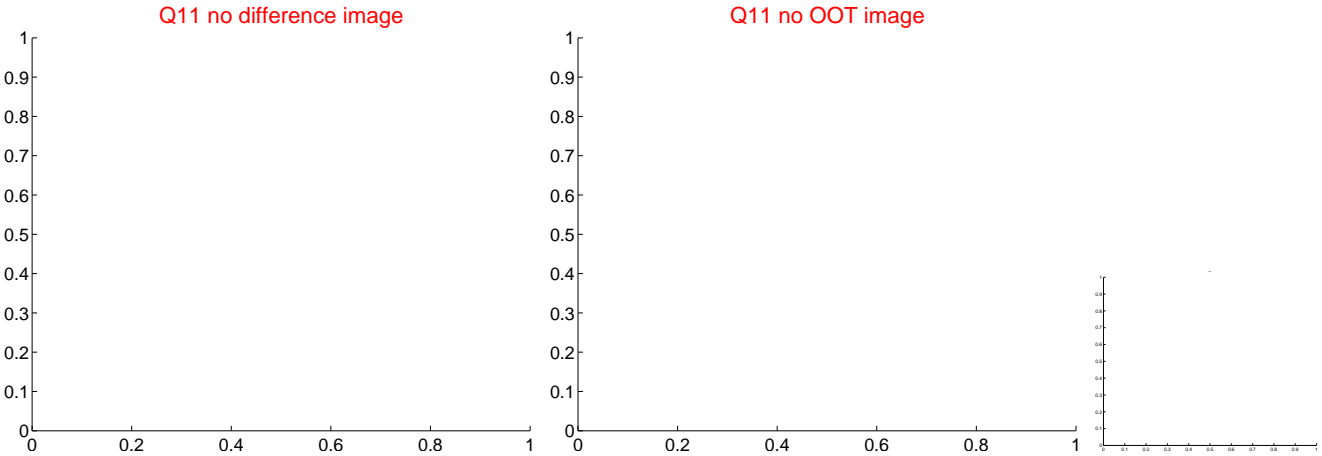
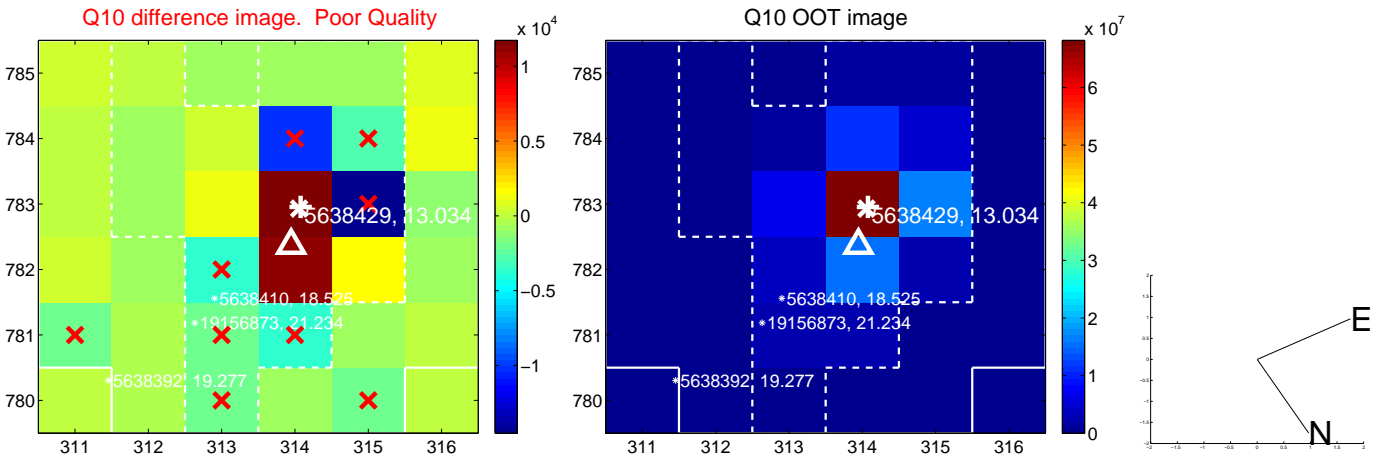
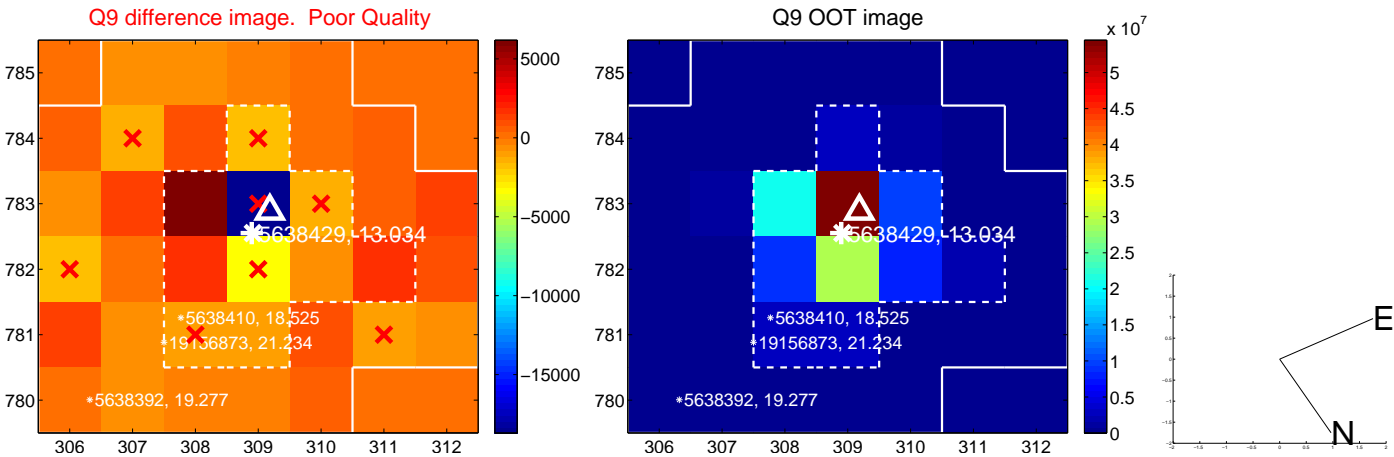


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





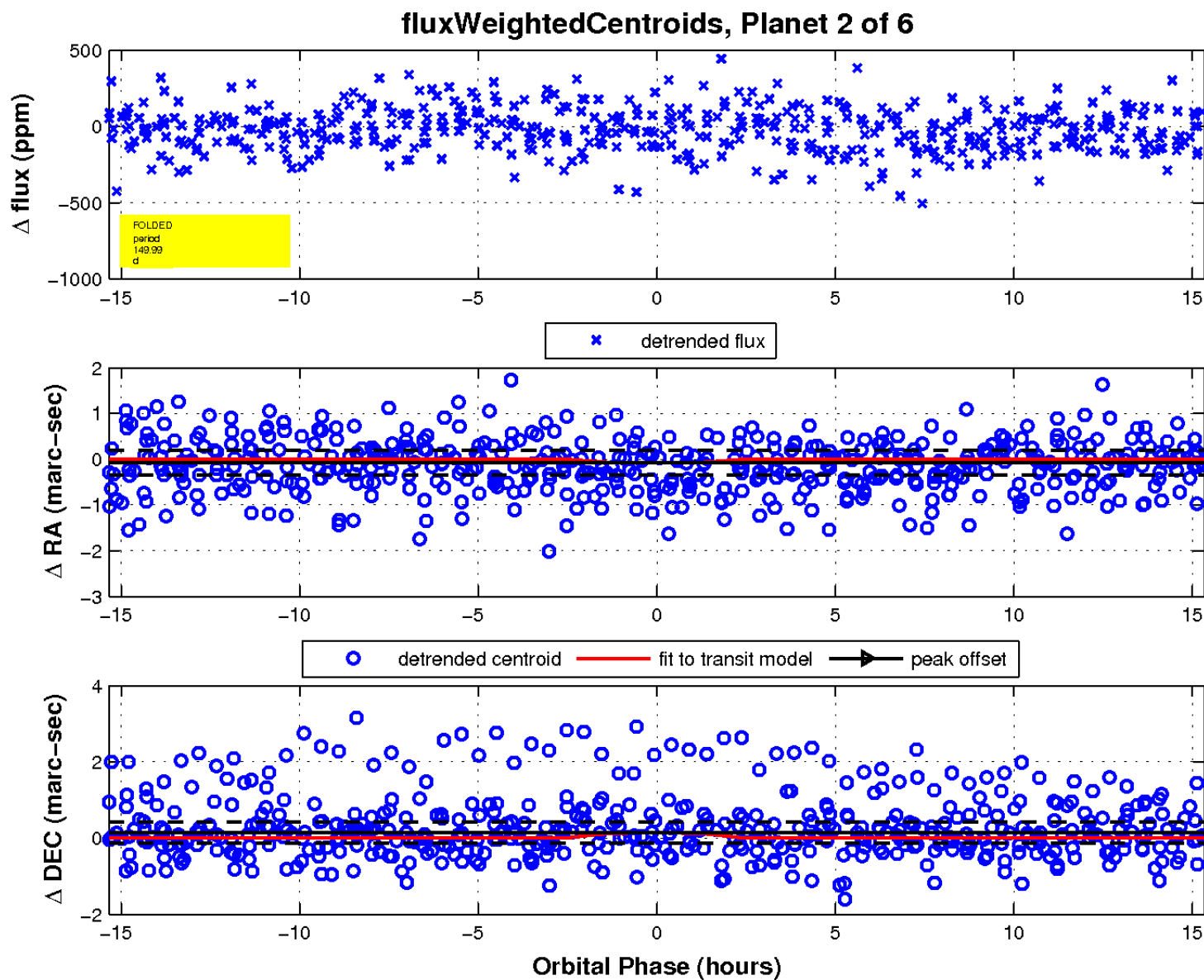
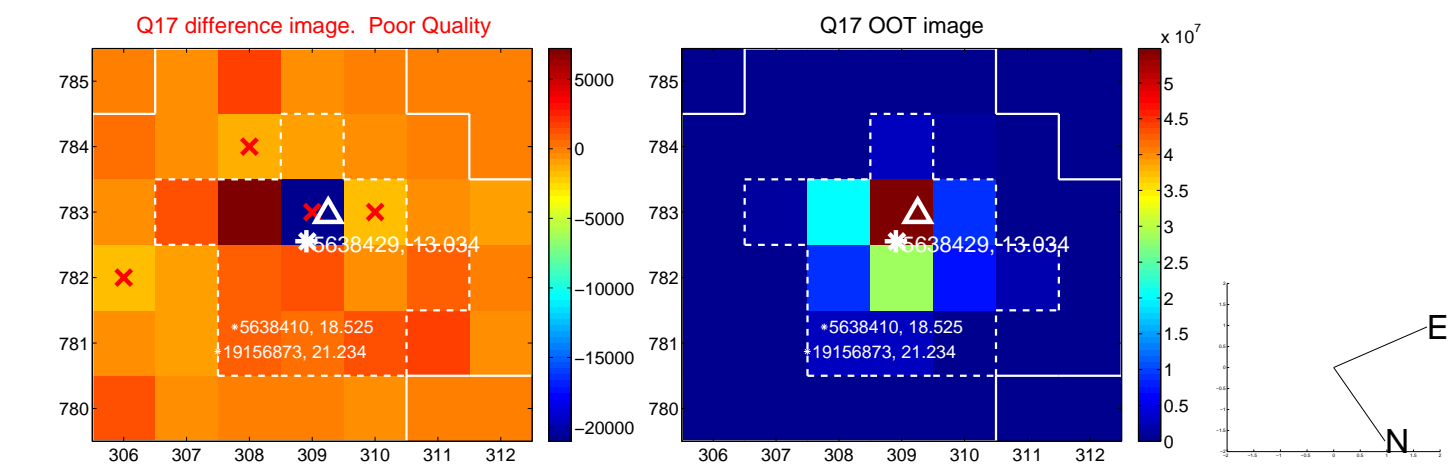
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



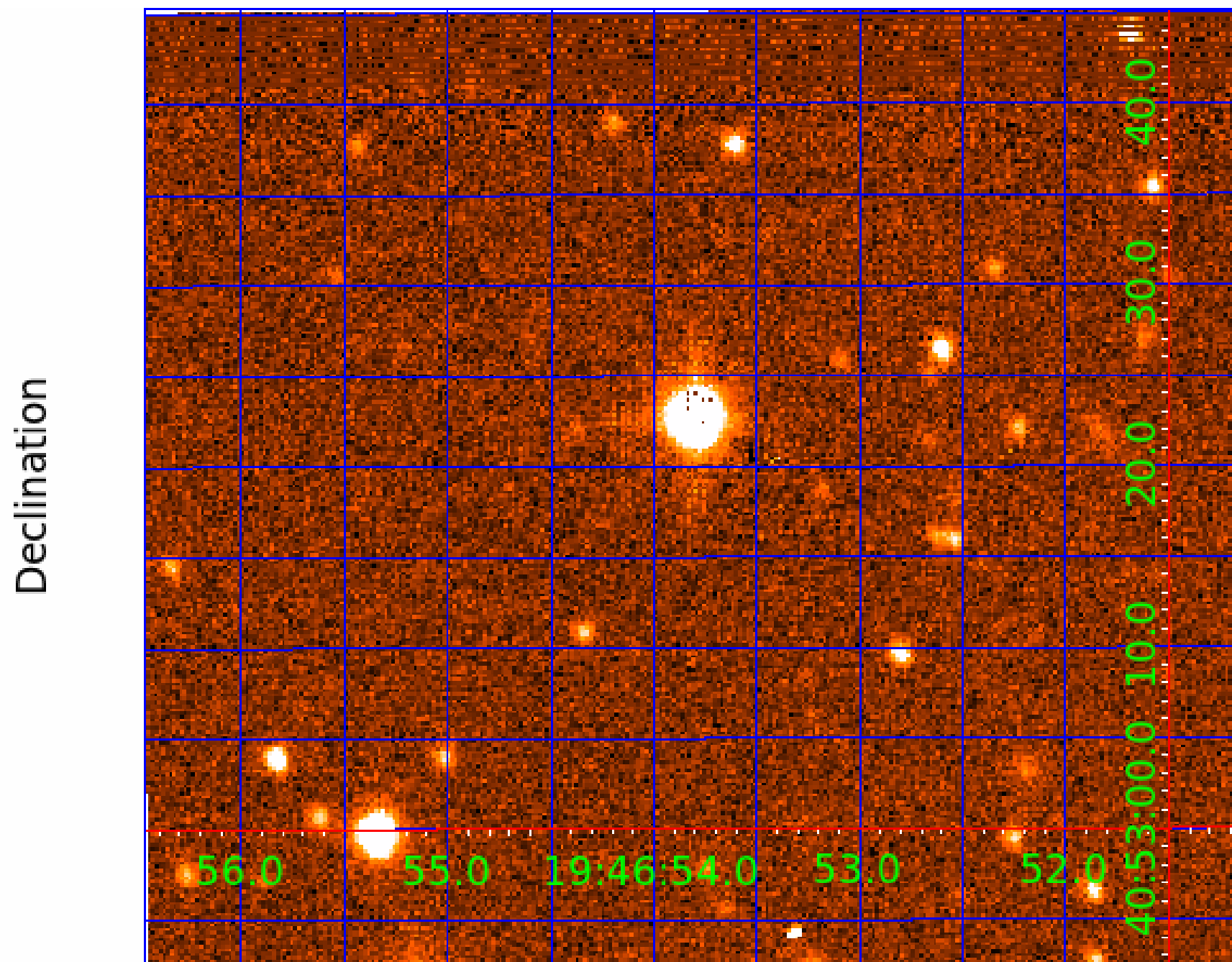
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 005638429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005638429-01	OBS	No	0.687679	131.671919	15.2	4.273	8.3	9.2	2.53	7113	1.16	49331.98
005638429-02	OBS	No	149.991455	217.275195	589.0	5.116	9.5	8.9	2.53	7113	7.70	37.57
005638429-03	OBS	No	152.634865	162.385454	251.2	4.701	8.2	8.2	2.53	7113	4.08	36.71
005638429-04	OBS	No	64.884695	166.731715	121.2	3.206	9.3	3.8	2.53	7113	3.23	114.85
005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
005638429-06	OBS	No	64.886267	167.047687	198.0	3.307	9.1	5.1	2.53	7113	3.81	114.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005638429-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

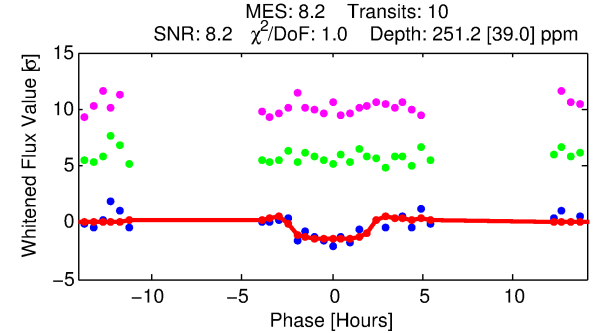
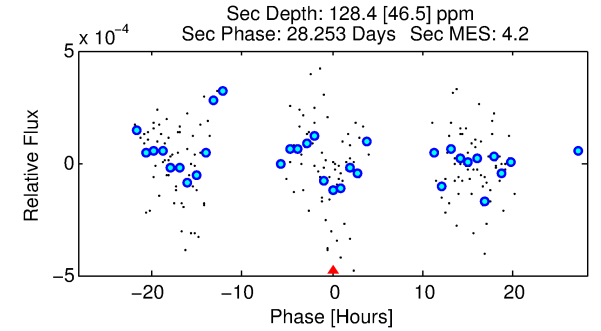
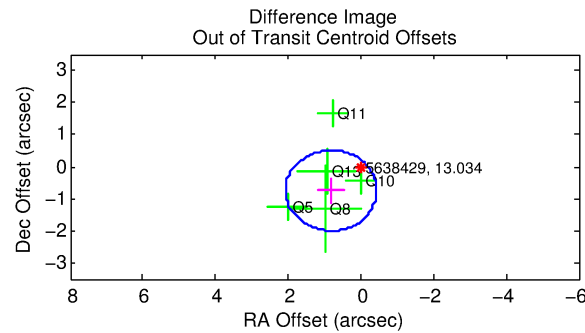
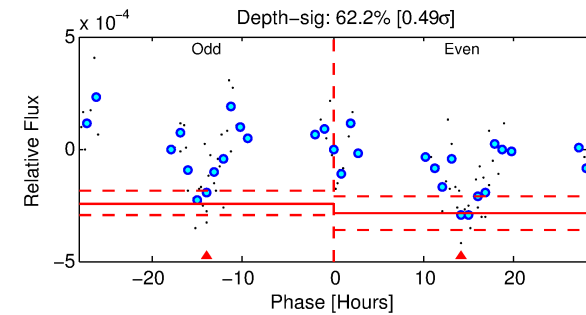
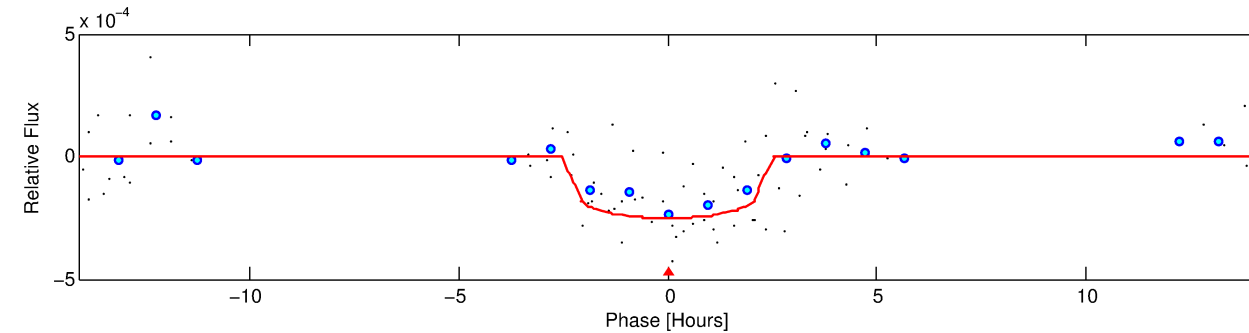
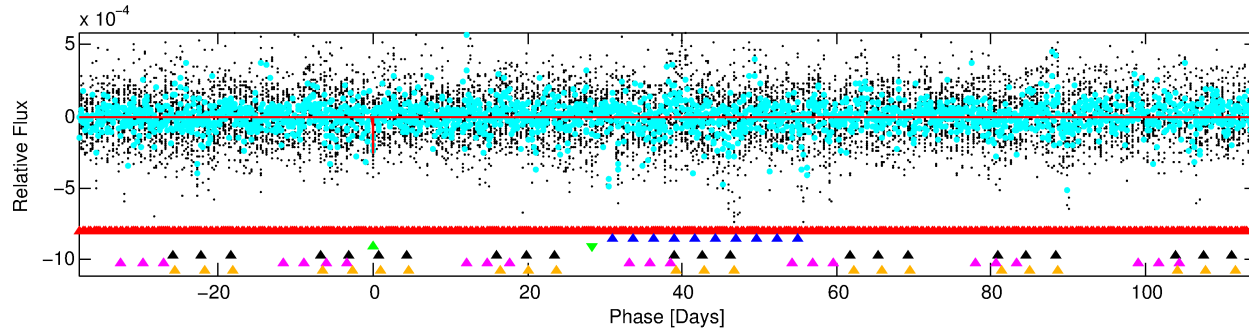
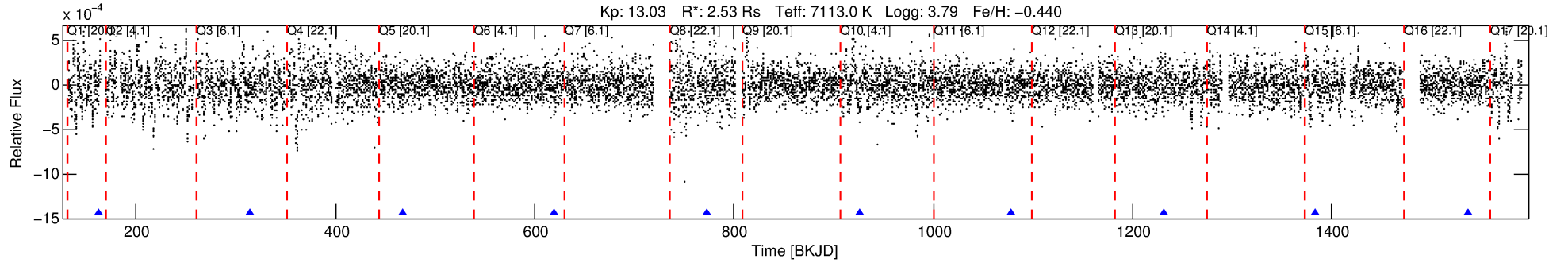
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-03

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 3 of 6 Period: 152.635 d



## DV Fit Results:

Period = 152.63487 [0.00455] d  
Epoch = 162.3855 [0.0206] BKJD  
Rp/R\* = 0.0148 [0.0231]  
a/R\* = 239.83 [2035.34]  
b = 0.31 [25.13]  
Seff = 36.71 [18.83]  
Teq = 628 [80] K  
Rp = 4.08 [6.55] Re  
a = 0.6334 [0.1997] AU  
Ag = 1700.13 [5430.31] [0.31 $\sigma$ ]  
Teffp = 6231 [4921] K [1.14 $\sigma$ ]

## DV Diagnostic Results:

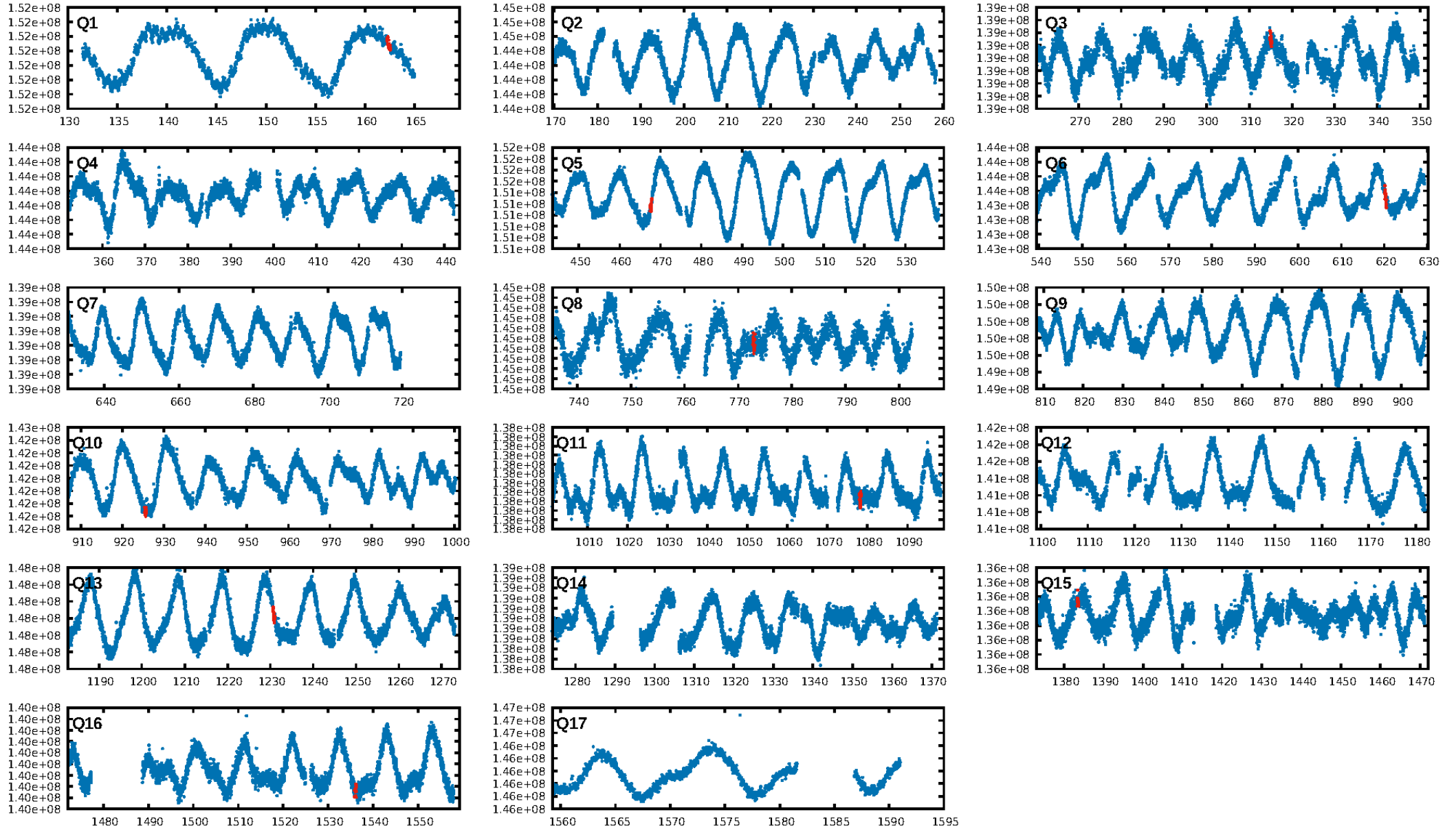
ShortPeriod-sig: 100.0% [9.13 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 21.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 5.96e-11**  
RollingBand-fgt: 1.00 [9/9]  
GhostDiagnostic-chr: 26.28  
Centroid-sig: 8.1%  
Centroid-so: 0.806 arcsec [1.14 $\sigma$ ]  
OotOffset-rm: 1.112 arcsec [2.66 $\sigma$ ]  
KicOffset-rm: 1.090 arcsec [2.73 $\sigma$ ]  
OotOffset-st: 1/1/1/2 [5]  
KicOffset-st: 1/1/1/2 [5]  
DiffImageQuality-fgm: 0.80 [4/5]  
DiffImageOverlap-fno: 0.00 [0/10]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:32 Z

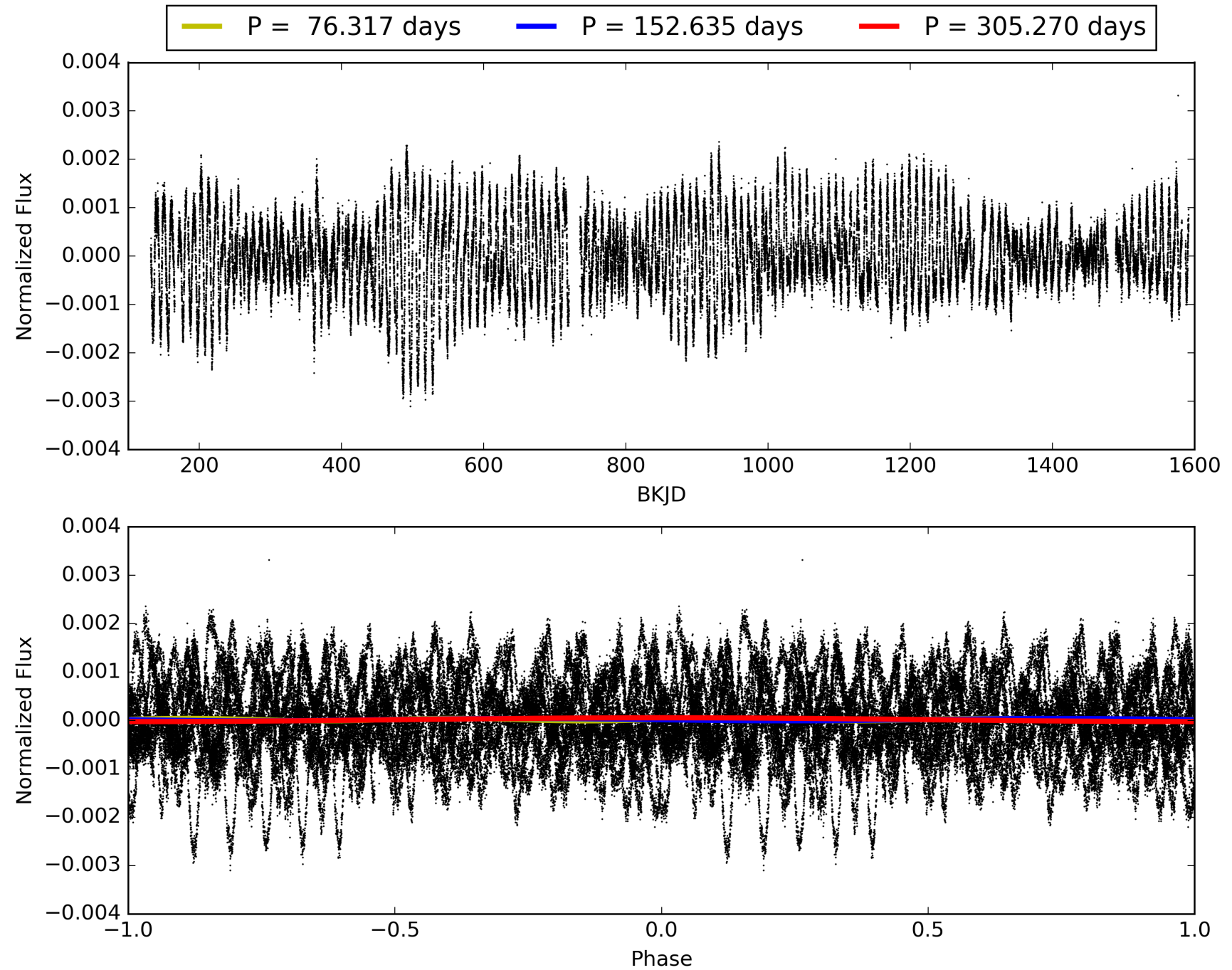
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005638429-03, PDC Light Curves

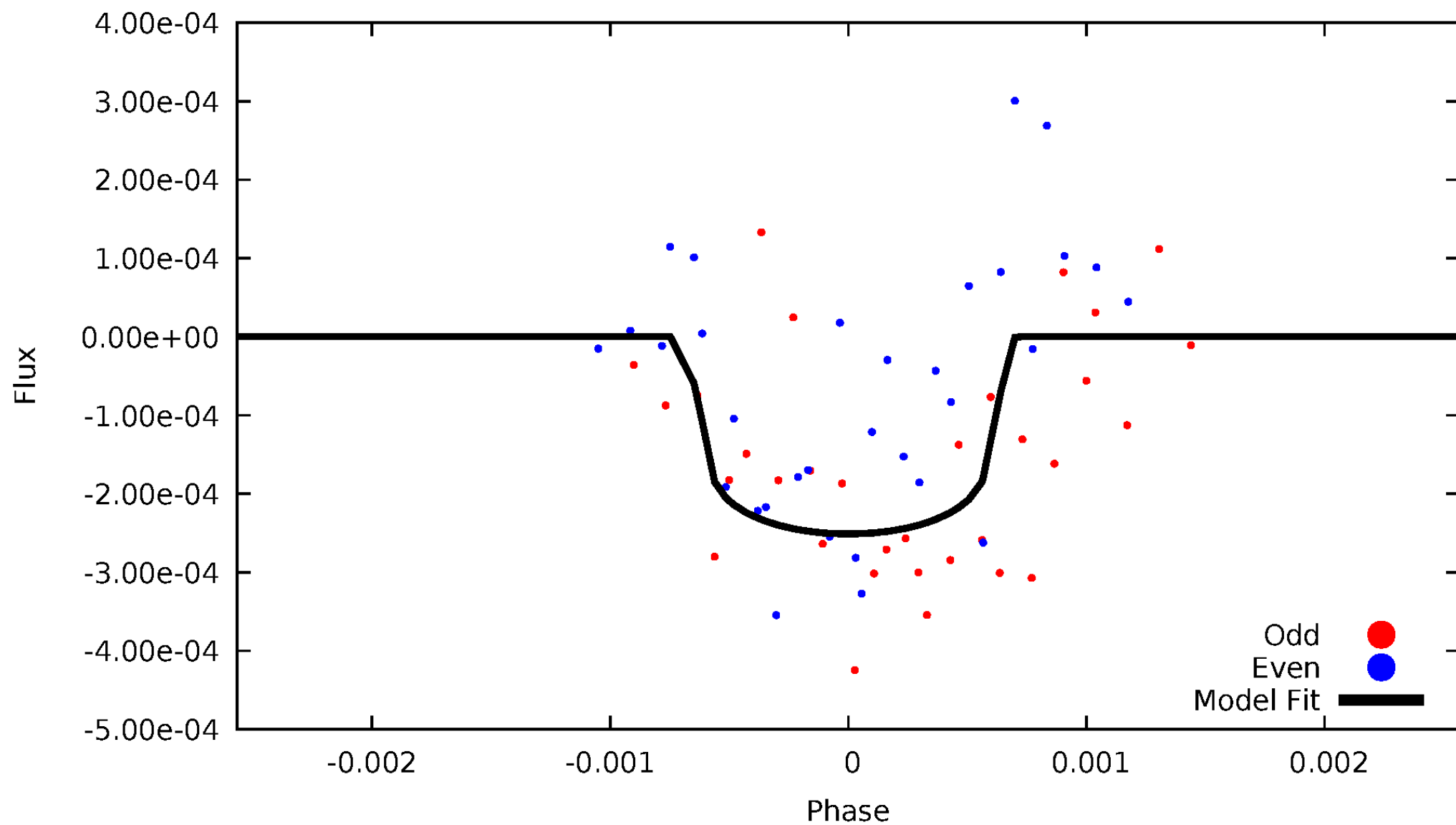


# TCE 005638429-03



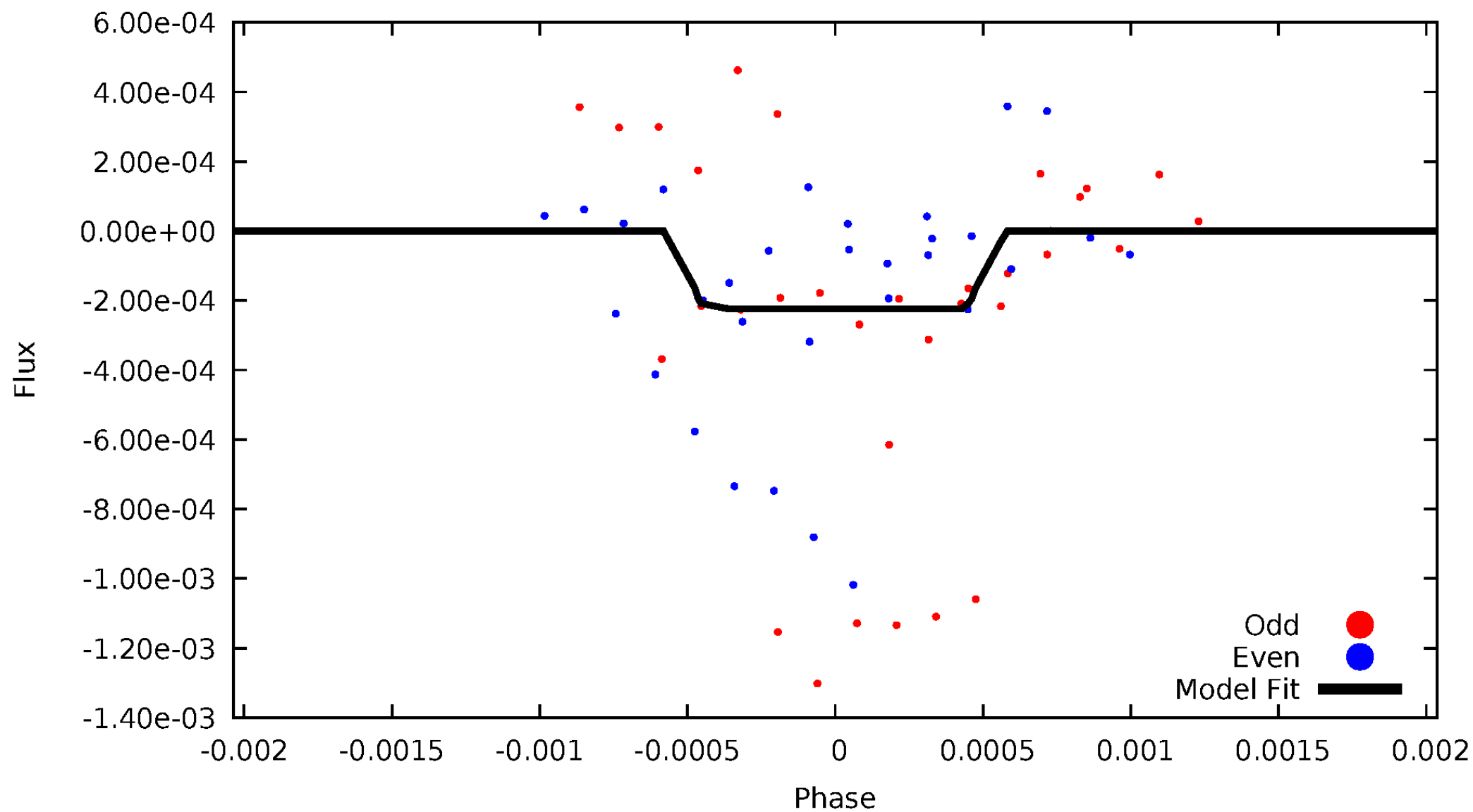
# DV Odd/Even

TCE 005638429-03

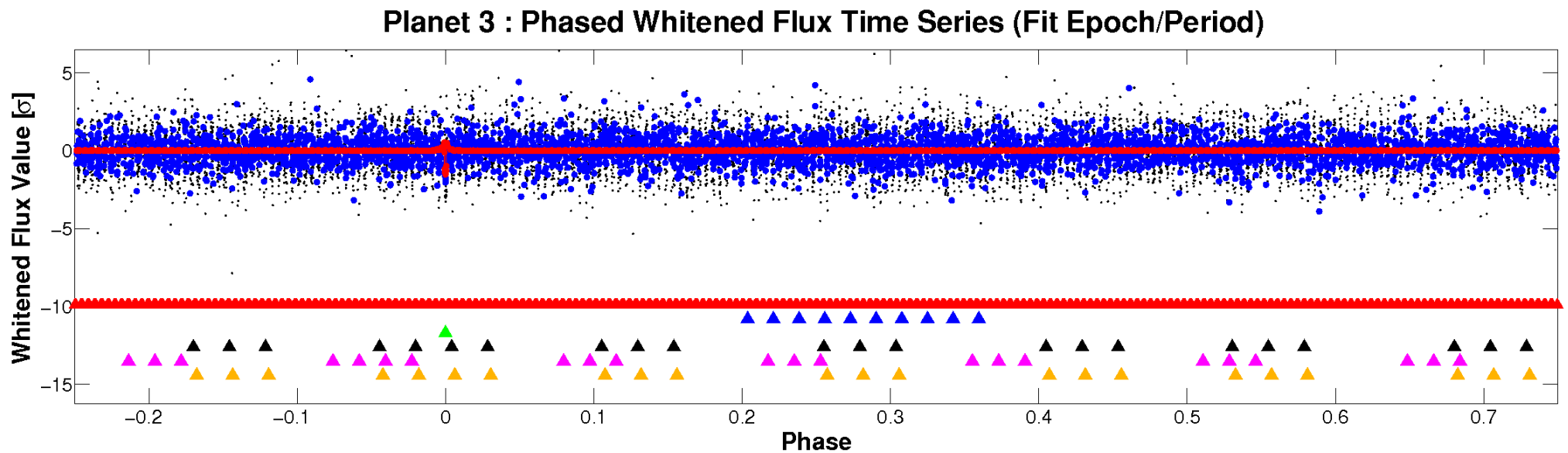
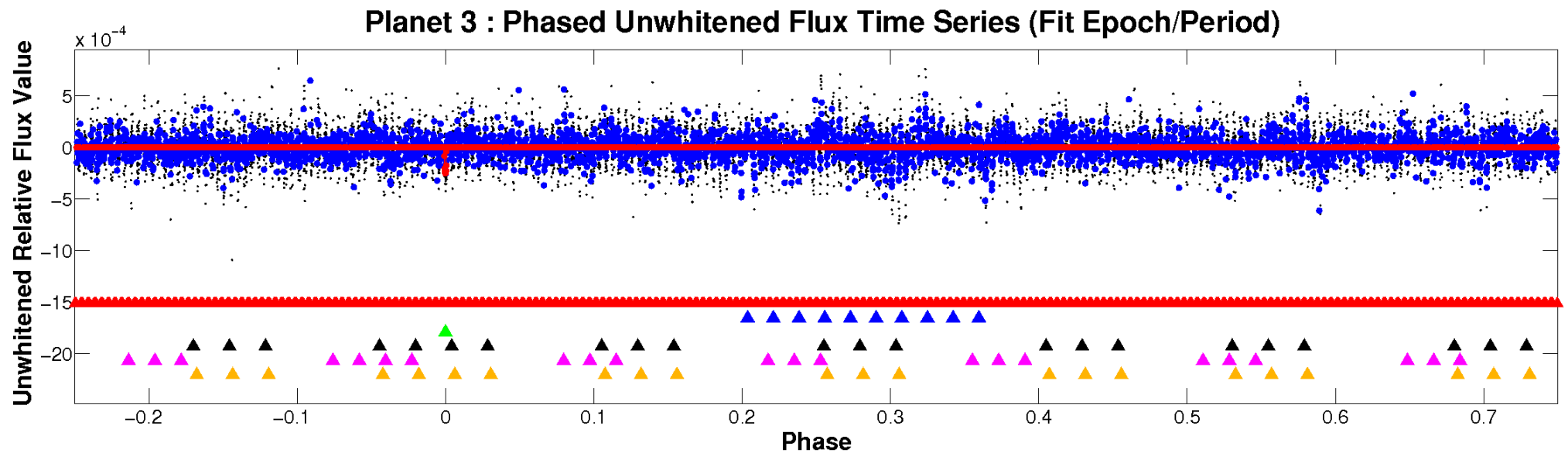


