

KIC 007281616

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})
007281616-01	OBS	6856.01	0.566767	131.848935	52.3	3.403	11.9	7.9	0.65	5092	0.48	1749.64
007281616-02	OBS	No	408.019563	199.024443	1135.7	4.554	9.3	6.8	0.65	5092	2.38	0.27

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007281616-01	OBS	FP	0.00	1	0	0	1	LPP_DV—EPHEM_MATCH
007281616-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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 for comment definitions.

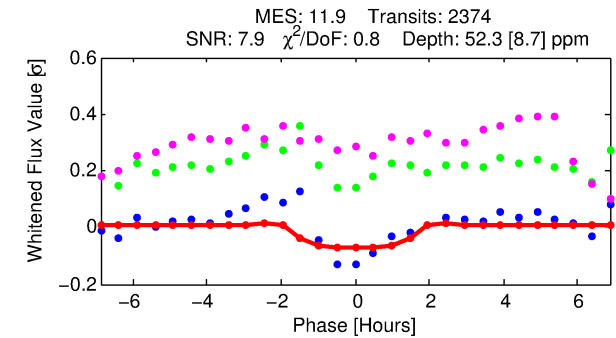
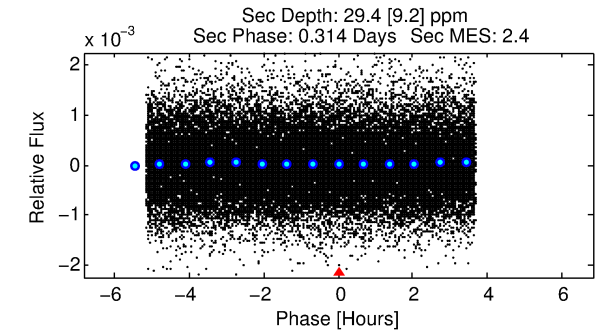
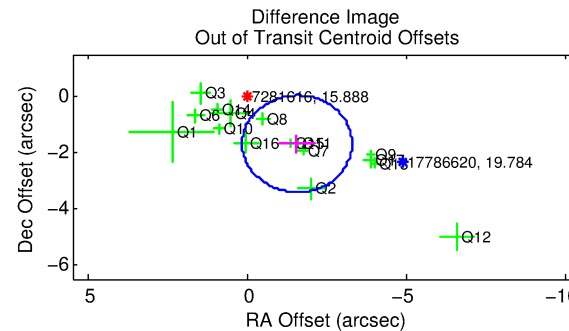
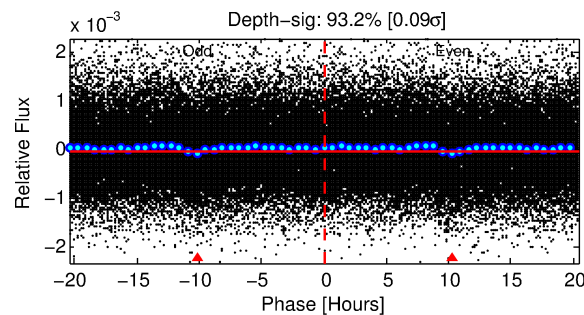
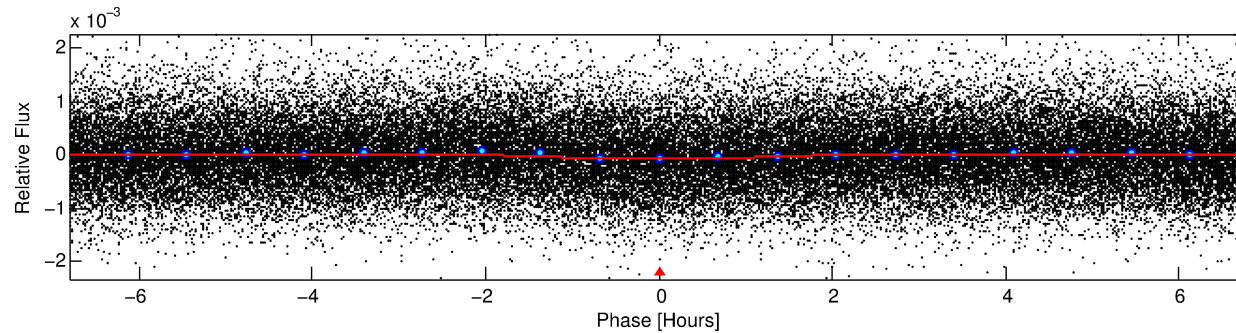
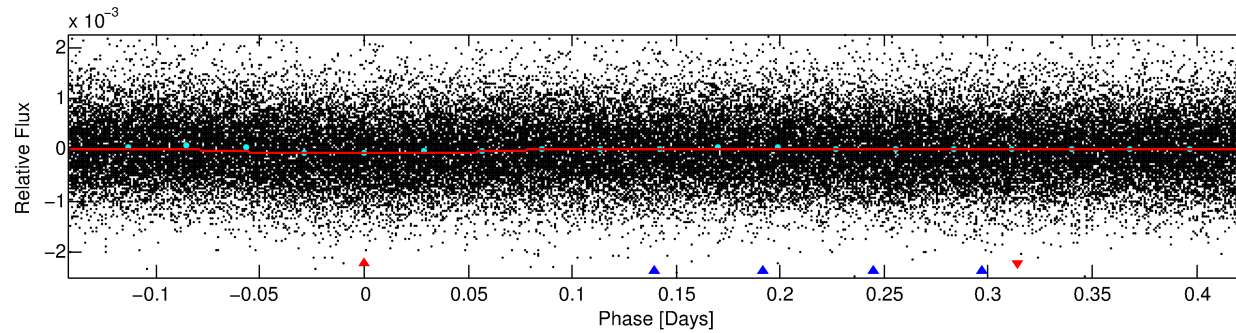
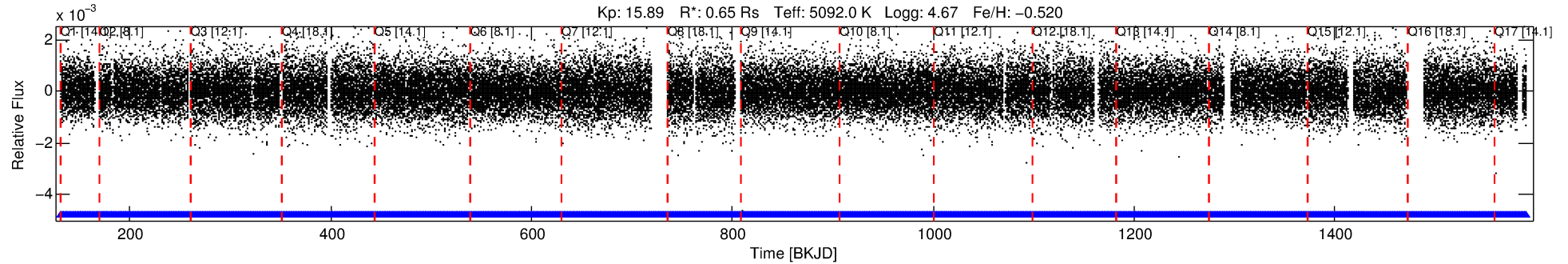
Ephemeris Match Information For 007281616-01

TCE (1)	KIC	Parent (2)	Parent KIC	P ₁ :P ₂	Dist ($''$)	Δ Row	Δ Col	m ₂	m ₁	D ₂ /D ₁	Mechanism	Flag	σ_P	σ_T
007281616-01	7281616	RR-Lyr-pri	7198959	1:1	791.7	41	194	7.86	15.89	11986.00	Direct-PRF	0	3.84	23.37

Notes: P₁:P₂ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m₂ and m₁ are the magnitudes of the parent and child. D₂/D₁ is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 7281616 Candidate: 1 of 2 Period: 0.567 d
KOI: K06856.01 Corr: 0.805