# ALT Odd/Even

TCE 005638429-03

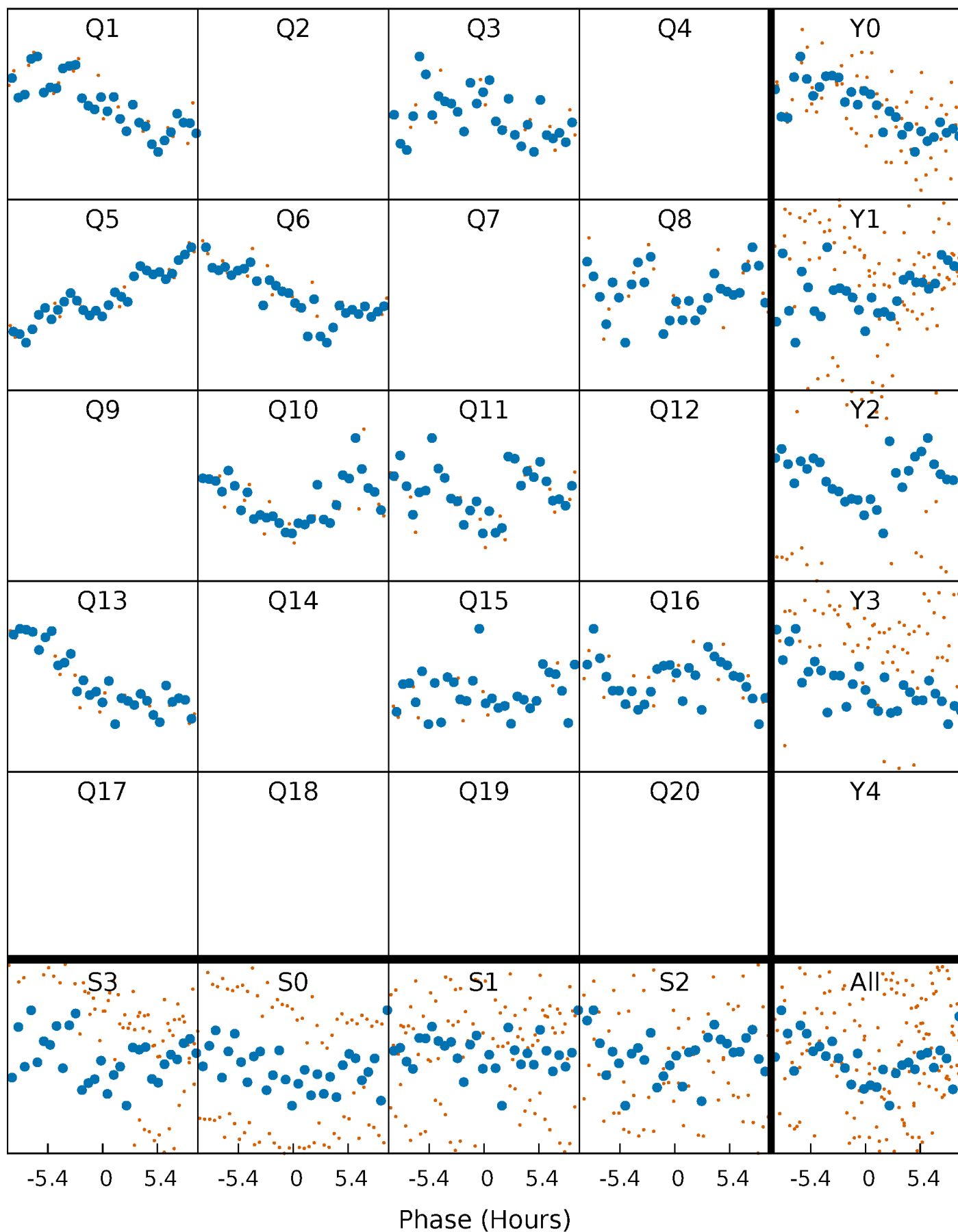


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

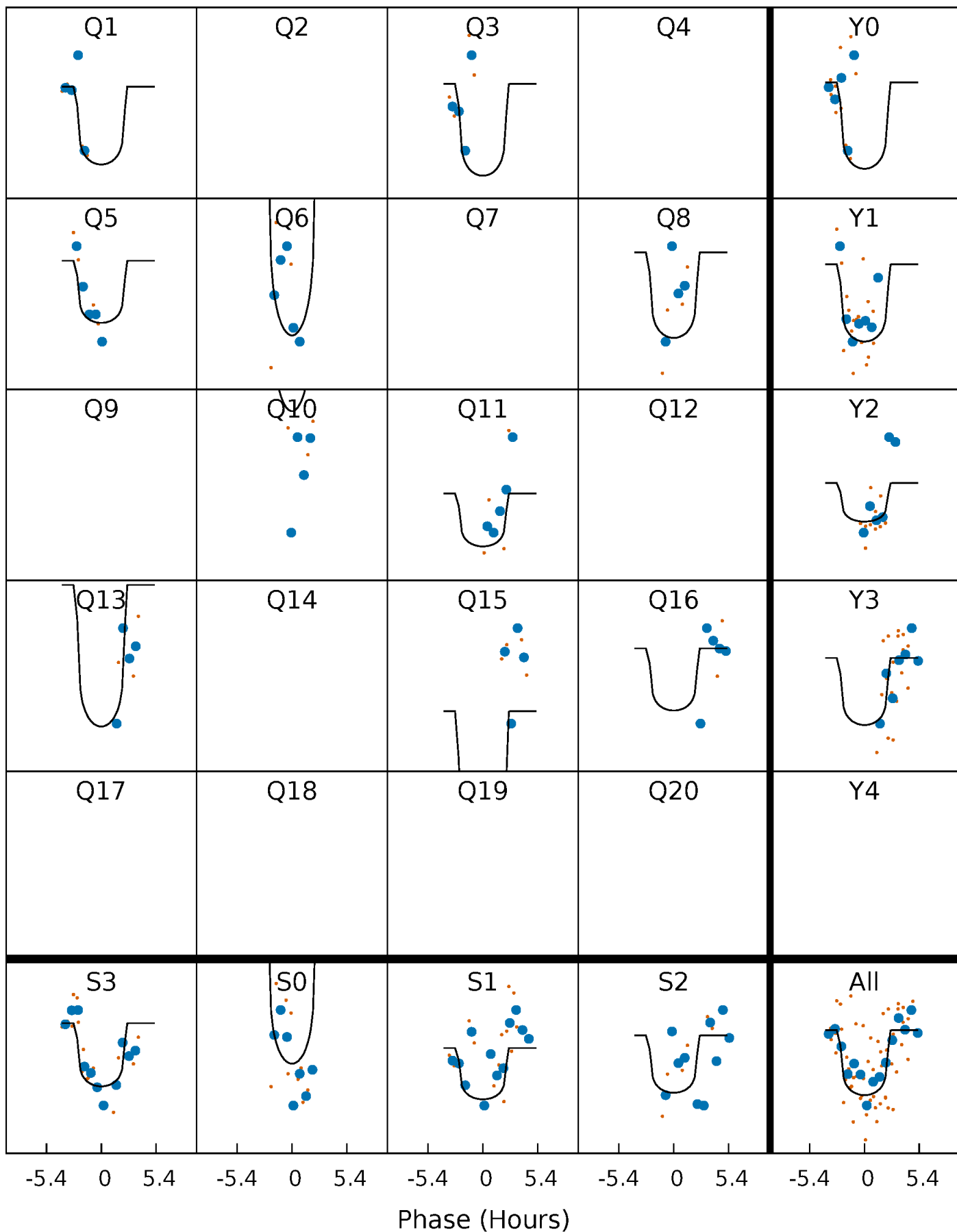
TCE 005638429-03 P=152.634865 Days  $T_0=162.385454$  (BKJD)





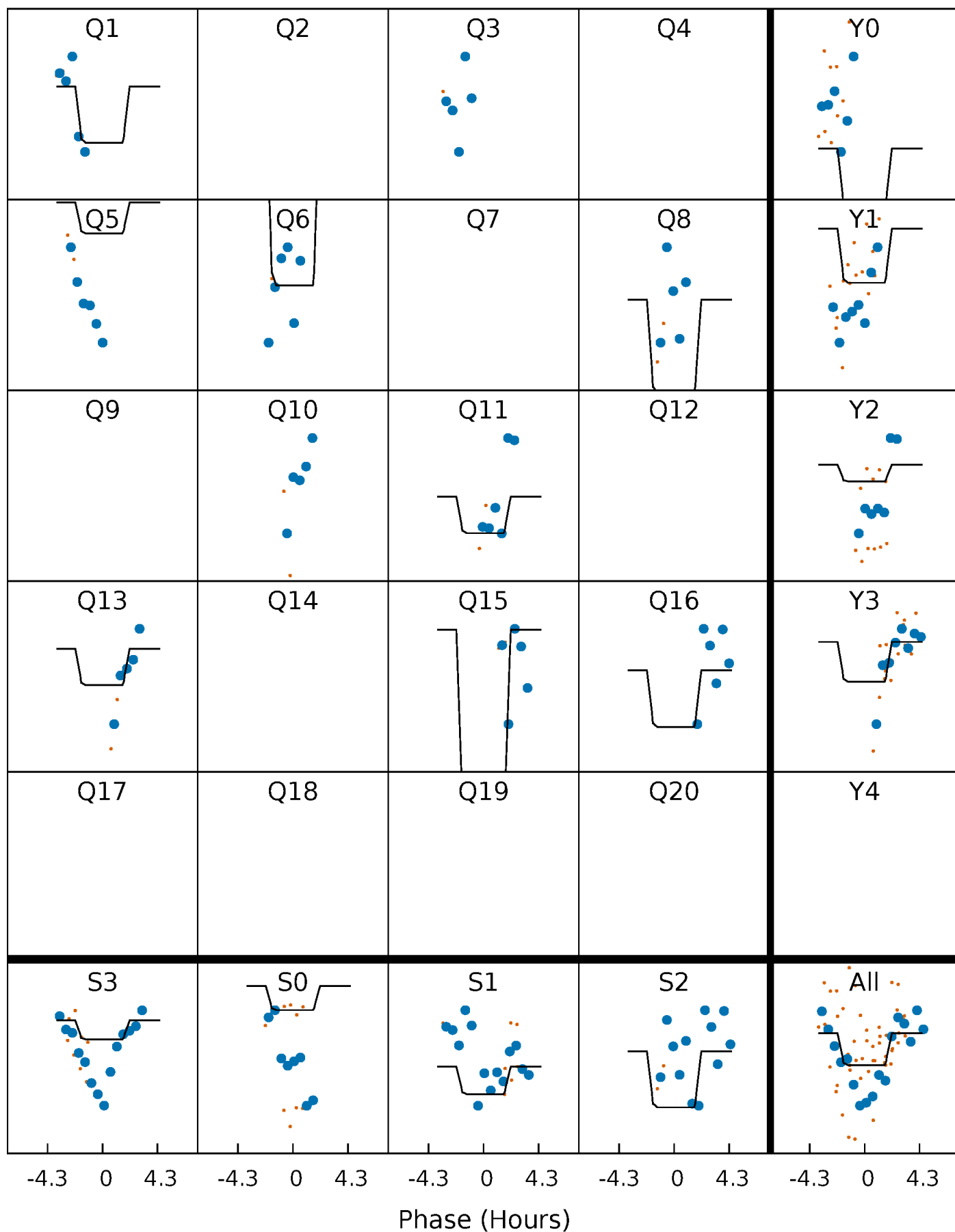
# DV Quarter-Phased Transit Curves

TCE 005638429-03 P=152.634865 Days  $T_0=162.385454$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

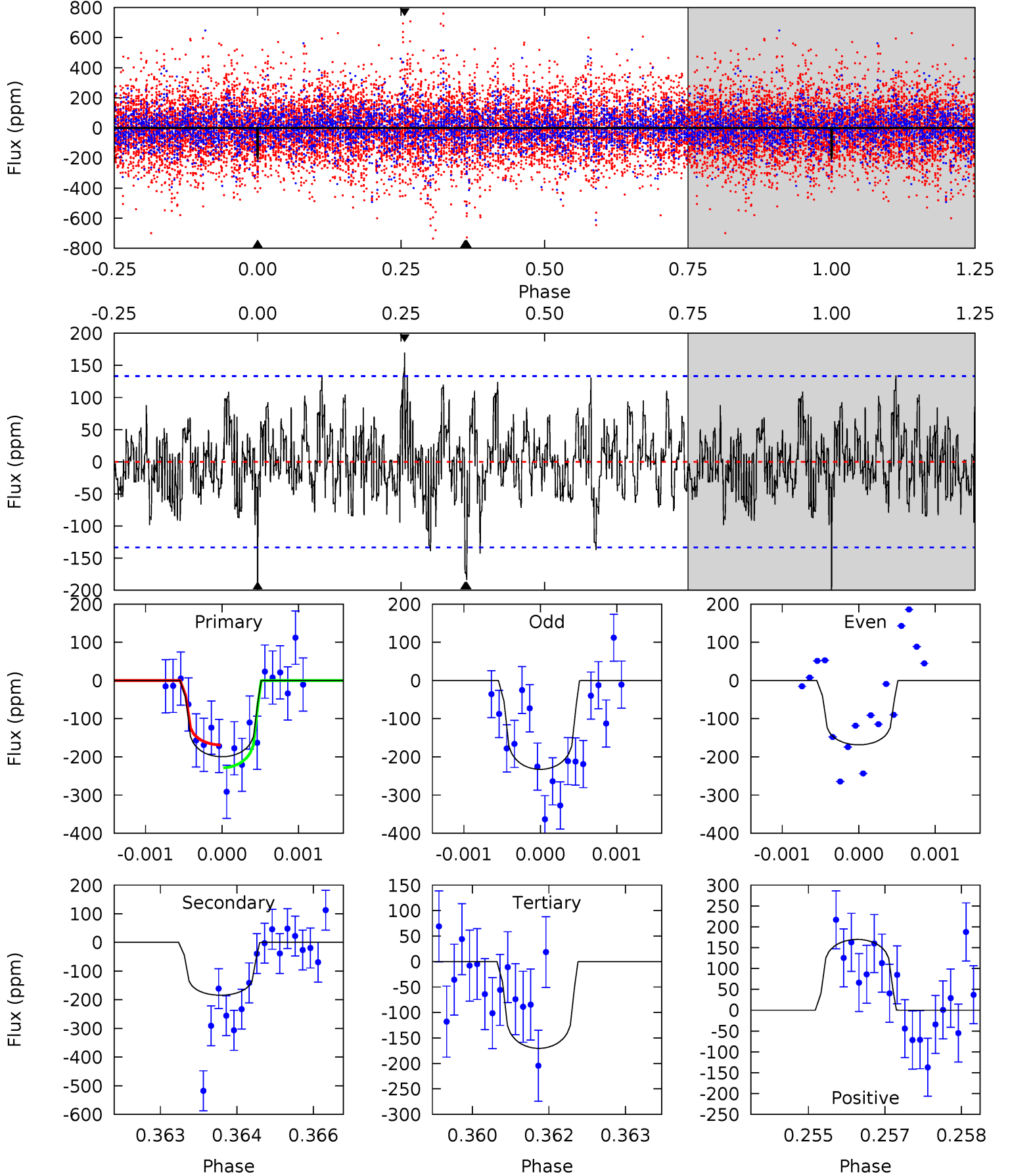
TCE 005638429-03 P=152.639550 Days  $T_0=162.375263$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-03, P = 152.634865 Days, E = 9.750589 Days

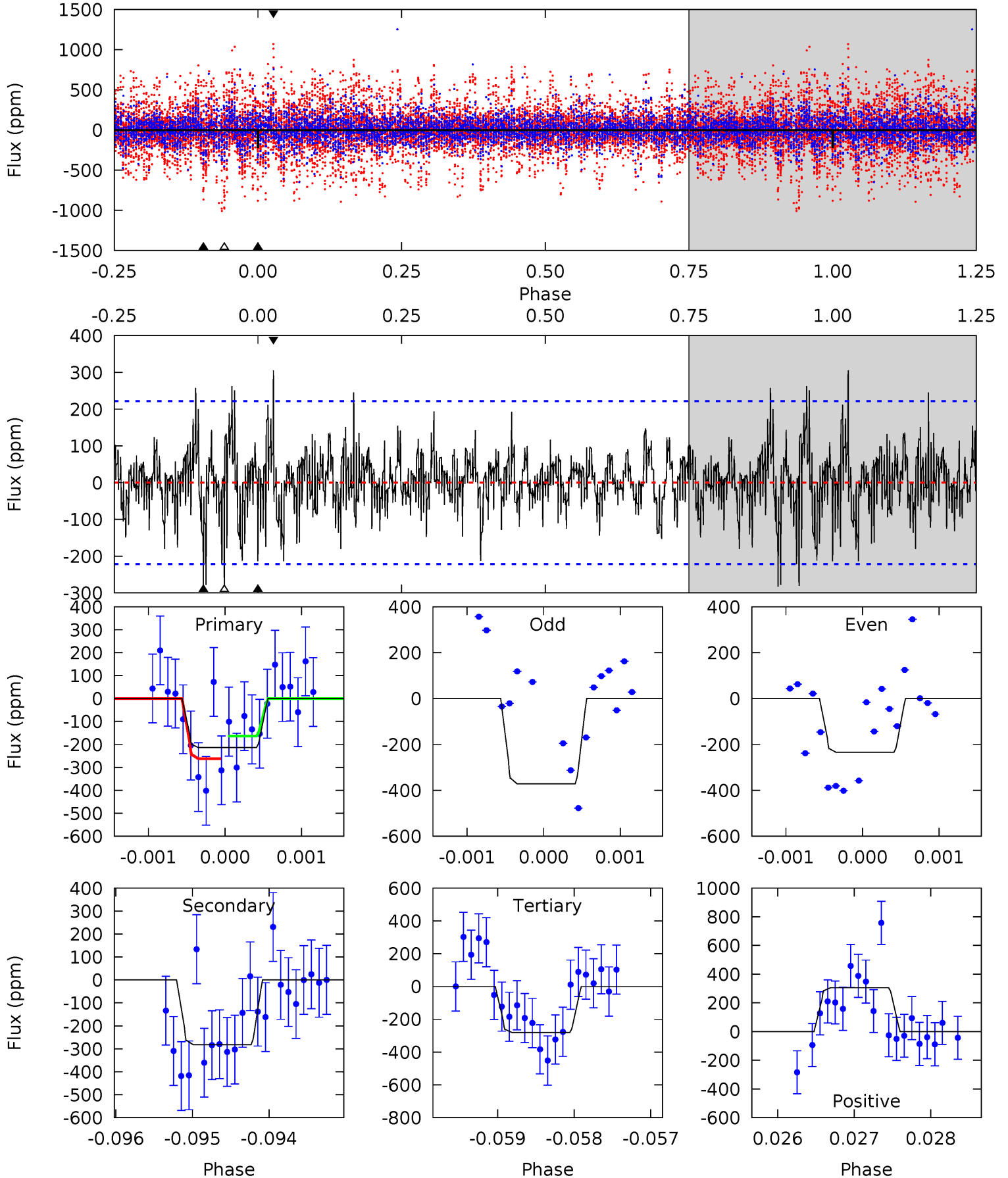
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.08	7.46	6.90	6.87	5.40	3.20	1.76	1.19	1.21	0.56	0.58	1.30	0.76	0.46	1.21



# Alt Model-Shift Uniqueness Test

005638429-03, P = 152.639550 Days, E = 9.735713 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
5.25	6.92	6.89	7.49	5.45	3.28	1.69	-1.64	-2.25	0.03	-0.58	1.65	1.32	0.52	1.23



### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-184 \pm 25$	$6.03^{+5.21}_{-3.82}$	$861^{+54}_{-76}$	$5402^{+4554}_{-1178}$	$1132^{+7879}_{-814}$
Alt.	$-282 \pm 41$	$6.06^{+5.47}_{-4.18}$	$857^{+58}_{-72}$	$5893^{+6965}_{-1369}$	$1664^{+16130}_{-1200}$

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

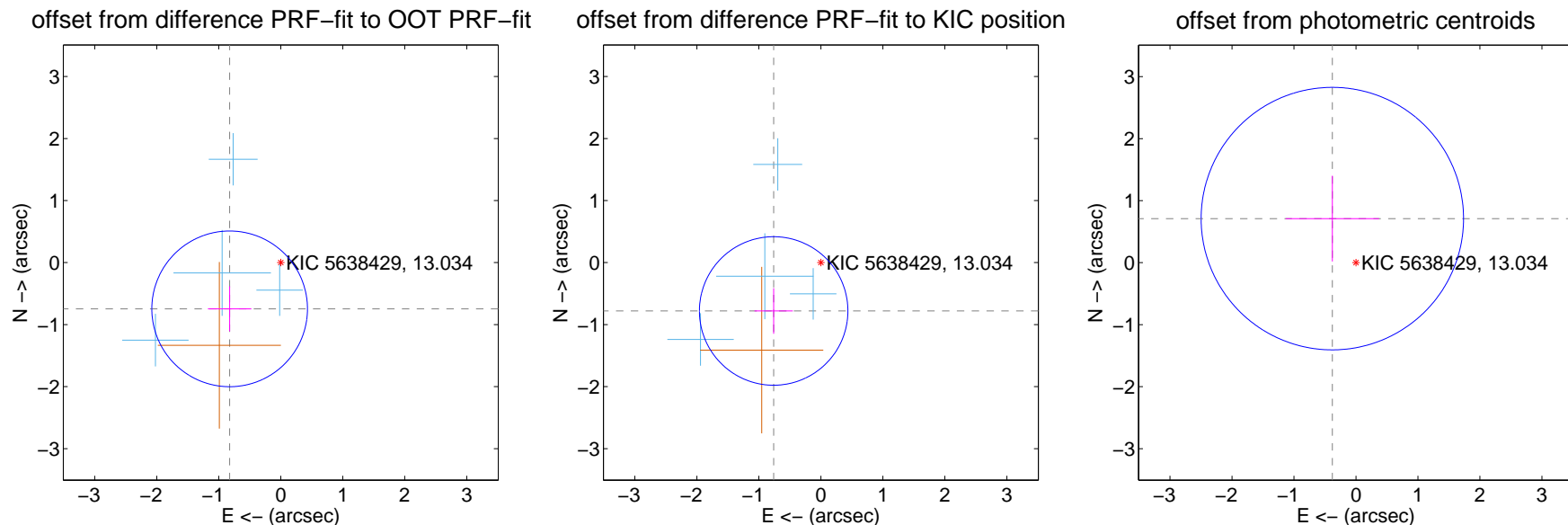
## DV Centroid Data

Supplemental centroid analysis for 005638429-03. Kepler magnitude: 13.03. Transit SNR 8.20

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

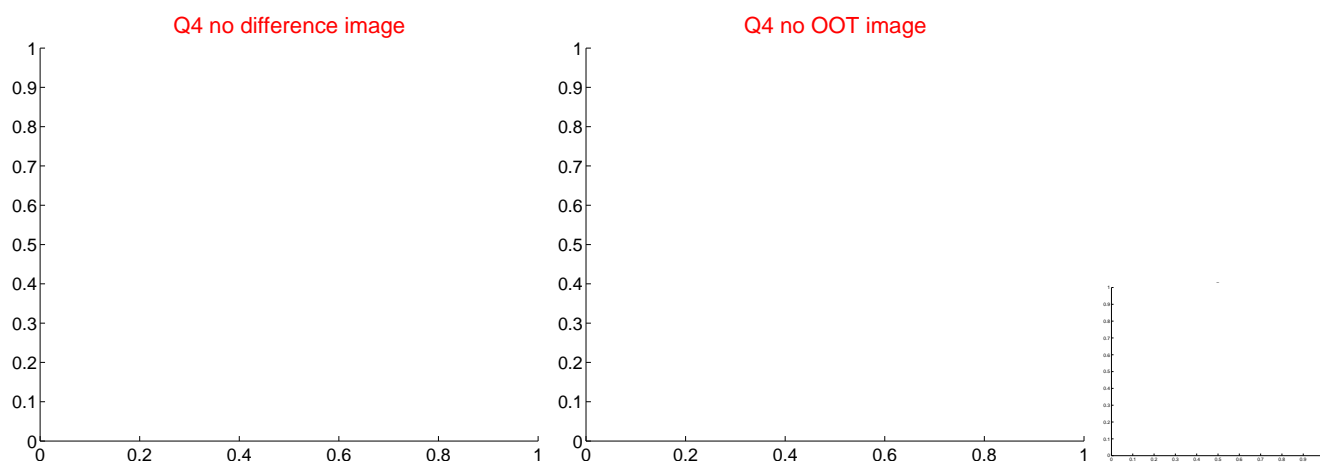
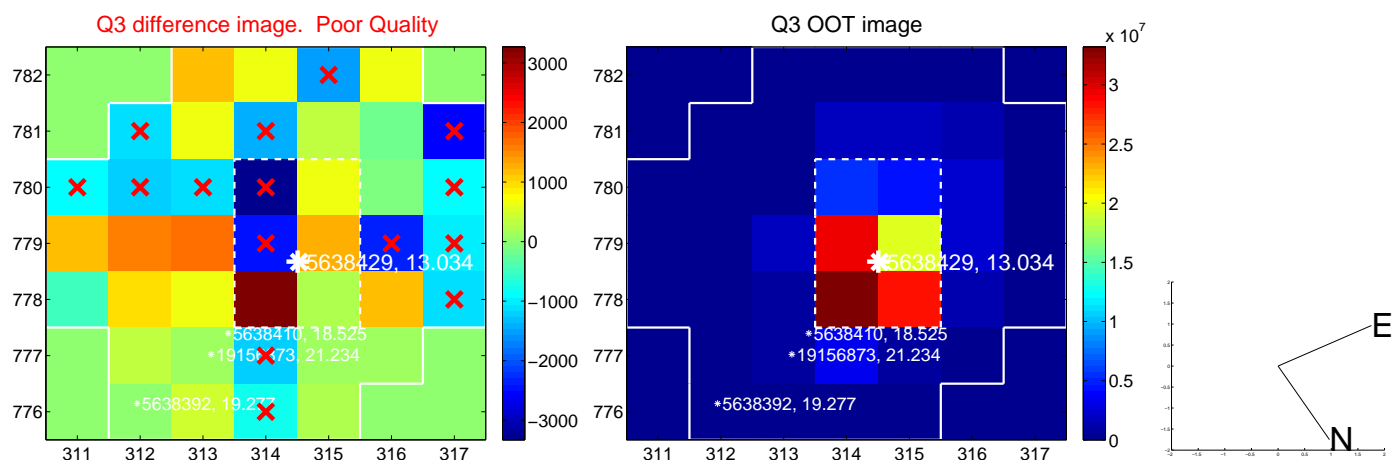
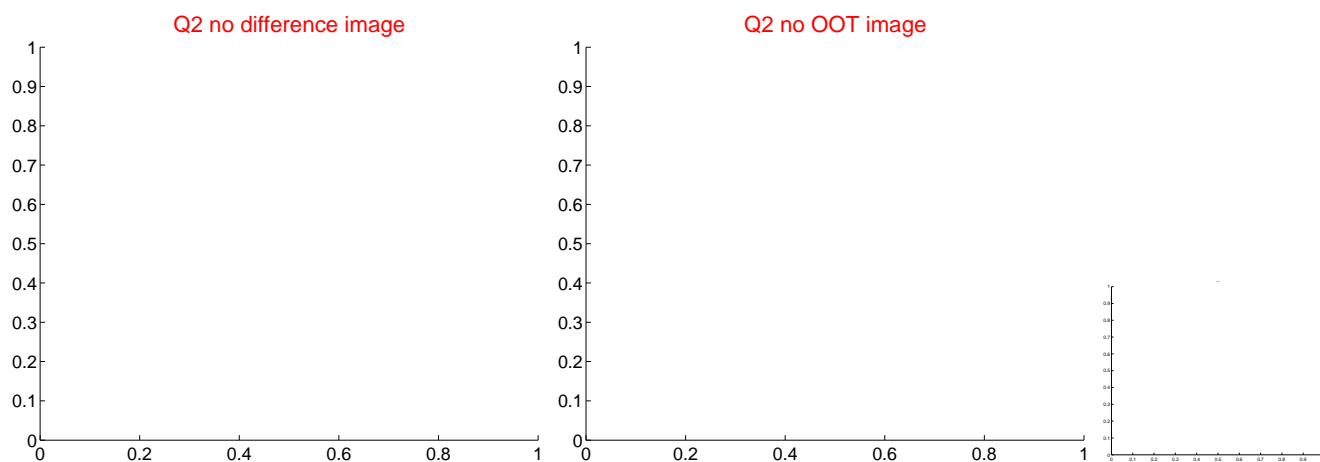
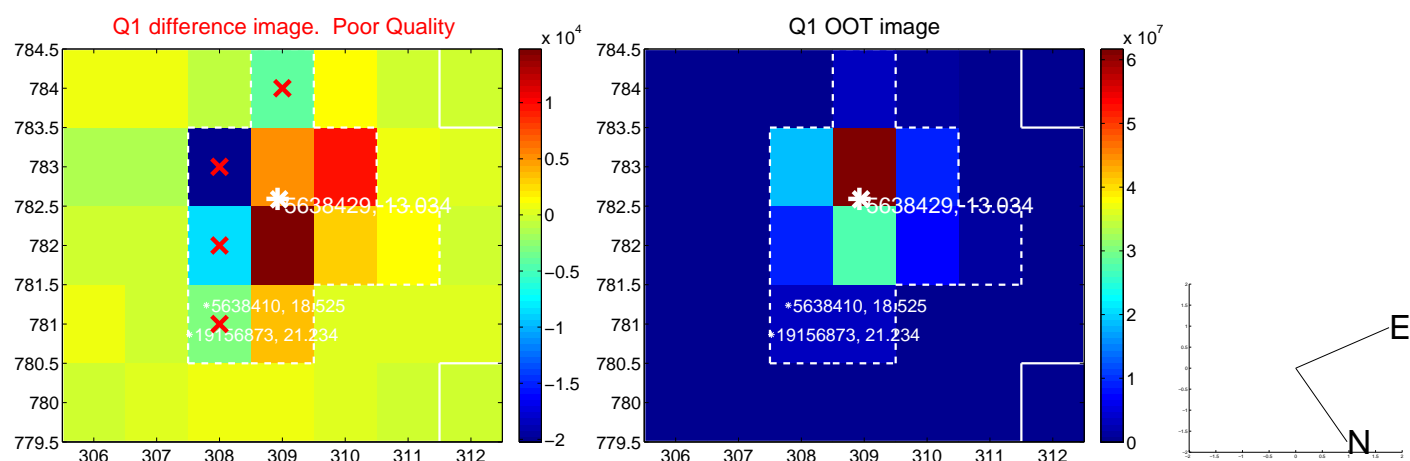
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.112 \pm 0.418$	2.66	$0.824 \pm 0.350$	$-0.746 \pm 0.363$
PRF-fit source offset from KIC position	$1.090 \pm 0.399$	2.73	$0.761 \pm 0.309$	$-0.780 \pm 0.368$
photometric centroid source offset	$0.81 \pm 0.71$	1.14	$0.38 \pm 0.75$	$0.71 \pm 0.69$



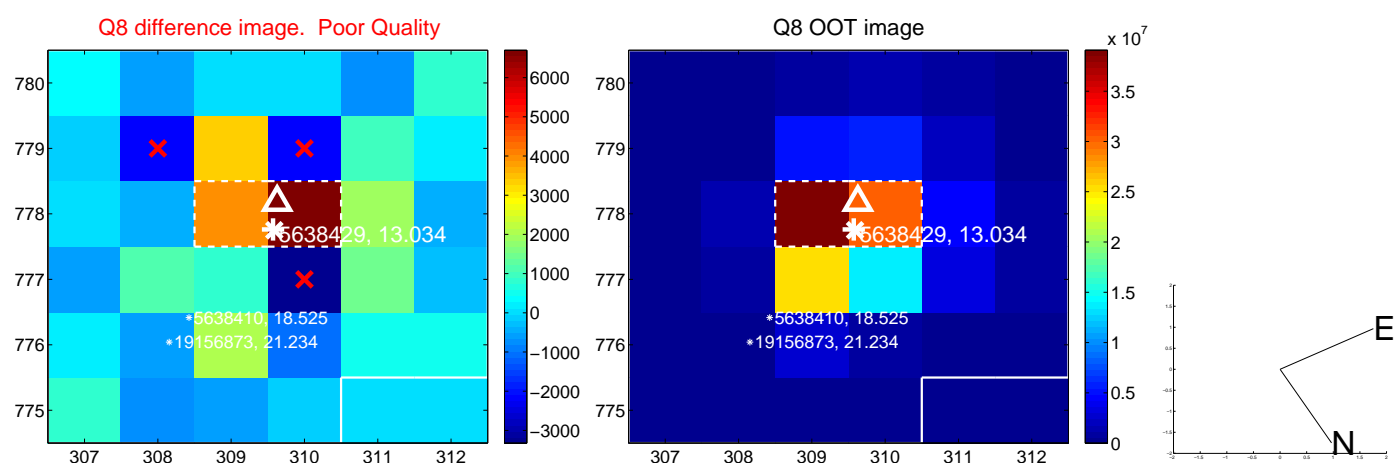
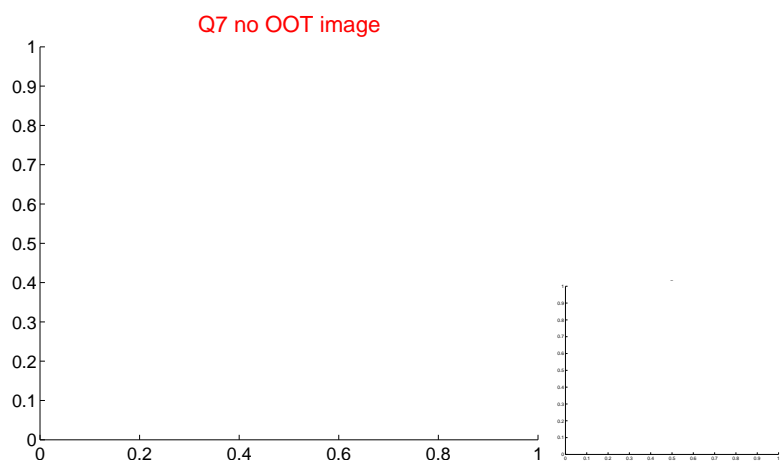
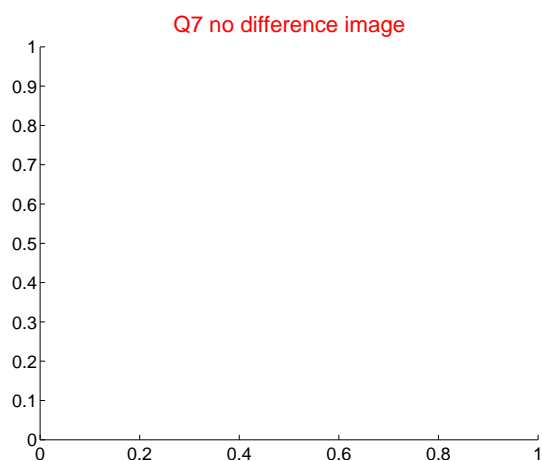
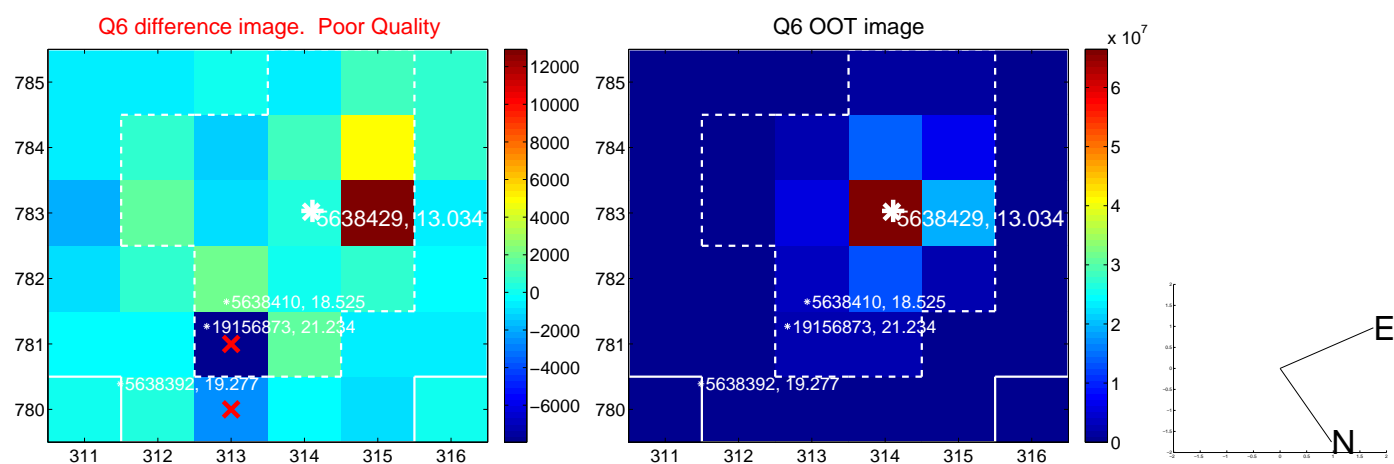
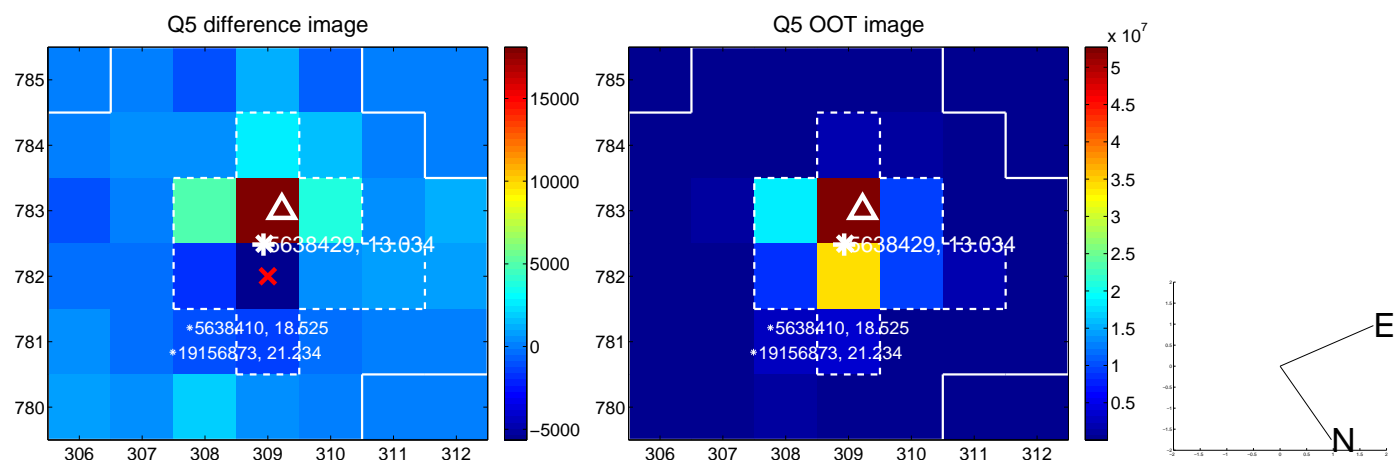
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



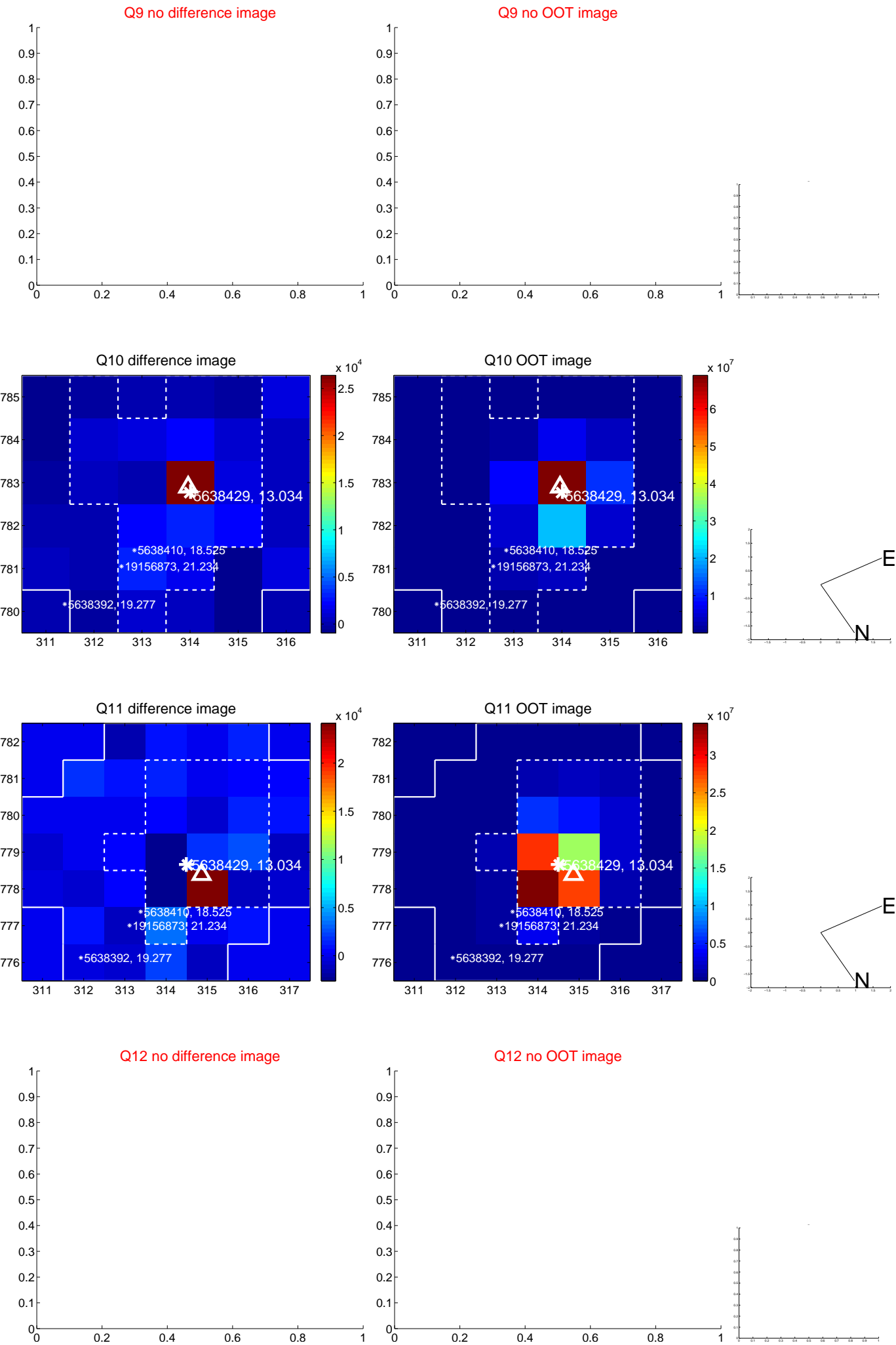
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