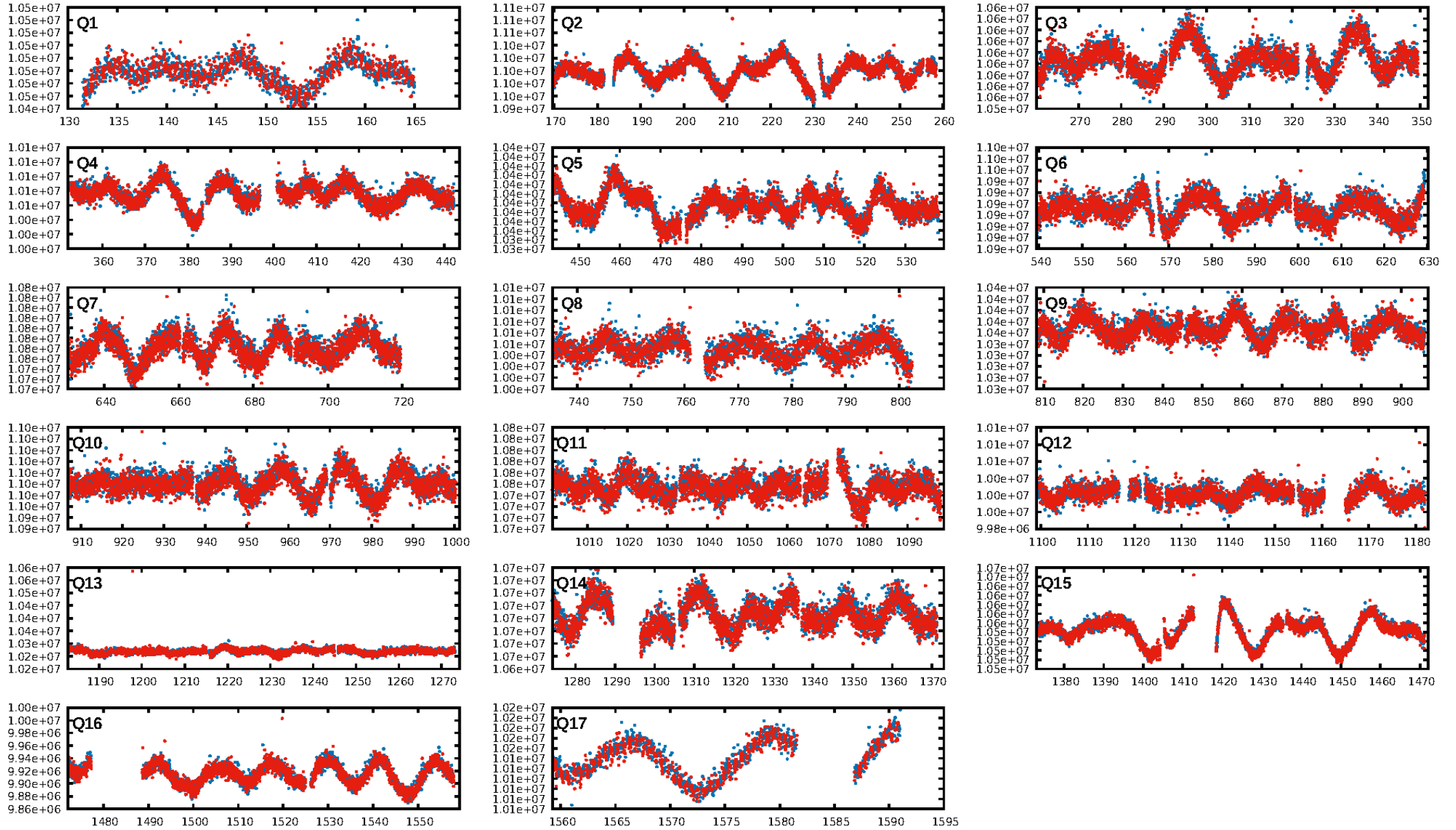
DV Fit Results:

Period = 0.56677 [0.00001] d
Epoch = 131.8489 [0.0047] BKJD
Rp/R* = 0.0068 [0.0076]
a/R* = 1.30 [2.21]
b = 0.58 [4.89]
Seff = 1749.64 [330.86]
Teq = 1649 [78] K
Rp = 0.48 [0.54] Re
a = 0.0120 [0.0013] AU
Ag = 10.02 [22.59] [0.40σ]
Teffp = 4536 [2555] K [1.13σ]

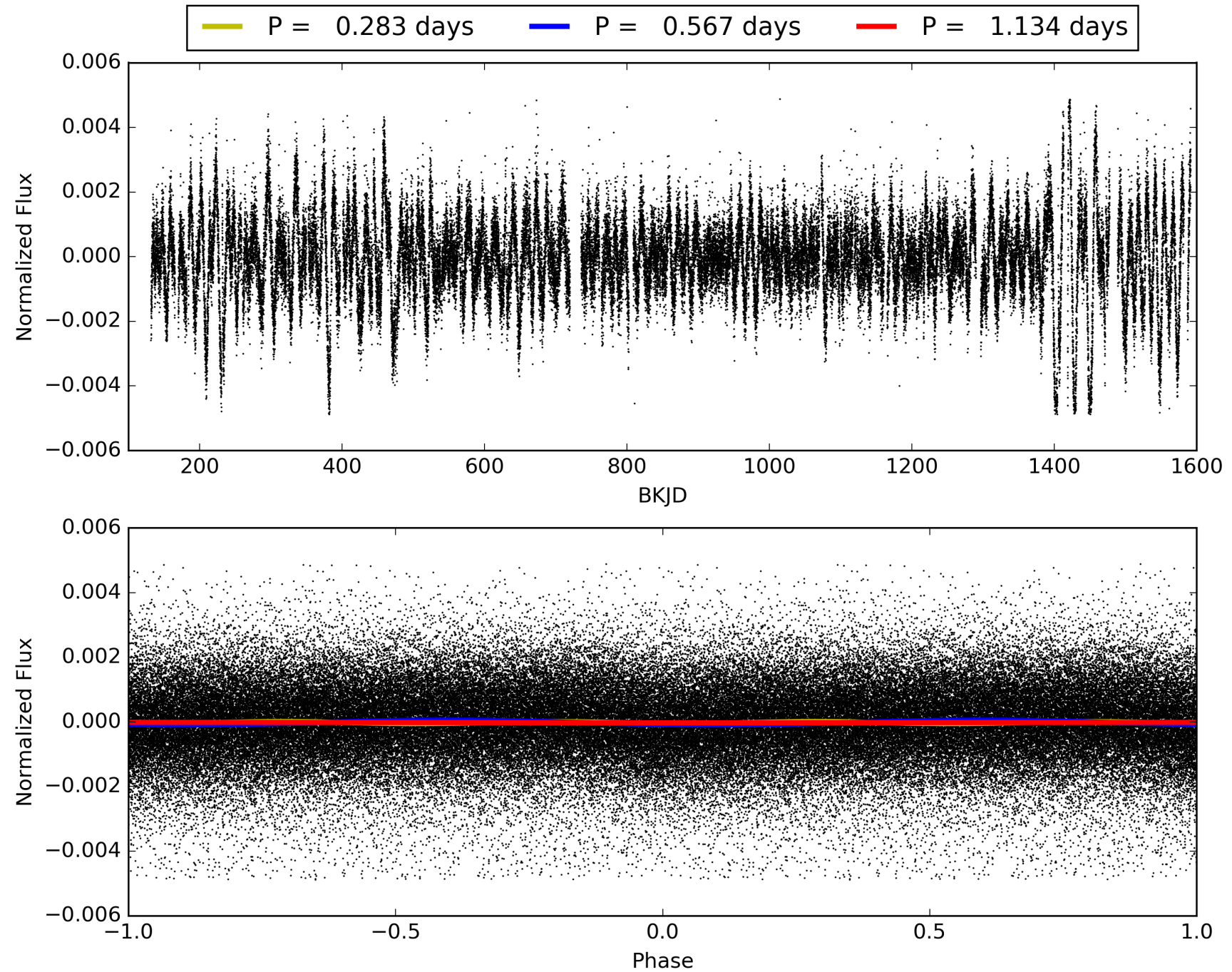
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1719.99σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.31e-19
RollingBand-fgt: 1.00 [2268/2268]
GhostDiagnostic-chr: -0.5333
Centroid-sig: 90.8%
Centroid-so: 0.698 arcsec [0.40σ]
OotOffset-rm: 2.297 arcsec [4.00σ]
KicOffset-rm: 2.289 arcsec [3.53σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.00 [0/16]
DiffImageOverlap-fno: 1.00 [17/17]