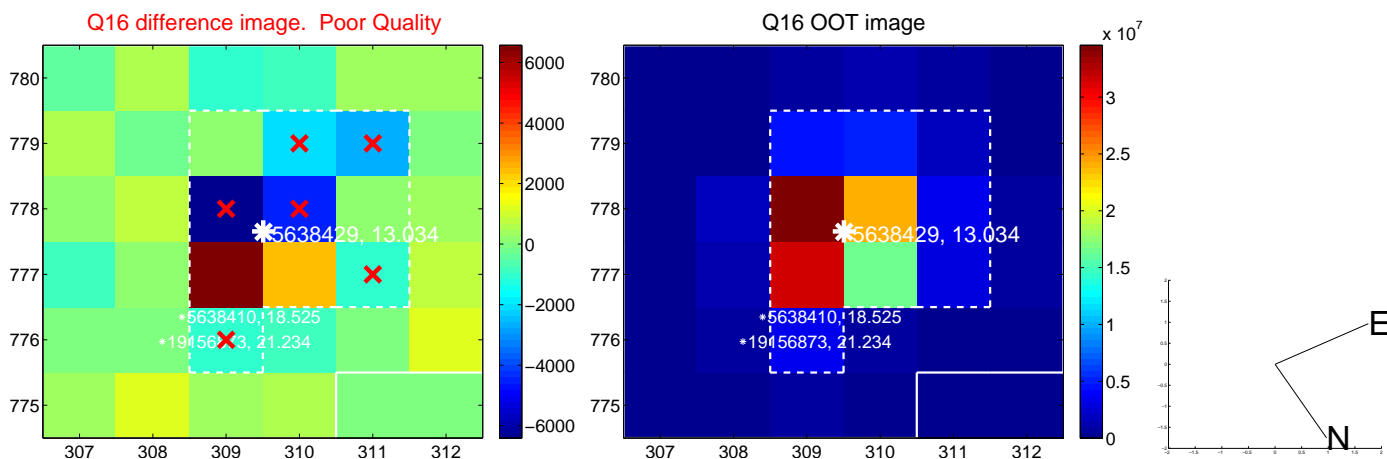
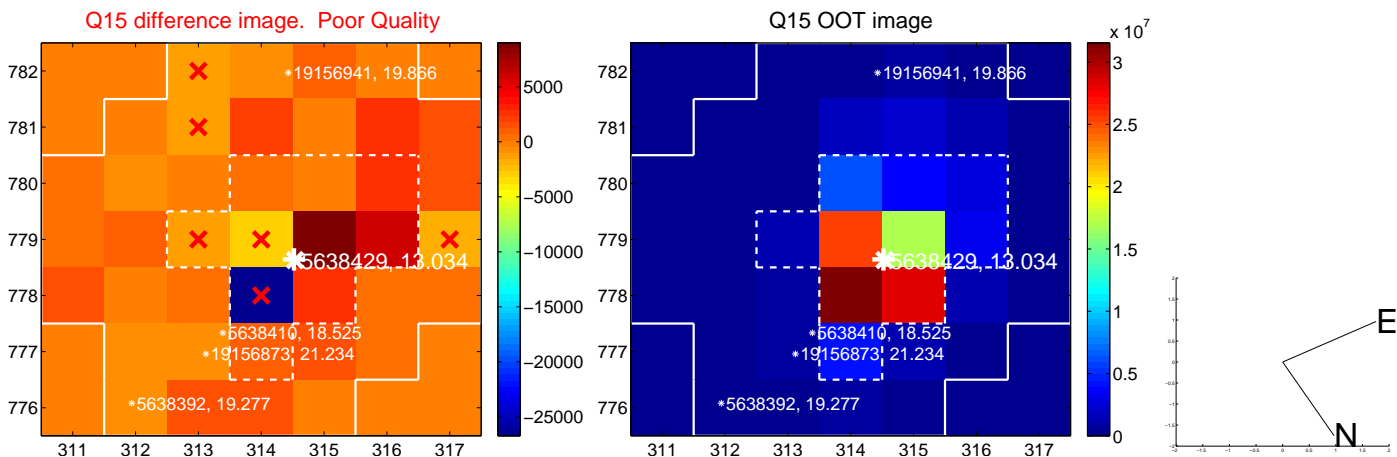
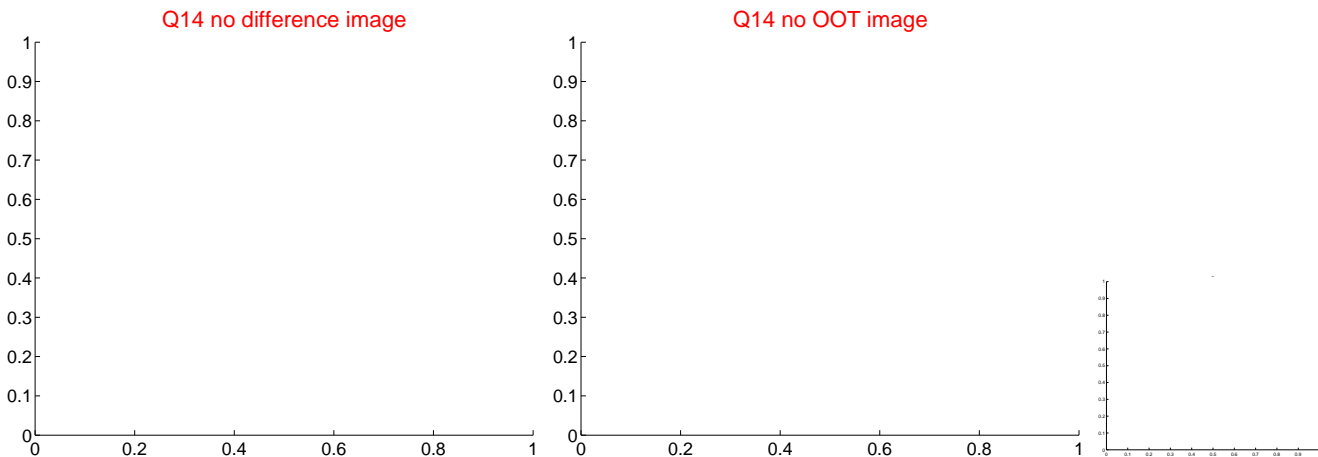
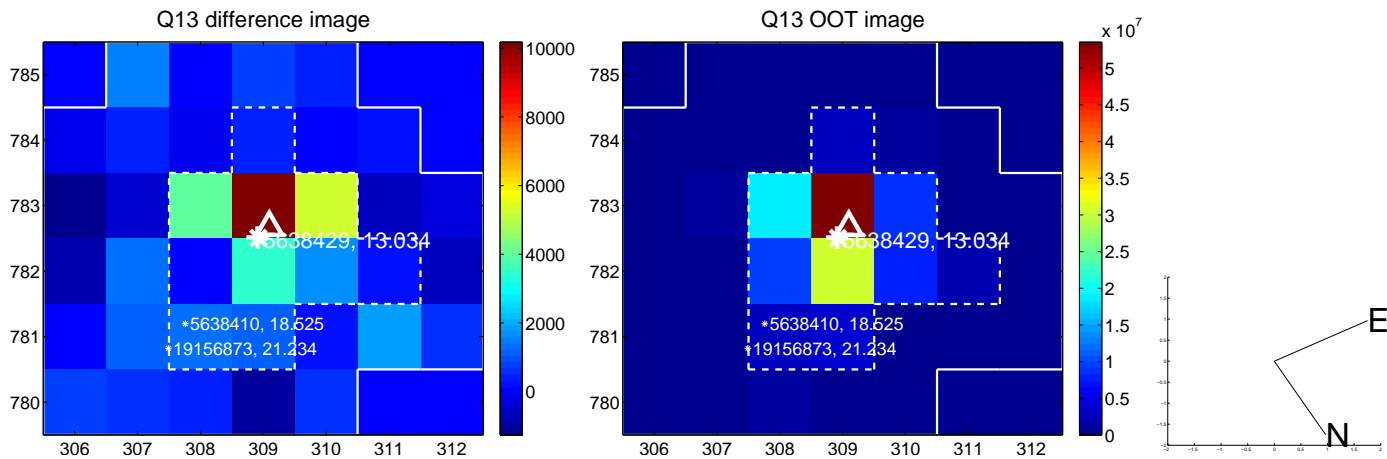
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



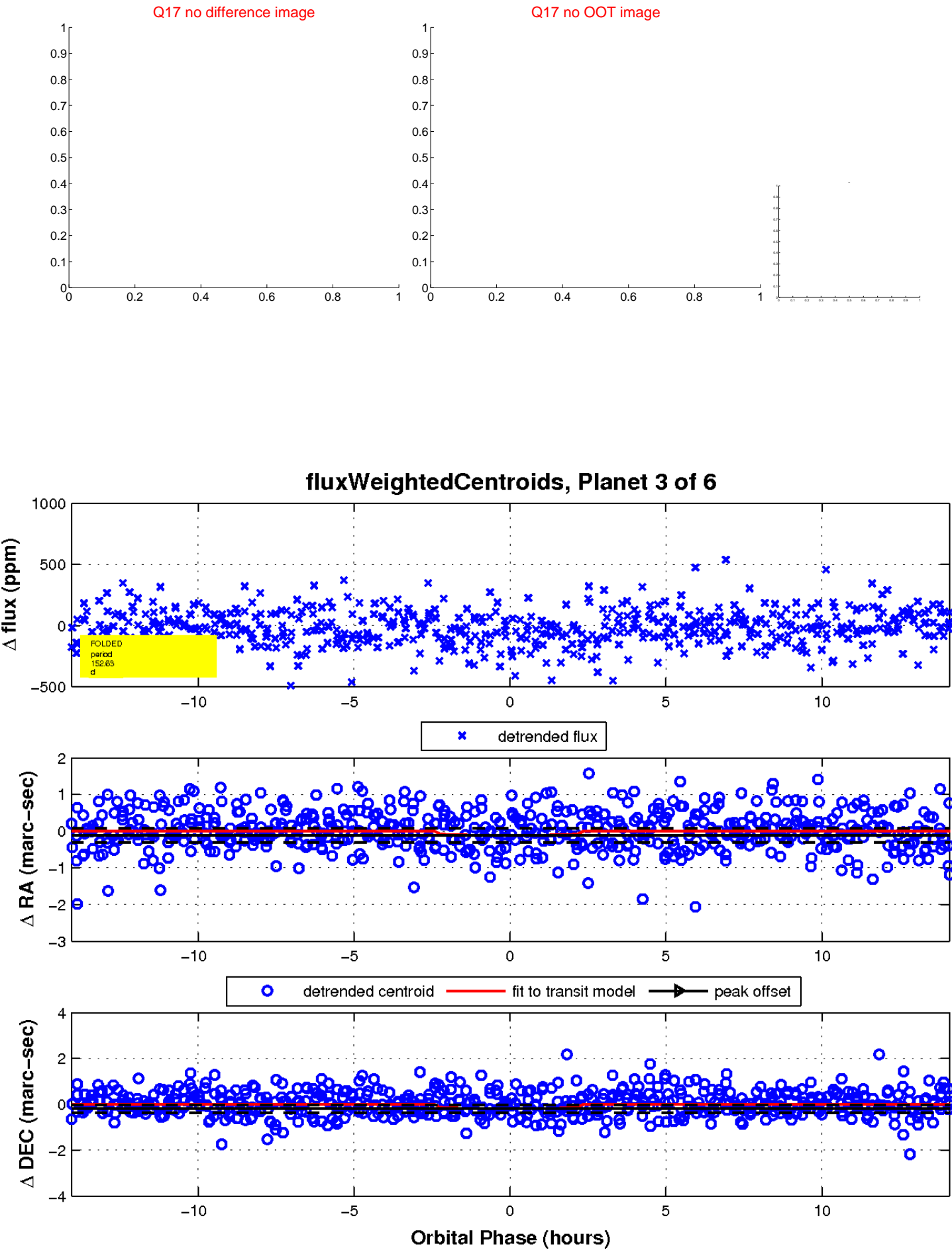
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



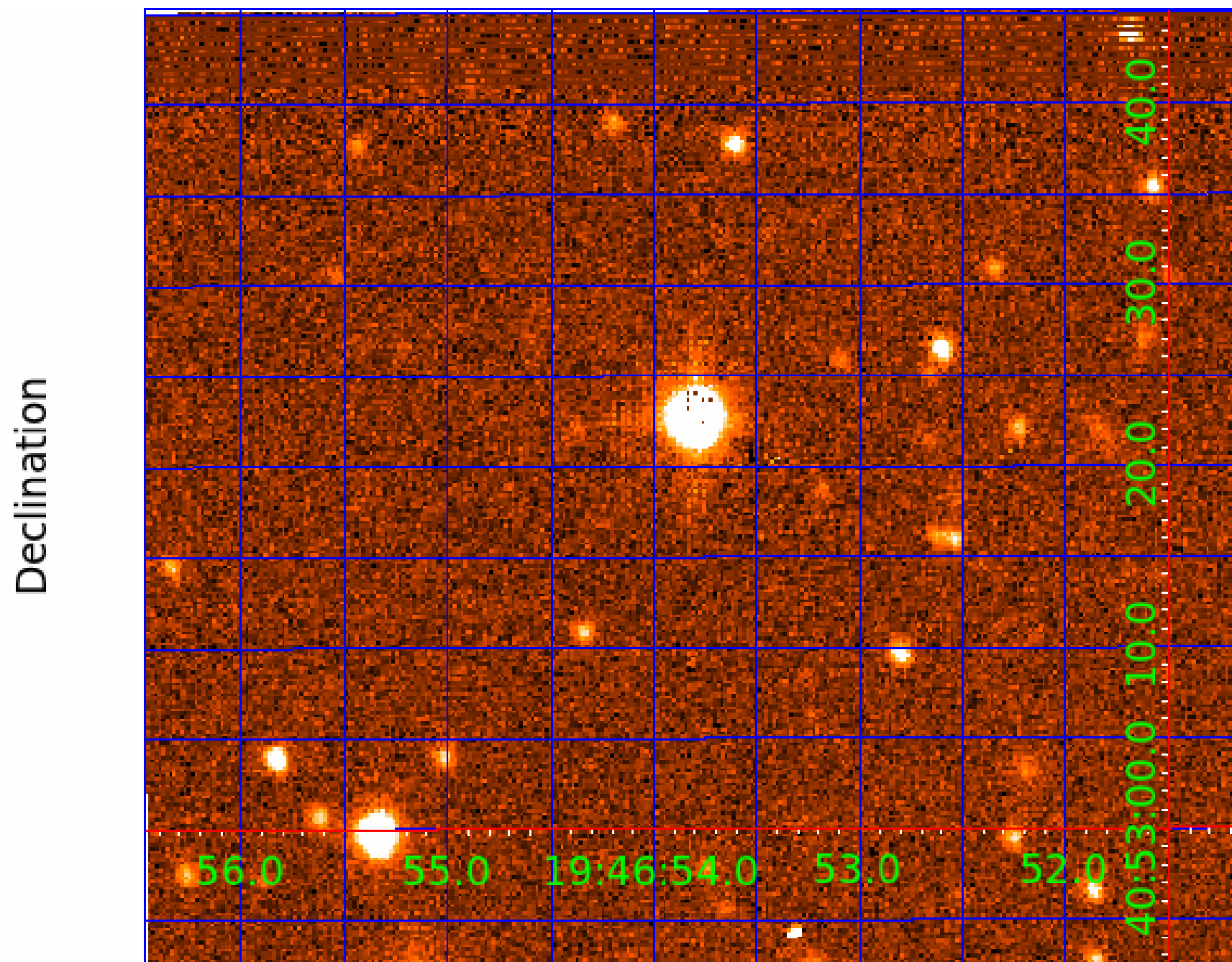
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 005638429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005638429-01	OBS	No	0.687679	131.671919	15.2	4.273	8.3	9.2	2.53	7113	1.16	49331.98
005638429-02	OBS	No	149.991455	217.275195	589.0	5.116	9.5	8.9	2.53	7113	7.70	37.57
005638429-03	OBS	No	152.634865	162.385454	251.2	4.701	8.2	8.2	2.53	7113	4.08	36.71
005638429-04	OBS	No	64.884695	166.731715	121.2	3.206	9.3	3.8	2.53	7113	3.23	114.85
005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
005638429-06	OBS	No	64.886267	167.047687	198.0	3.307	9.1	5.1	2.53	7113	3.81	114.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005638429-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

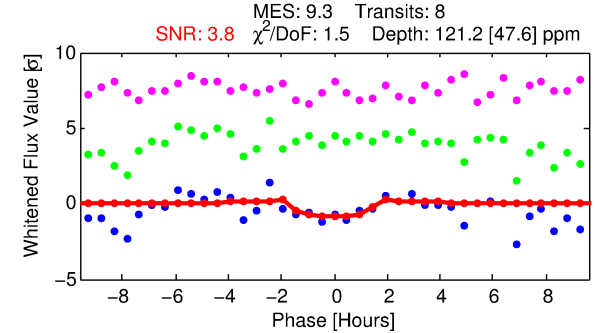
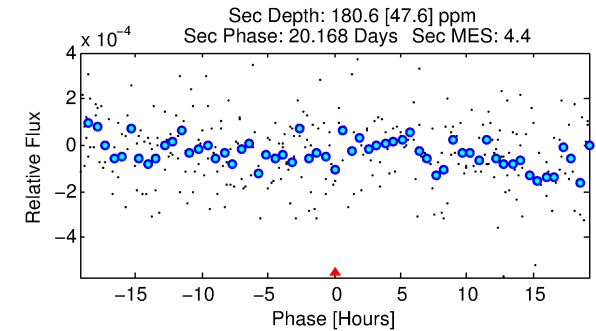
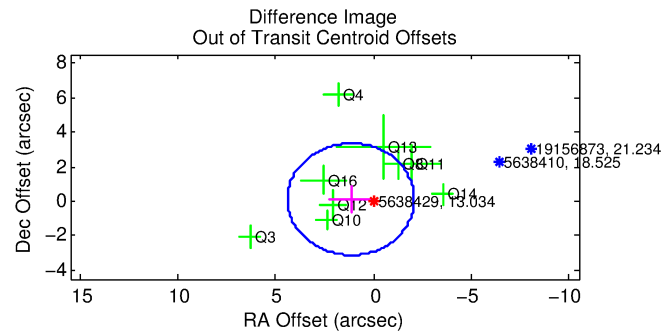
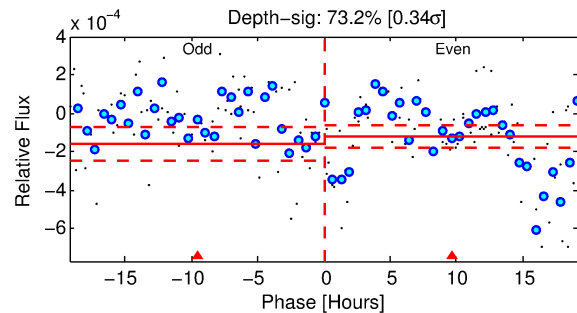
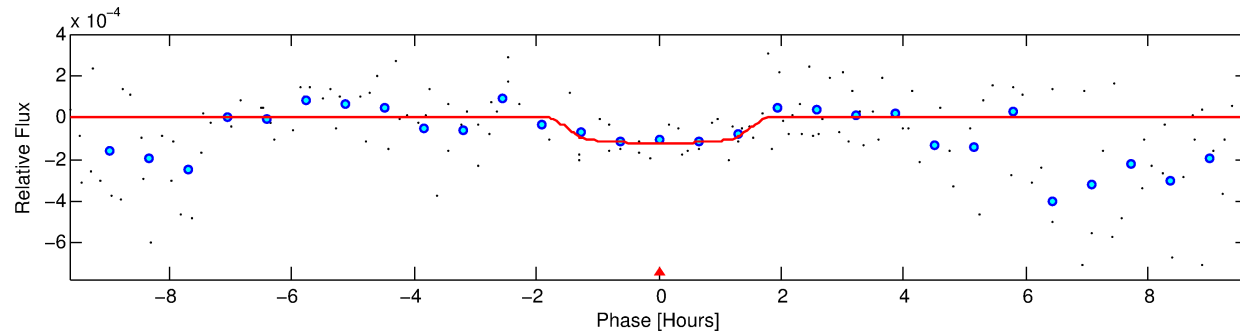
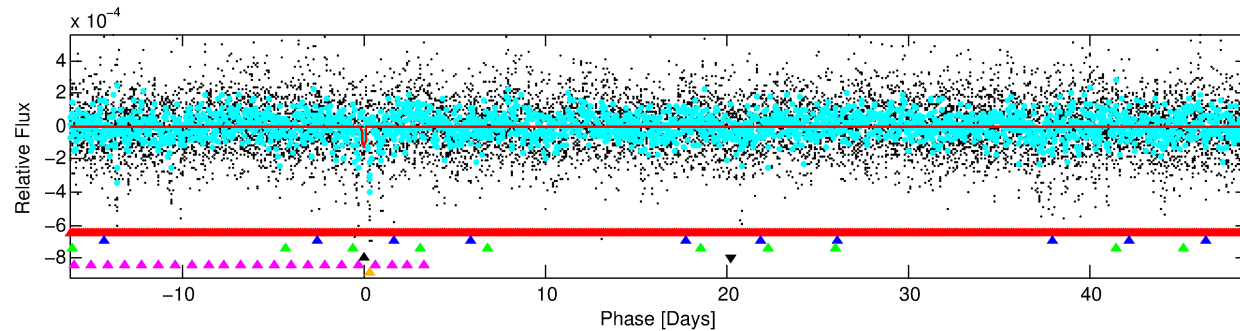
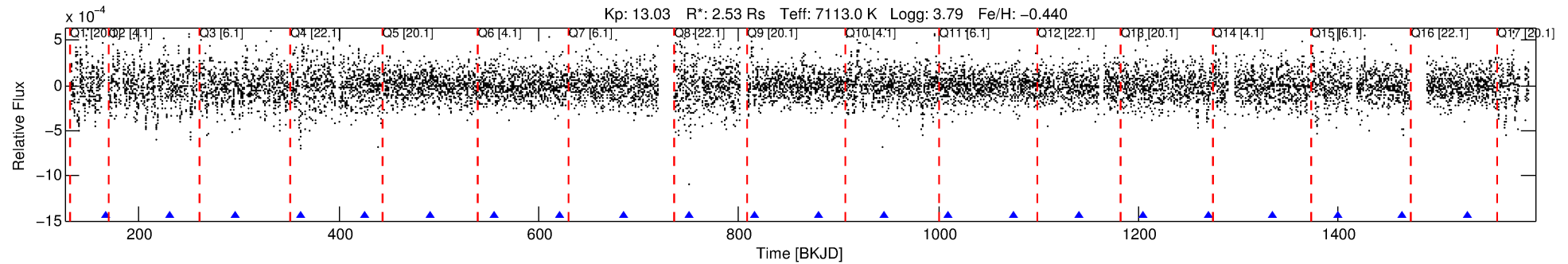
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-04

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 4 of 6 Period: 64.885 d



## DV Fit Results:

Period = 64.88470 [0.00178] d  
Epoch = 166.7317 [0.0245] BKJD  
Rp/R\* = 0.0117 [0.0187]  
a/R\* = 73.93 [688.39]  
b = 0.89 [2.18]  
Seff = 114.85 [58.90]  
Teq = 835 [107] K  
Rp = 3.23 [5.29] Re  
a = 0.3581 [0.1129] AU  
Ag = 1217.60 [3956.04] [0.31 $\sigma$ ]  
Teffp = 7624 [6127] K [1.11 $\sigma$ ]

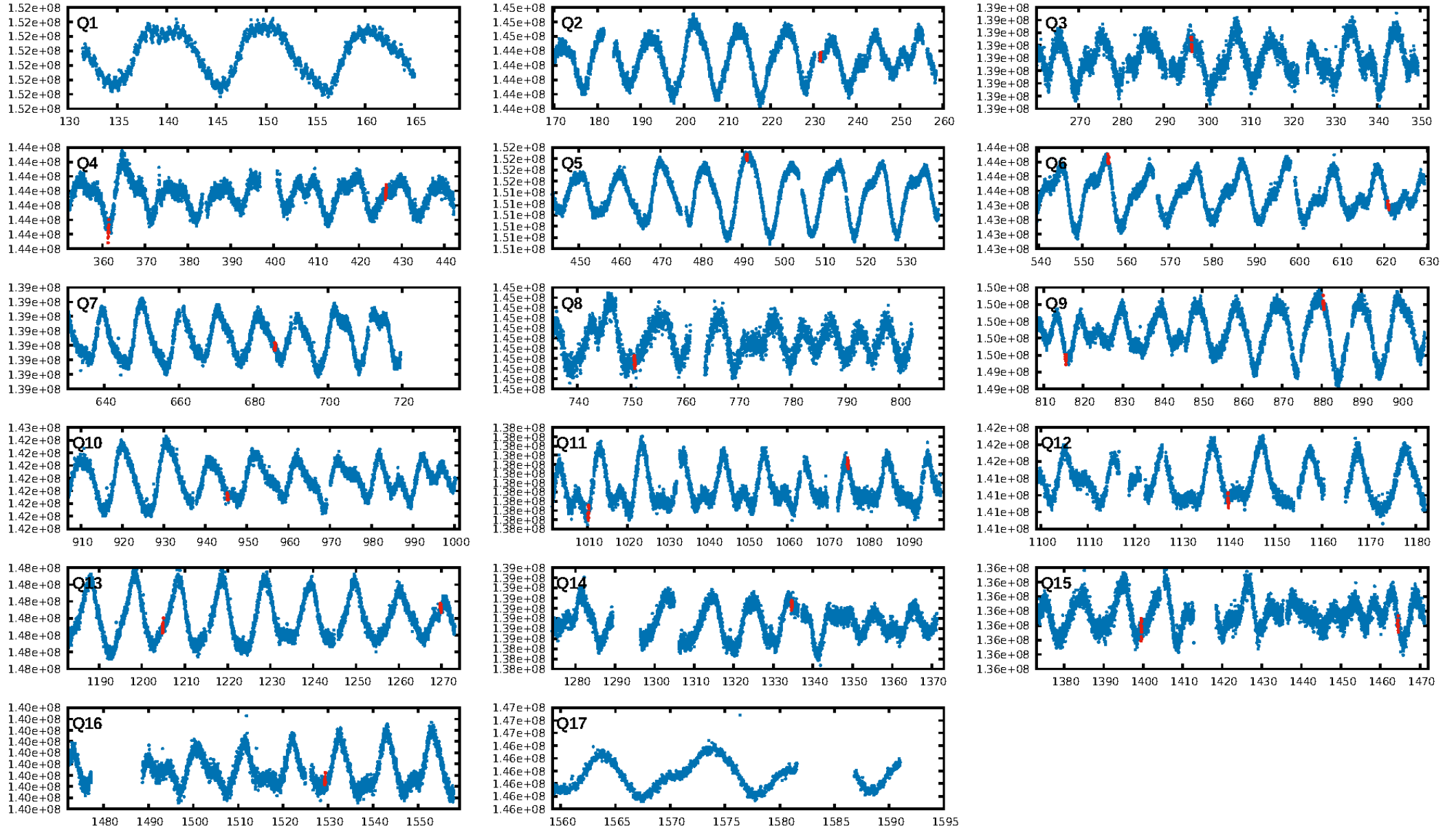
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [288.41 $\sigma$ ]  
LongPeriod-sig: 0.7% [0.01 $\sigma$ ]  
ModelChiSquare2-sig: 94.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.46e-13  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: -0.08581  
Centroid-sig: 0.6%  
Centroid-so: 2.158 arcsec [1.89 $\sigma$ ]  
OotOffset-rm: 1.163 arcsec [1.08 $\sigma$ ]  
KicOffset-rm: 1.239 arcsec [1.11 $\sigma$ ]  
OotOffset-st: 2/2/4/1 [9]  
KicOffset-st: 2/2/4/1 [9]  
DiffImageQuality-fgm: 0.22 [2/9]  
DiffImageOverlap-fno: 0.00 [0/14]

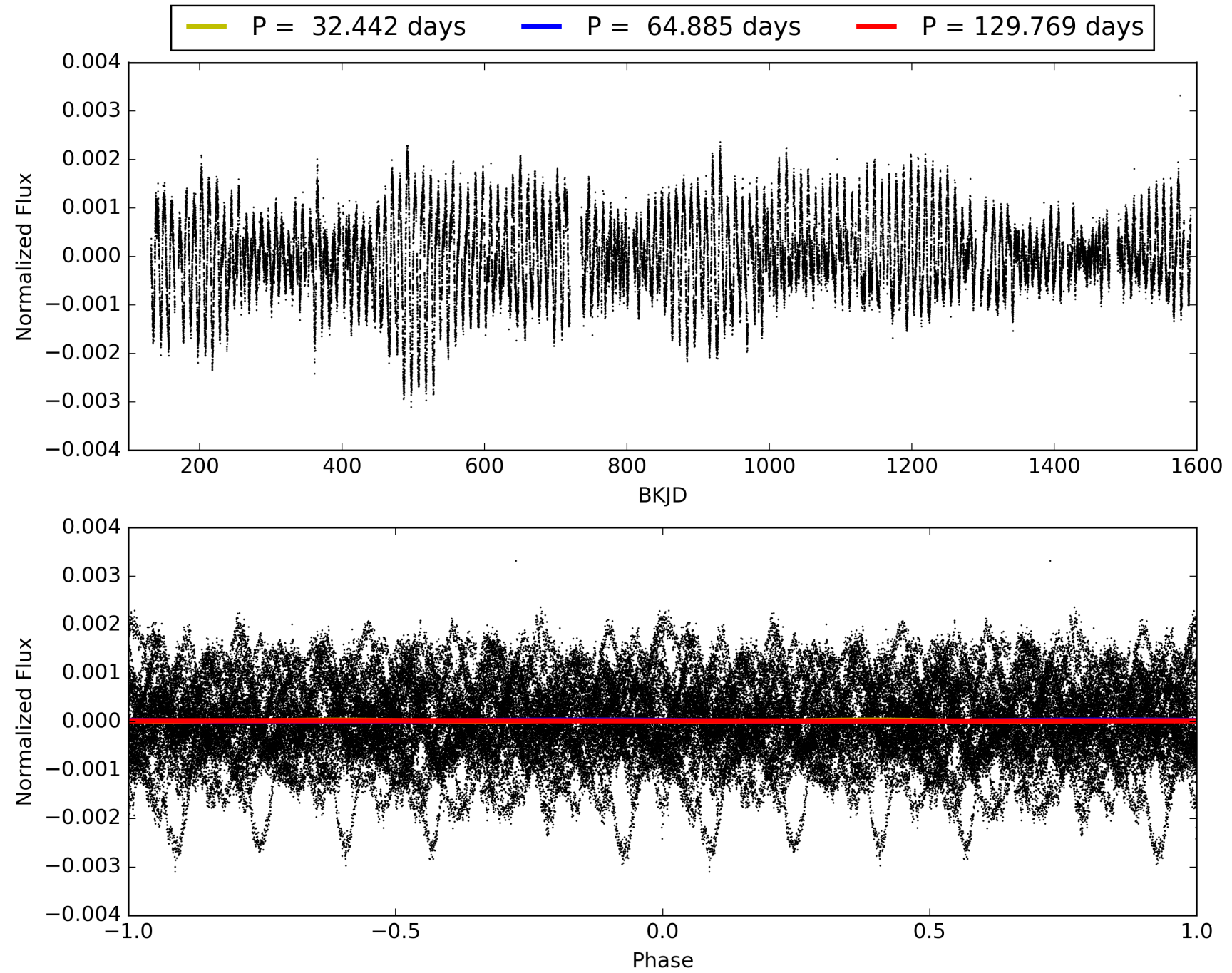
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:36 Z

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

# TCE 005638429-04, PDC Light Curves

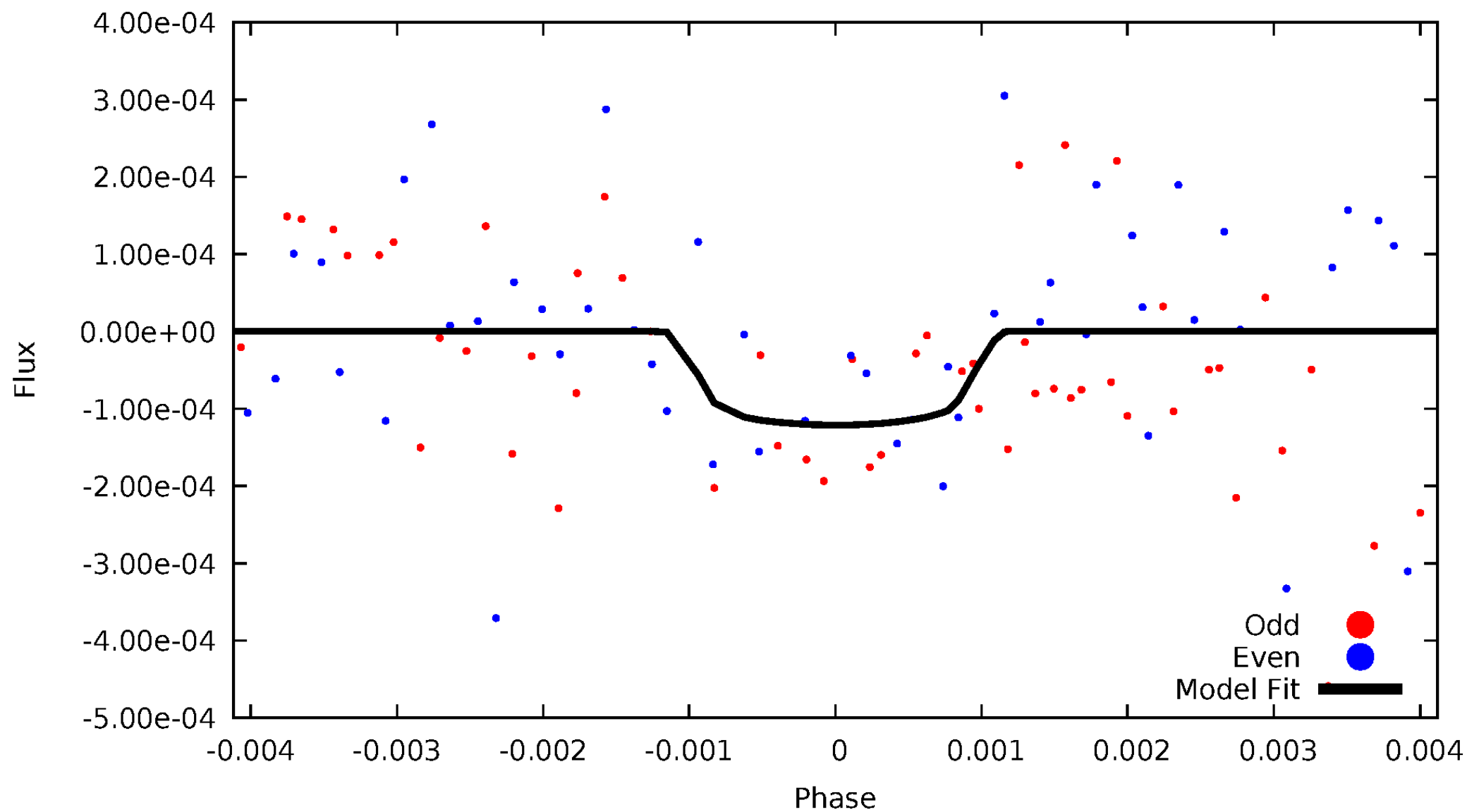


TCE 005638429-04



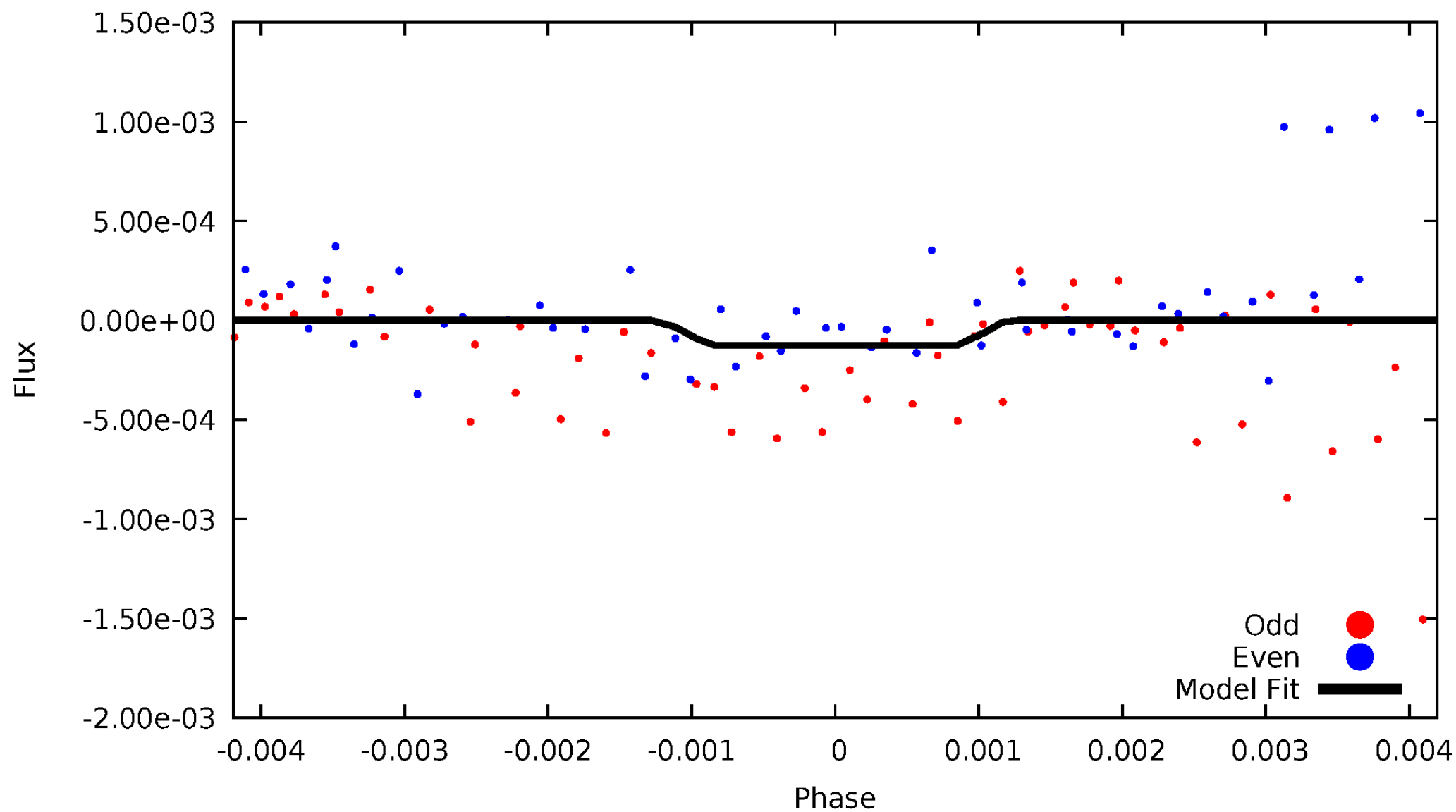
# DV Odd/Even

TCE 005638429-04



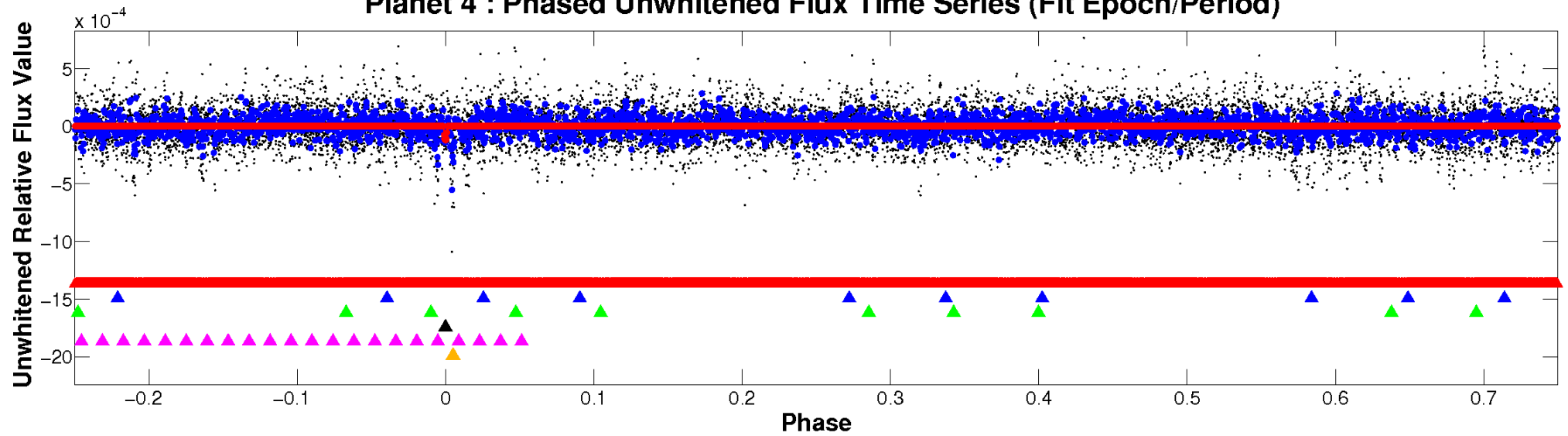
# ALT Odd/Even

TCE 005638429-04

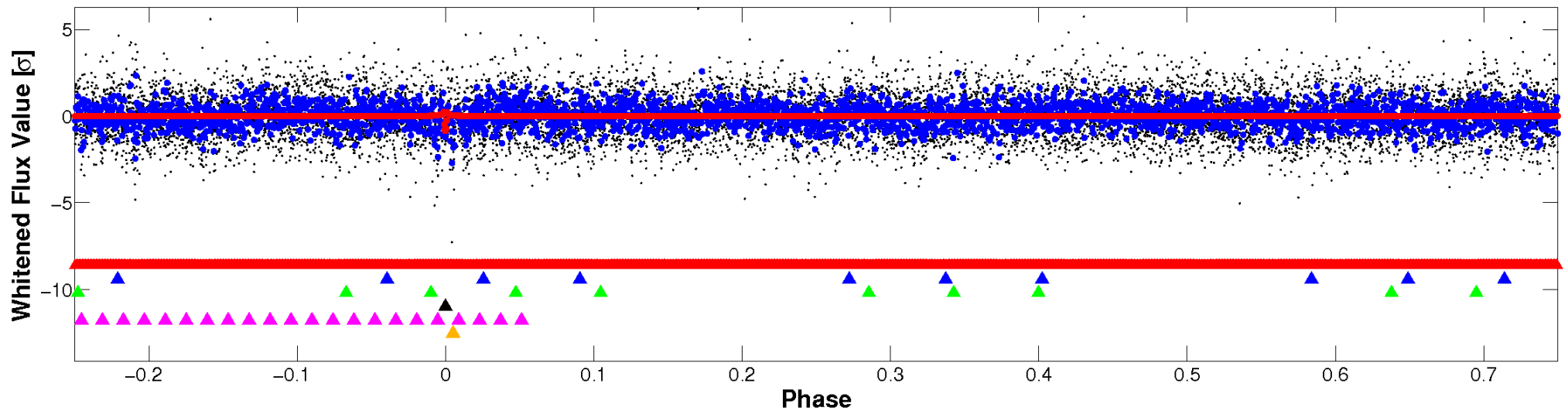


# Non-Whitened Vs. Whitened Light Curve

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



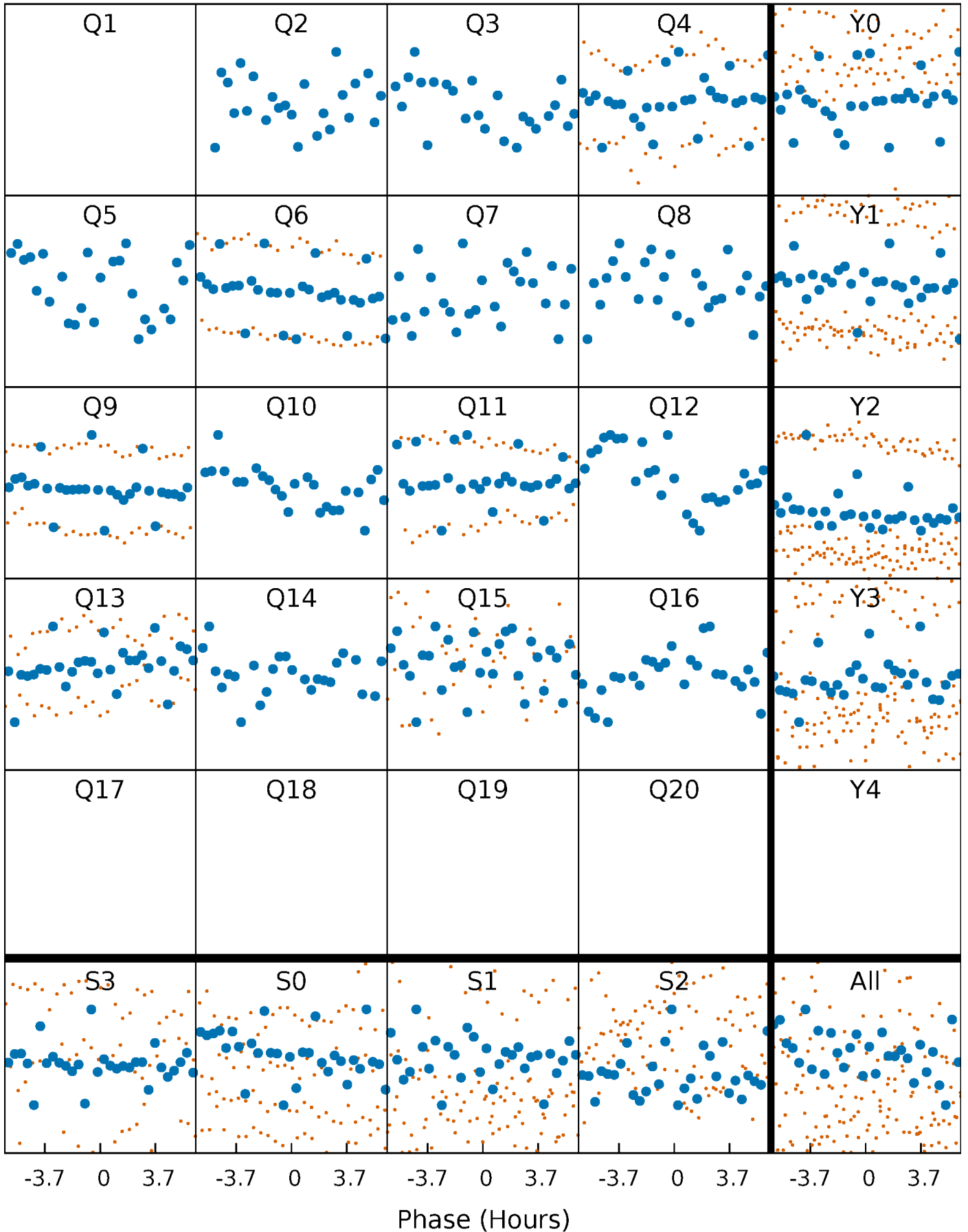
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