TCE 007281616-01, PDC Light Curves

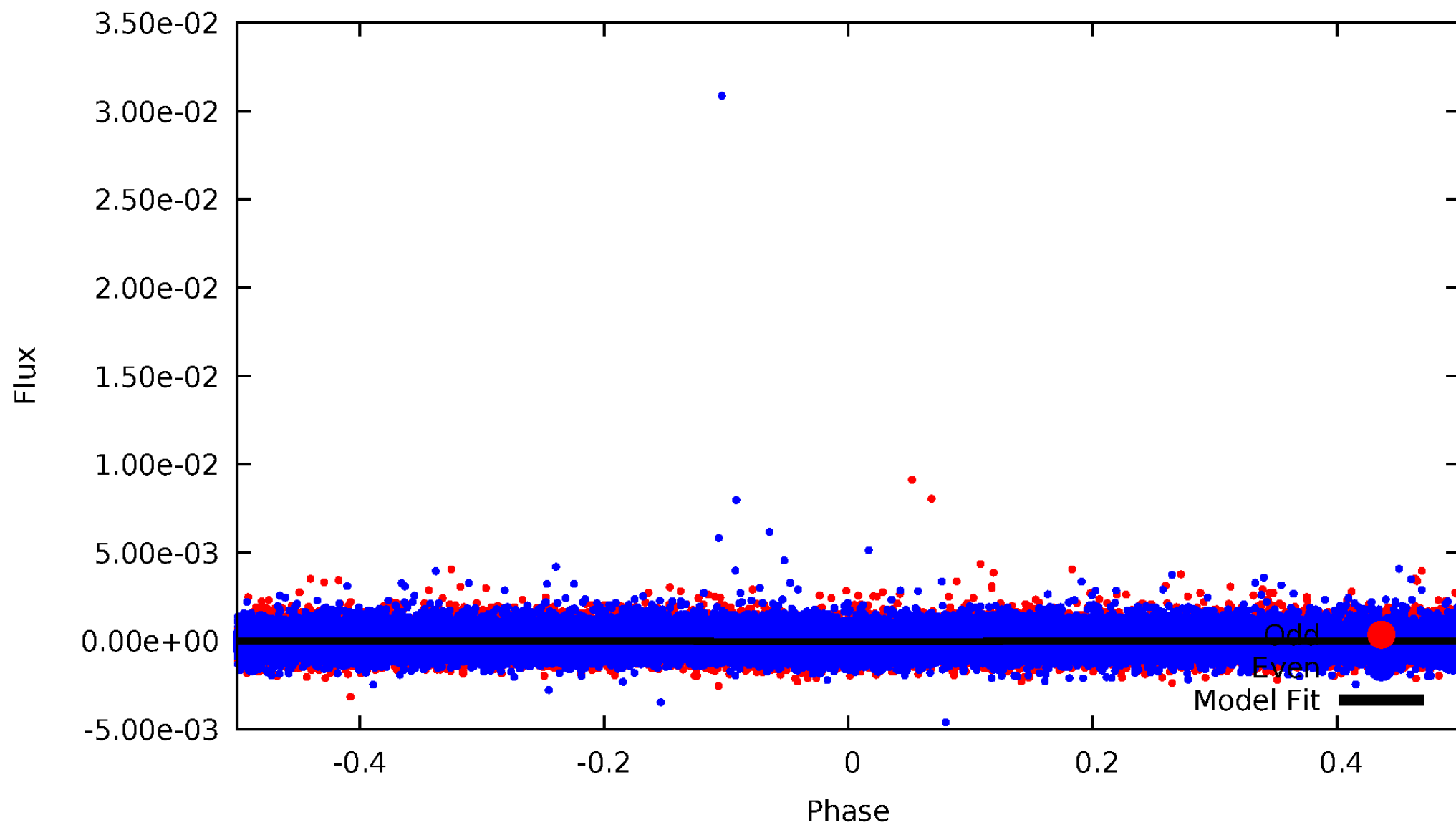


TCE 007281616-01



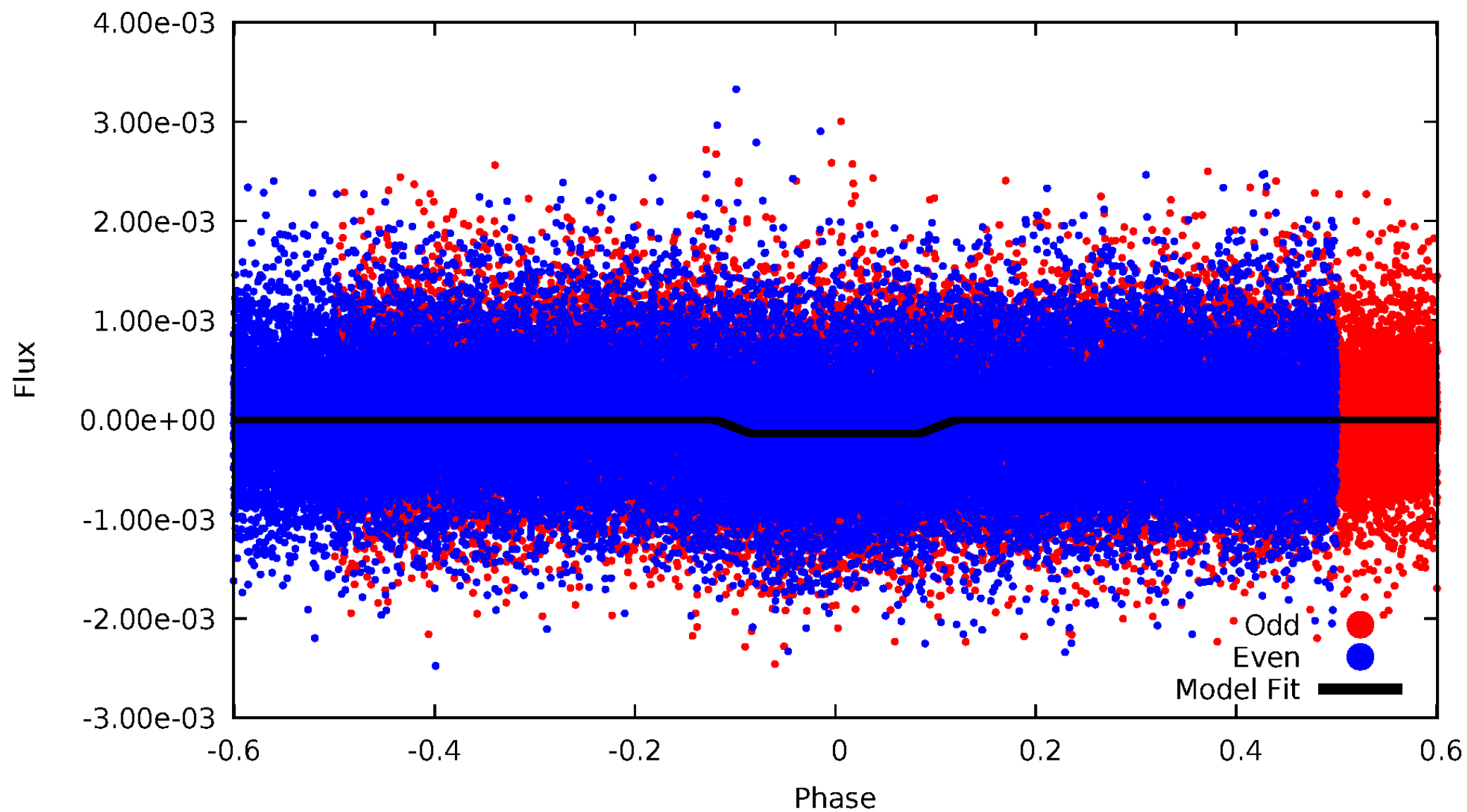