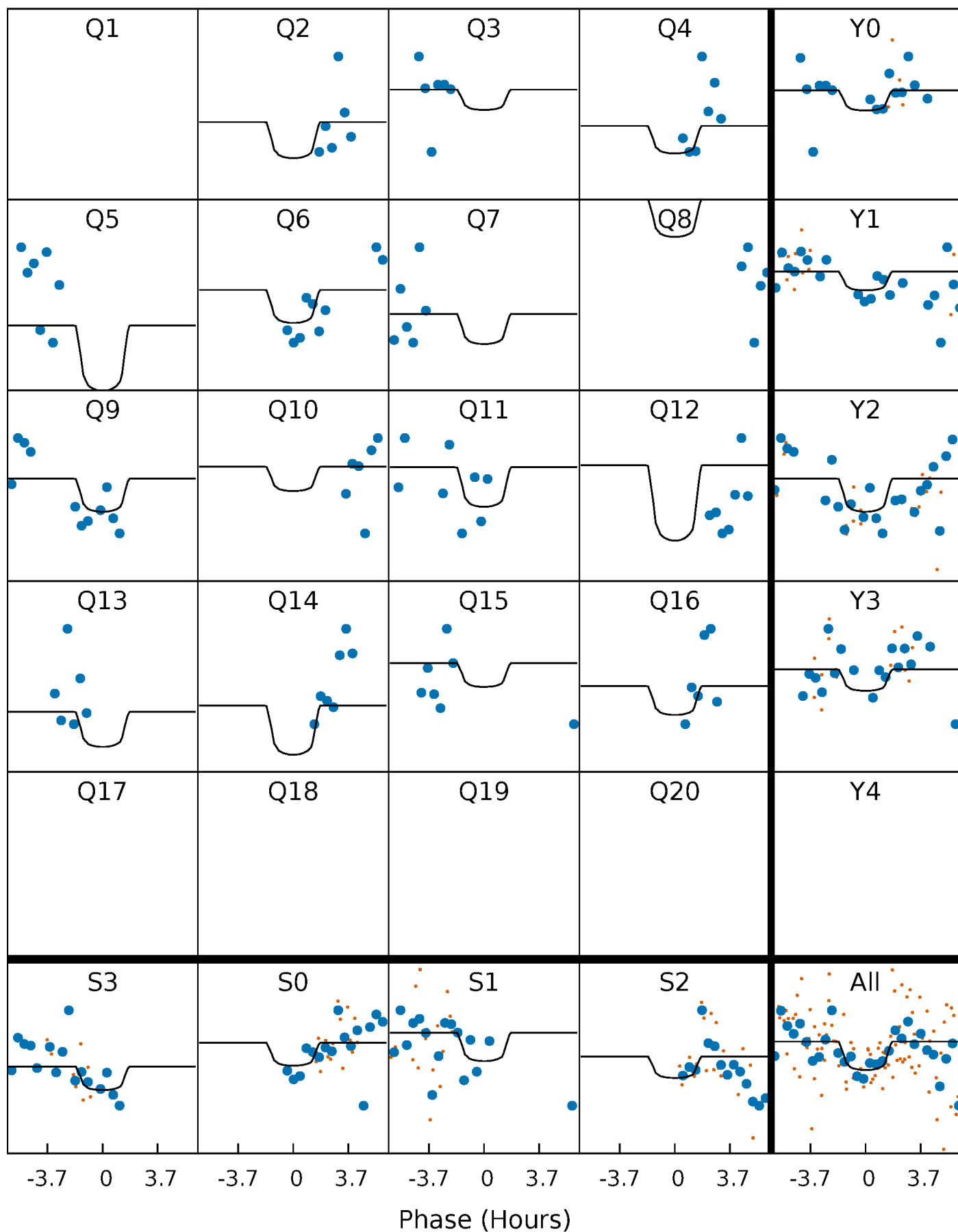
# PDC Quarter-Phased Transit Curves

TCE 005638429-04   P= 64.884695 Days    $T_0=166.731715$  (BKJD)



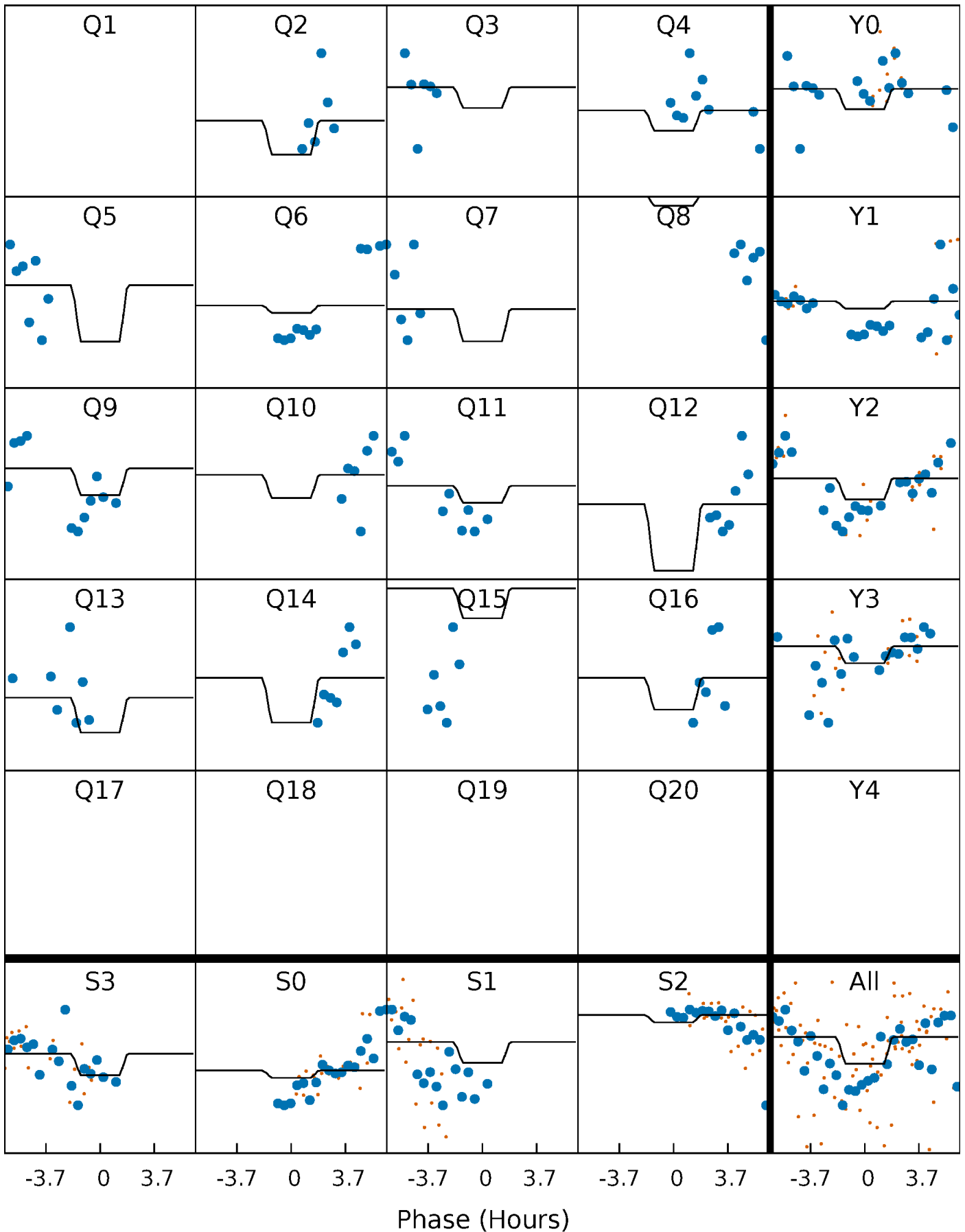
# DV Quarter-Phased Transit Curves

TCE 005638429-04 P= 64.884695 Days  $T_0=166.731715$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

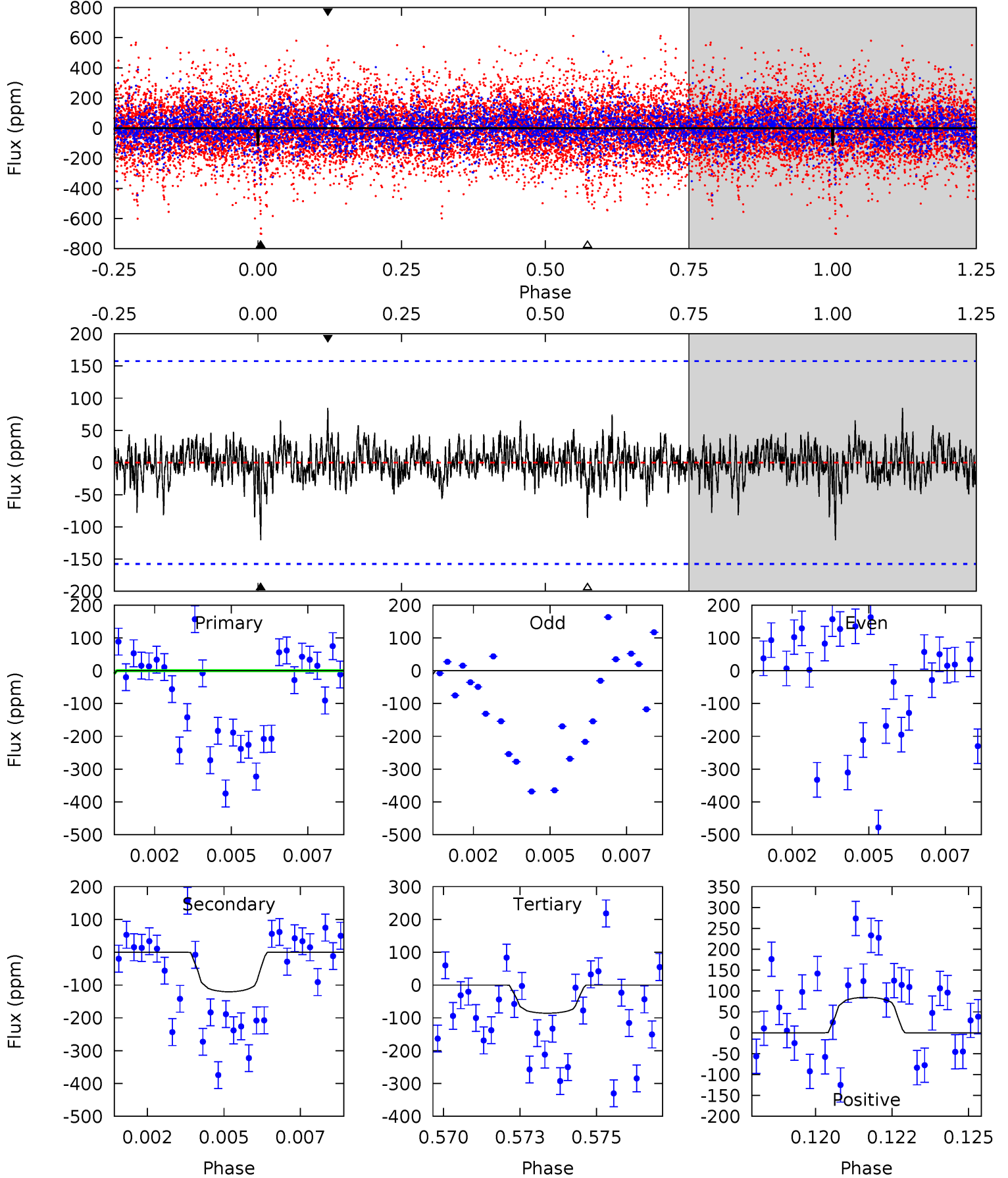
TCE 005638429-04 P= 64.881313 Days  $T_0=166.776603$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-04, P = 64.884695 Days, E = 101.847020 Days

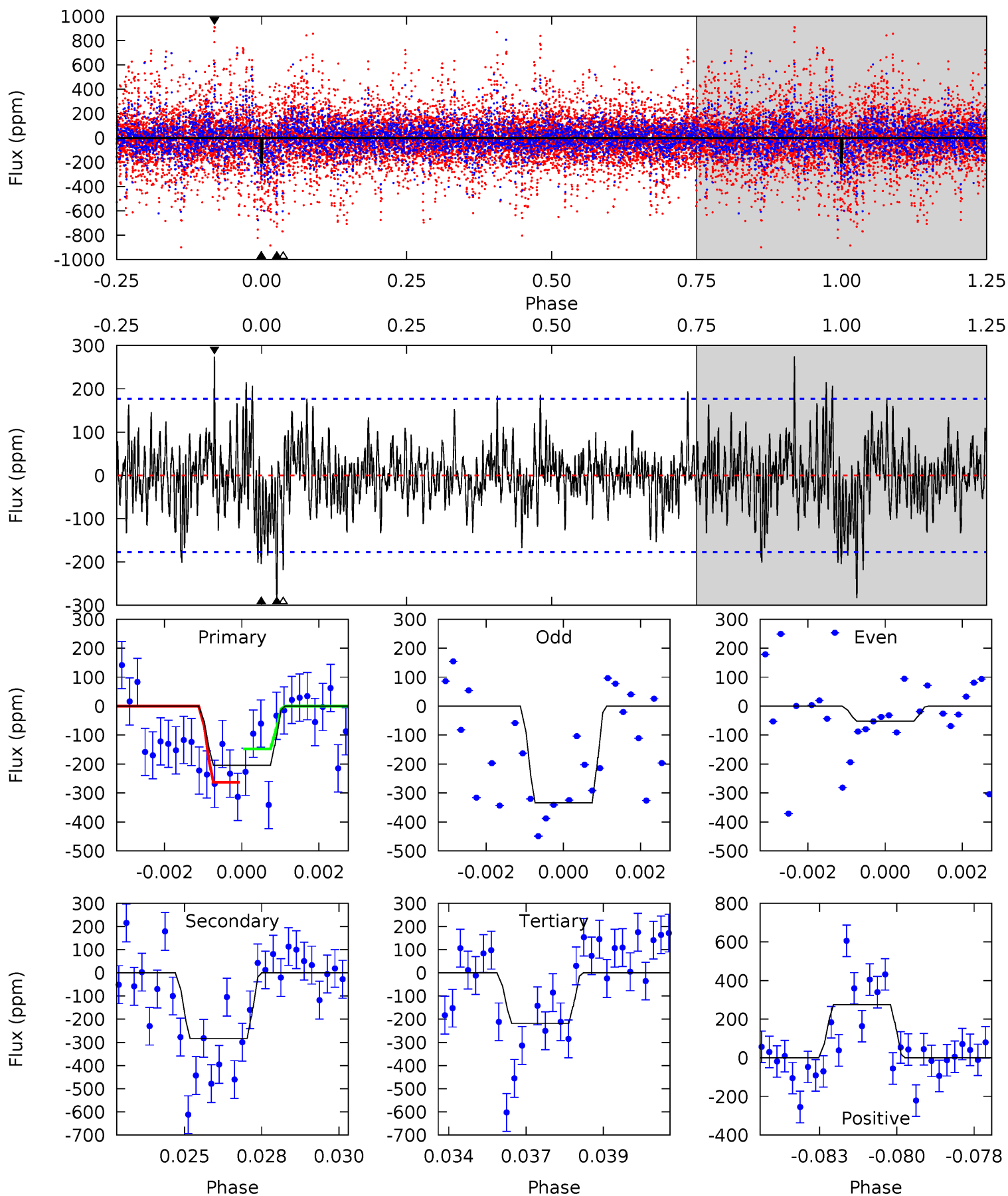
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.75	4.05	2.88	2.85	5.30	3.05	0.73	0.87	0.90	1.17	1.20	0.26	0.83	0.41	0.51



# Alt Model-Shift Uniqueness Test

005638429-04, P = 64.881313 Days, E = 101.895290 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
6.11	8.47	6.53	8.21	5.30	3.05	1.72	-0.43	-2.10	1.93	0.26	3.82	1.09	0.49	1.74



### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-120 \pm 30$	$4.74^{+4.29}_{-2.99}$	$1143^{+69}_{-101}$	$5429^{+3935}_{-1274}$	$375^{+2525}_{-277}$
Alt.	$-283 \pm 33$	$4.36^{+4.24}_{-2.83}$	$1140^{+72}_{-100}$	$6952^{+8896}_{-1888}$	$1039^{+7448}_{-789}$

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

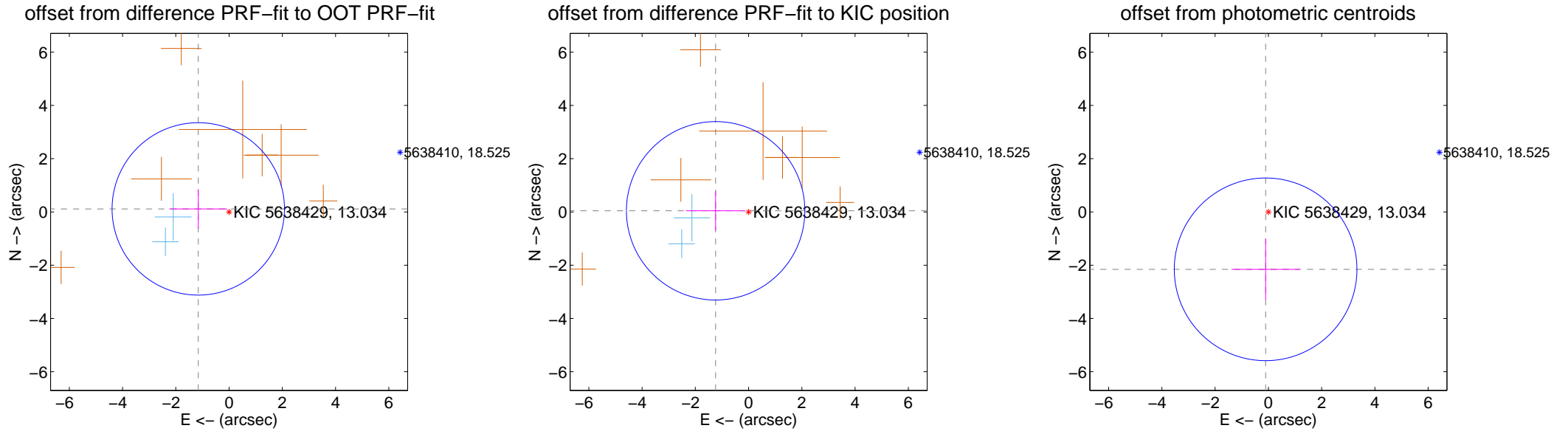
## DV Centroid Data

Supplemental centroid analysis for 005638429-04. Kepler magnitude: 13.03. Transit SNR 3.76

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.163 \pm 1.079$	1.08	$1.157 \pm 1.082$	$0.114 \pm 0.744$
PRF-fit source offset from KIC position	$1.239 \pm 1.117$	1.11	$1.238 \pm 1.117$	$0.042 \pm 0.741$
photometric centroid source offset	$2.16 \pm 1.14$	1.89	$0.10 \pm 1.28$	$-2.16 \pm 1.14$



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.

Q1 no difference image



Q1 no OOT image



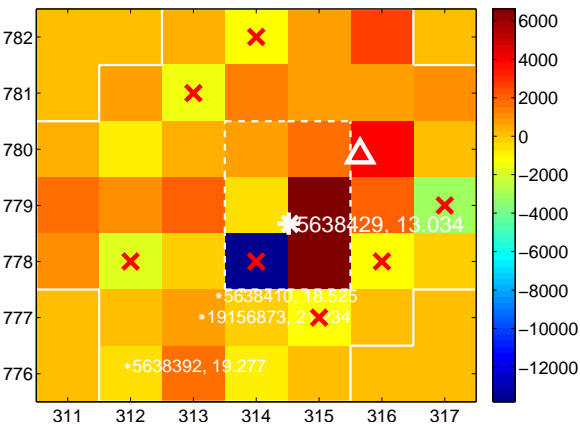
Q2 no difference image



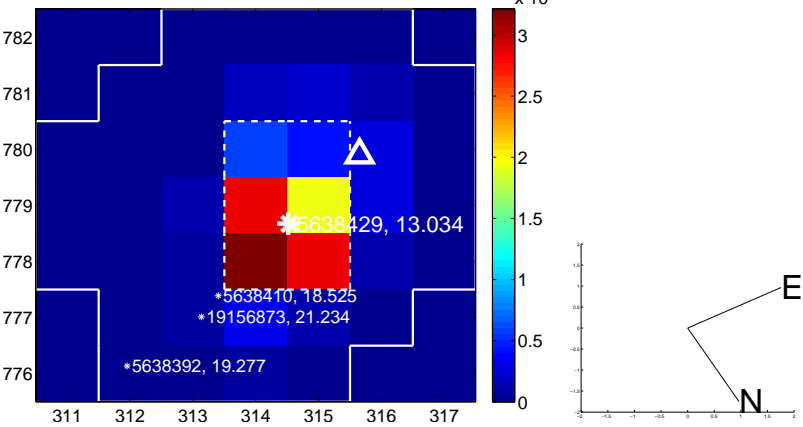
Q2 no OOT image



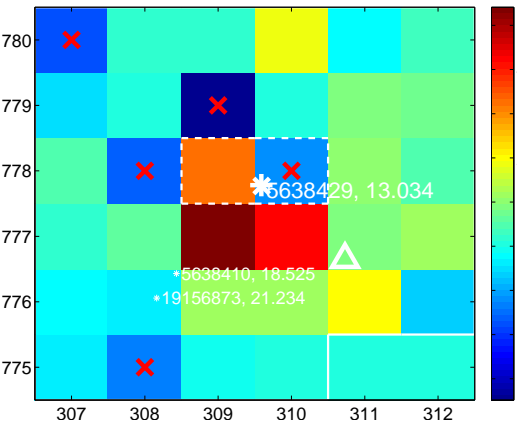
Q3 difference image. Poor Quality



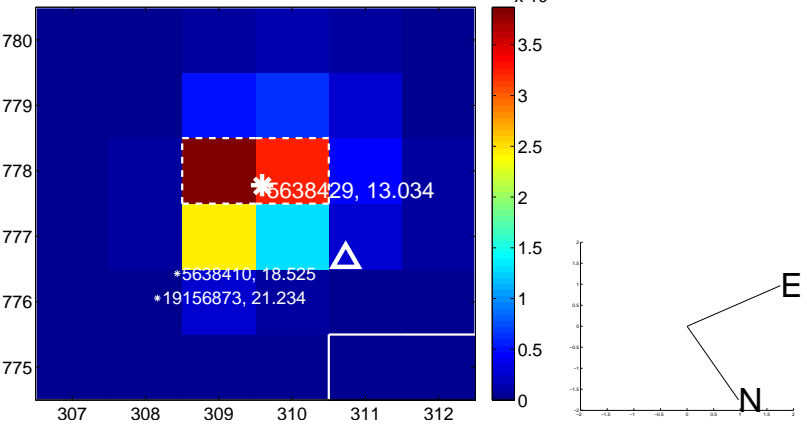
Q3 OOT image



Q4 difference image. Poor Quality

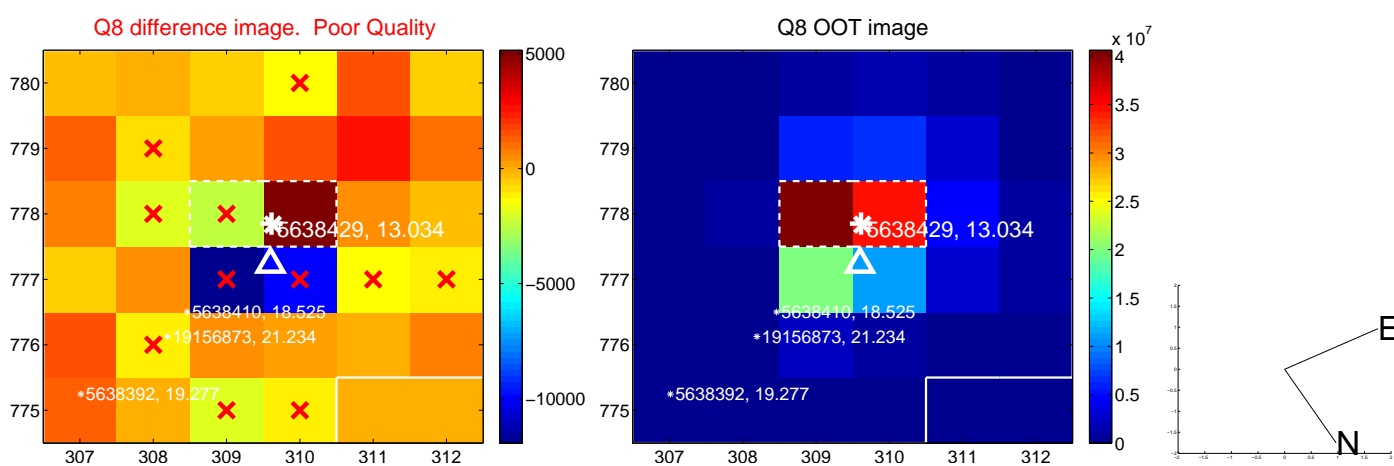
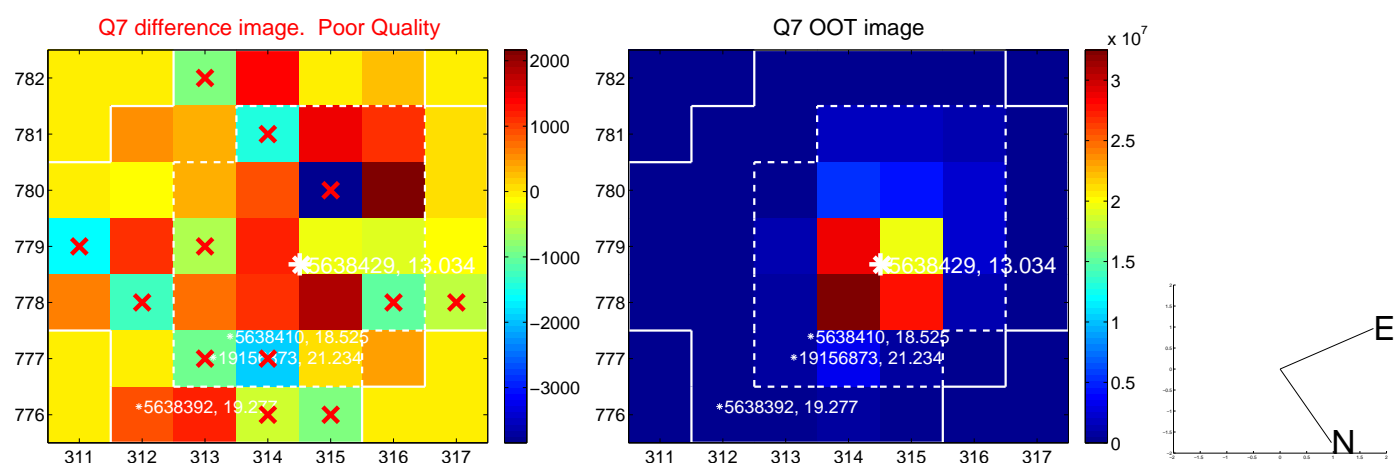
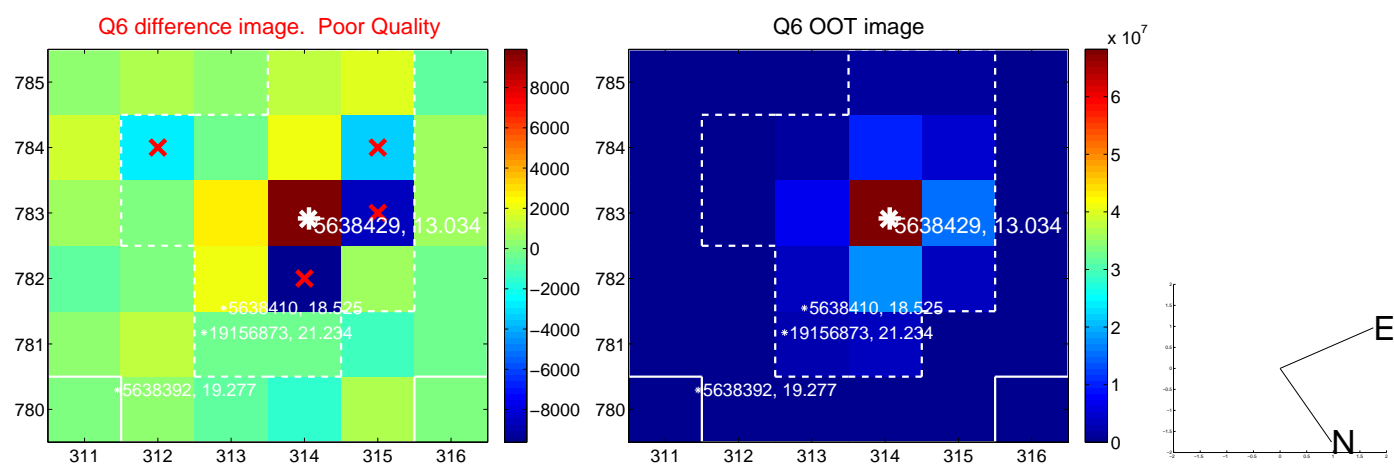
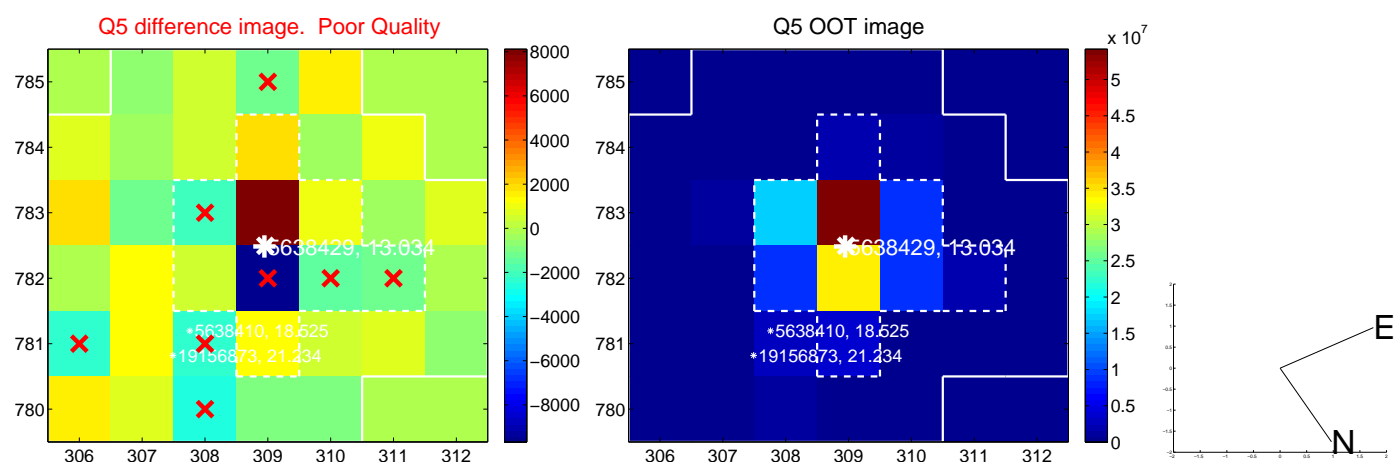


Q4 OOT image

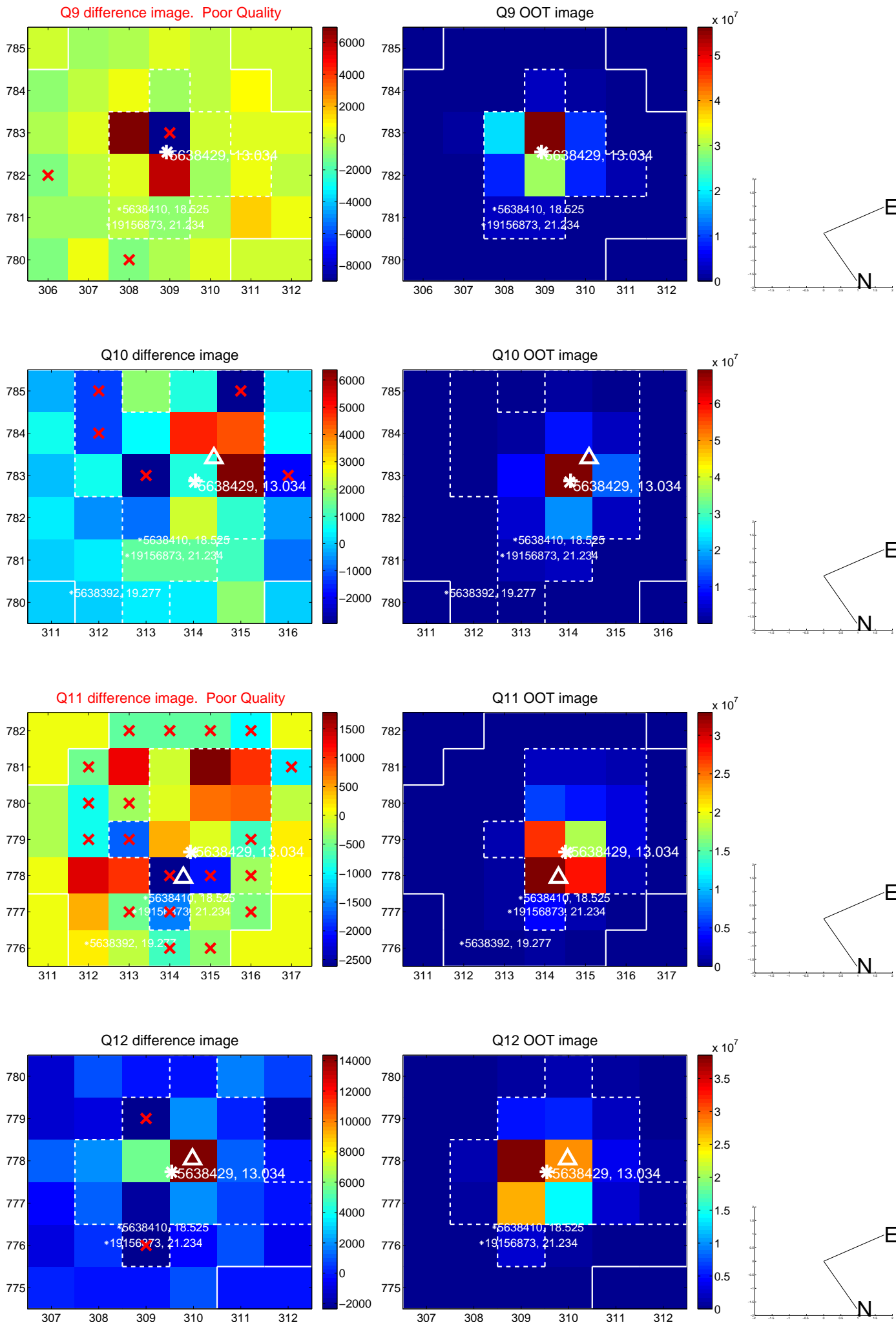




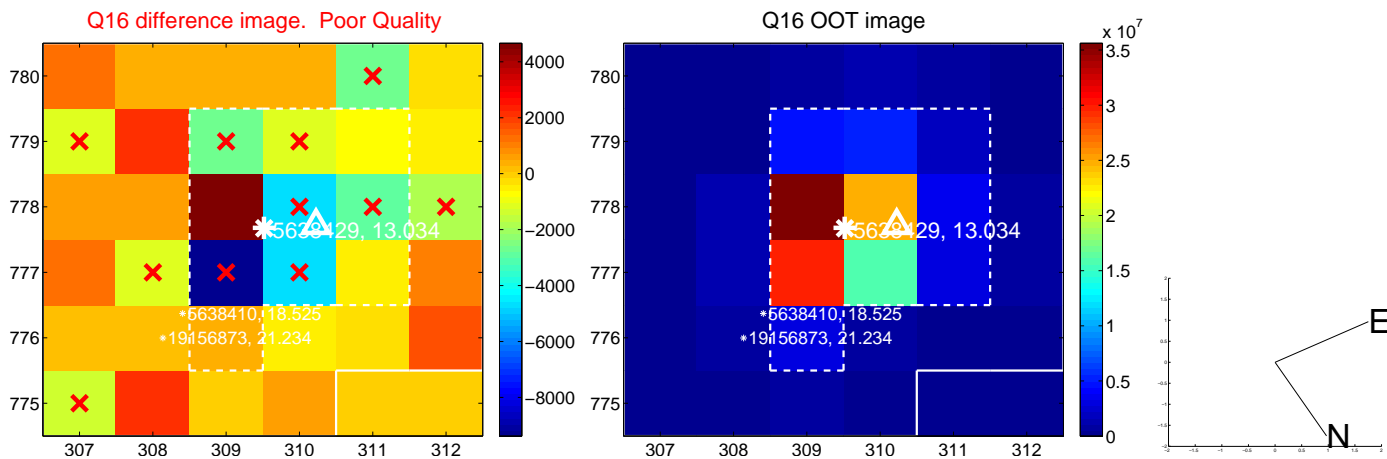
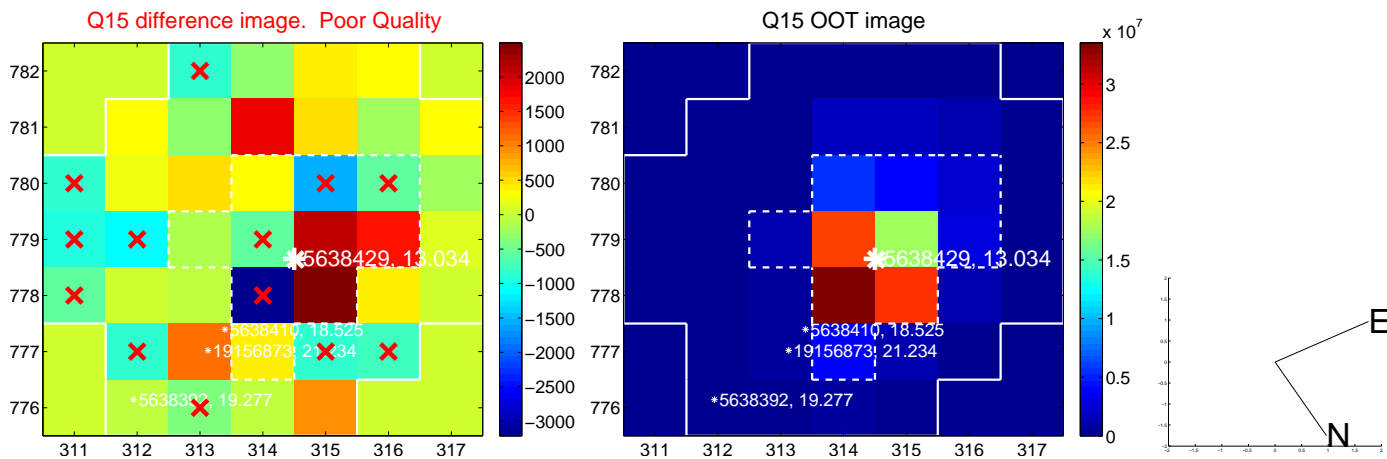
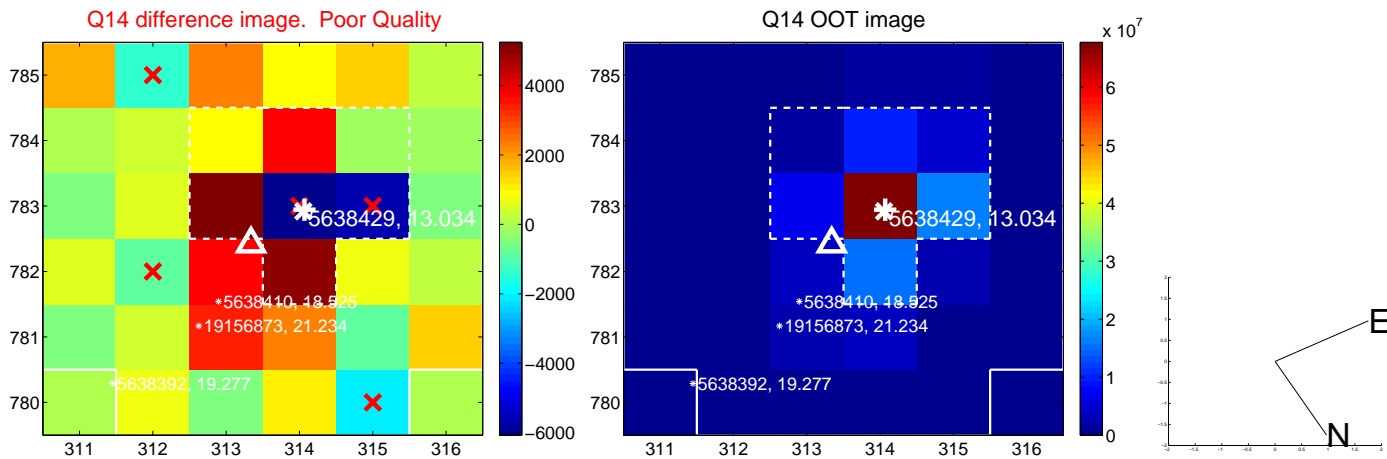
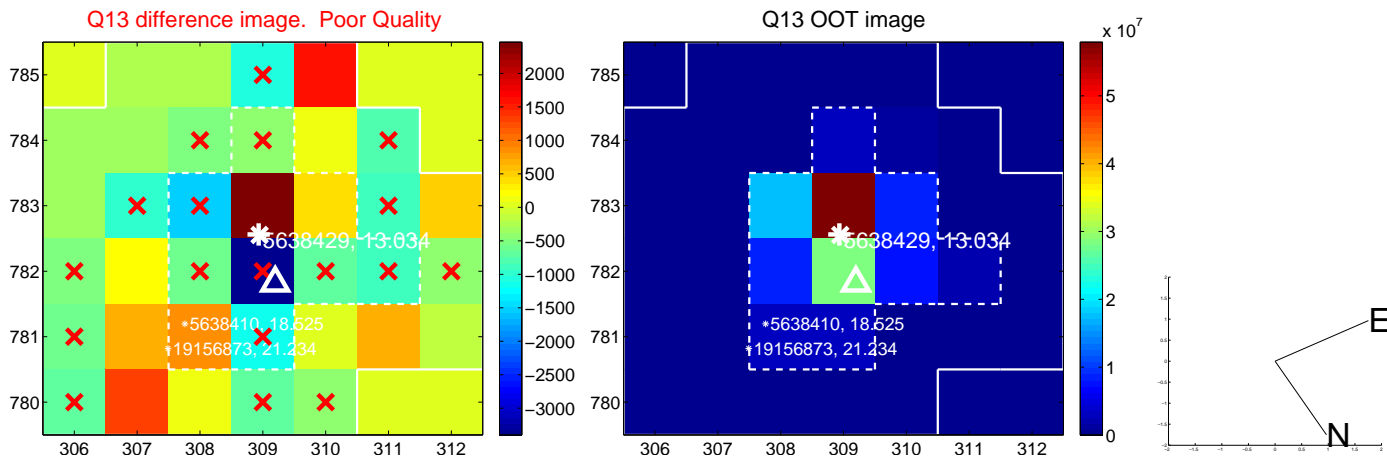
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