DV Odd/Even

TCE 007281616-01

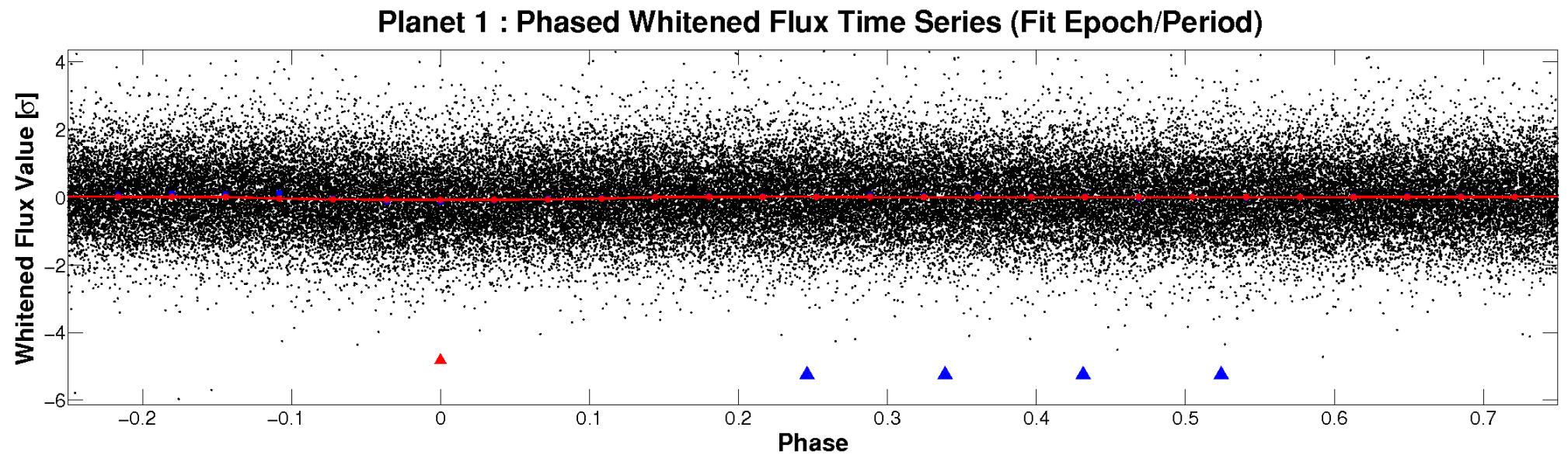
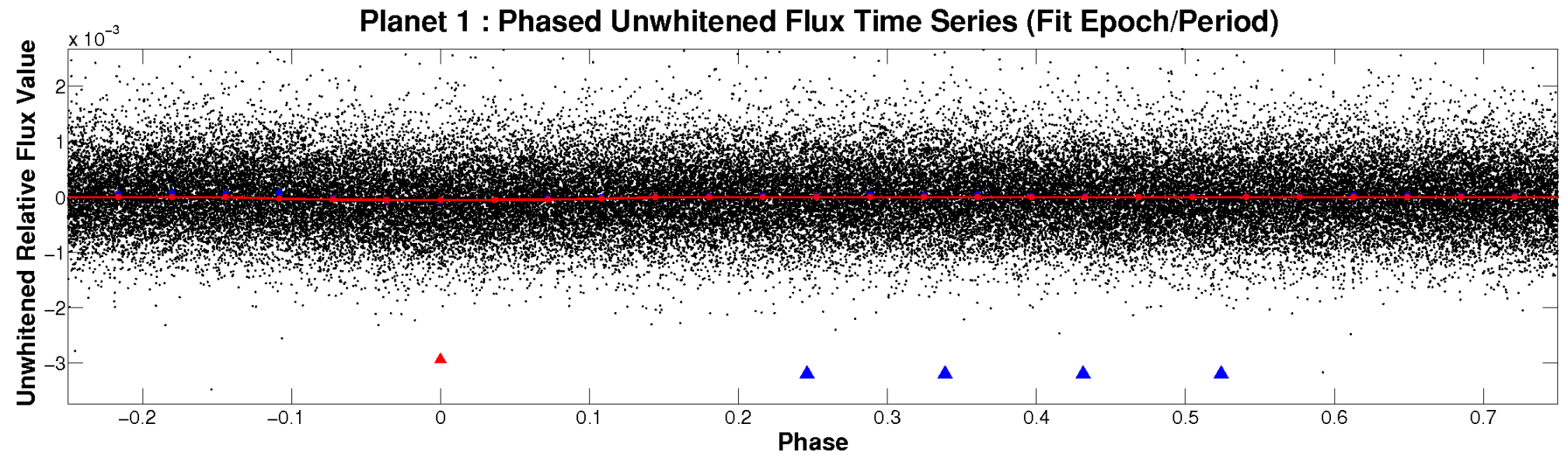