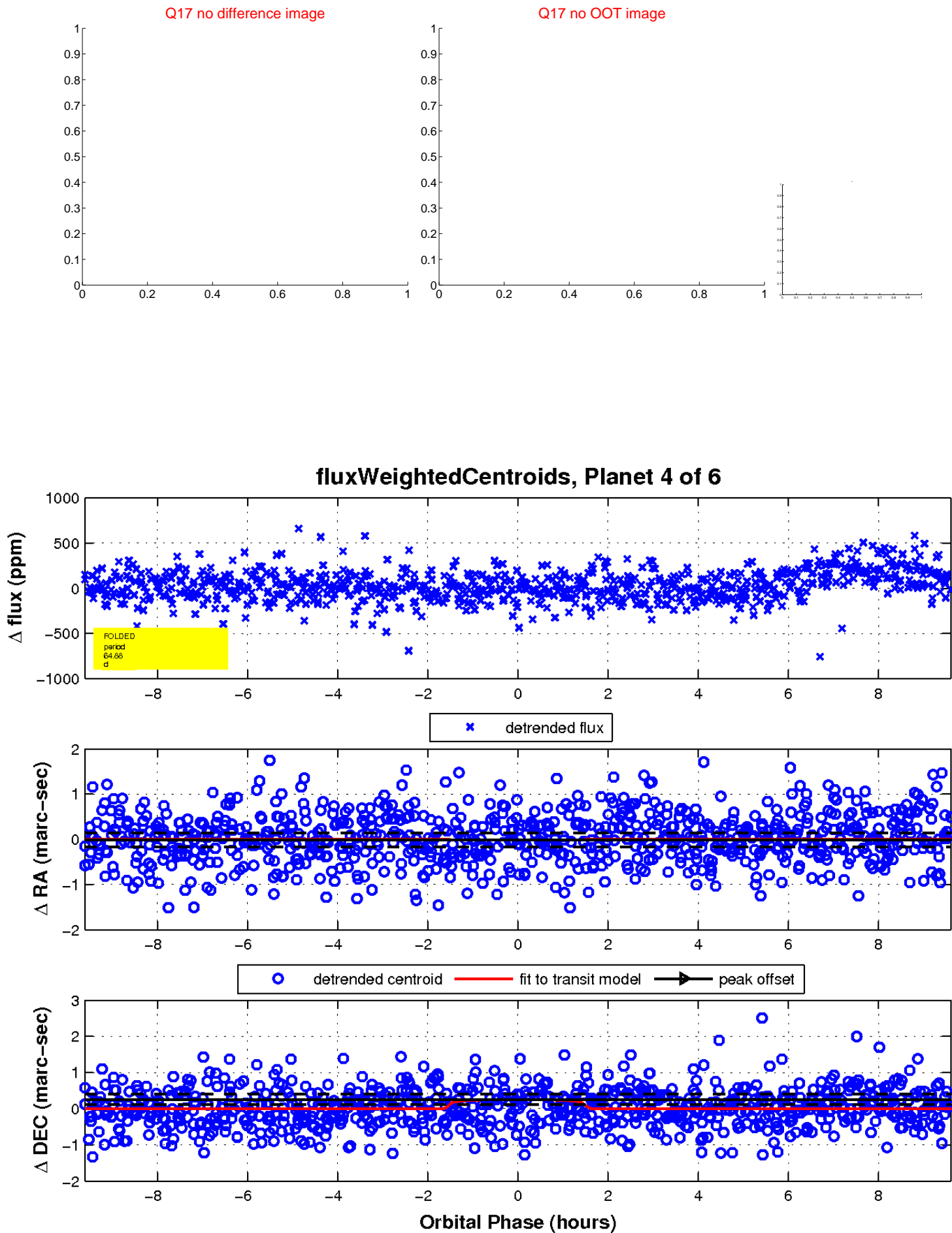
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



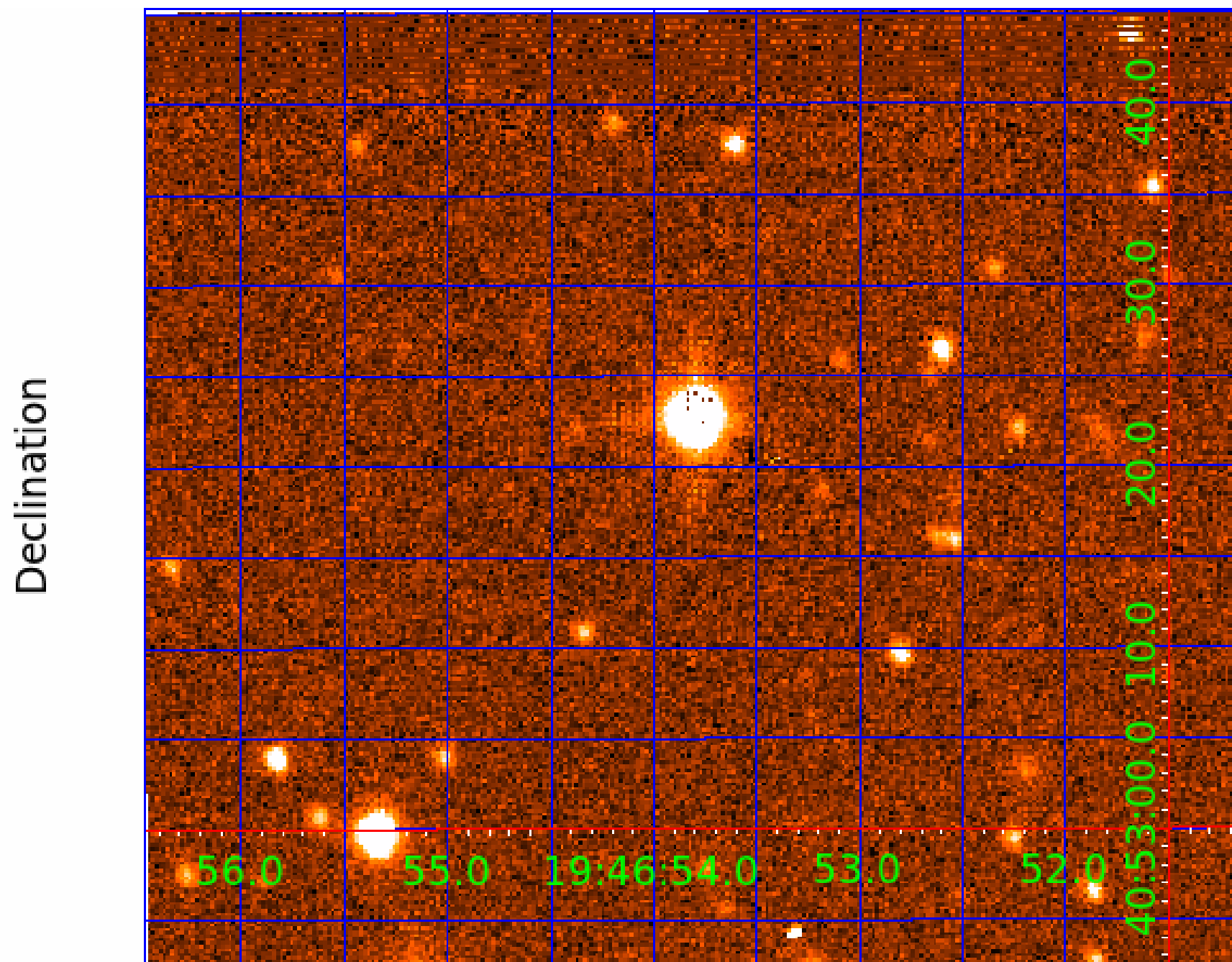
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 005638429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005638429-01	OBS	No	0.687679	131.671919	15.2	4.273	8.3	9.2	2.53	7113	1.16	49331.98
005638429-02	OBS	No	149.991455	217.275195	589.0	5.116	9.5	8.9	2.53	7113	7.70	37.57
005638429-03	OBS	No	152.634865	162.385454	251.2	4.701	8.2	8.2	2.53	7113	4.08	36.71
005638429-04	OBS	No	64.884695	166.731715	121.2	3.206	9.3	3.8	2.53	7113	3.23	114.85
005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
005638429-06	OBS	No	64.886267	167.047687	198.0	3.307	9.1	5.1	2.53	7113	3.81	114.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005638429-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

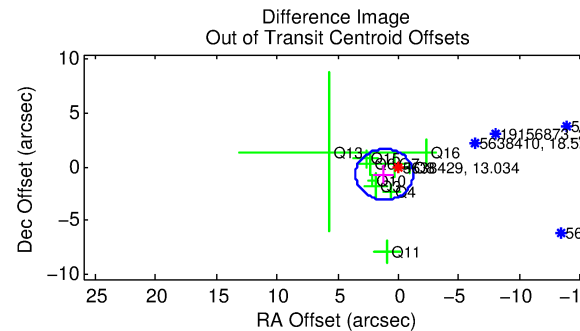
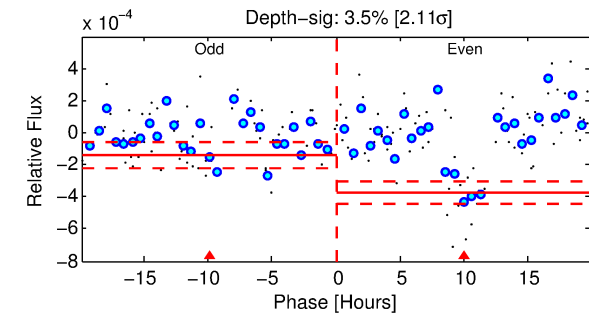
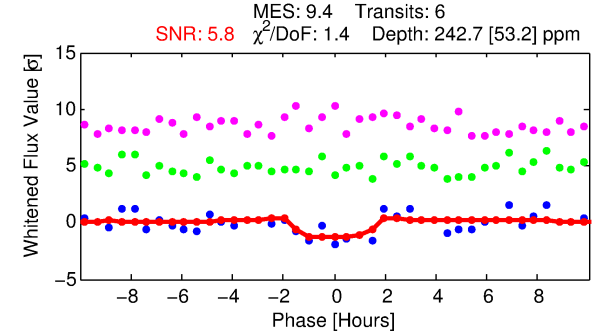
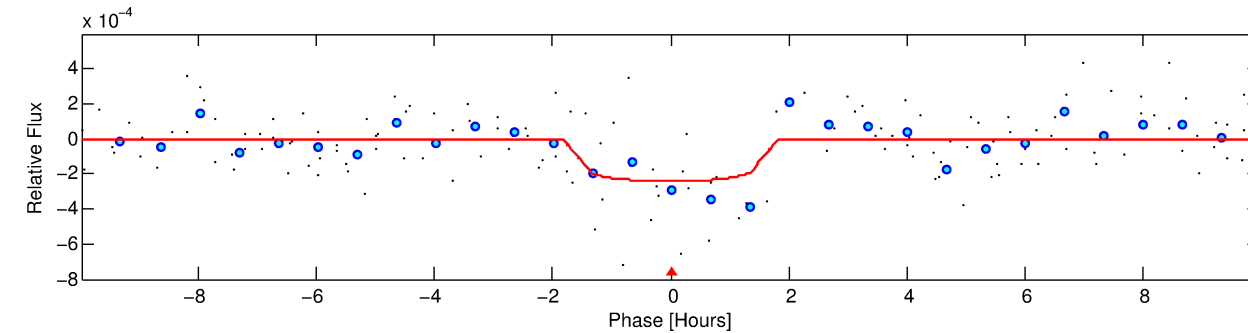
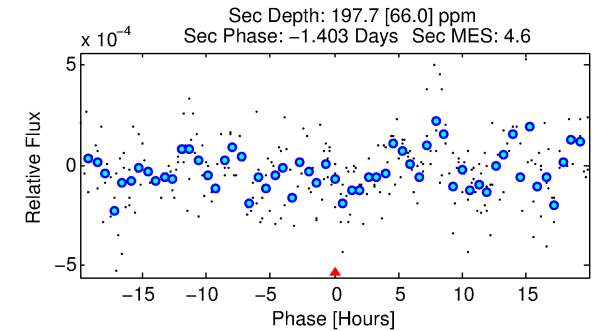
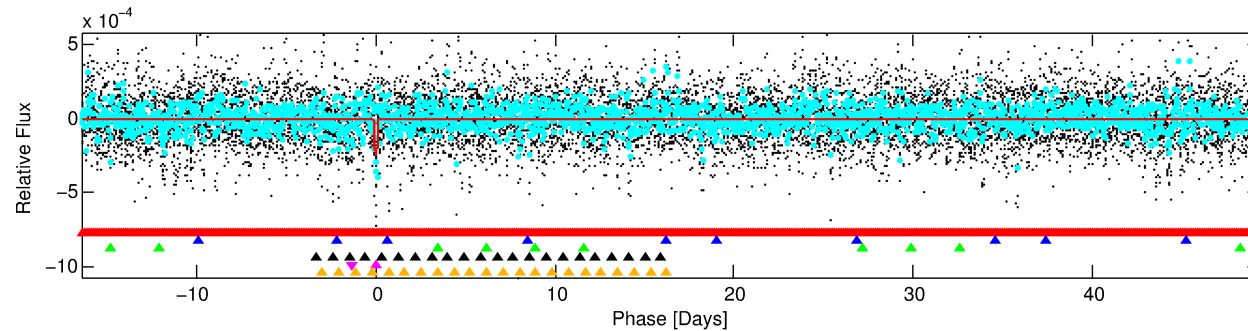
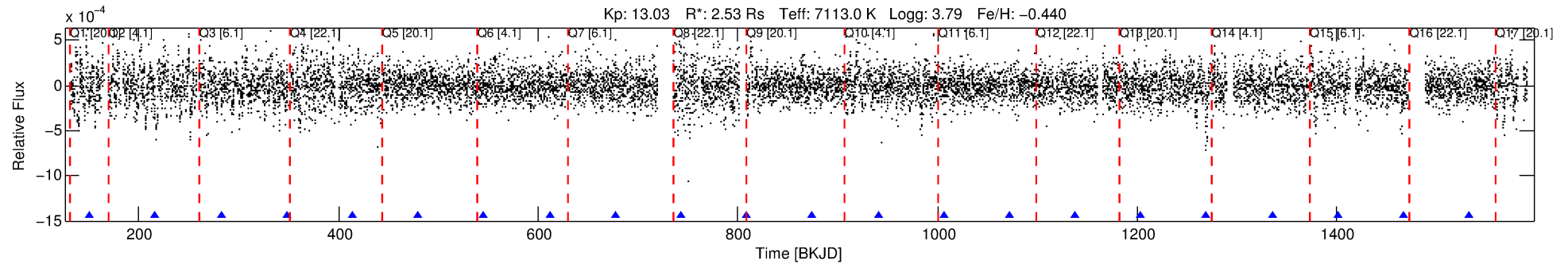
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-05

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 5 of 6 Period: 65.802 d



## DV Fit Results:

Period = 65.80154 [0.00100] d  
Epoch = 150.8067 [0.0127] BKJD  
Rp/R\* = 0.0156 [0.0279]  
a/R\* = 101.19 [1026.25]  
b = 0.76 [5.61]  
Seff = 112.72 [57.81]  
Teq = 831 [107] K  
Rp = 4.30 [7.84] Re  
a = 0.3615 [0.1140] AU  
Ag = 766.95 [2782.62] [0.28σ]  
Teffp = 6760 [6080] K [0.98σ]

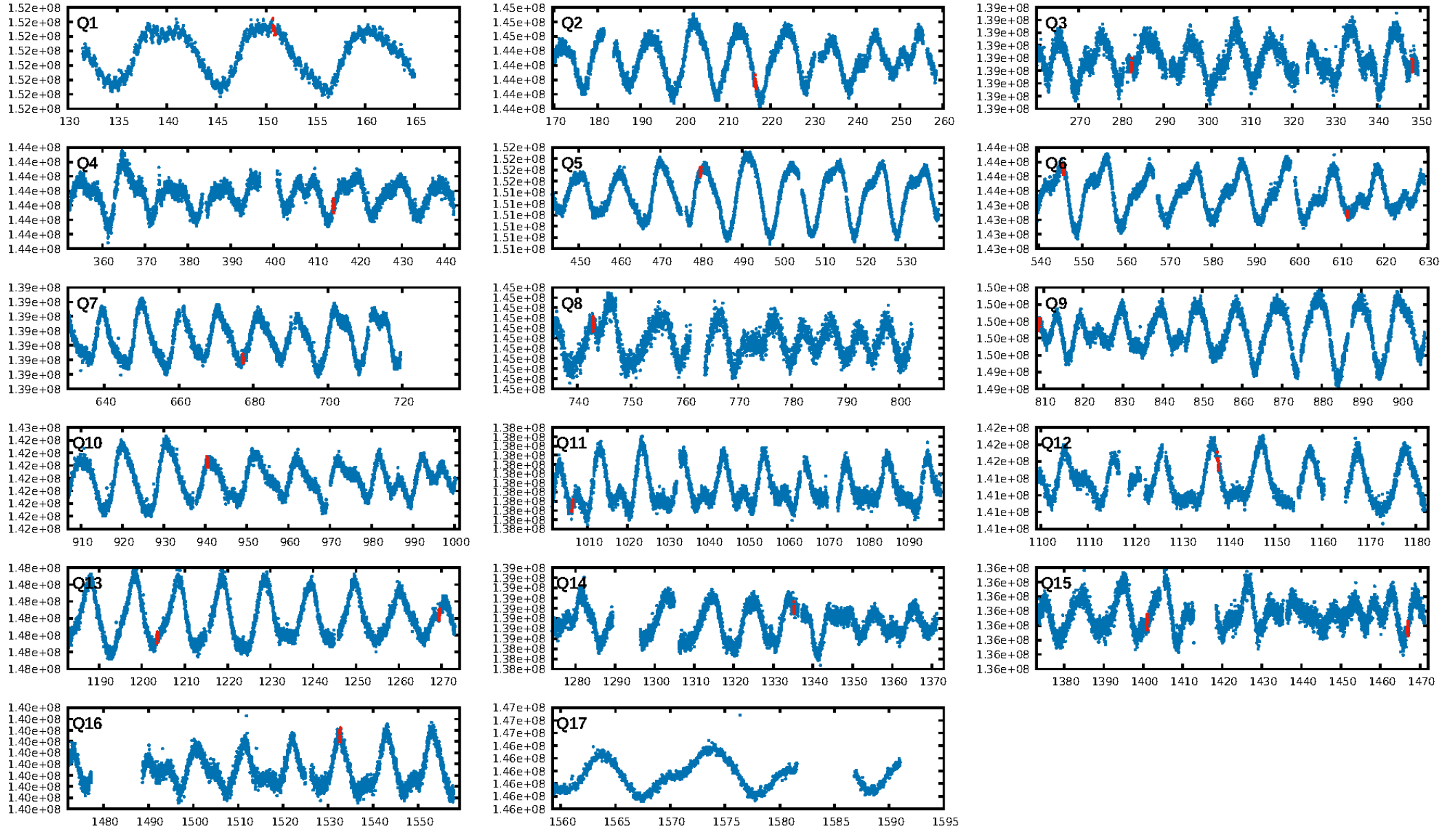
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.68σ]  
LongPeriod-sig: 100.0% [330.90σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 94.1%  
Bootstrap-pfa: 4.72e-14  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 0.1086  
Centroid-sig: 40.6%  
Centroid-so: 0.535 arcsec [0.89σ]  
OotOffset-rm: 1.370 arcsec [1.73σ]  
KicOffset-rm: 1.319 arcsec [1.67σ]  
OotOffset-st: 2/4/3/1 [10]  
KicOffset-st: 2/4/3/1 [10]  
DiffImageQuality-fgm: 0.20 [2/10]  
DiffImageOverlap-fno: 0.00 [0/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:40 Z

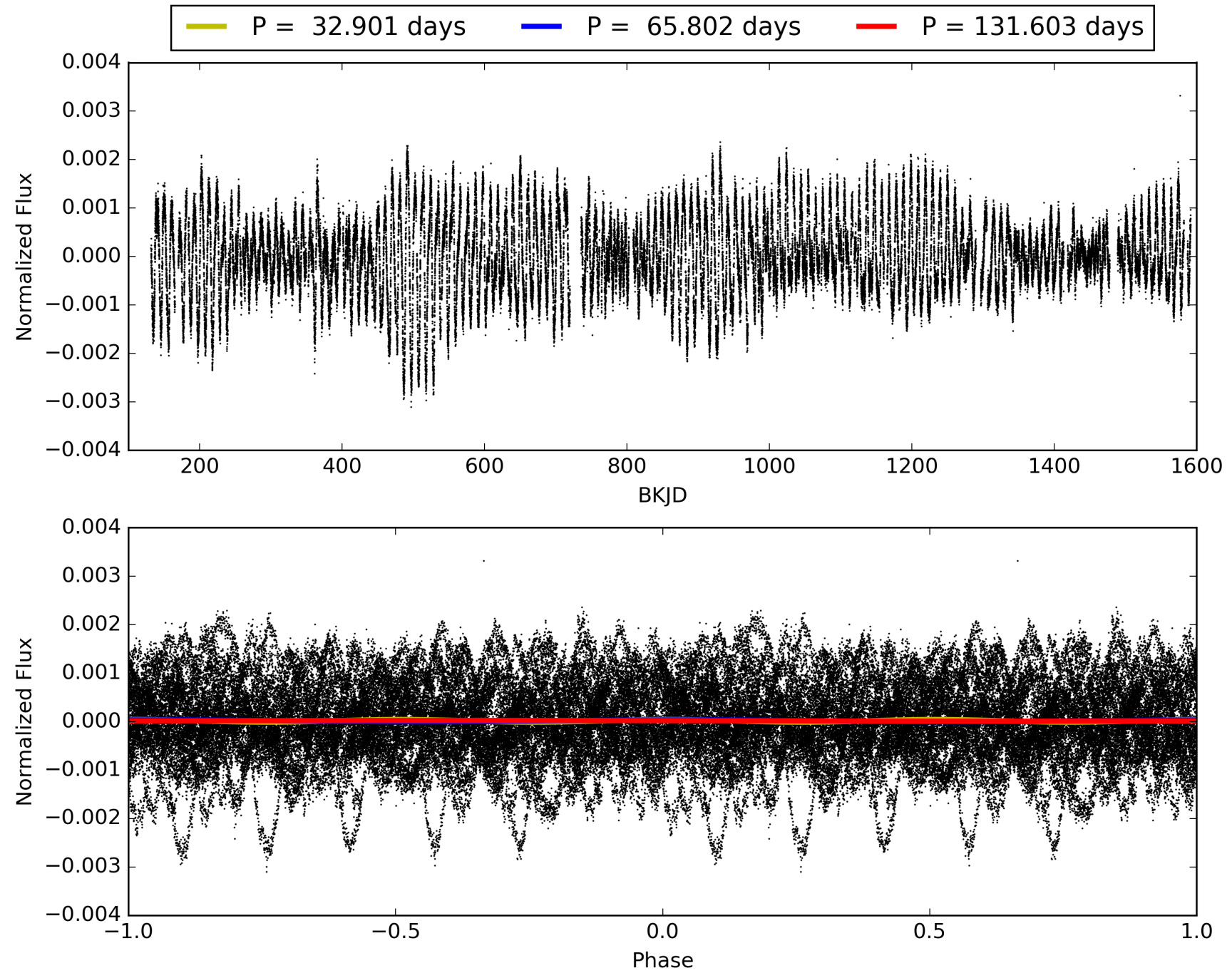
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005638429-05, PDC Light Curves



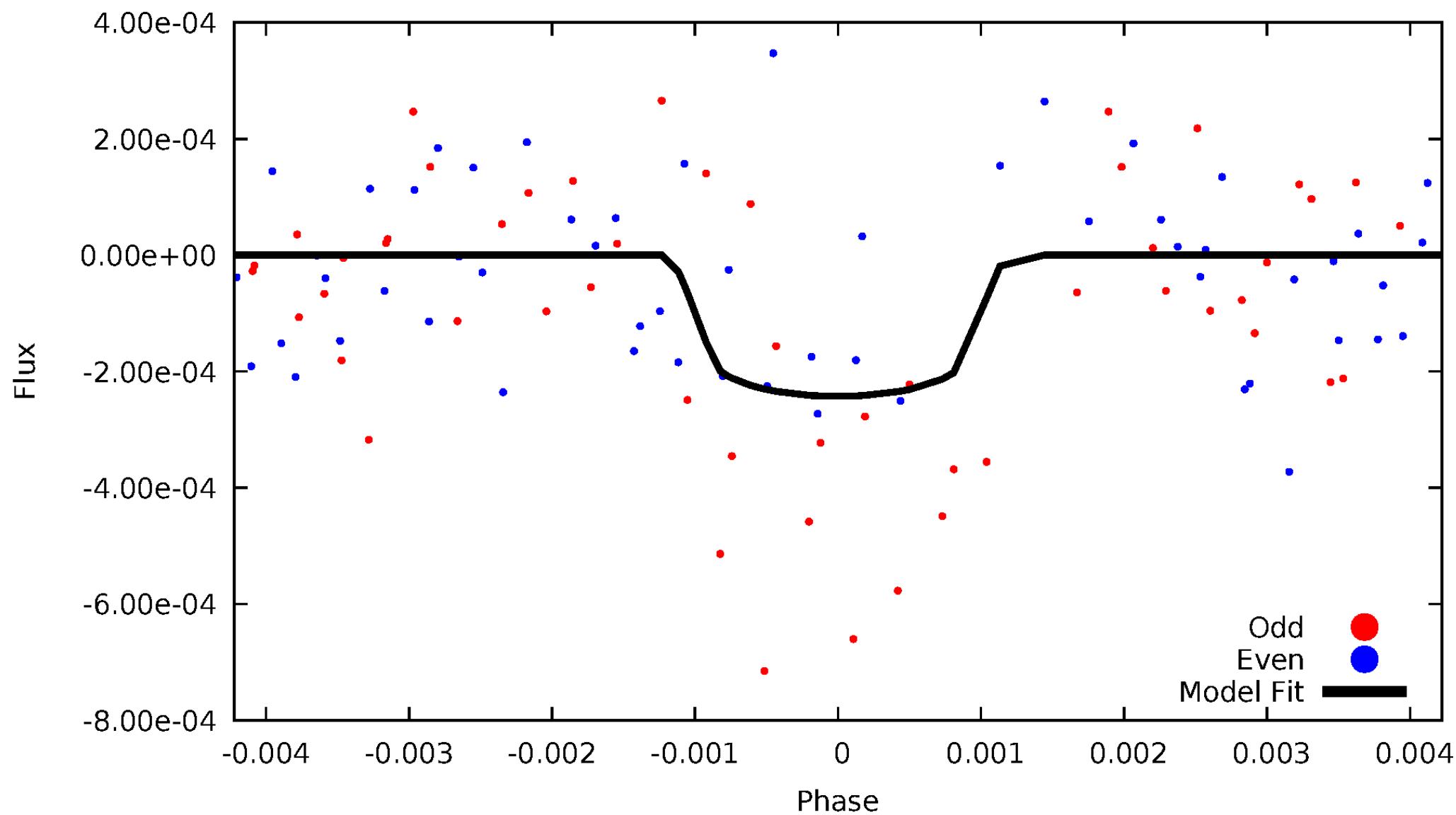


TCE 005638429-05



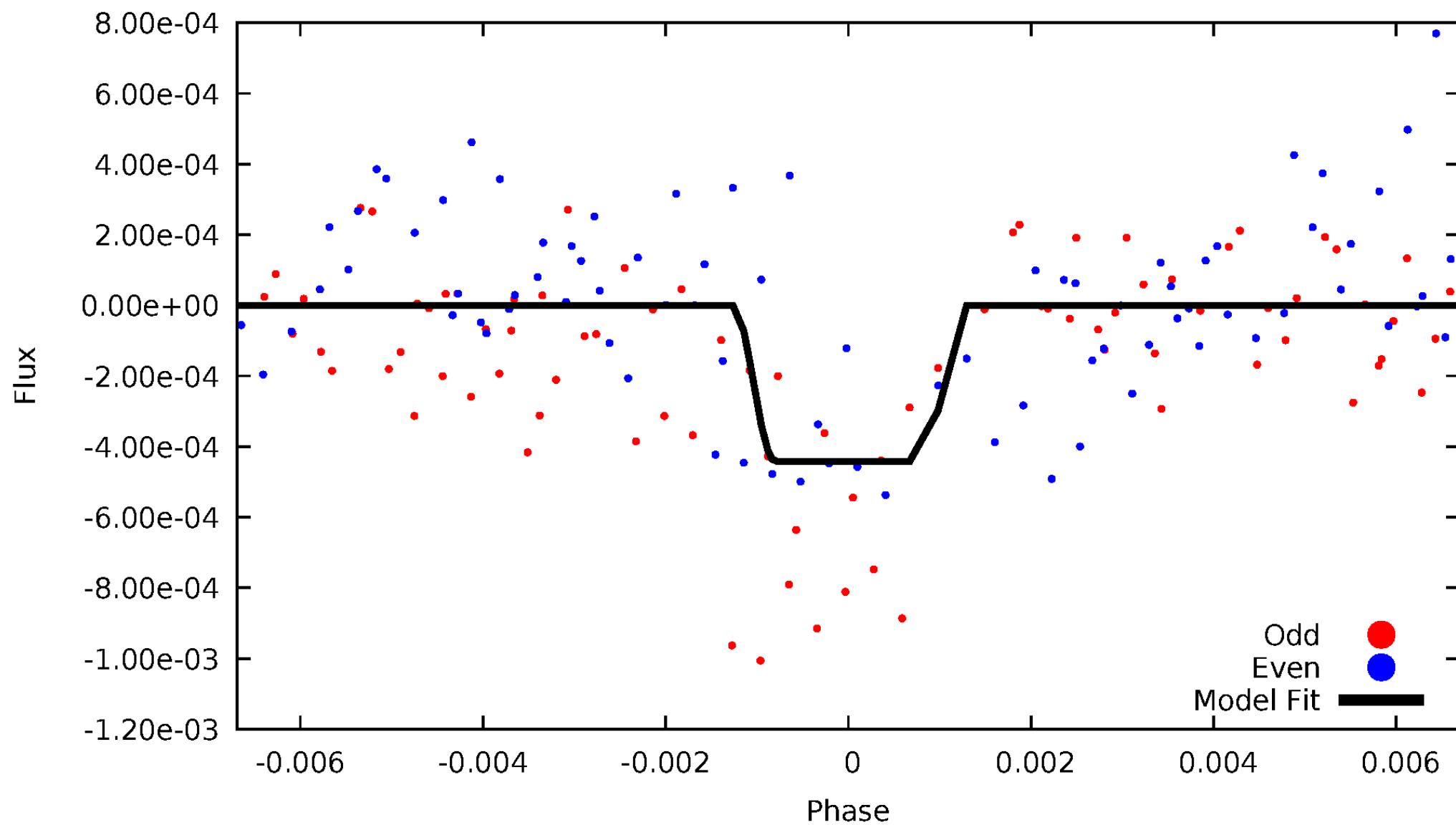
# DV Odd/Even

TCE 005638429-05

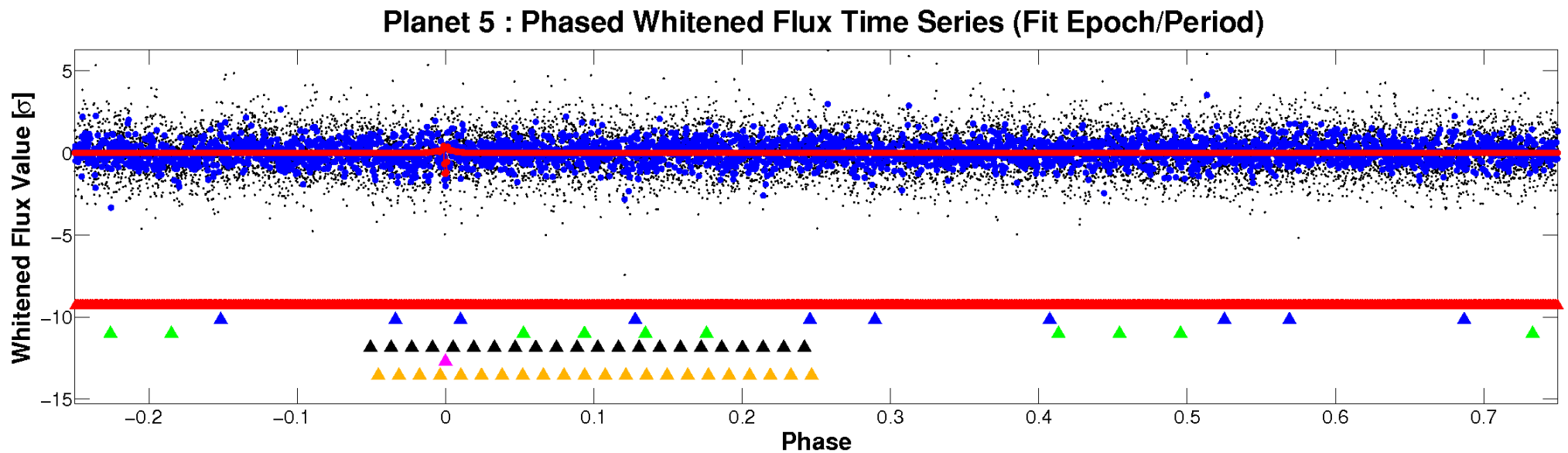
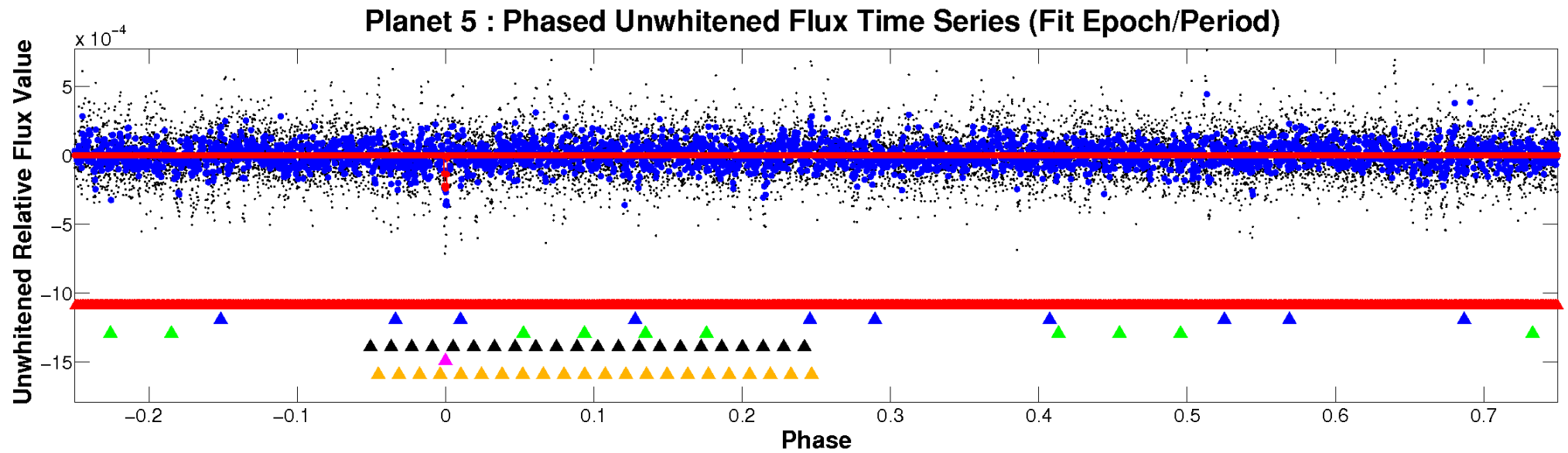


# ALT Odd/Even

TCE 005638429-05

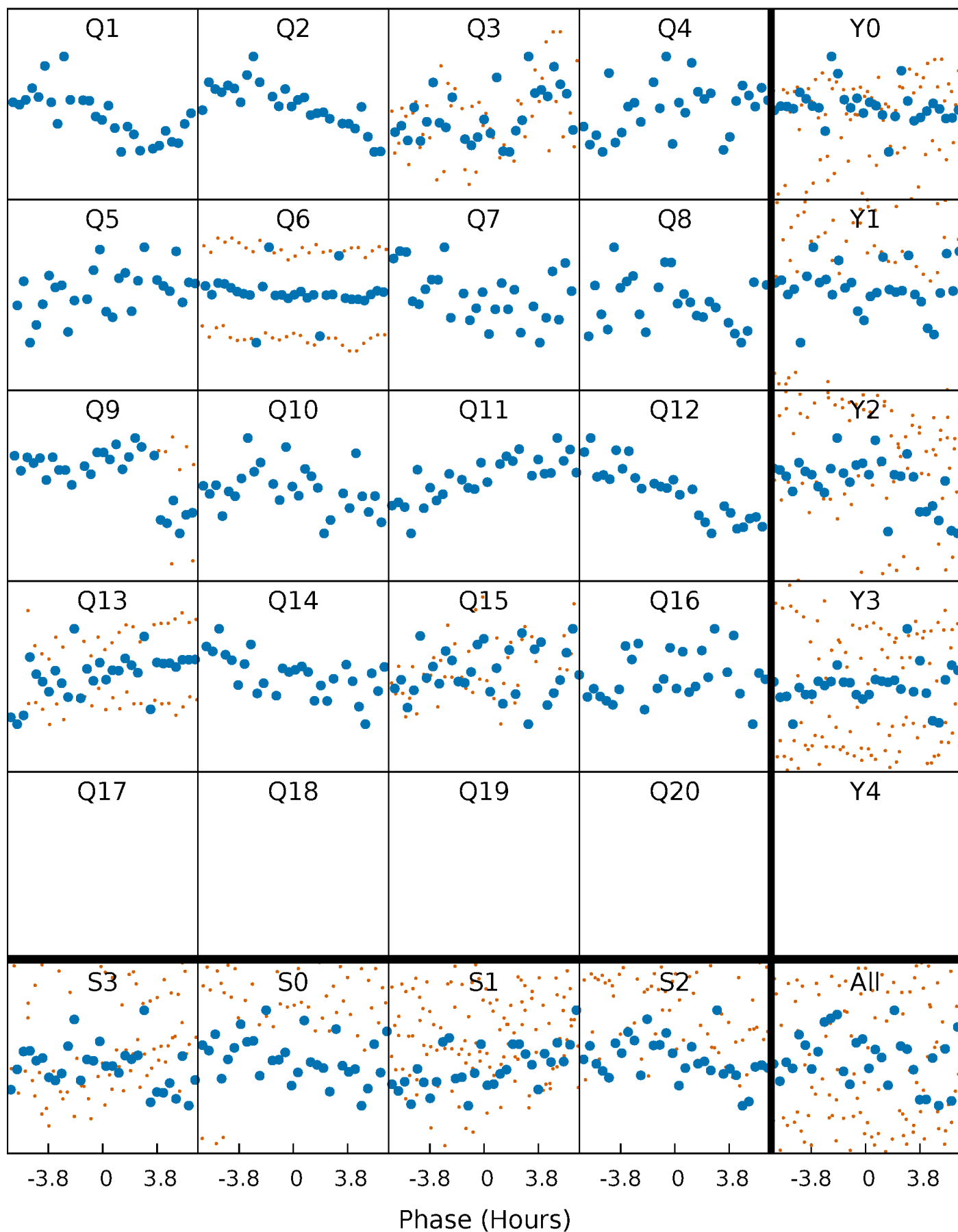


# Non-Whitened Vs. Whitened Light Curve



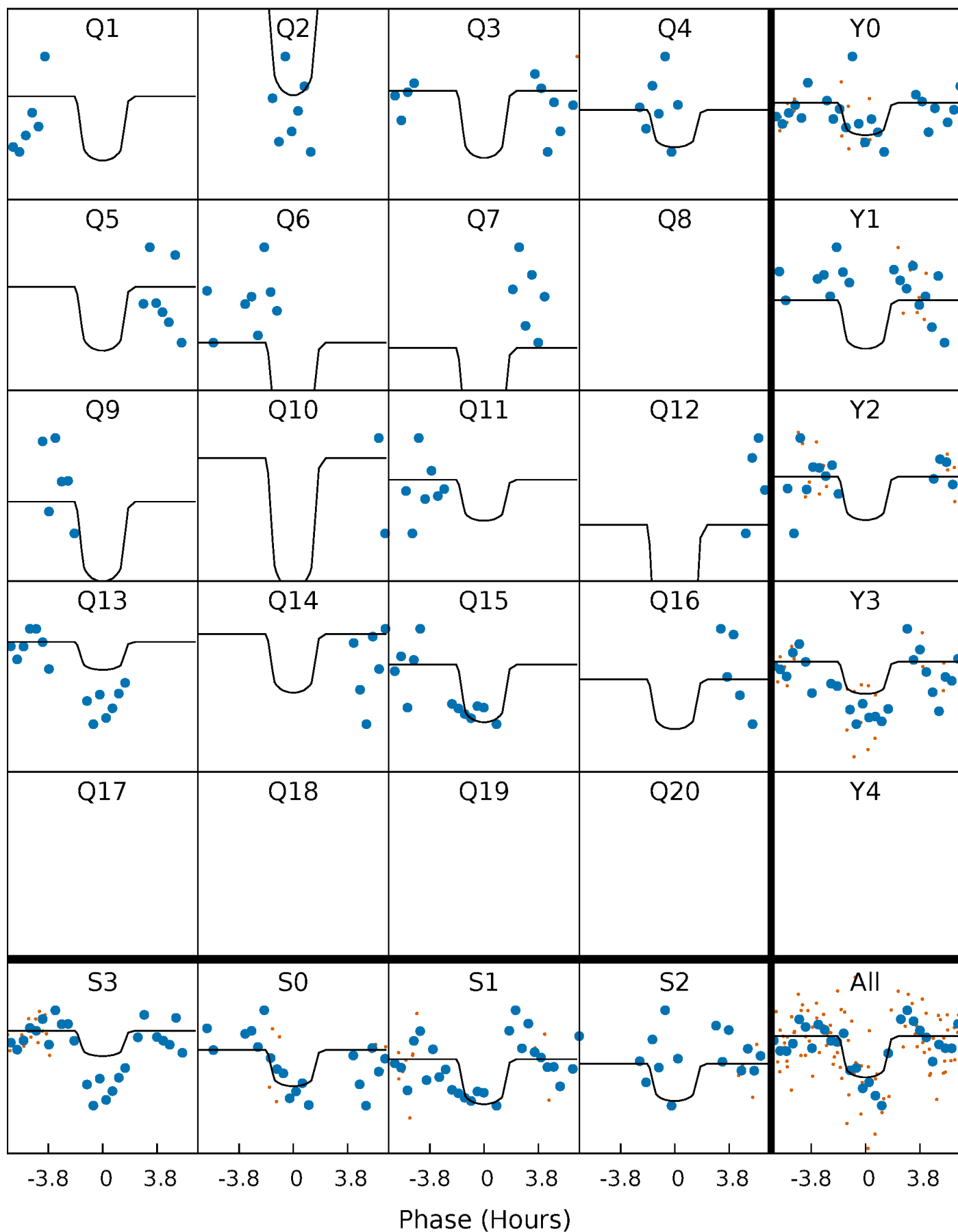
# PDC Quarter-Phased Transit Curves

TCE 005638429-05   P= 65.801537 Days    $T_0=150.806663$  (BKJD)



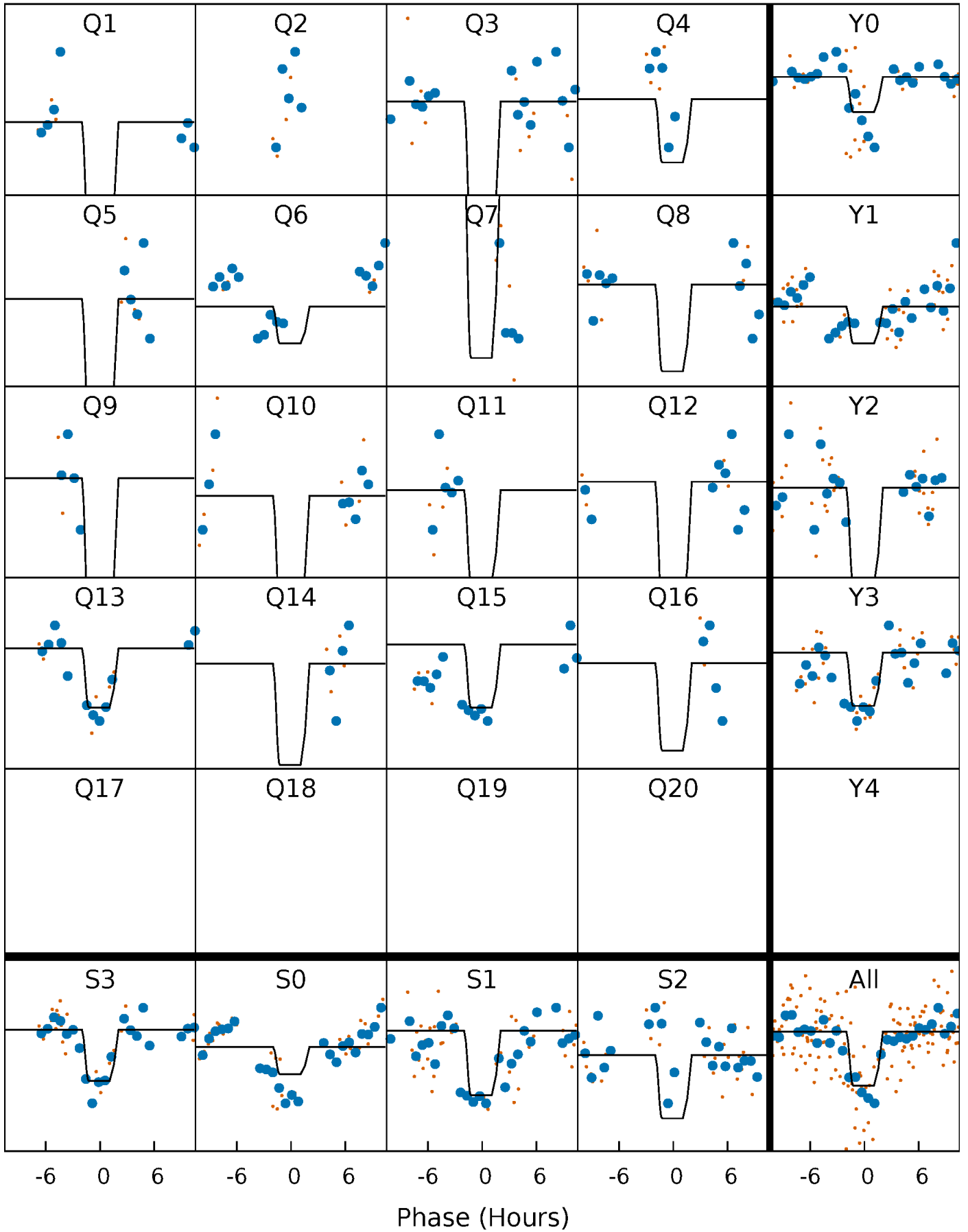
# DV Quarter-Phased Transit Curves

TCE 005638429-05   P= 65.801537 Days    $T_0=150.806663$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

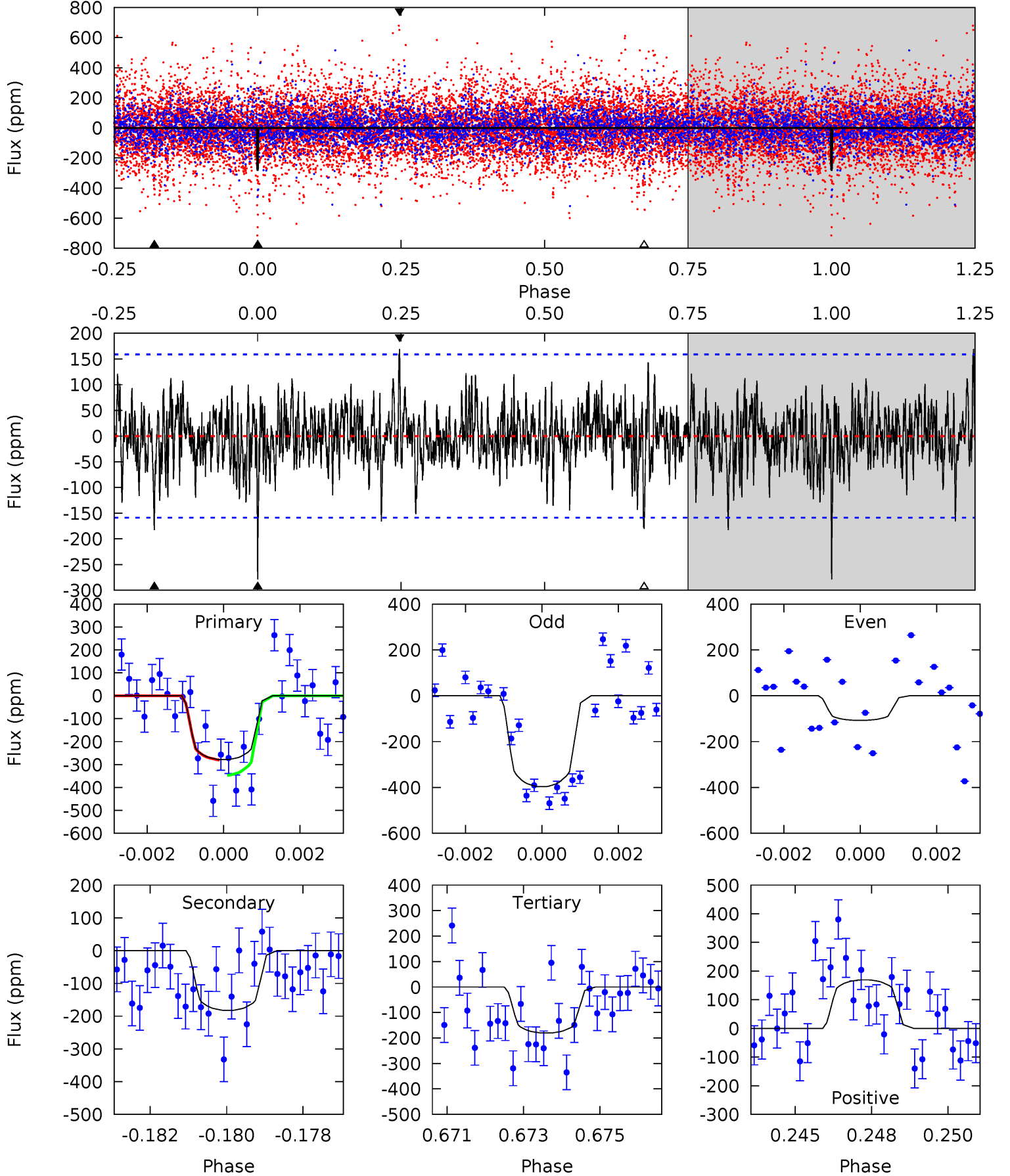
TCE 005638429-05     $P = 65.800870$  Days     $T_0 = 150.821806$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-05, P = 65.801537 Days, E = 85.005126 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
9.32	6.10	6.04	5.66	5.31	3.06	1.54	3.28	3.65	0.06	0.44	4.84	0.88	0.38	1.09

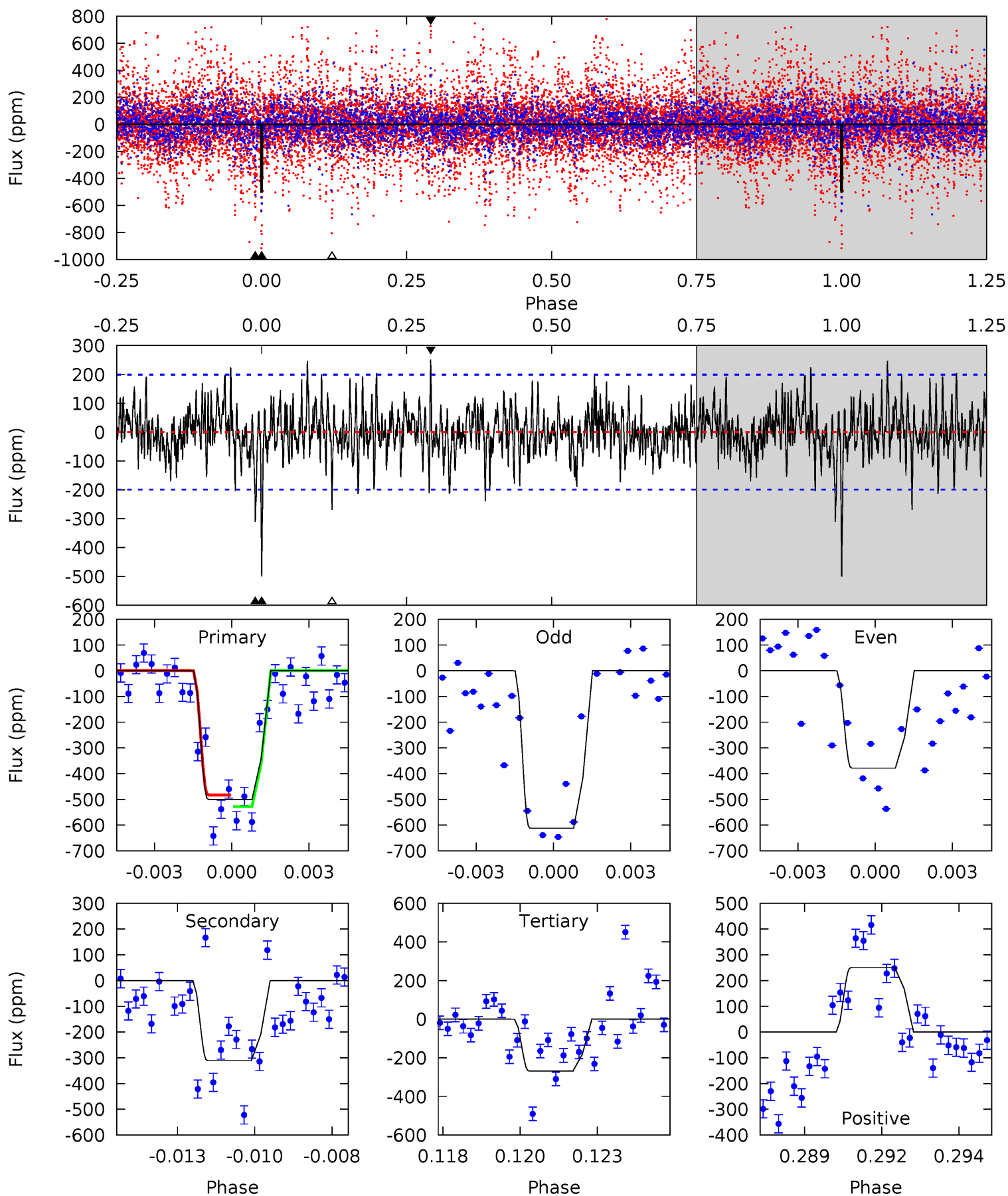




# Alt Model-Shift Uniqueness Test

005638429-05, P = 65.800870 Days, E = 85.020936 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
13.3	8.25	7.13	6.64	5.28	3.02	1.80	6.14	6.63	1.12	1.60	3.05	0.94	0.33	0.58



### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-183 \pm 30$	$6.39^{+6.73}_{-4.43}$	$1136^{+73}_{-107}$	$5156^{+4928}_{-1172}$	$326^{+3242}_{-248}$
Alt.	$-311 \pm 38$	$7.32^{+6.58}_{-4.56}$	$1134^{+73}_{-103}$	$5520^{+4043}_{-1266}$	$407^{+2459}_{-293}$

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

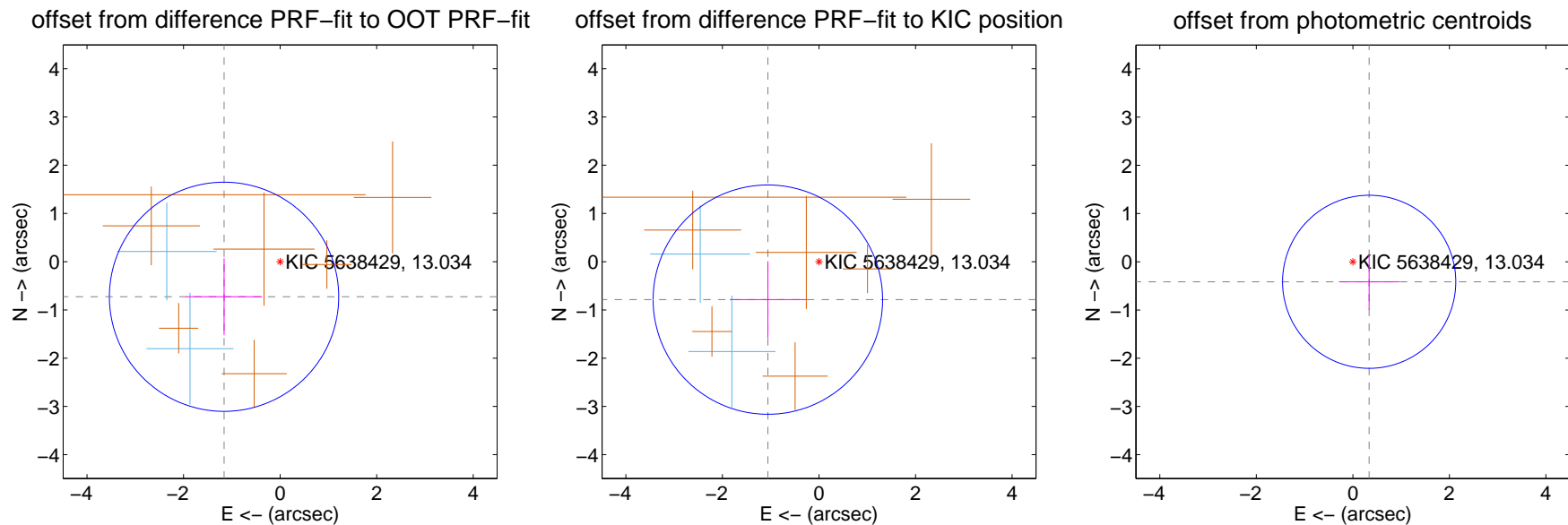
## DV Centroid Data

Supplemental centroid analysis for 005638429-05. Kepler magnitude: 13.03. Transit SNR 5.80

There are 2 quarters with good PRF difference image offsets

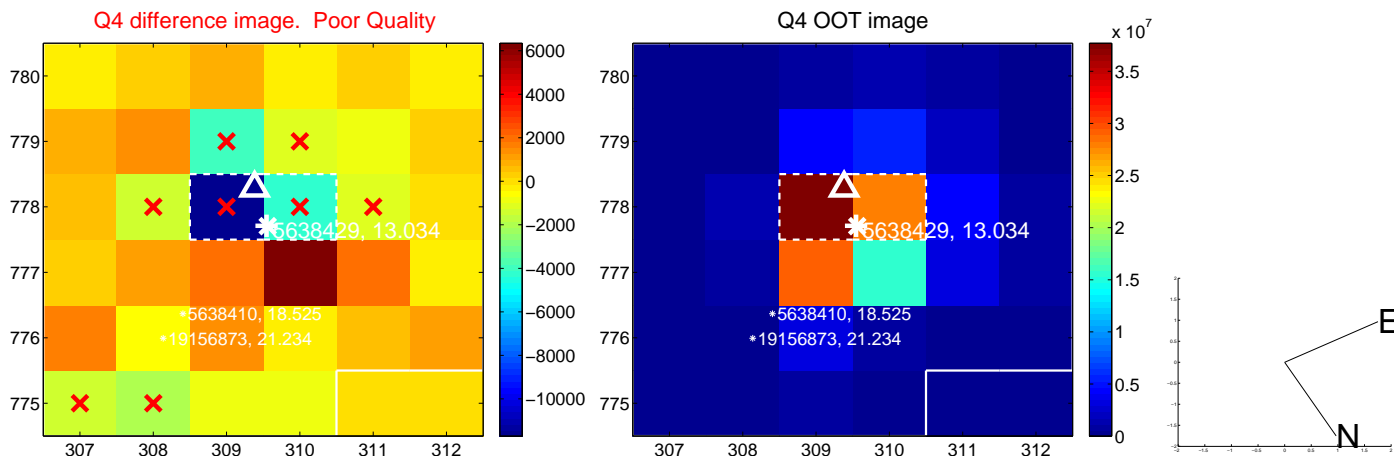
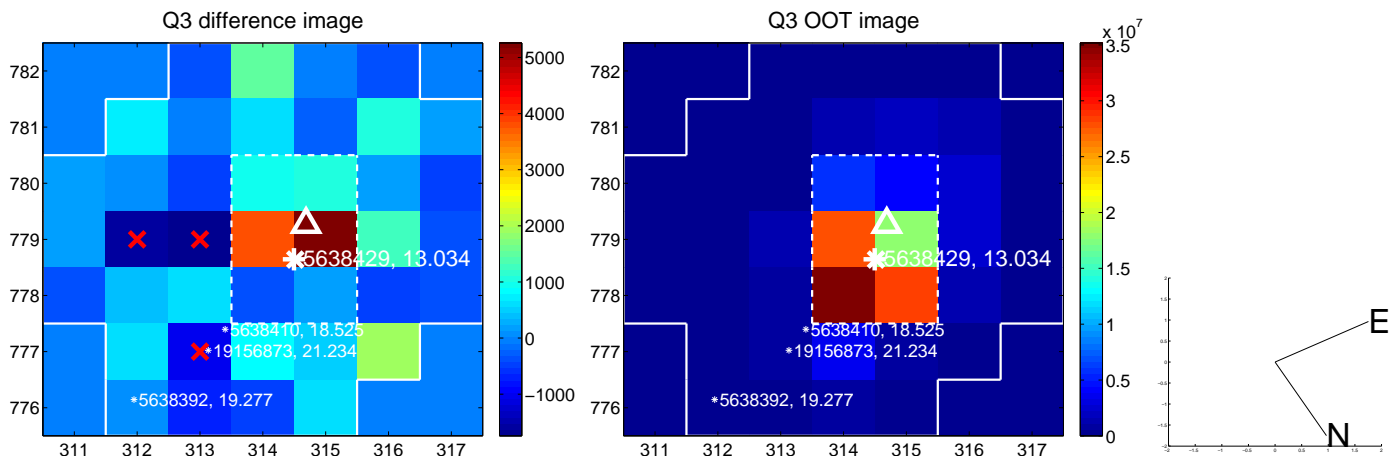
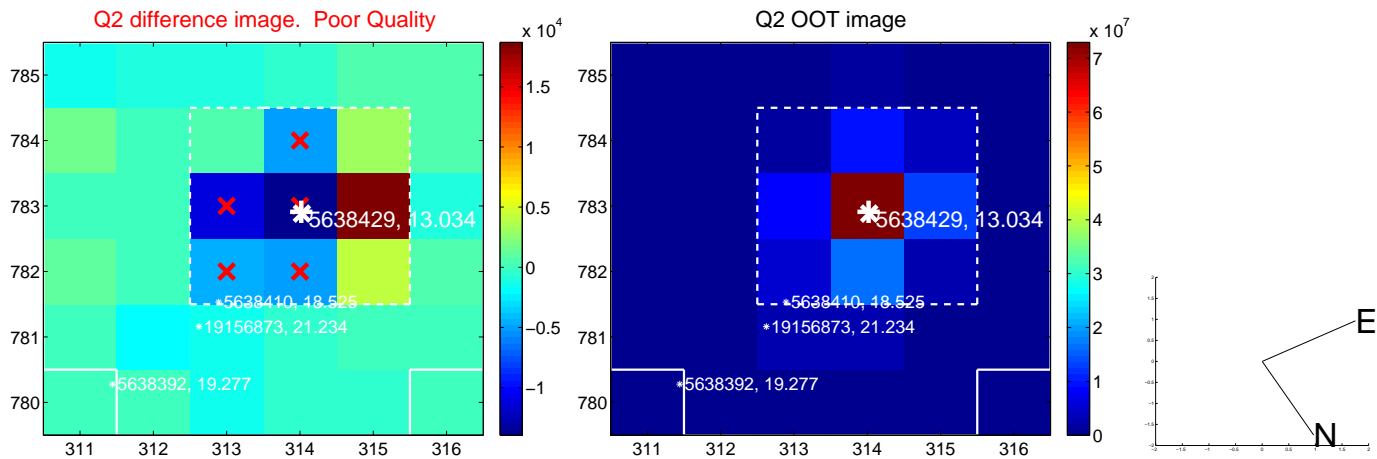
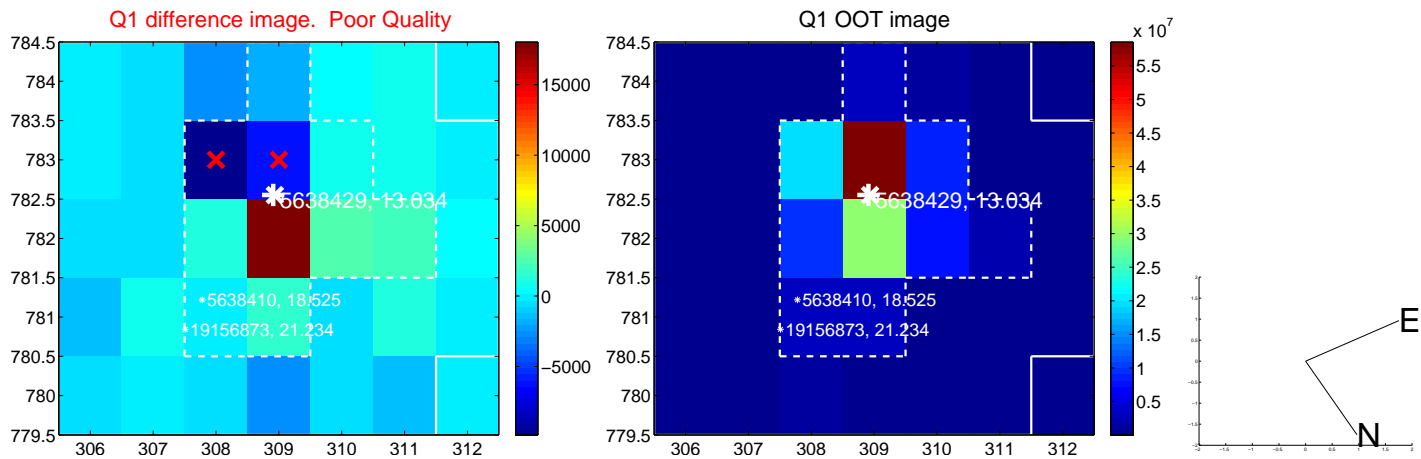
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.370 \pm 0.792$	1.73	$1.161 \pm 0.790$	$-0.727 \pm 0.796$
PRF-fit source offset from KIC position	$1.319 \pm 0.792$	1.67	$1.059 \pm 0.790$	$-0.786 \pm 0.796$
photometric centroid source offset	$0.54 \pm 0.60$	0.89	$-0.34 \pm 0.63$	$-0.42 \pm 0.58$

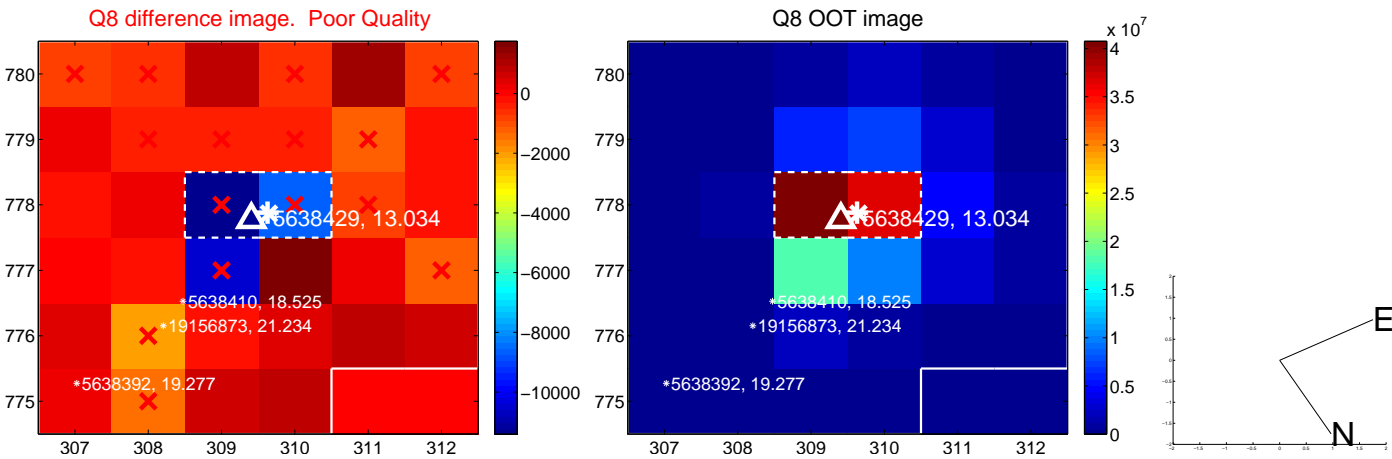
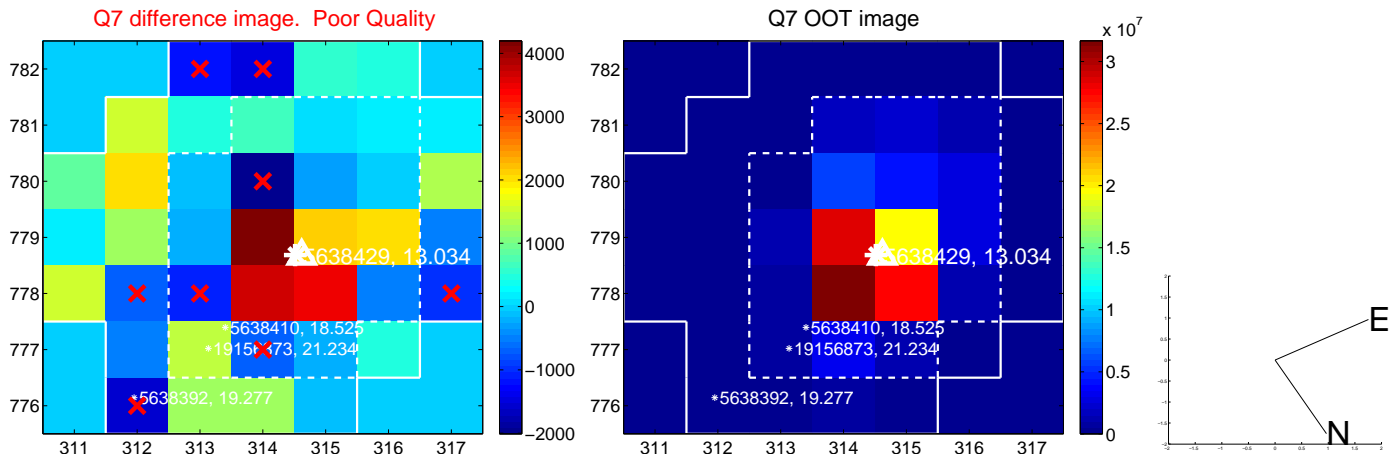
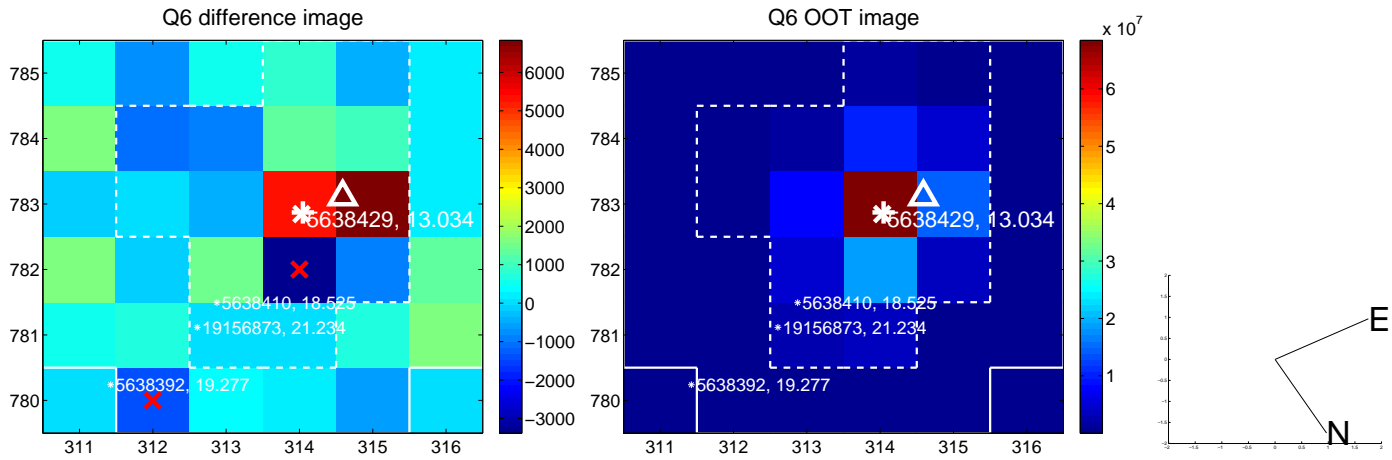
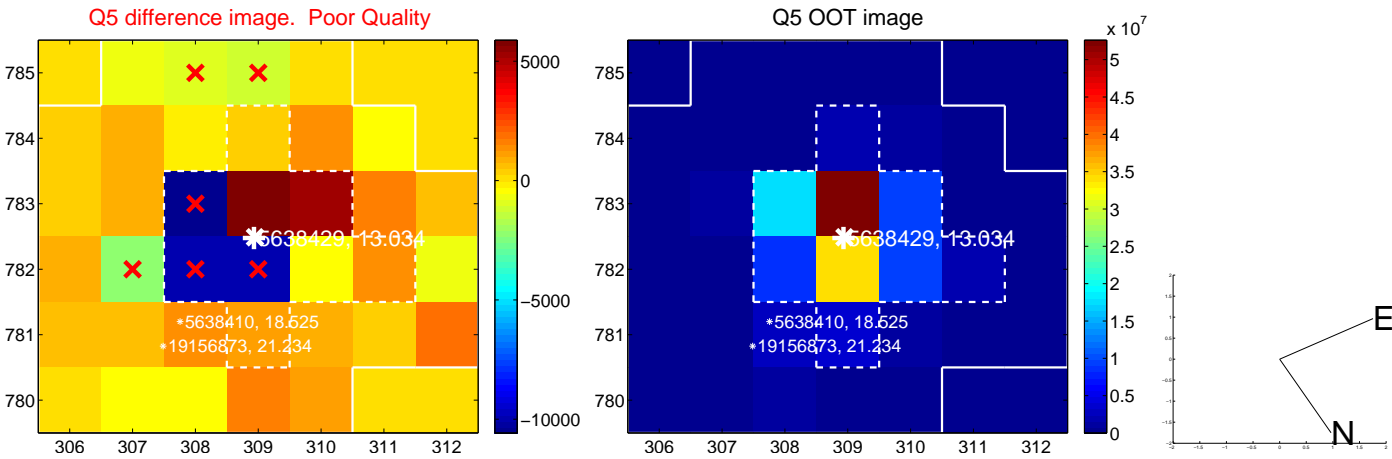


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

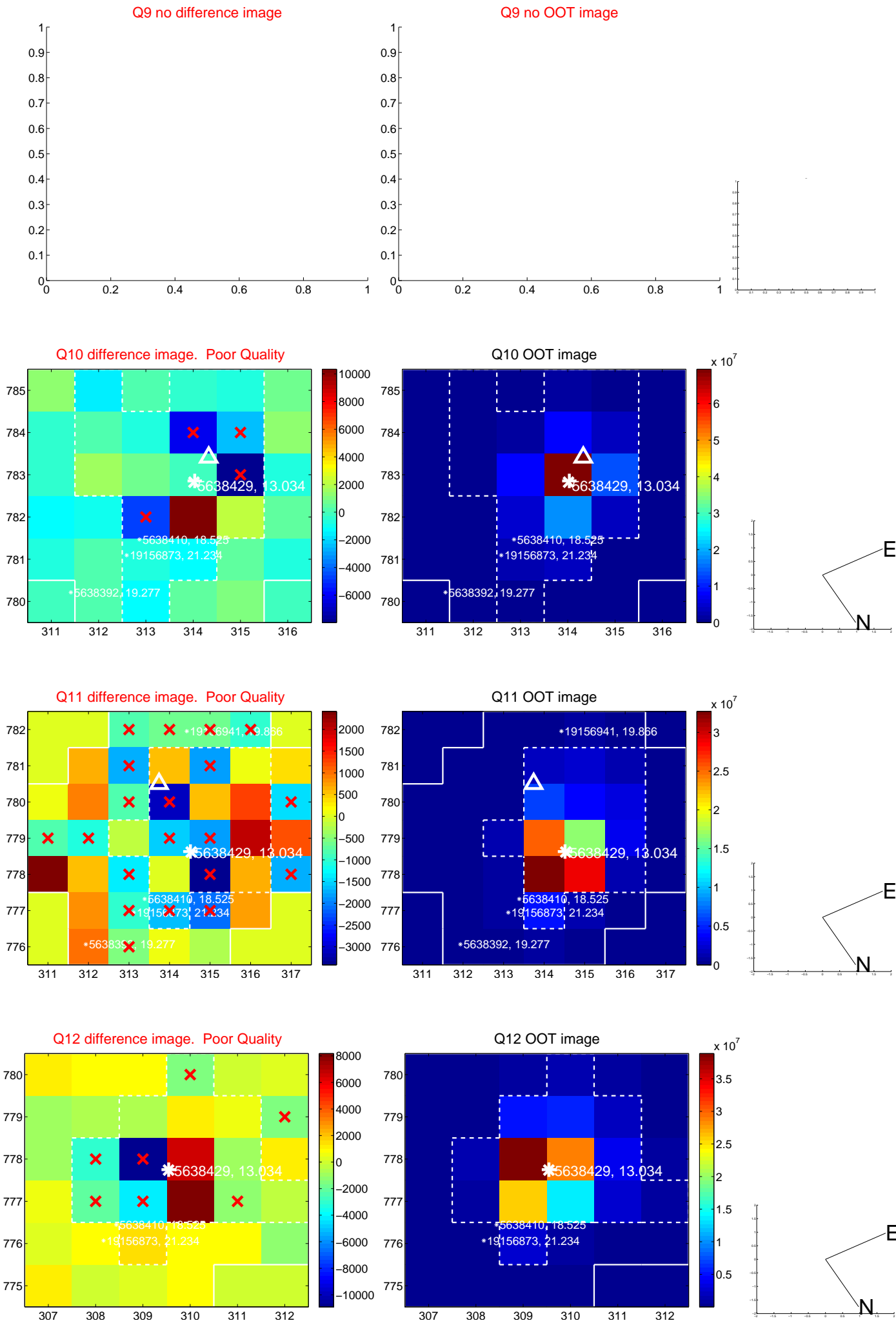
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



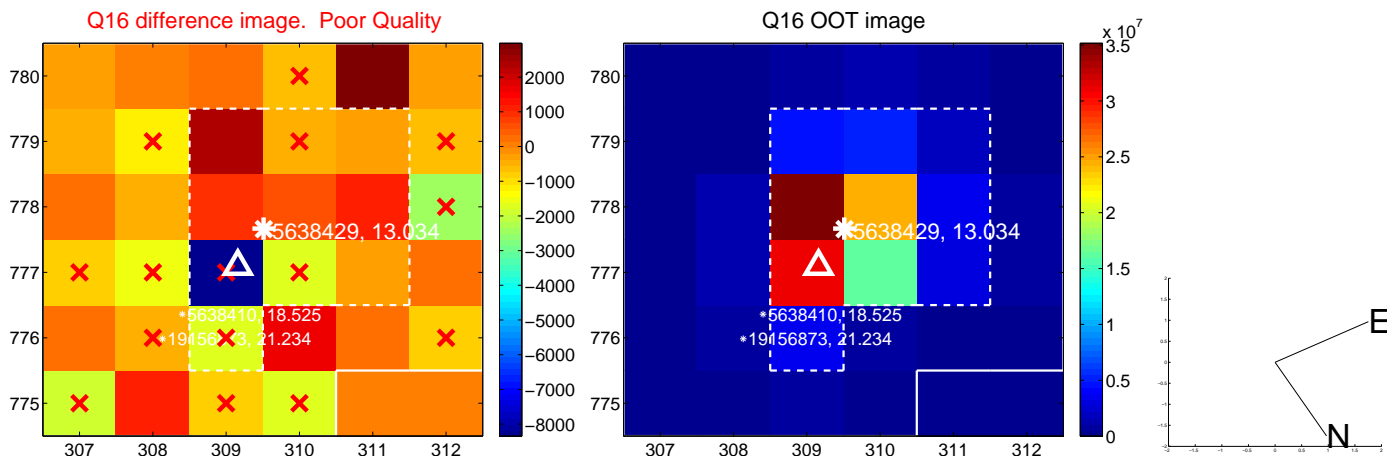
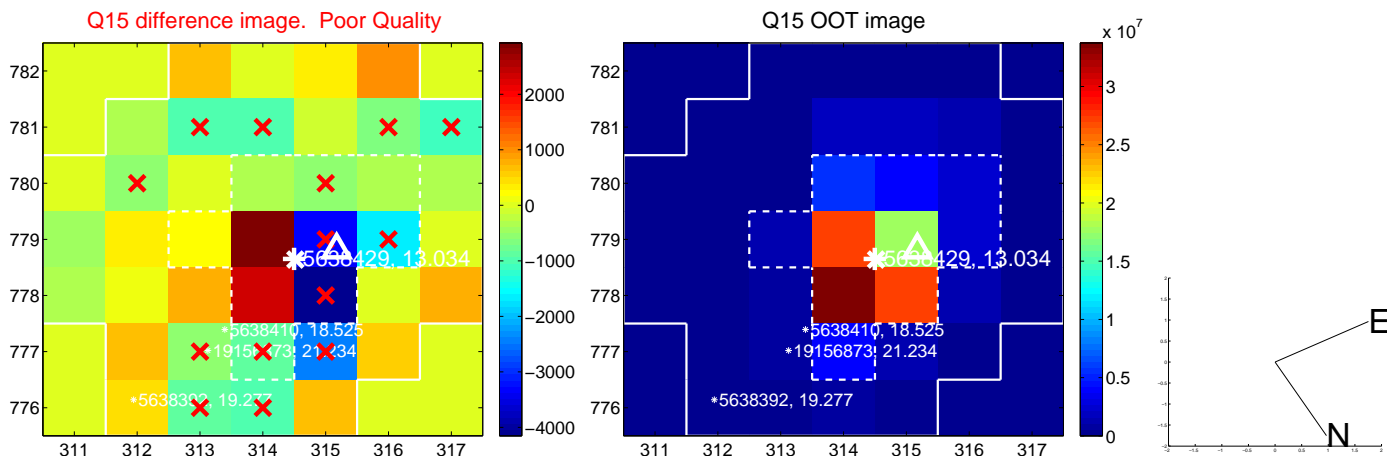
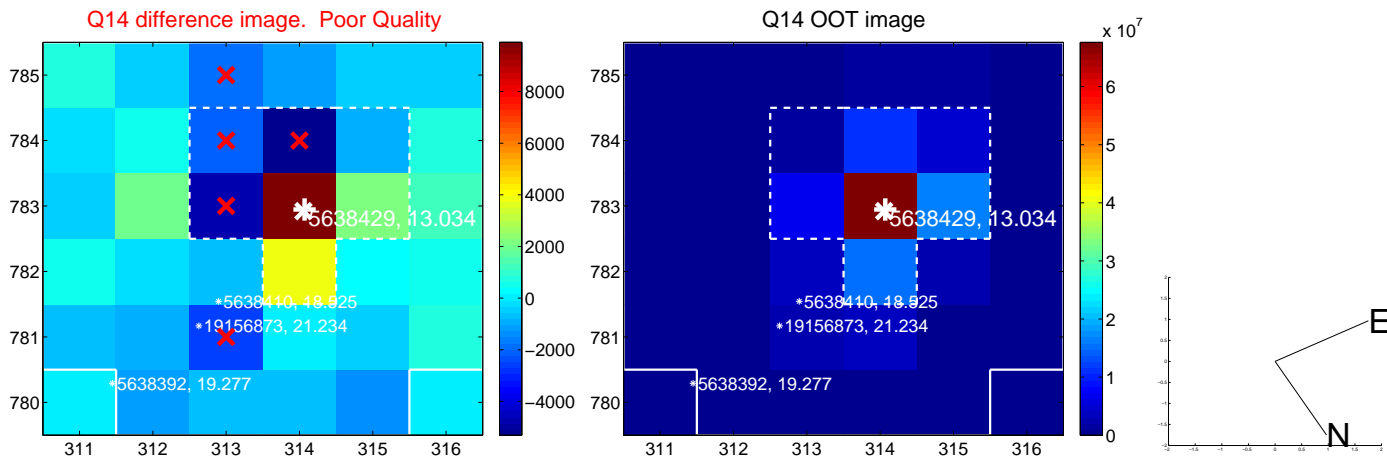
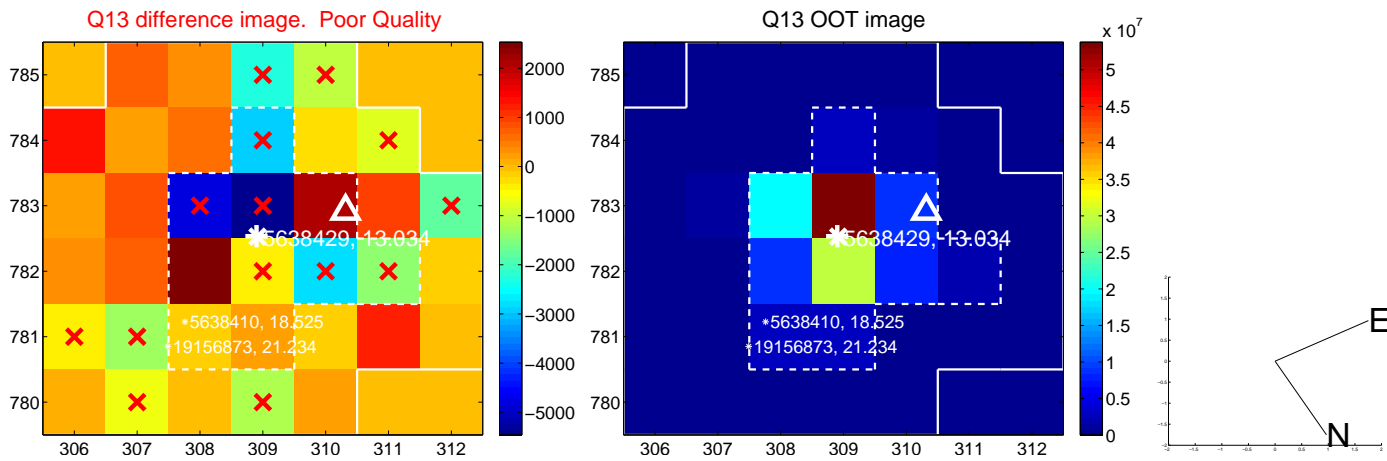
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



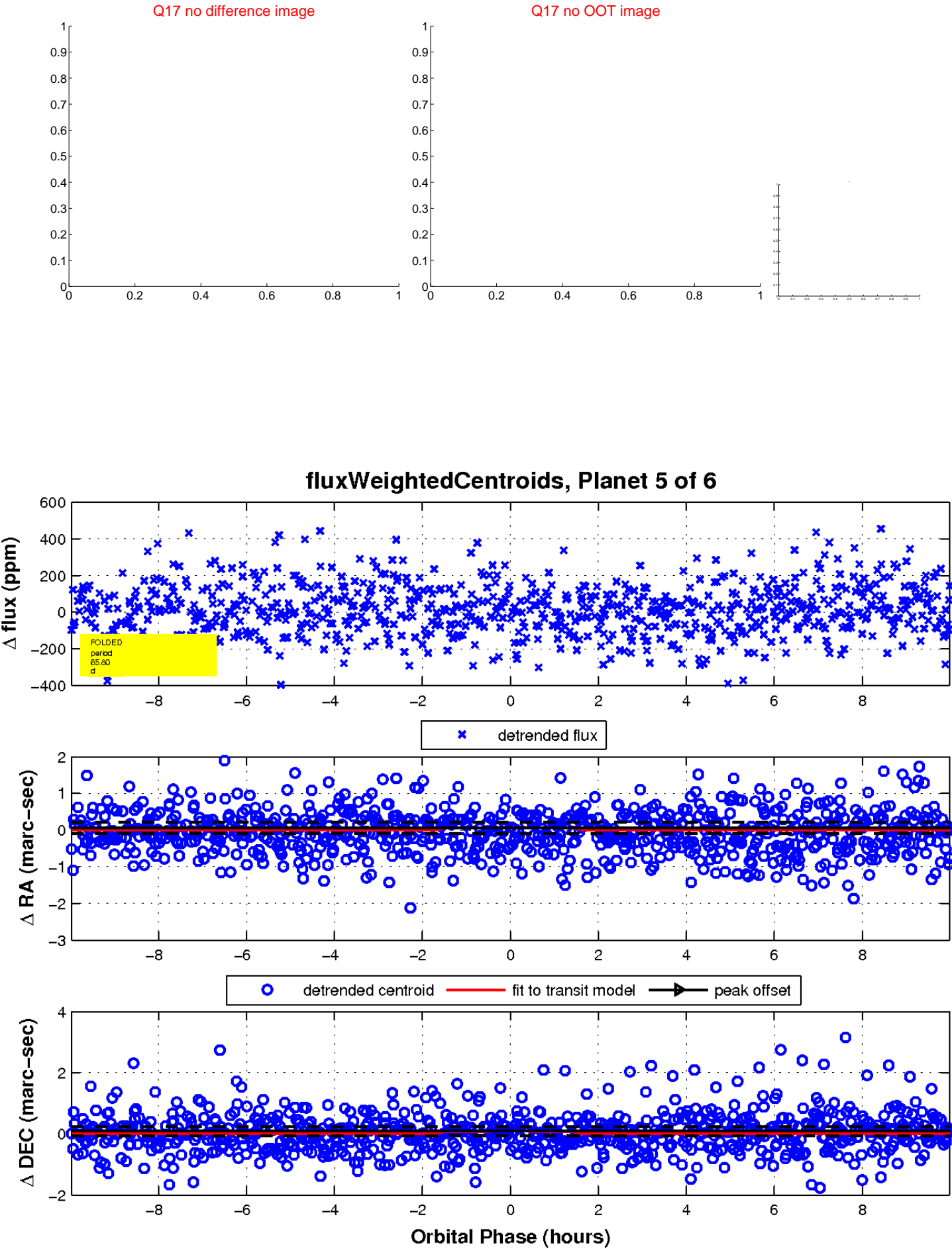
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