ALT Odd/Even

TCE 007281616-01

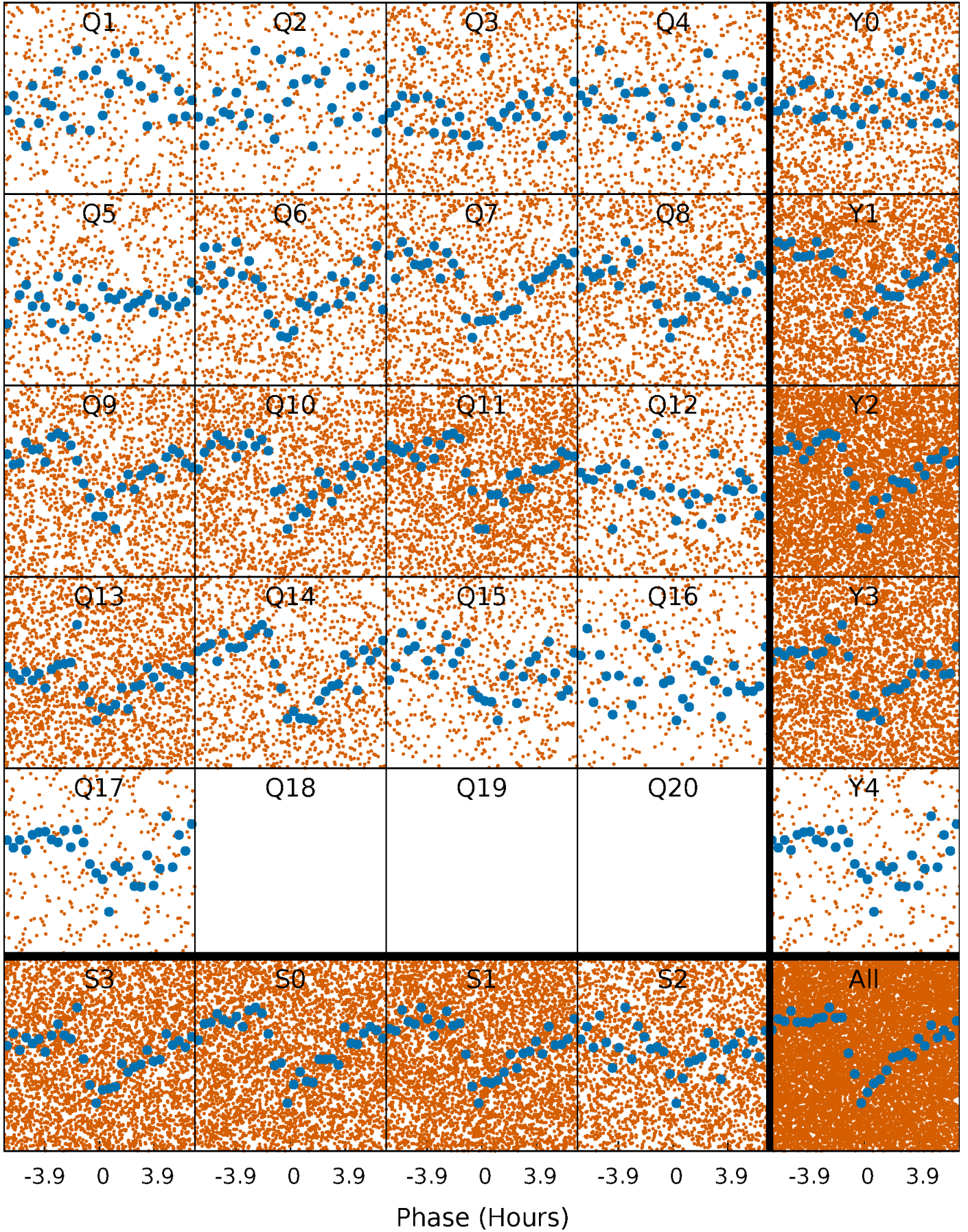


Non-Whitened Vs. Whitened Light Curve



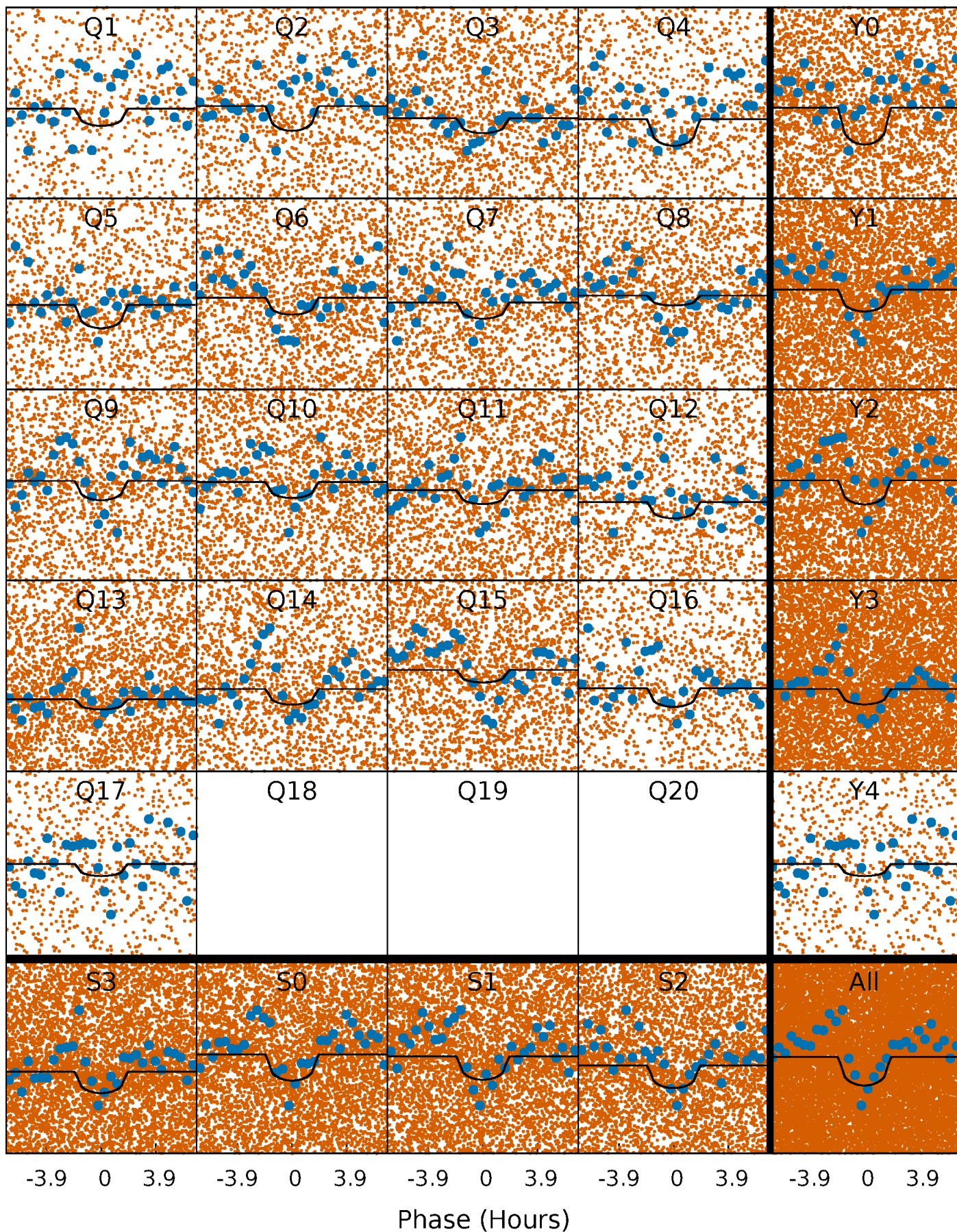
PDC Quarter-Phased Transit Curves

TCE 007281616-01 P= 0.566767 Days $T_0=131.848935$ (BKJD)



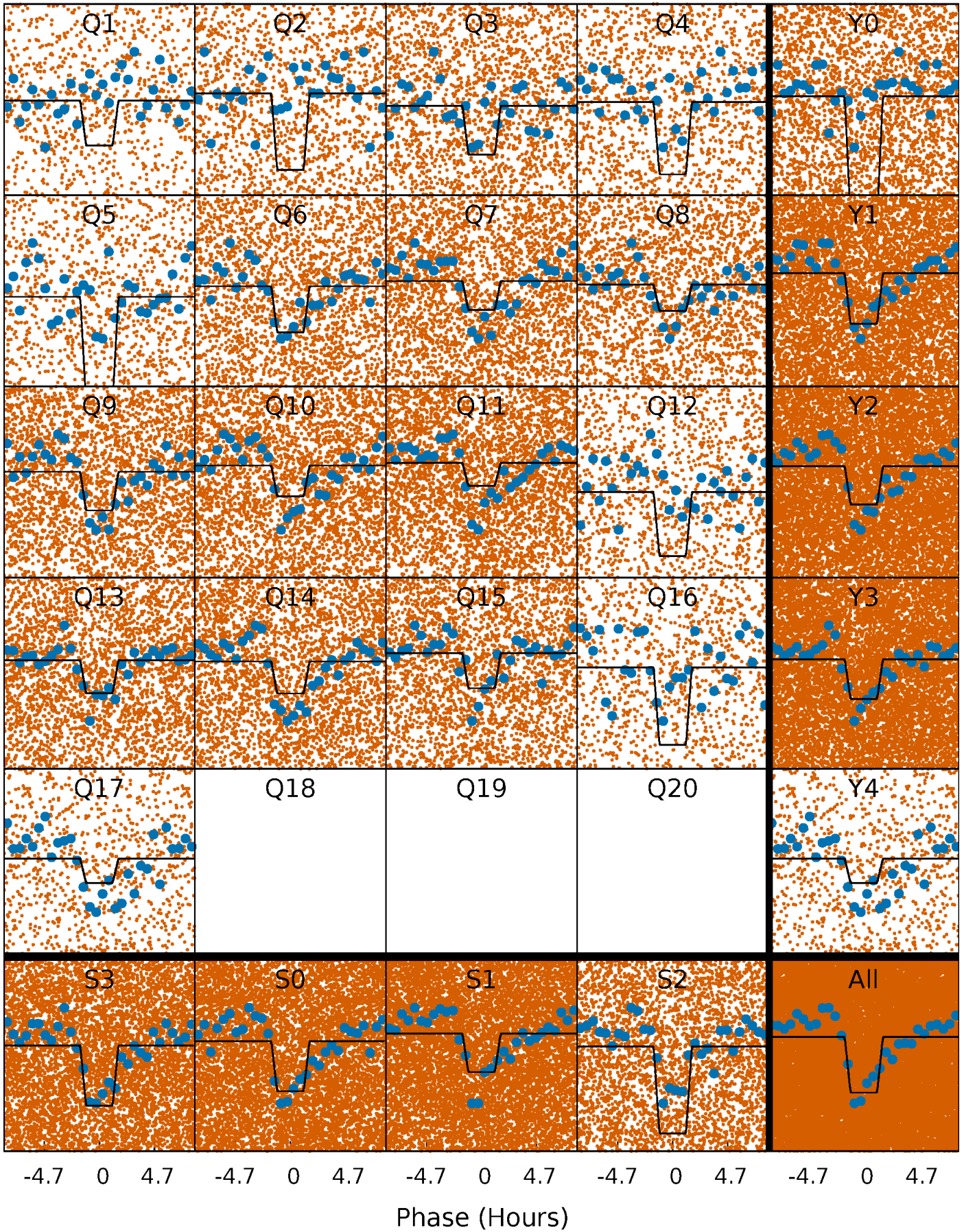
DV Quarter-Phased Transit Curves

TCE 007281616-01 P= 0.566767 Days $T_0=131.848935$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