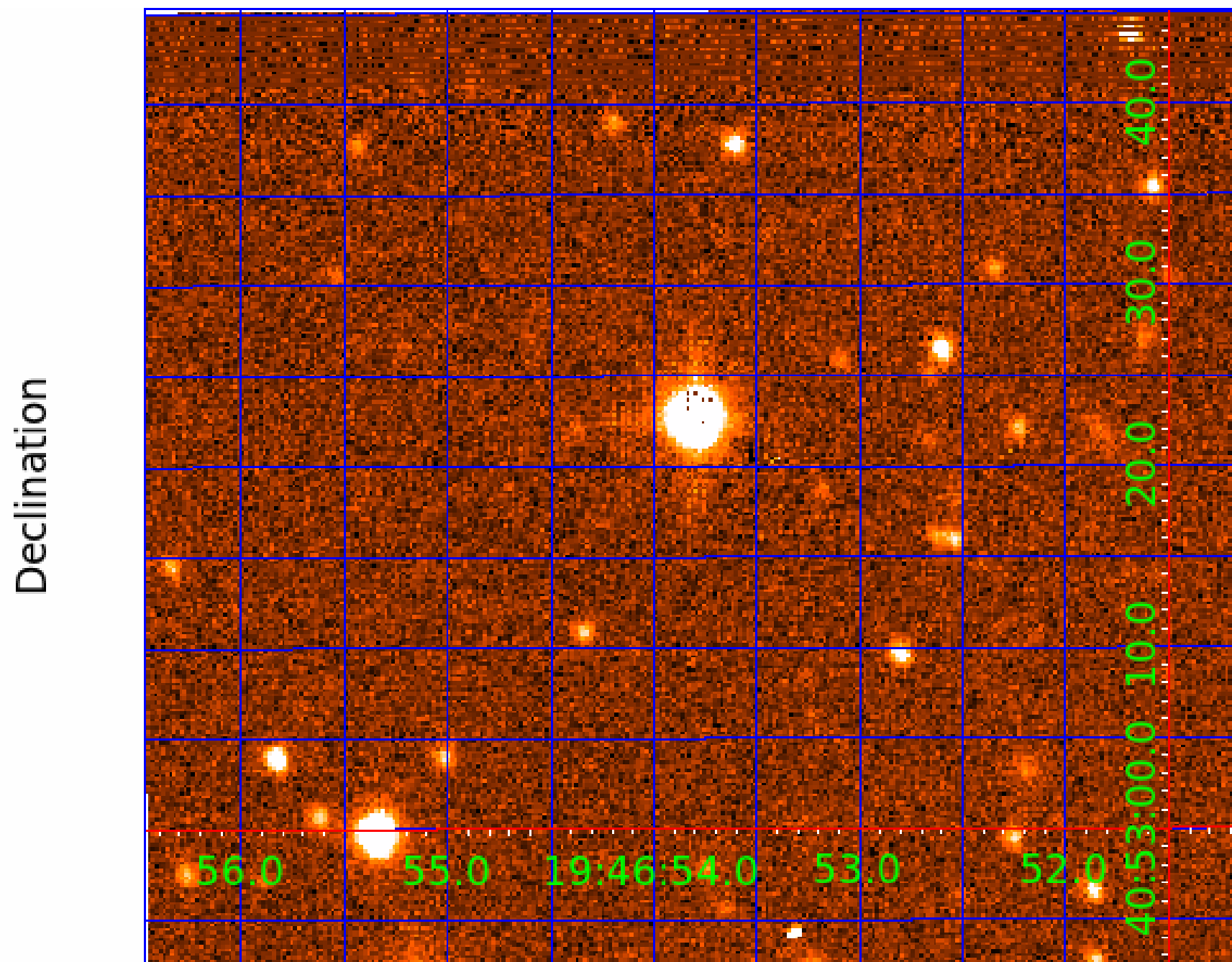


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 005638429

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005638429-01	OBS	No	0.687679	131.671919	15.2	4.273	8.3	9.2	2.53	7113	1.16	49331.98
005638429-02	OBS	No	149.991455	217.275195	589.0	5.116	9.5	8.9	2.53	7113	7.70	37.57
005638429-03	OBS	No	152.634865	162.385454	251.2	4.701	8.2	8.2	2.53	7113	4.08	36.71
005638429-04	OBS	No	64.884695	166.731715	121.2	3.206	9.3	3.8	2.53	7113	3.23	114.85
005638429-05	OBS	No	65.801537	150.806663	242.7	3.333	9.4	5.8	2.53	7113	4.30	112.72
005638429-06	OBS	No	64.886267	167.047687	198.0	3.307	9.1	5.1	2.53	7113	3.81	114.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005638429-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
005638429-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005638429-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
005638429-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
005638429-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—HALO_GHOST
005638429-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD

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

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

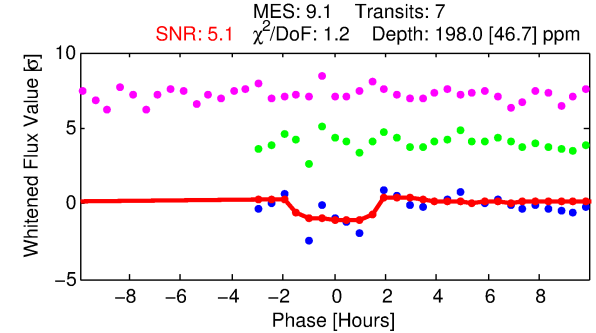
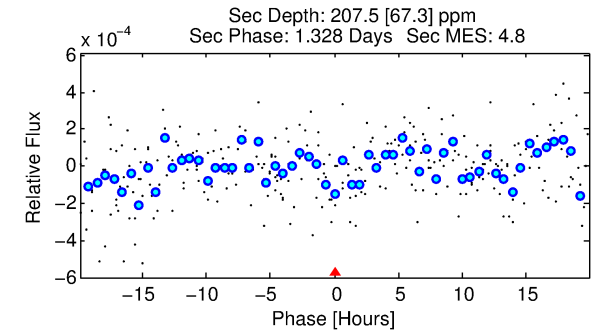
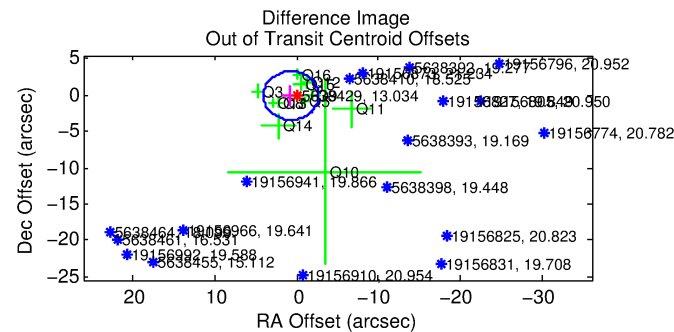
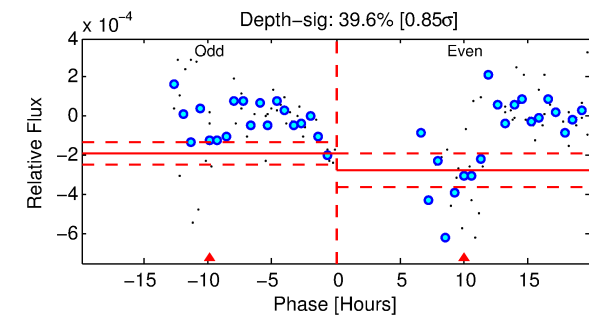
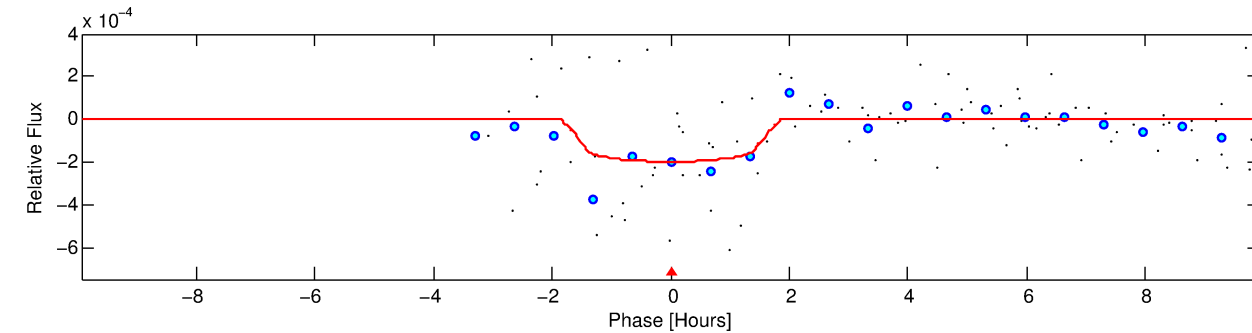
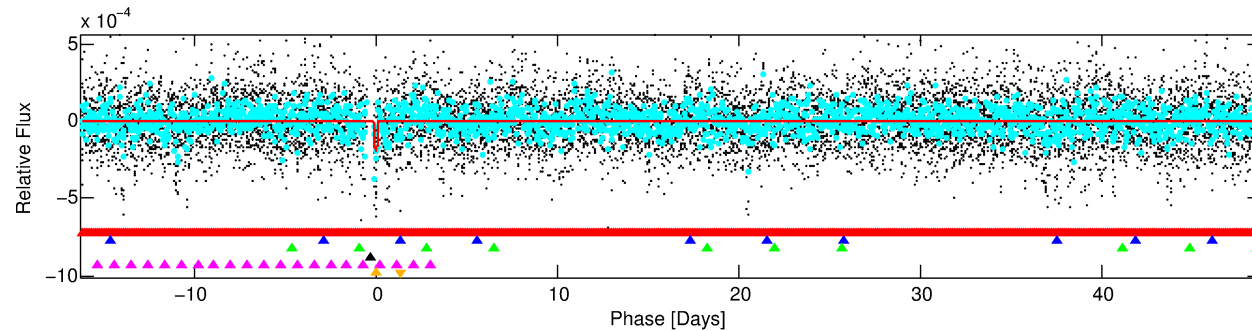
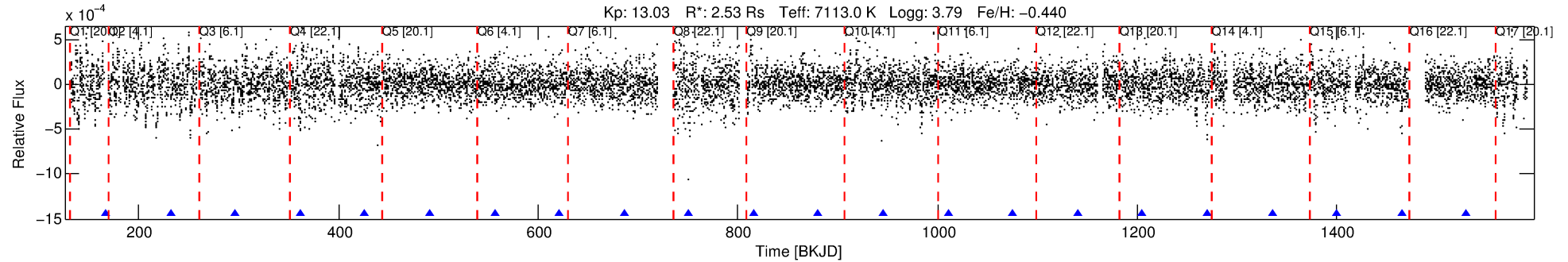
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005638429-06

No Significant Match Found

# DV One-Page Summary

KIC: 5638429 Candidate: 6 of 6 Period: 64.886 d



## DV Fit Results:

Period = 64.88627 [0.00271] d  
Epoch = 167.0477 [0.0305] BKJD  
Rp/R\* = 0.0138 [0.0231]  
a/R\* = 112.08 [1030.30]  
b = 0.68 [7.27]  
Seff = 114.84 [58.90]  
Teq = 835 [107] K  
Rp = 3.81 [6.51] Re  
a = 0.3581 [0.1129] AU  
Ag = 1011.05 [3444.64] [0.29σ]  
Teffp = 7278 [6139] K [1.05σ]

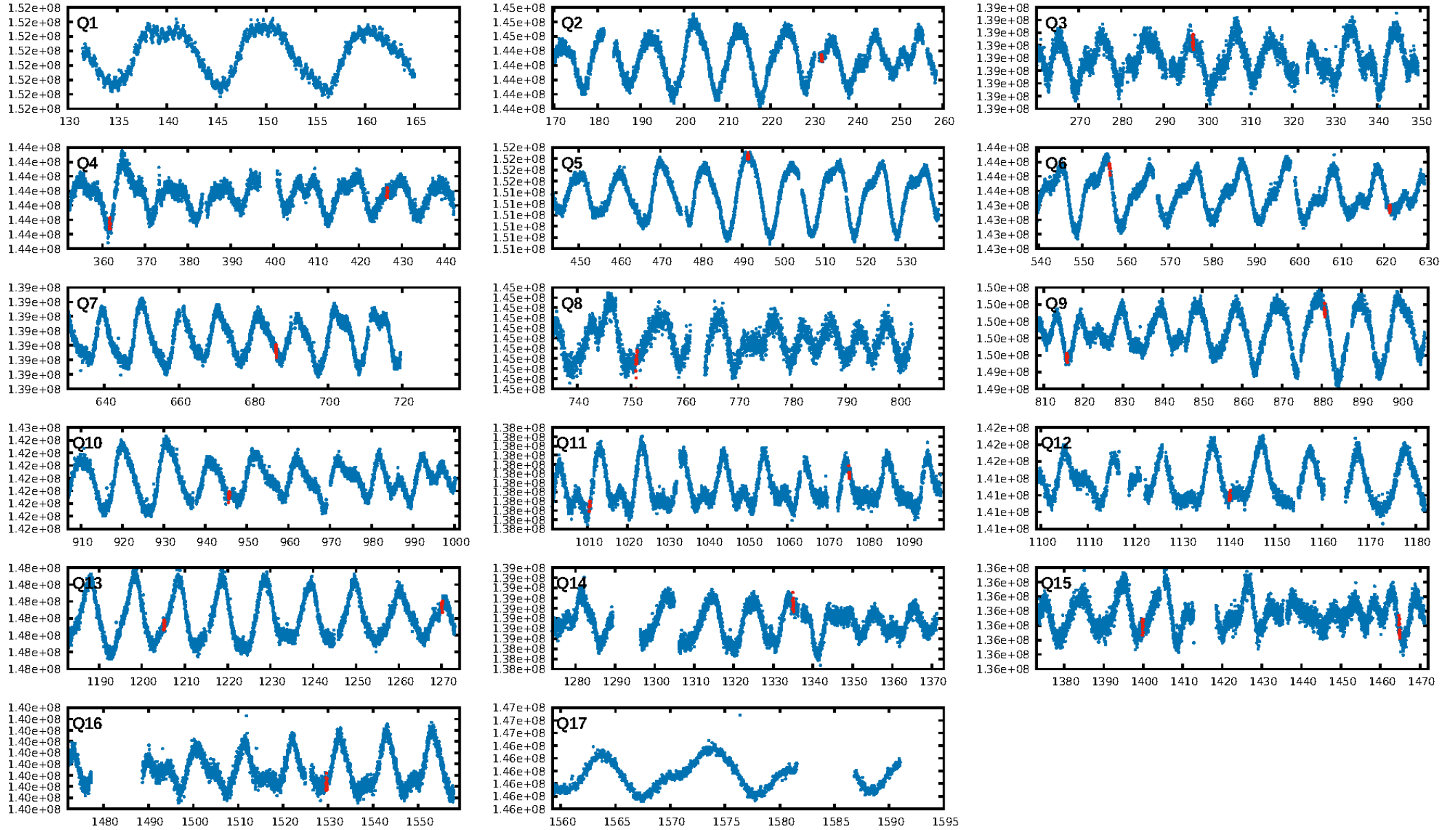
## DV Diagnostic Results:

ShortPeriod-sig: 0.7% [0.01σ]  
LongPeriod-sig: 100.0% [4.68σ]  
ModelChiSquare2-sig: 0.5%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 6.39e-13  
RollingBand-fgt: 1.00 [7/7]  
**GhostDiagnostic-chr: 1.843**  
Centroid-sig: 1.3%  
Centroid-so: 0.982 arcsec [1.45σ]  
OotOffset-rm: 0.713 arcsec [0.64σ]  
KicOffset-rm: 0.690 arcsec [0.62σ]  
OotOffset-st: 2/3/3/3 [11]  
KicOffset-st: 2/3/3/3 [11]  
DiffImageQuality-fgm: 0.27 [3/11]  
DiffImageOverlap-fno: 0.00 [0/14]

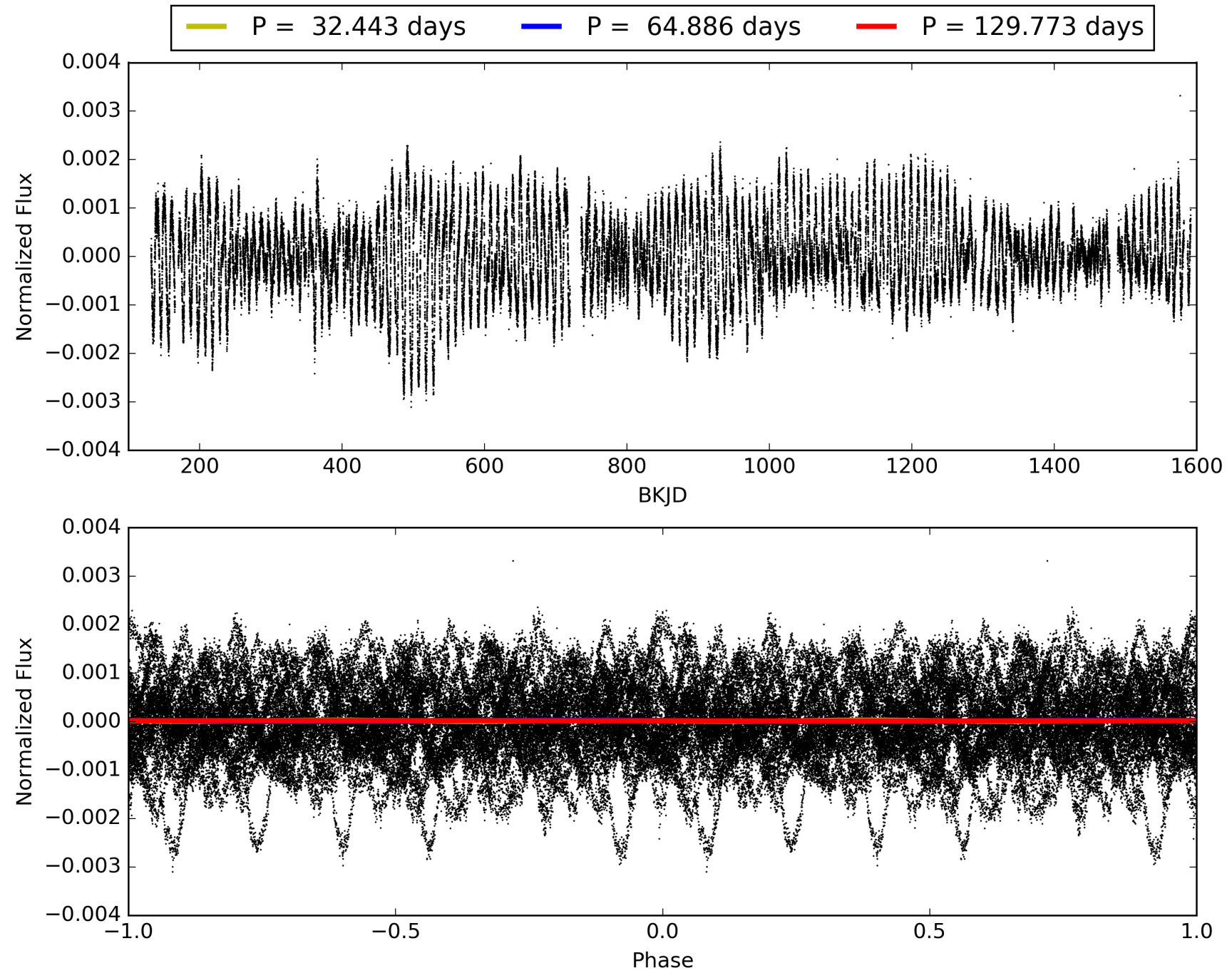
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:03:43 Z

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

# TCE 005638429-06, PDC Light Curves

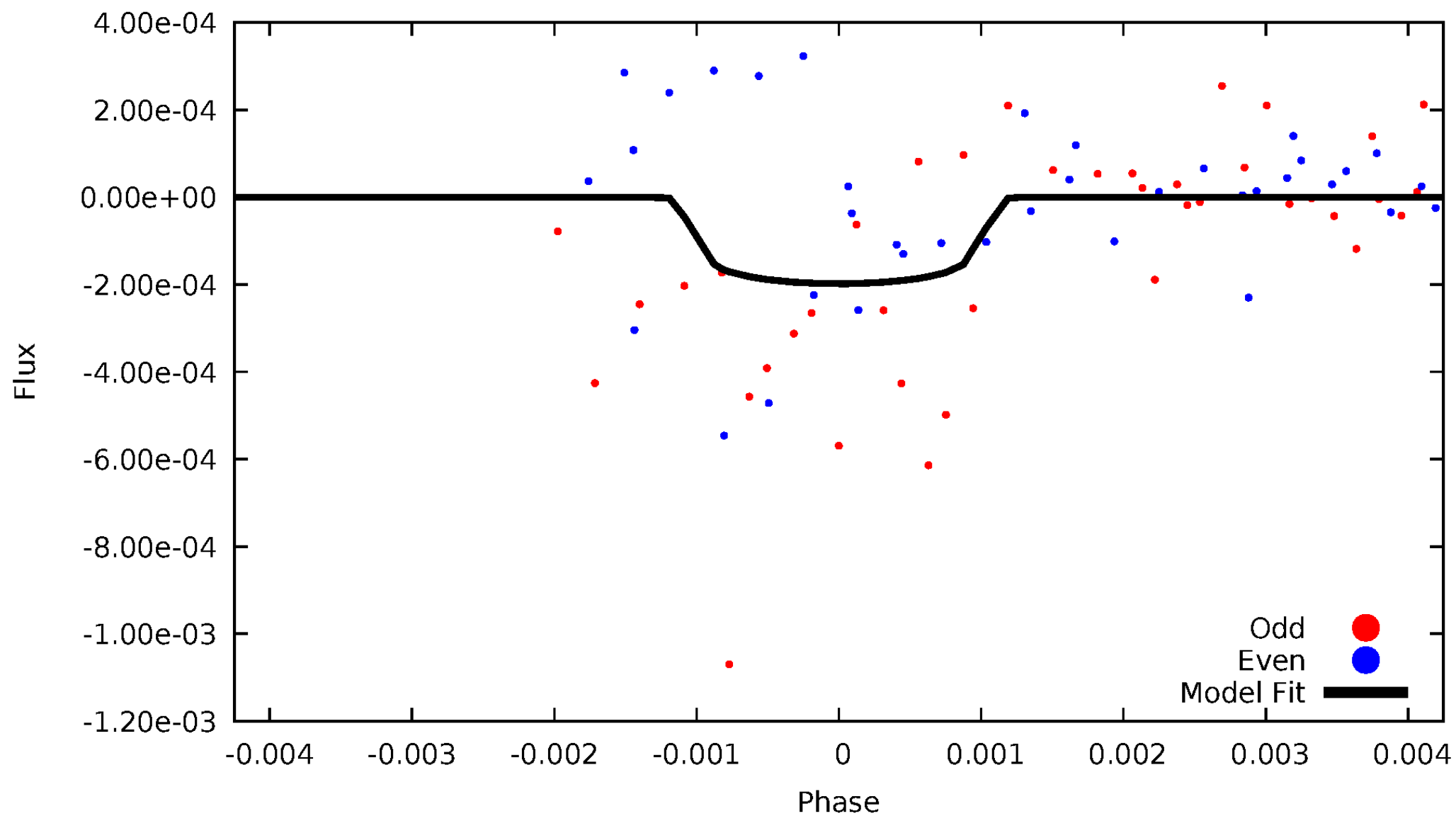


TCE 005638429-06



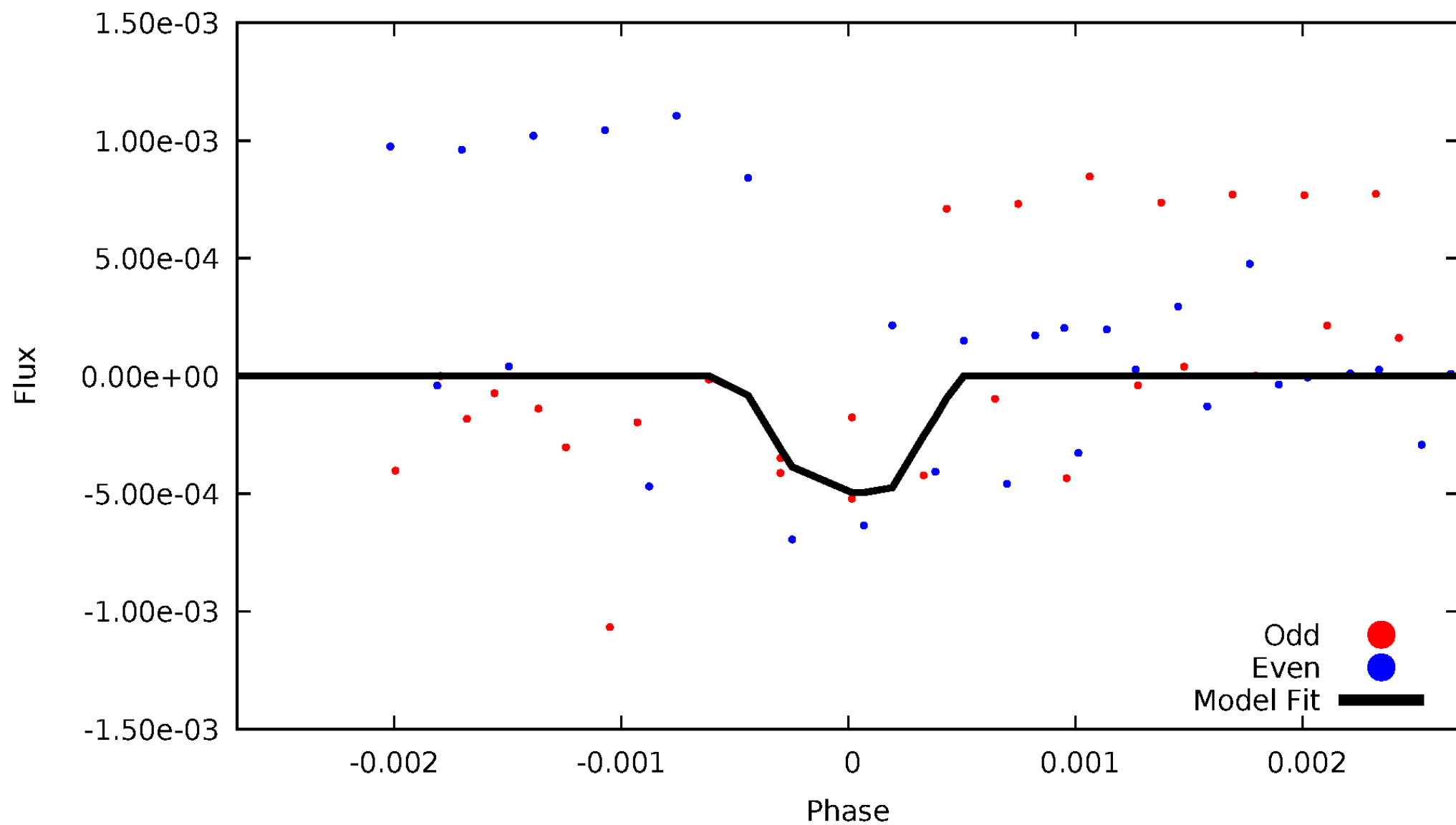
# DV Odd/Even

TCE 005638429-06



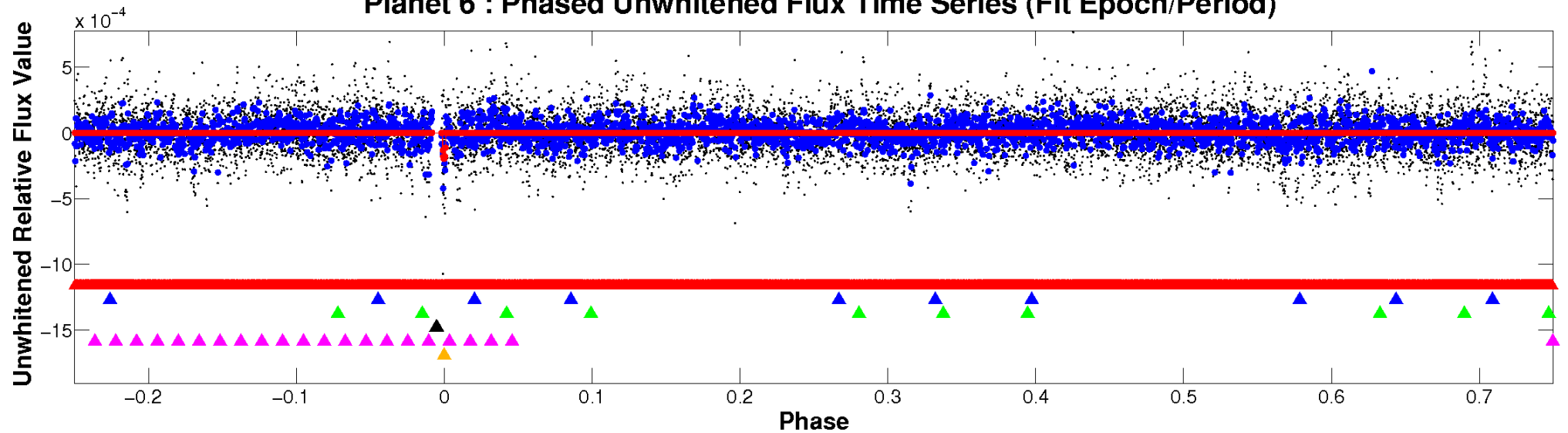
# ALT Odd/Even

TCE 005638429-06

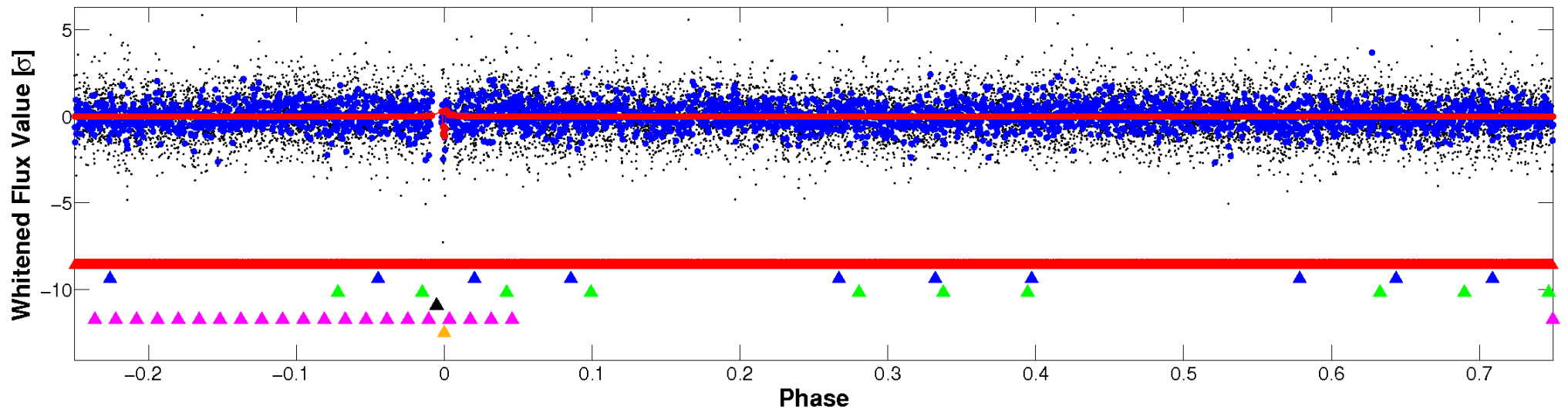


# Non-Whitened Vs. Whitened Light Curve

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



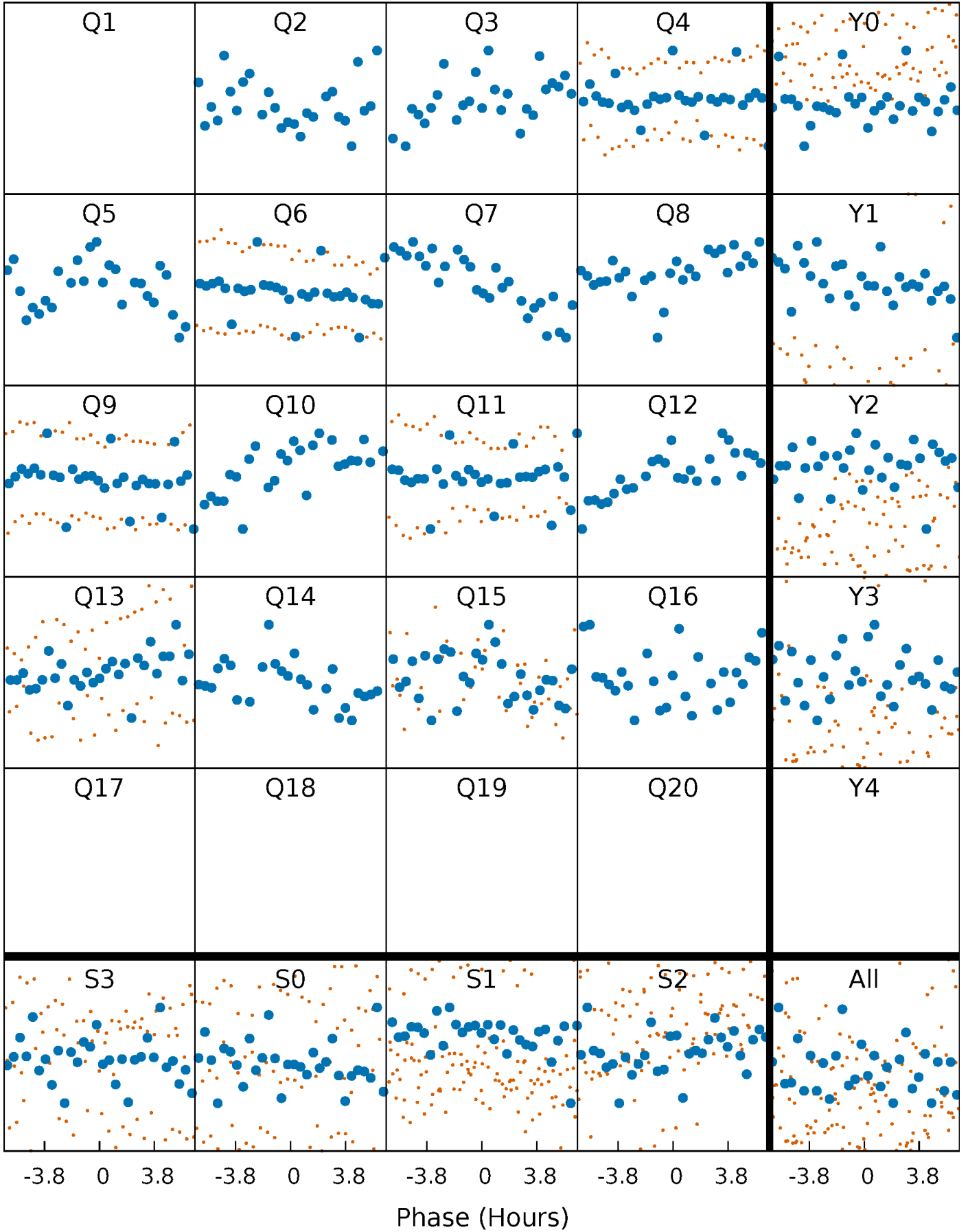
## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)





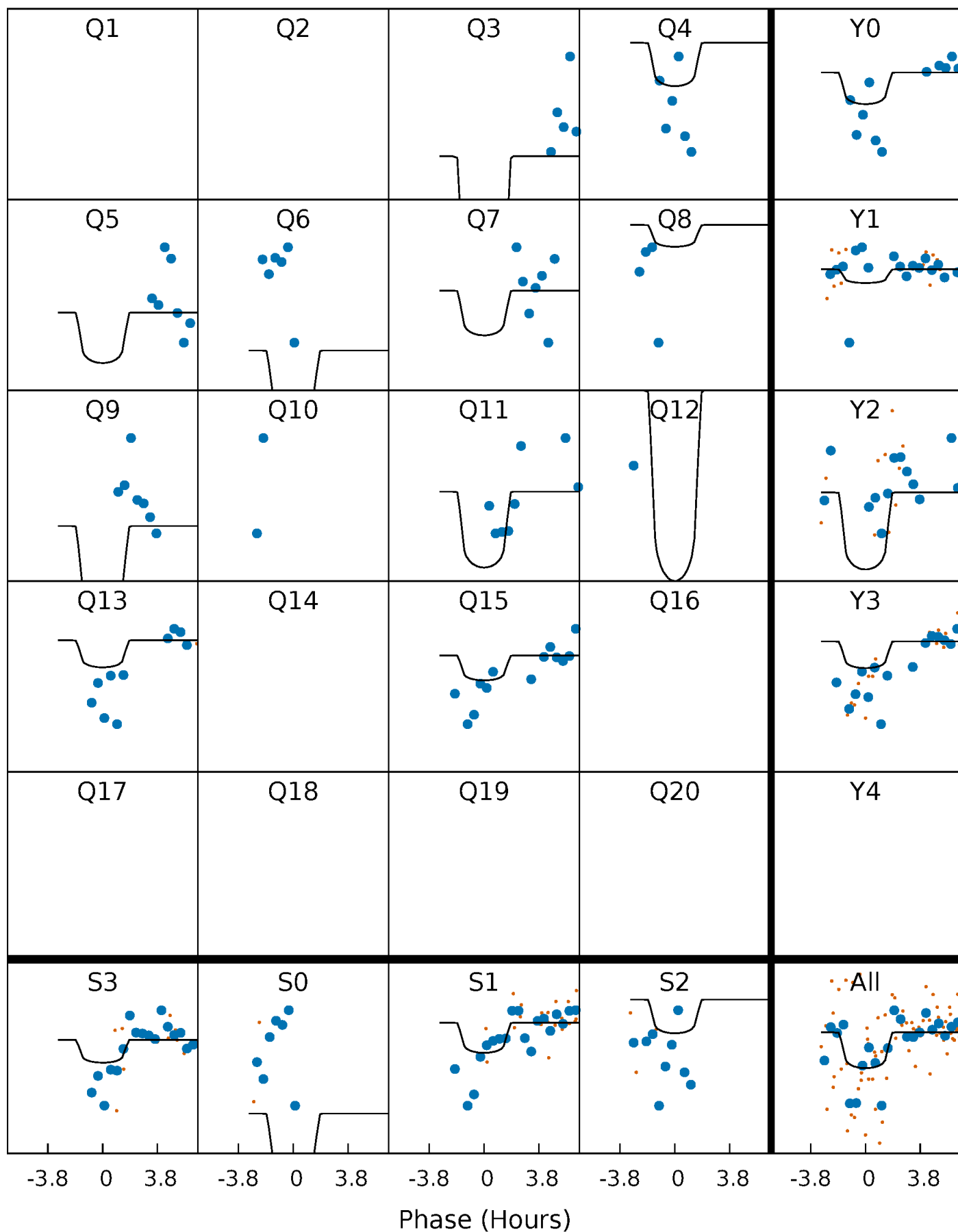
# PDC Quarter-Phased Transit Curves

TCE 005638429-06   P= 64.886267 Days    $T_0=167.047687$  (BKJD)



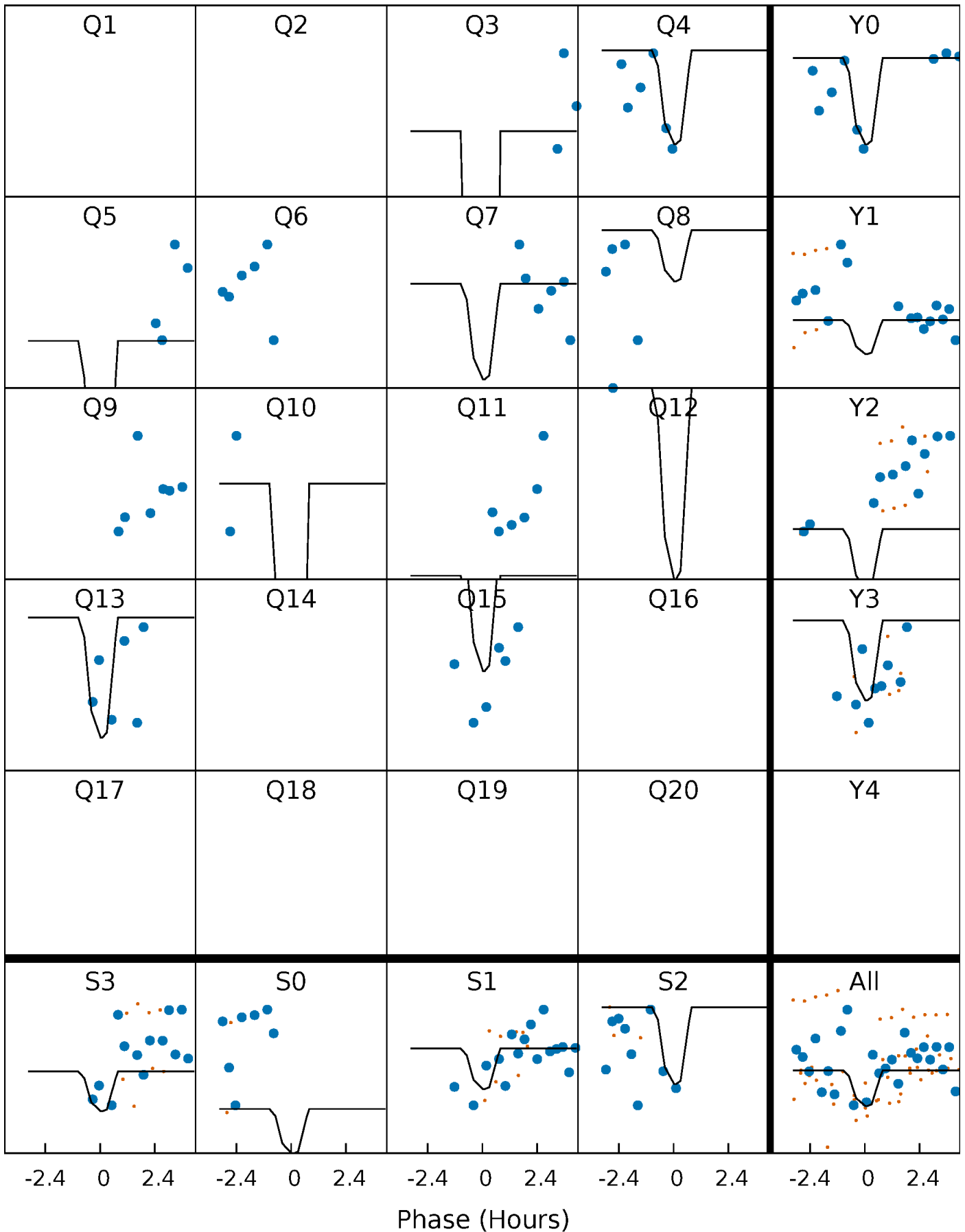
# DV Quarter-Phased Transit Curves

TCE 005638429-06 P= 64.886267 Days  $T_0=167.047687$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