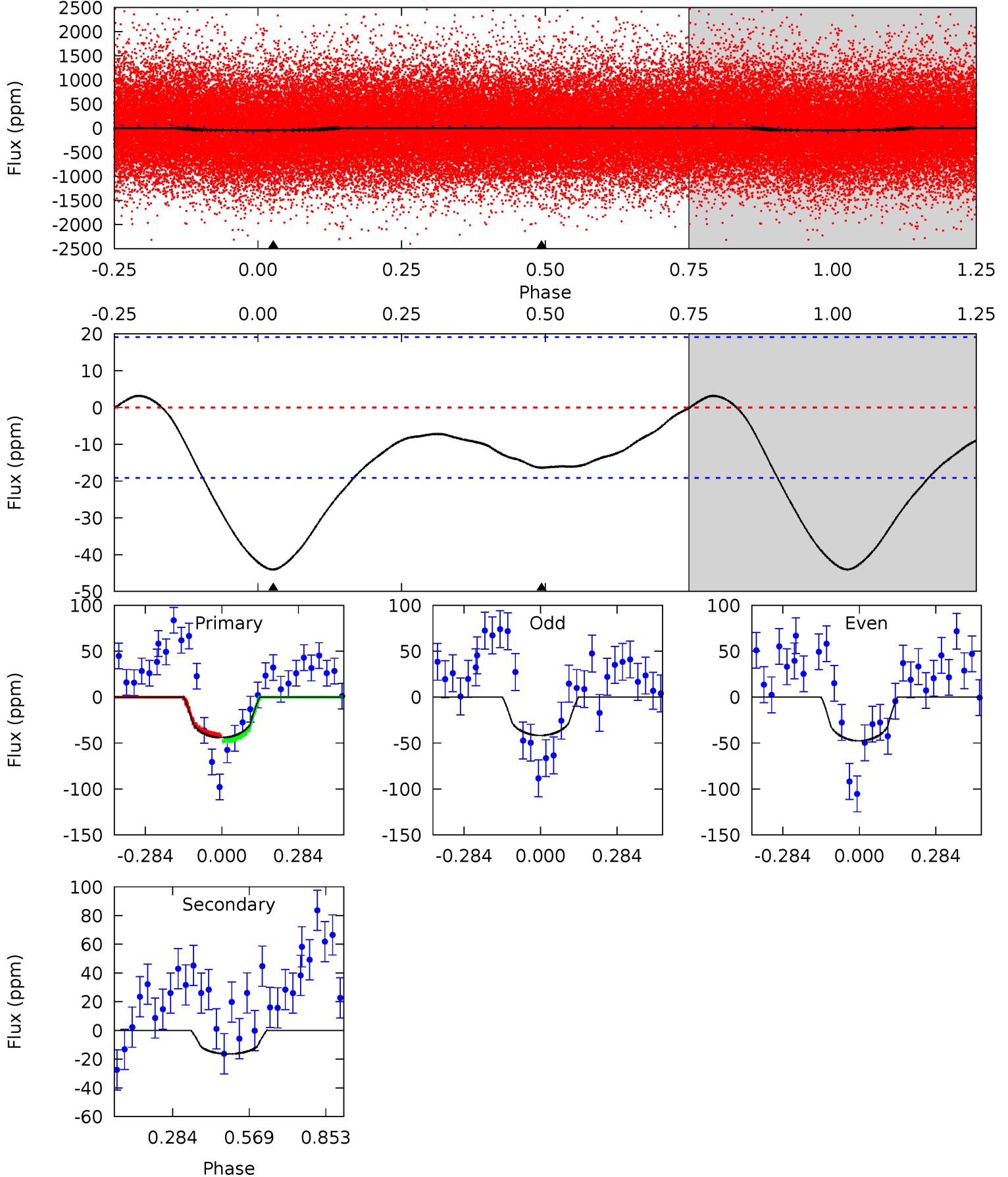
TCE 007281616-01 P= 0.566794 Days $T_0=131.825580$ (BKJD)



DV Model-Shift Uniqueness Test

007281616-01, P = 0.566767 Days, E = 131.282168 Days

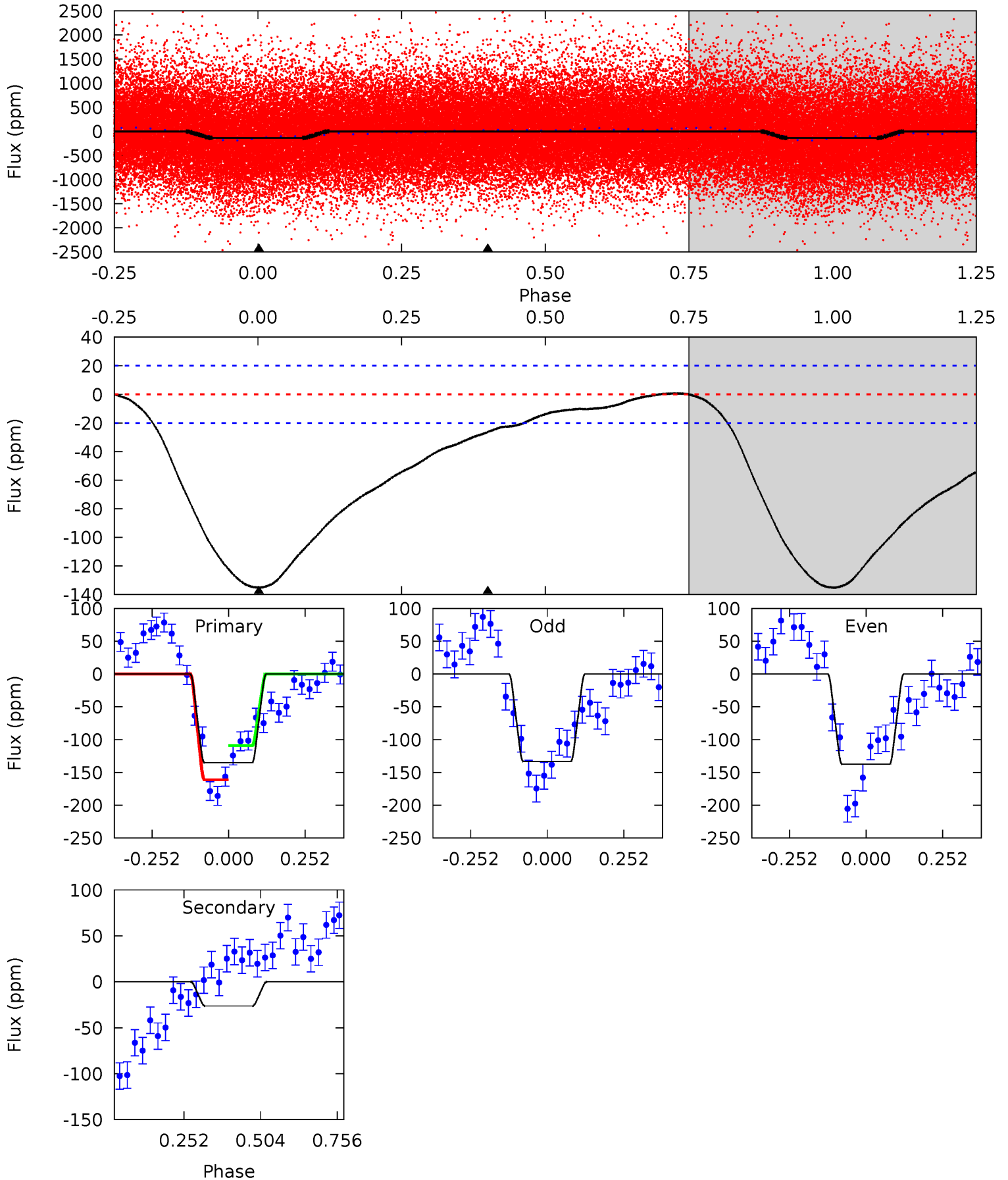
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.00	3.72	0	0	4.34	1.07	0.88	10.00	10.00	3.72	3.72	0.67	0.90	0.07	0.64



Alt Model-Shift Uniqueness Test

007281616-01, P = 0.566794 Days, E = 131.258786 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.4	5.73	0	0	4.37	1.15	0.28	29.4	29.4	5.73	5.73	0.46	0.97	0.01	5.56