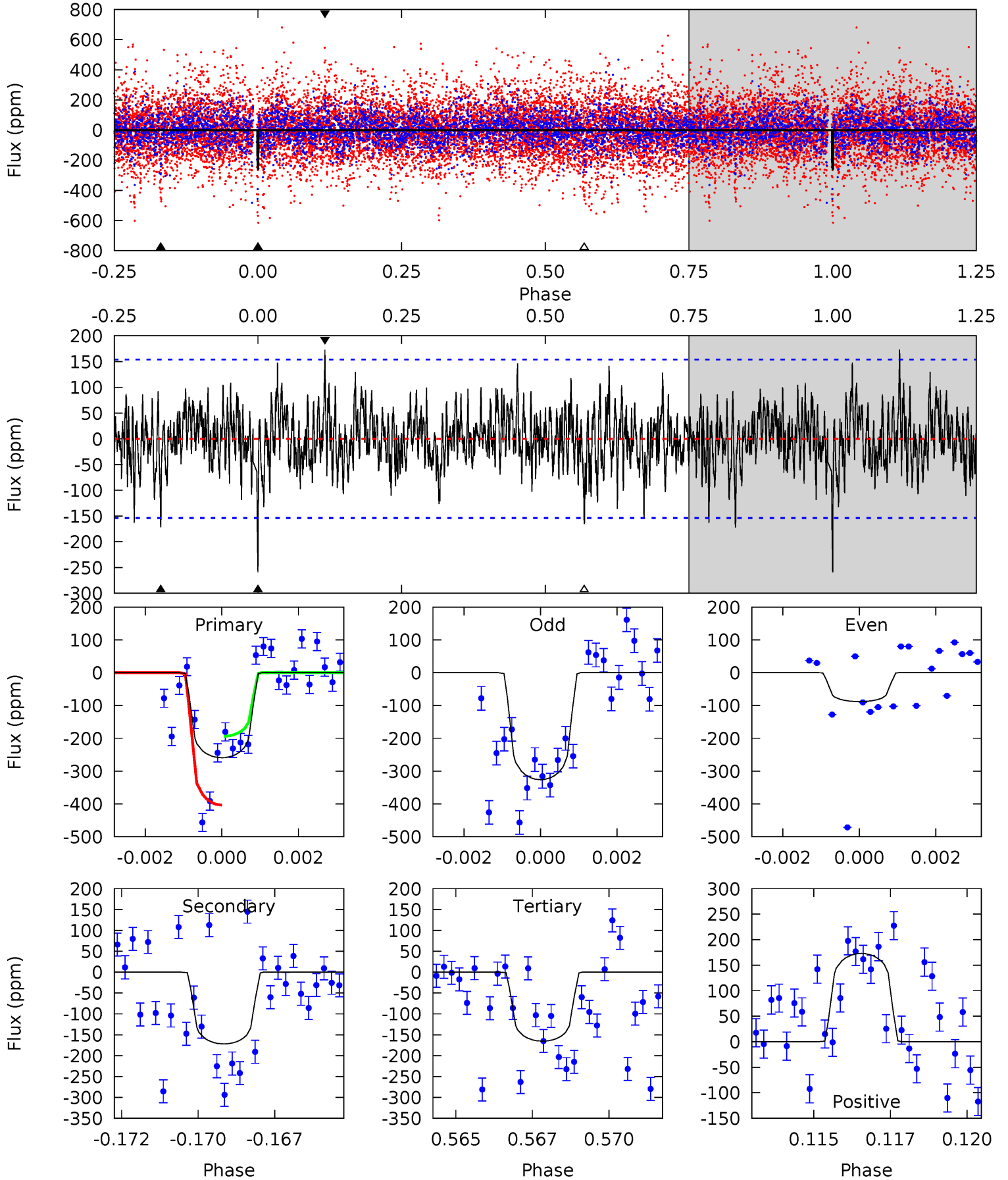
TCE 005638429-06 P= 64.881313 Days  $T_0=167.110402$  (BKJD)



# DV Model-Shift Uniqueness Test

005638429-06, P = 64.886267 Days, E = 102.161420 Days

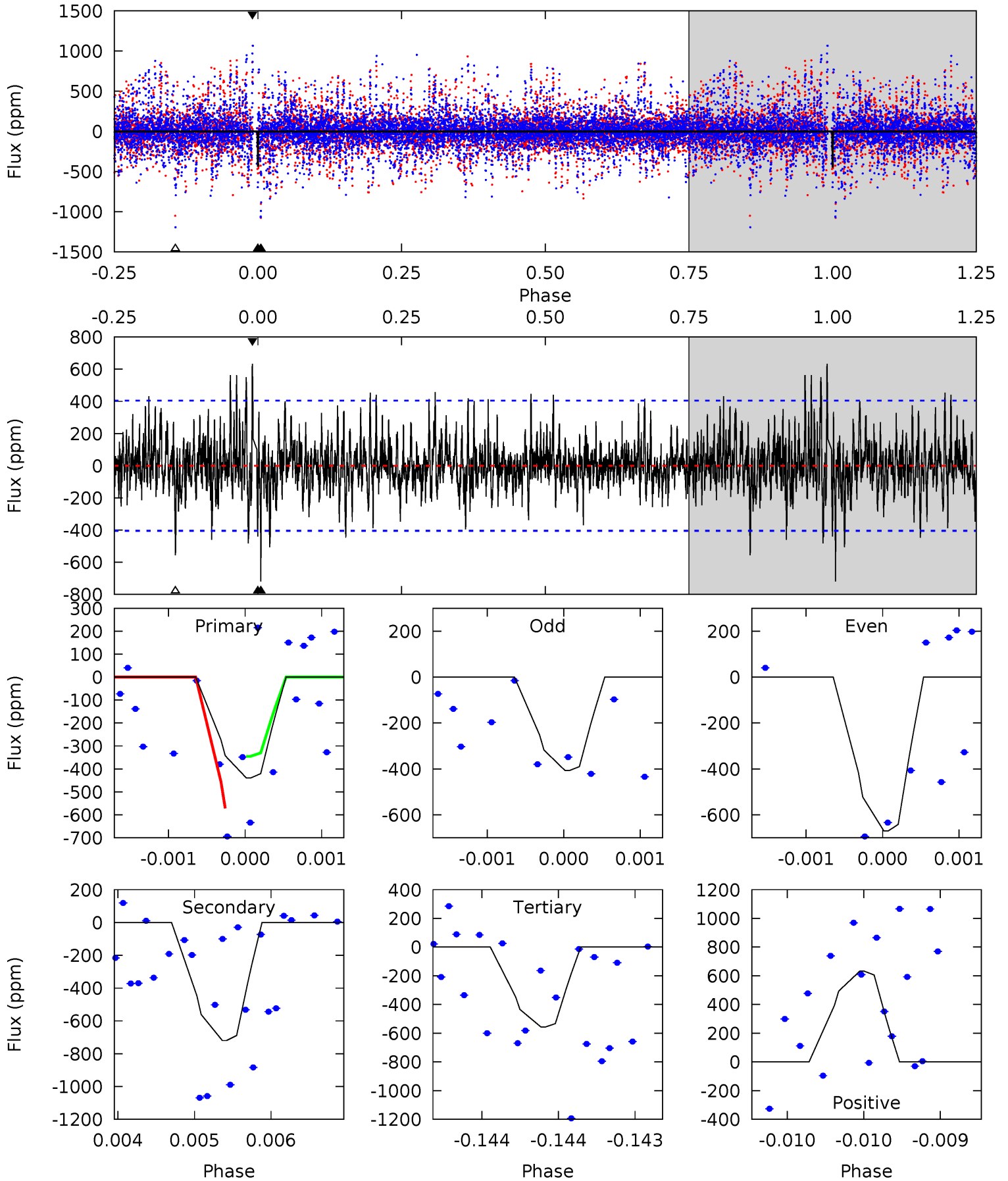
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.90	5.91	5.68	5.94	5.29	3.02	1.60	3.23	2.96	0.23	-0.03	4.22	0.93	0.40	3.42



# Alt Model-Shift Uniqueness Test

005638429-06, P = 64.881313 Days, E = 102.229089 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
5.94	9.72	7.53	8.55	5.46	3.30	1.74	-1.59	-2.61	2.19	1.17	1.71	1.01	0.47	1.48



### Stellar Parameters For KIC 005638429

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7113^{+201}_{-252}$	$3.793^{+0.285}_{-0.095}$	$-0.440^{+0.300}_{-0.250}$	$2.534^{+0.465}_{-0.863}$	$1.453^{+0.219}_{-0.267}$	$0.126^{+0.255}_{-0.039}$
	+3%/-4%	+8%/-3%	+68%/-57%	+18%/-34%	+15%/-18%	+203%/-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 005638429-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-172 \pm 29$	$5.74^{+5.52}_{-3.68}$	$1143^{+74}_{-95}$	$5509^{+4278}_{-1326}$	$363^{+2633}_{-268}$
Alt.	$-719 \pm 74$	$7.24^{+5.87}_{-4.88}$	$1145^{+71}_{-103}$	$6978^{+8394}_{-1691}$	$951^{+7760}_{-653}$

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

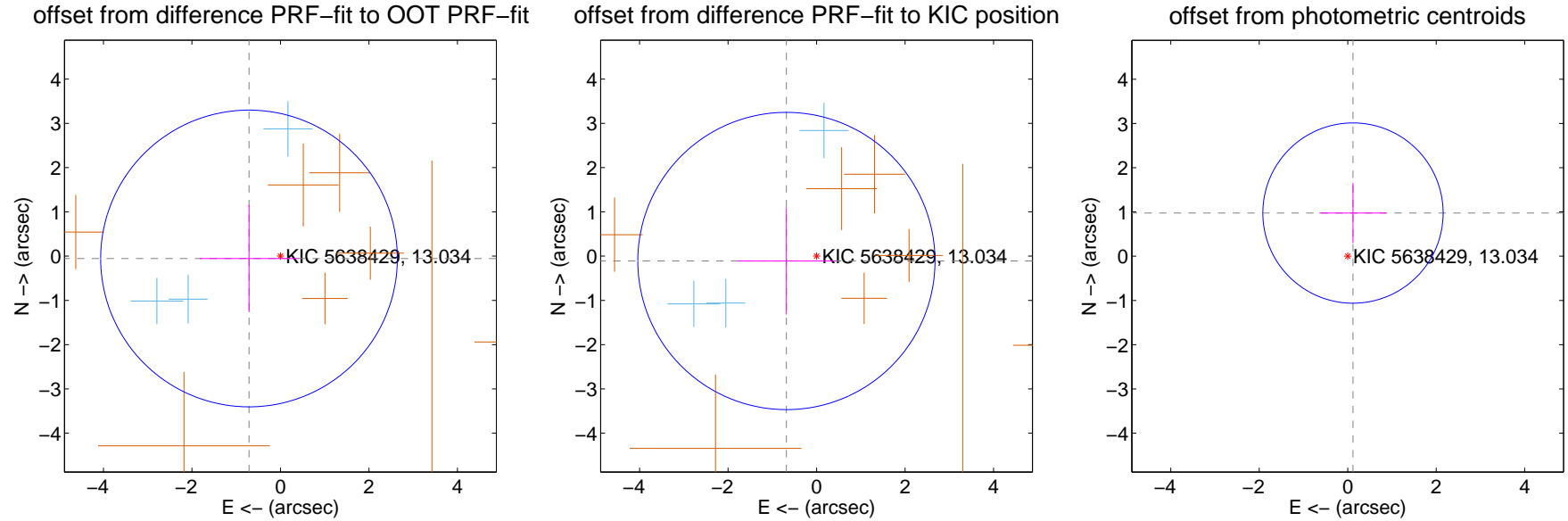
## DV Centroid Data

Supplemental centroid analysis for 005638429-06. Kepler magnitude: 13.03. Transit SNR 5.14

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.713 \pm 1.117$	0.64	$0.711 \pm 1.117$	$-0.053 \pm 1.210$
PRF-fit source offset from KIC position	$0.690 \pm 1.119$	0.62	$0.681 \pm 1.117$	$-0.110 \pm 1.210$
photometric centroid source offset	$0.98 \pm 0.68$	1.45	$-0.12 \pm 0.76$	$0.98 \pm 0.68$



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.

Q1 no difference image



Q1 no OOT image



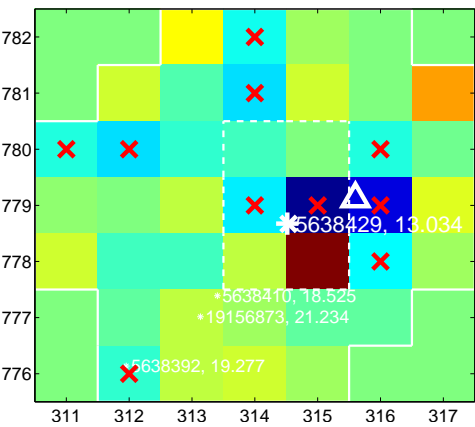
Q2 no difference image



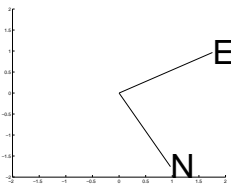
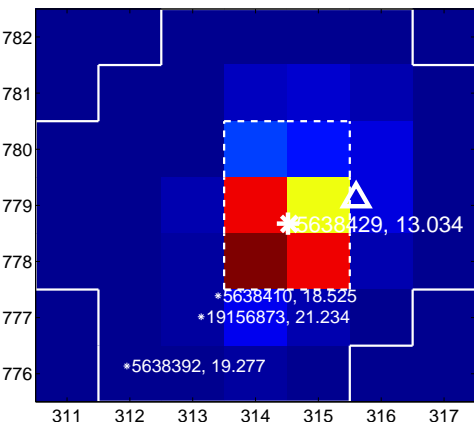
Q2 no OOT image



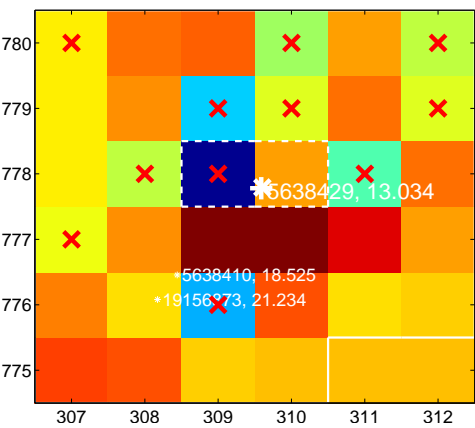
Q3 difference image. Poor Quality



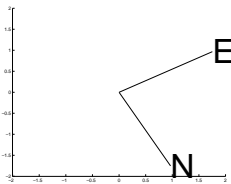
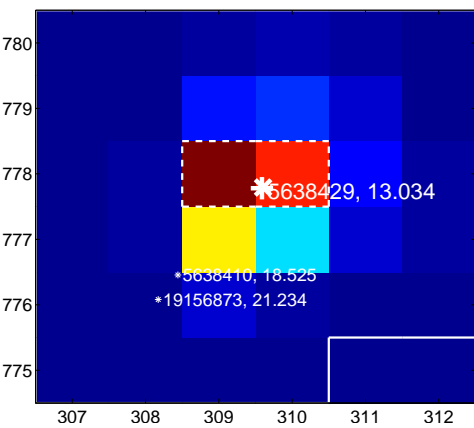
Q3 OOT image



Q4 difference image. Poor Quality

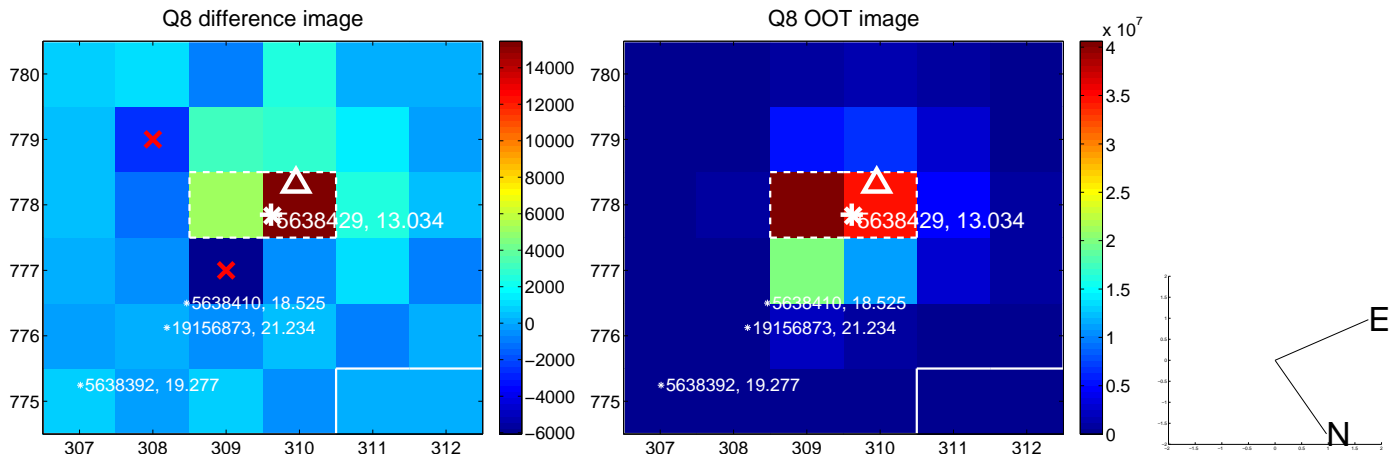
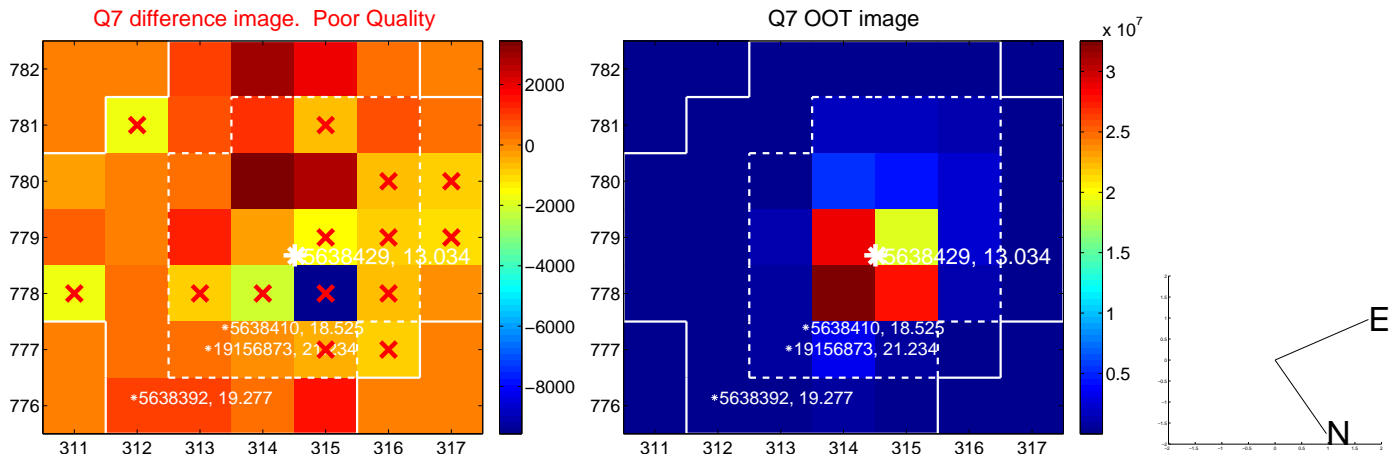
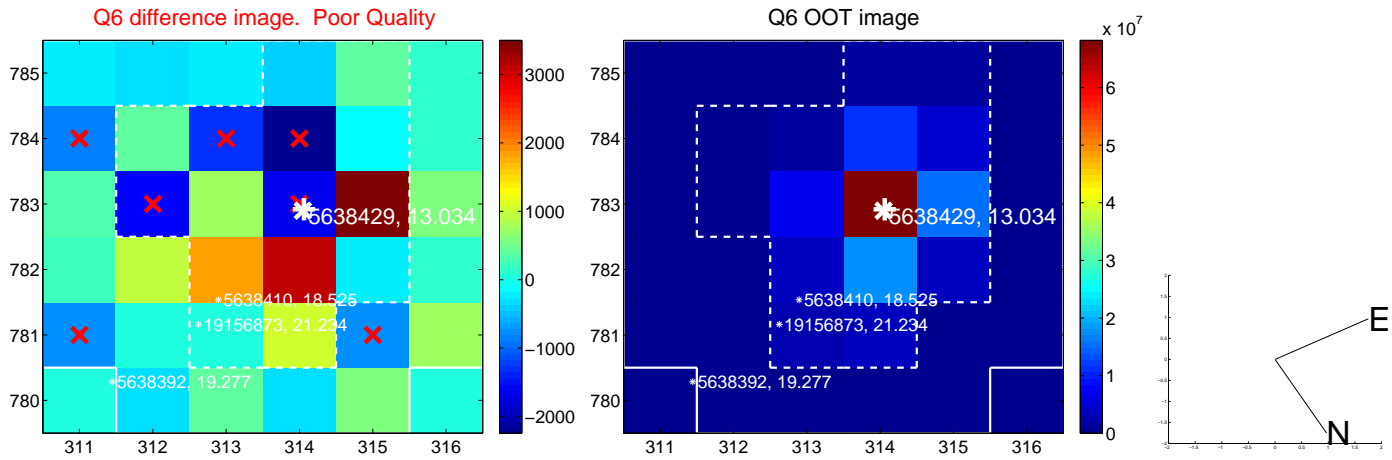
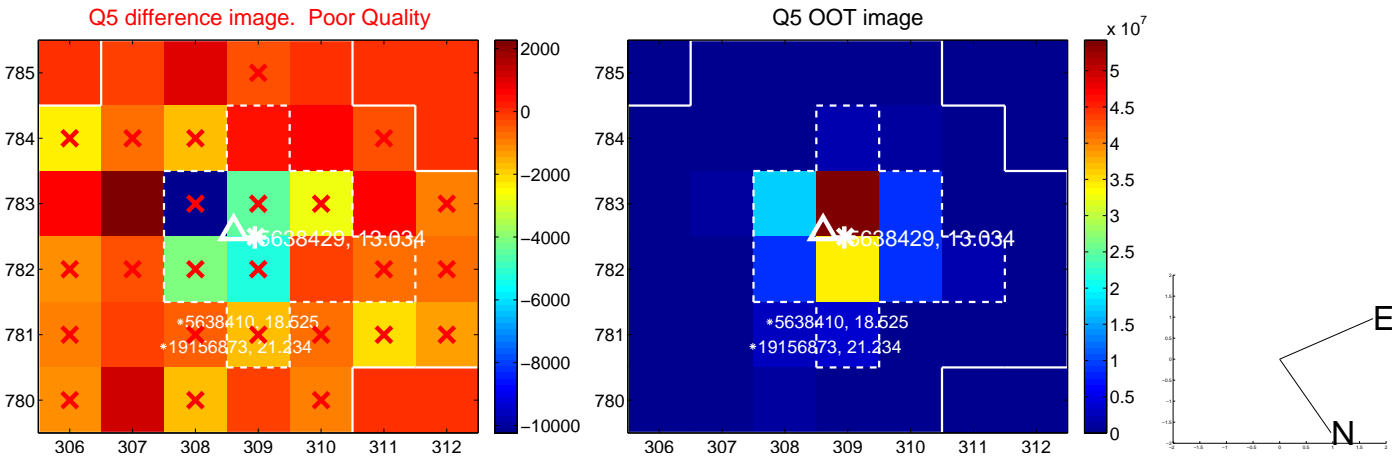


Q4 OOT image

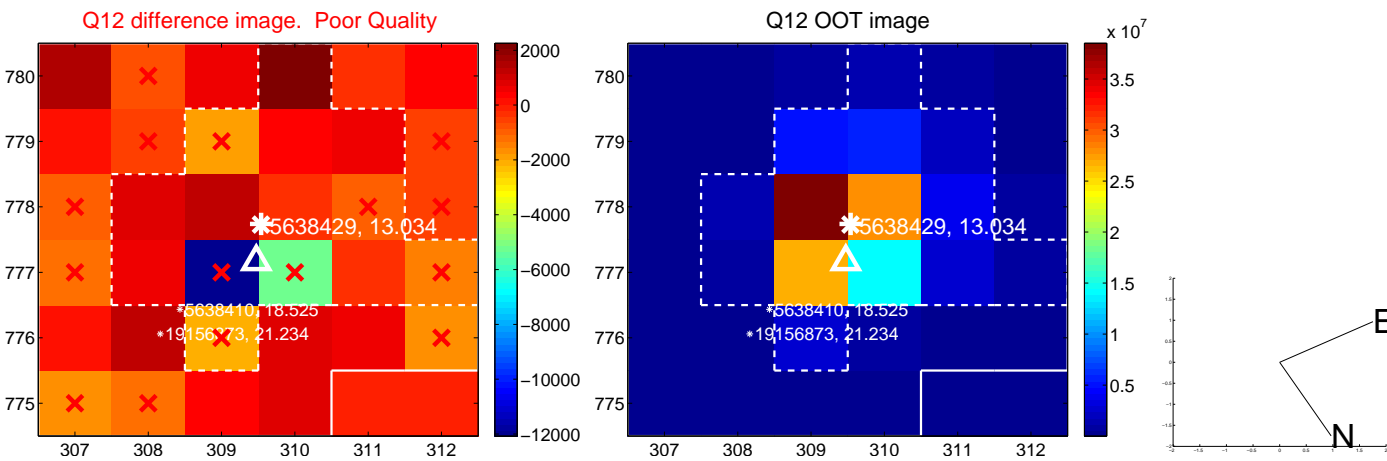
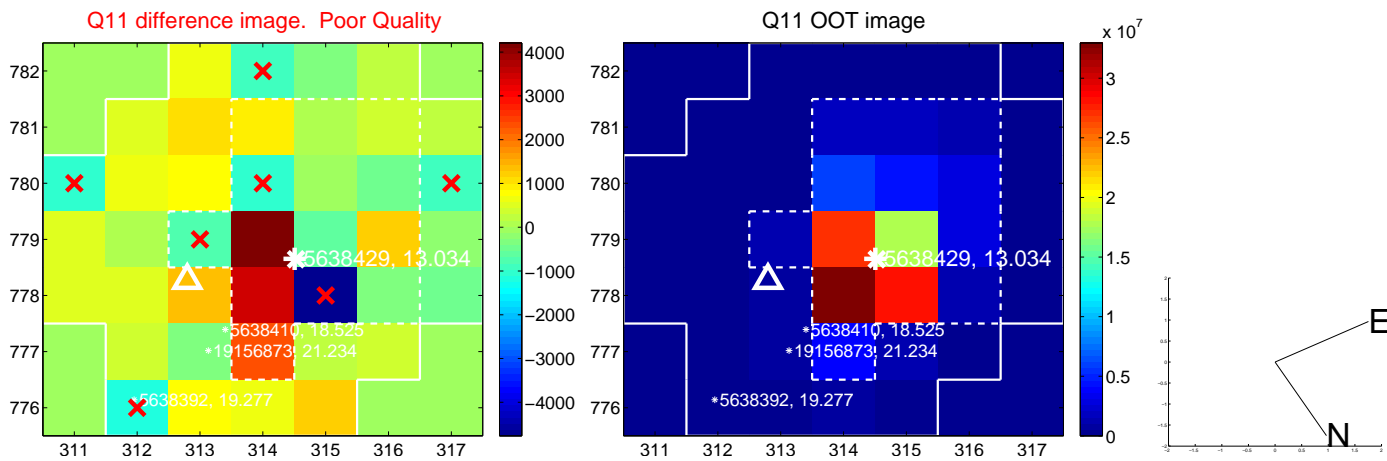
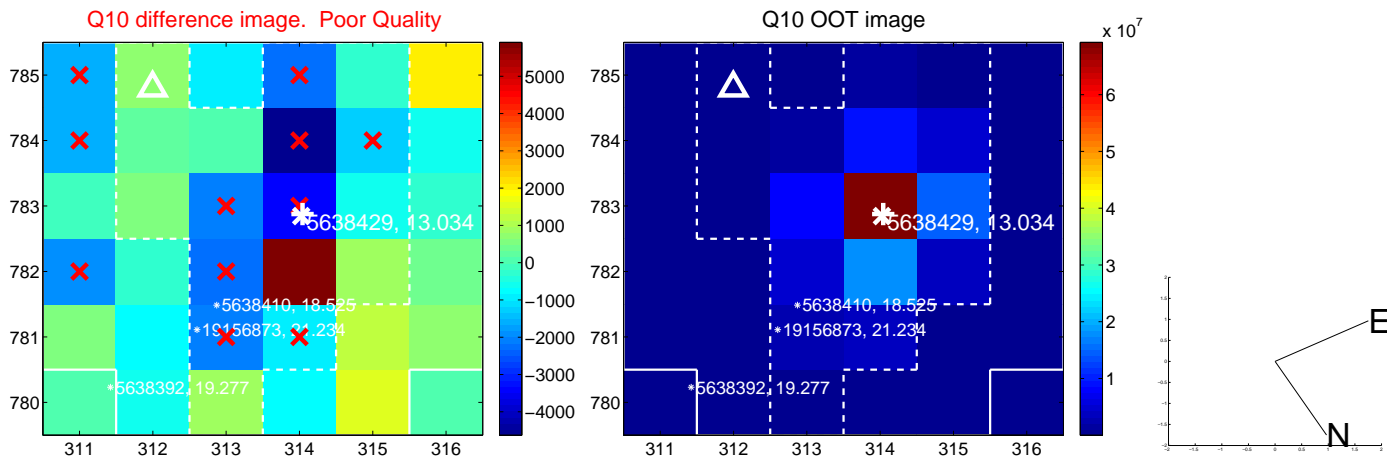
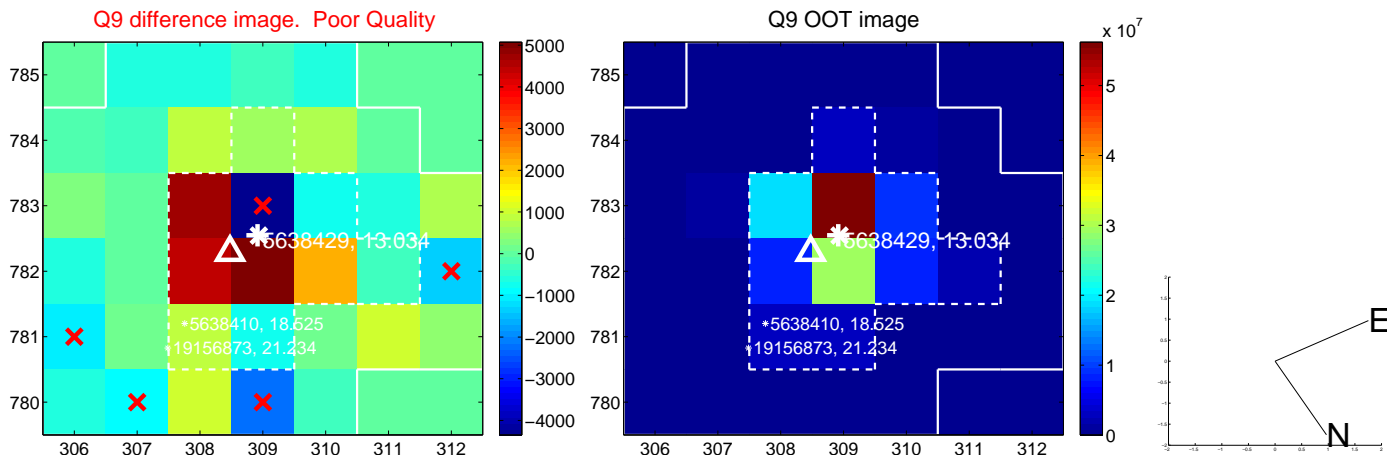




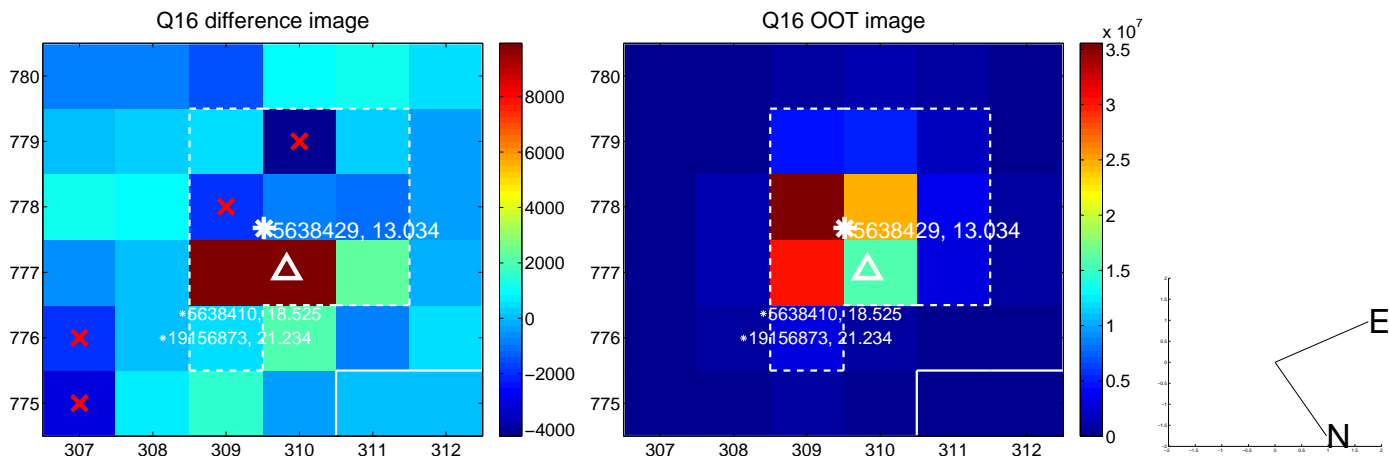
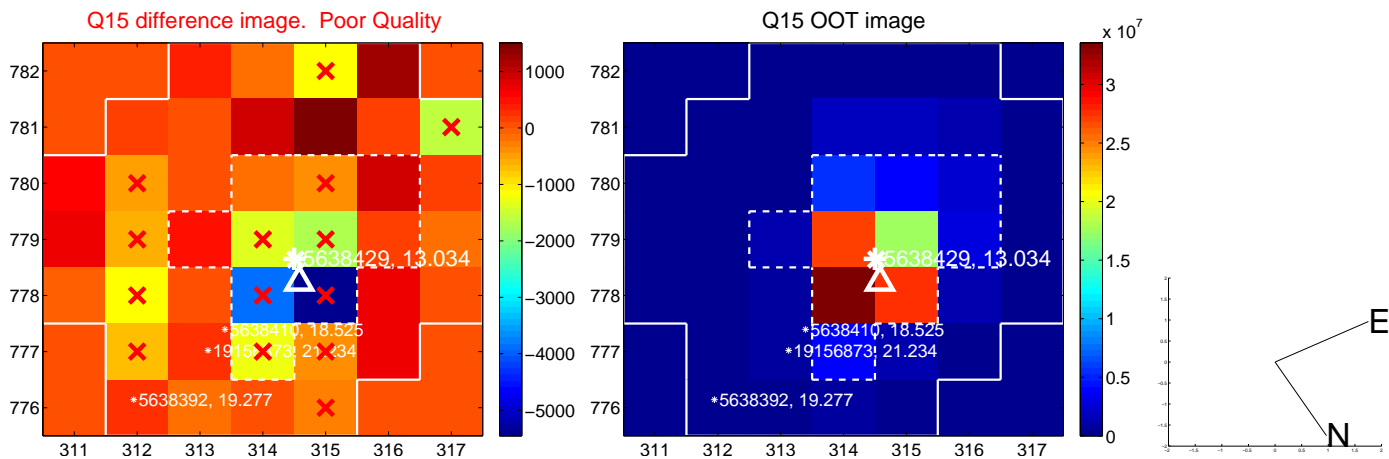
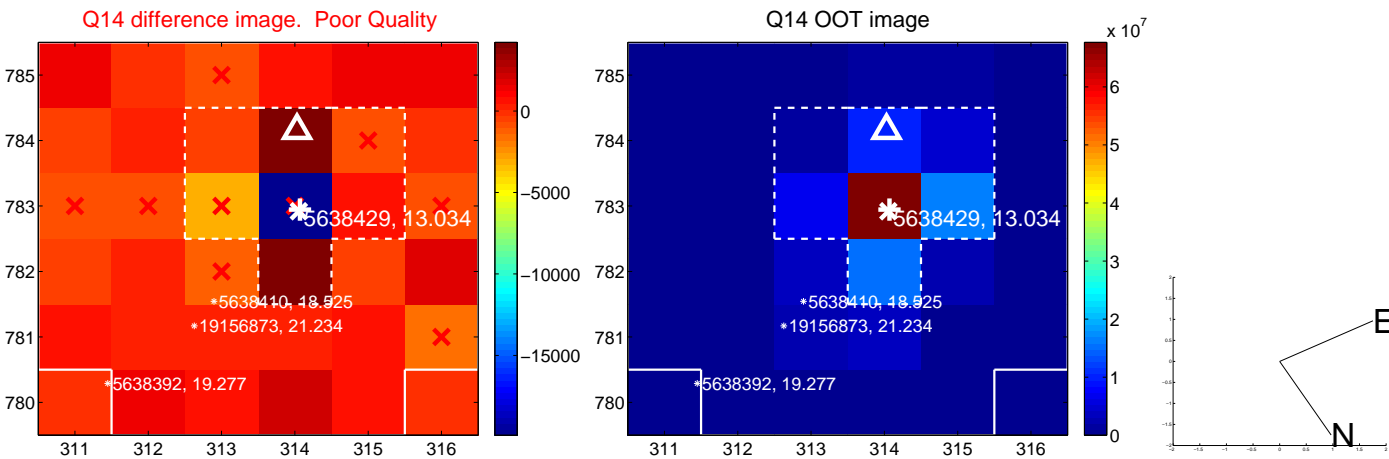
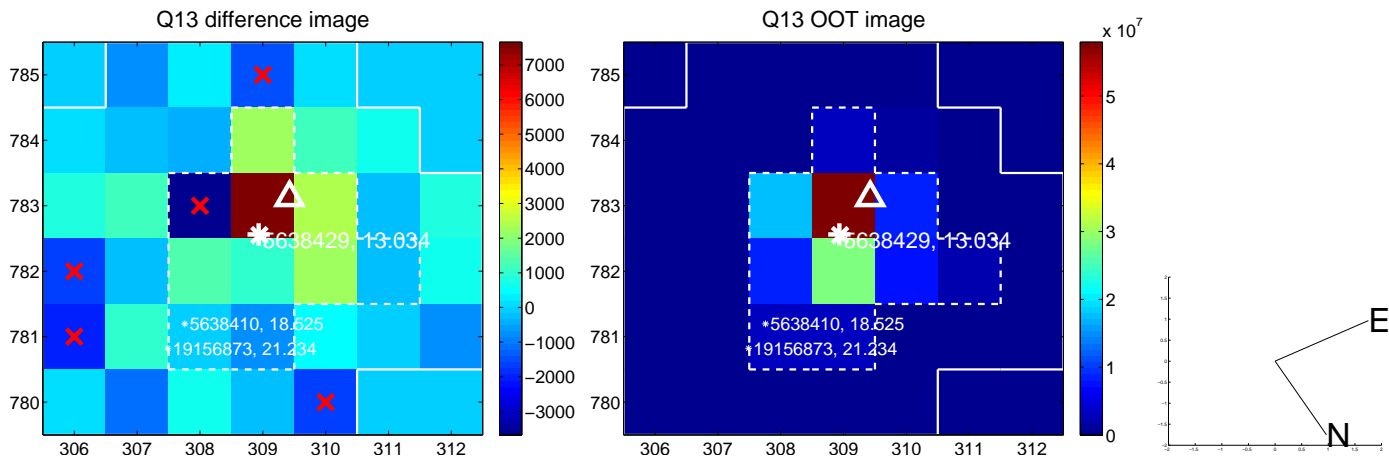
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



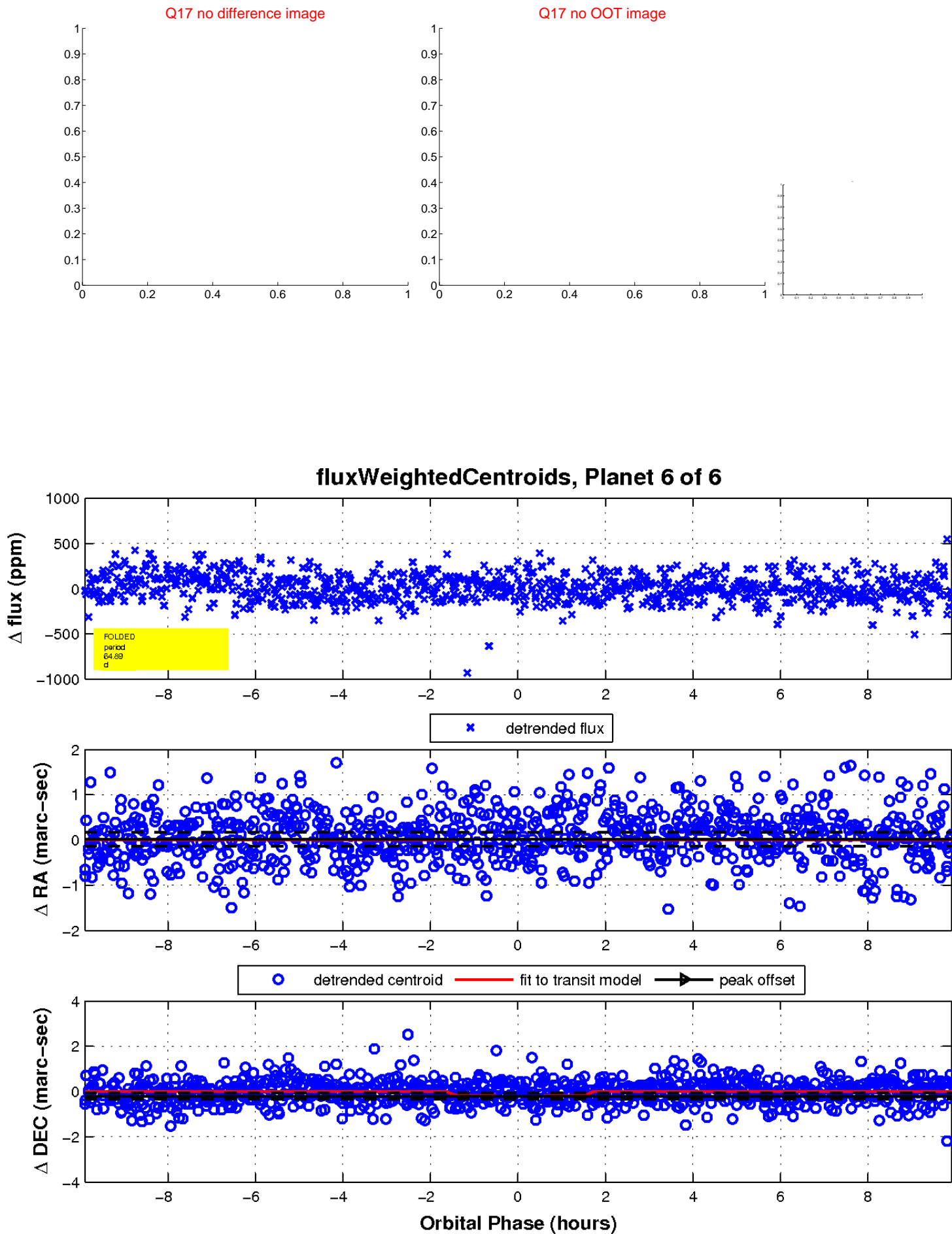
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