Stellar Parameters For KIC 007281616

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5092^{+151}_{-151}	$4.671^{+0.028}_{-0.077}$	$-0.520^{+0.300}_{-0.300}$	$0.645^{+0.085}_{-0.039}$	$0.712^{+0.067}_{-0.067}$	$3.728^{+0.498}_{-0.947}$
	+3%/-3%	+1%/-2%	+58%/-58%	+13%/-6%	+9%/-9%	+13%/-25%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007281616-01 / KOI 6856.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-16 ± 4	$0.64^{+0.49}_{-0.41}$	2321^{+95}_{-84}	3686^{+2068}_{-737}	$3.012^{+23.074}_{-2.068}$
Alt.	-26 ± 5	$0.90^{+0.59}_{-0.46}$	2328^{+90}_{-84}	3555^{+1102}_{-595}	$2.430^{+8.063}_{-1.498}$

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

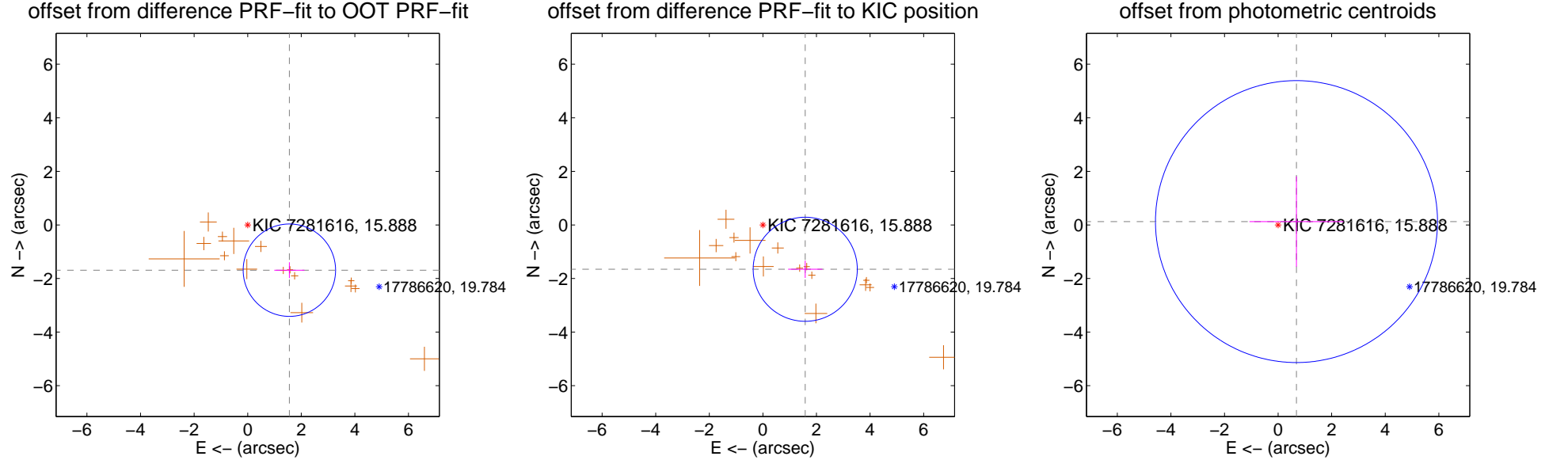
DV Centroid Data

Supplemental centroid analysis for 007281616-01. Kepler magnitude: 15.89. Transit SNR 7.88

There are 0 quarters with good PRF difference image offsets

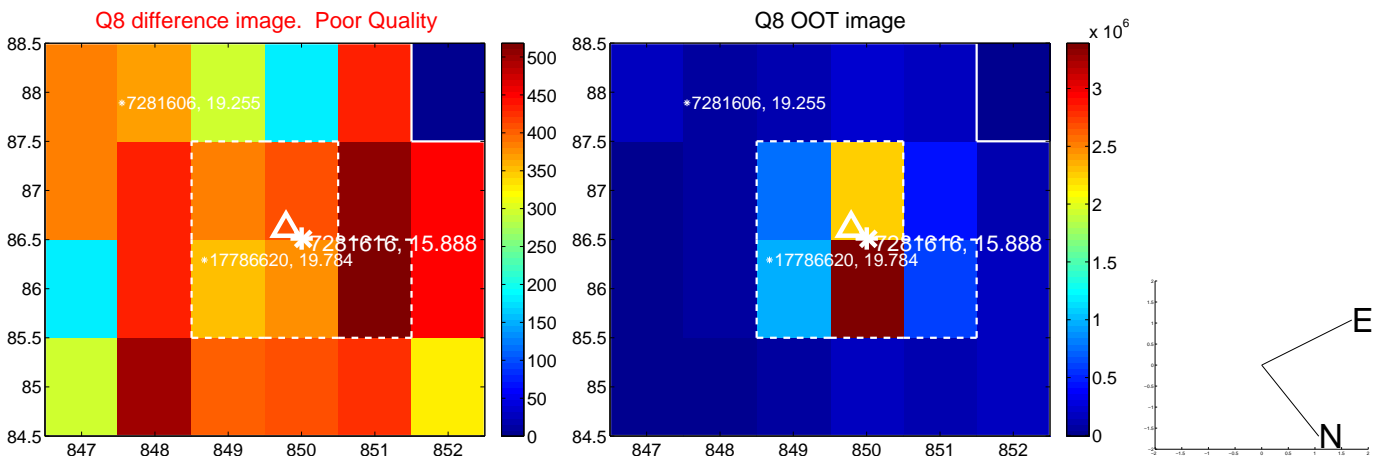
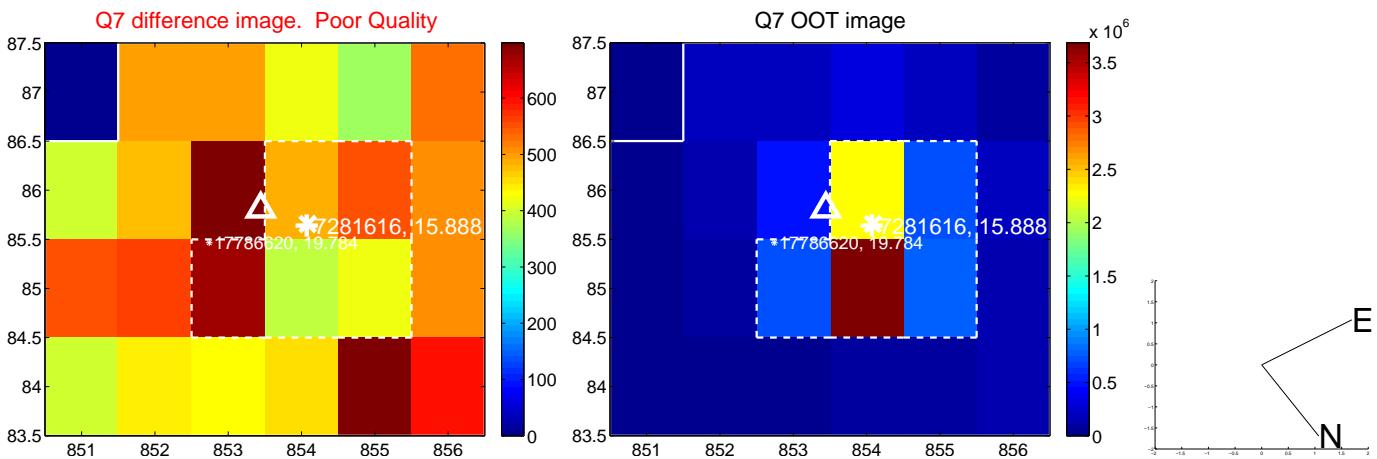
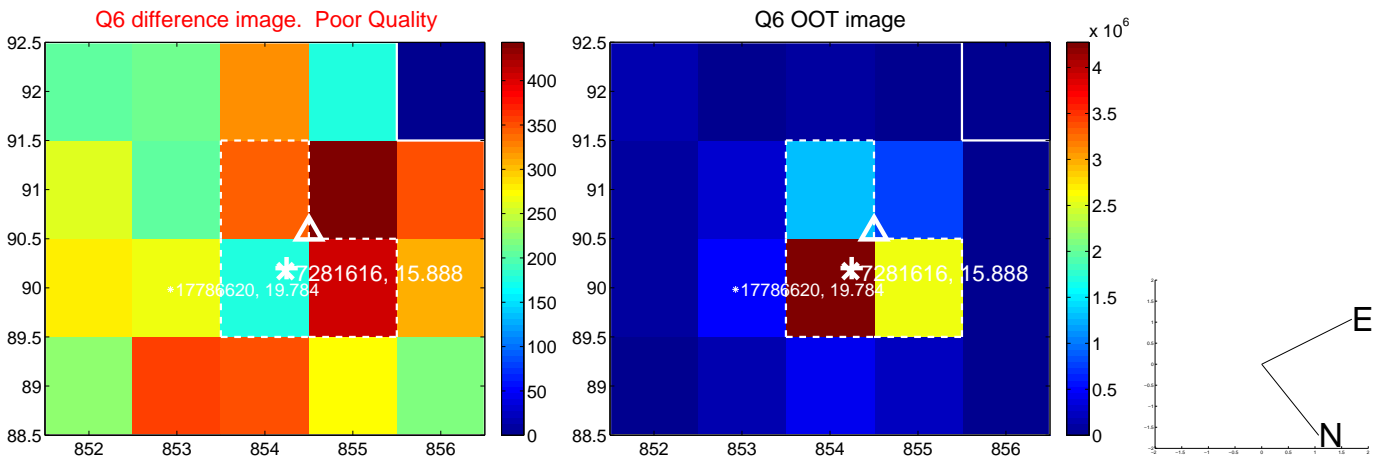
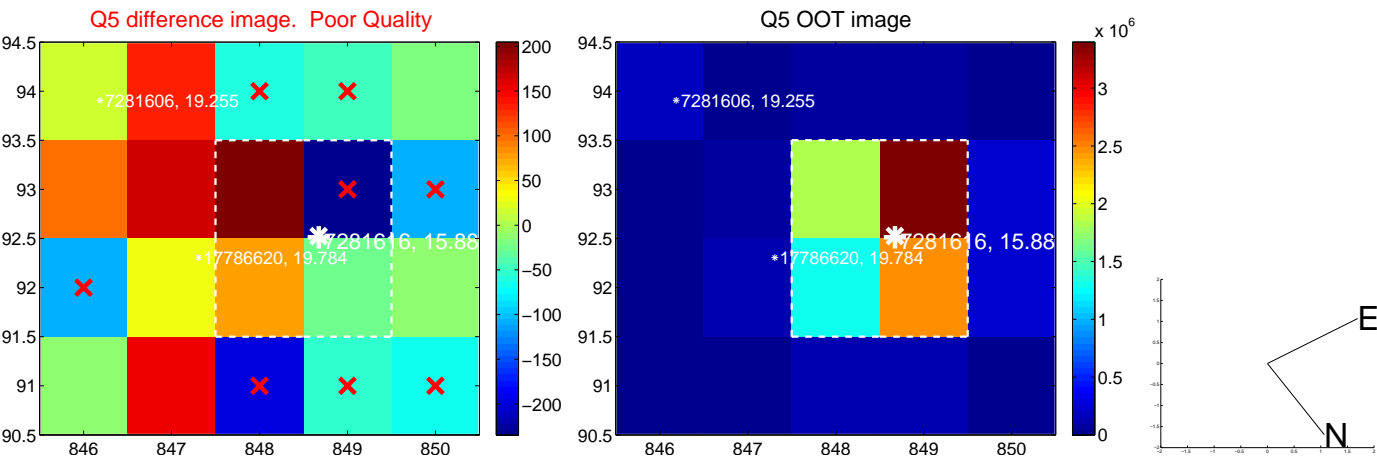
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.297 ± 0.575	4.00	-1.556 ± 0.563	-1.690 ± 0.295
PRF-fit source offset from KIC position	2.289 ± 0.648	3.53	-1.581 ± 0.638	-1.655 ± 0.324
photometric centroid source offset	0.70 ± 1.75	0.40	-0.69 ± 1.76	0.13 ± 1.69

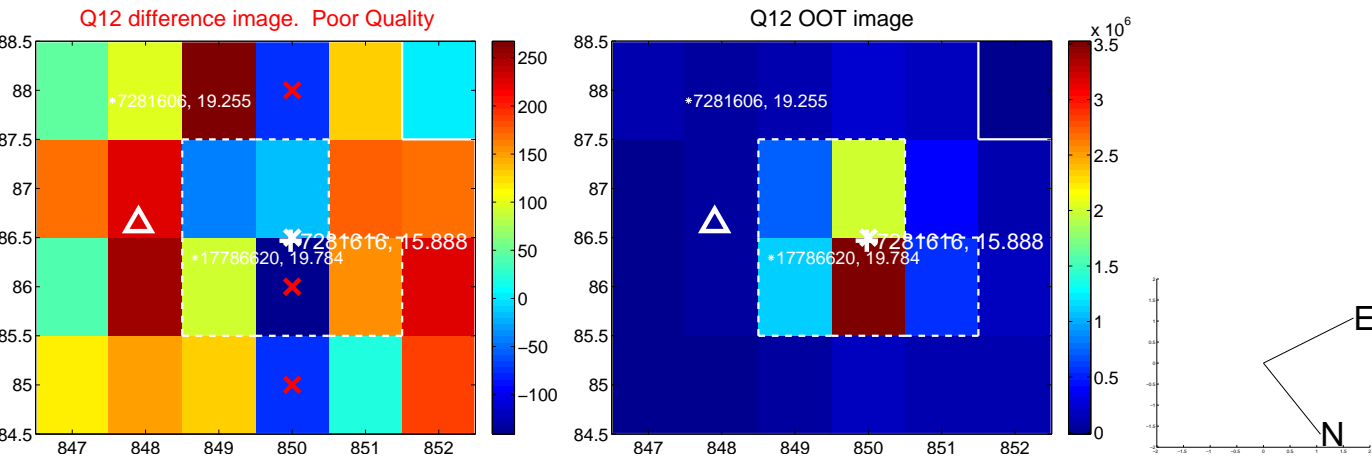
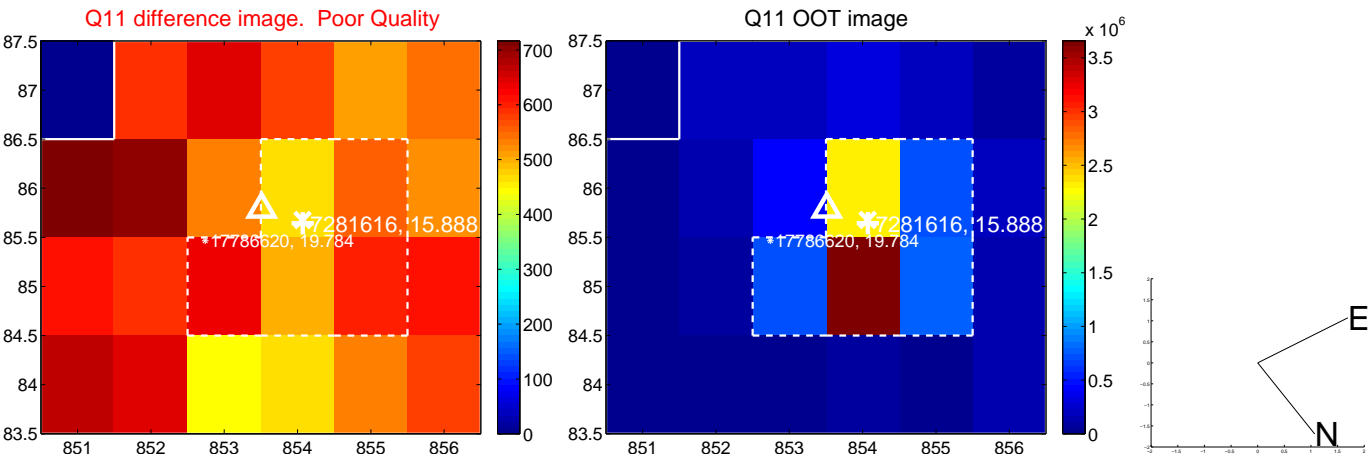
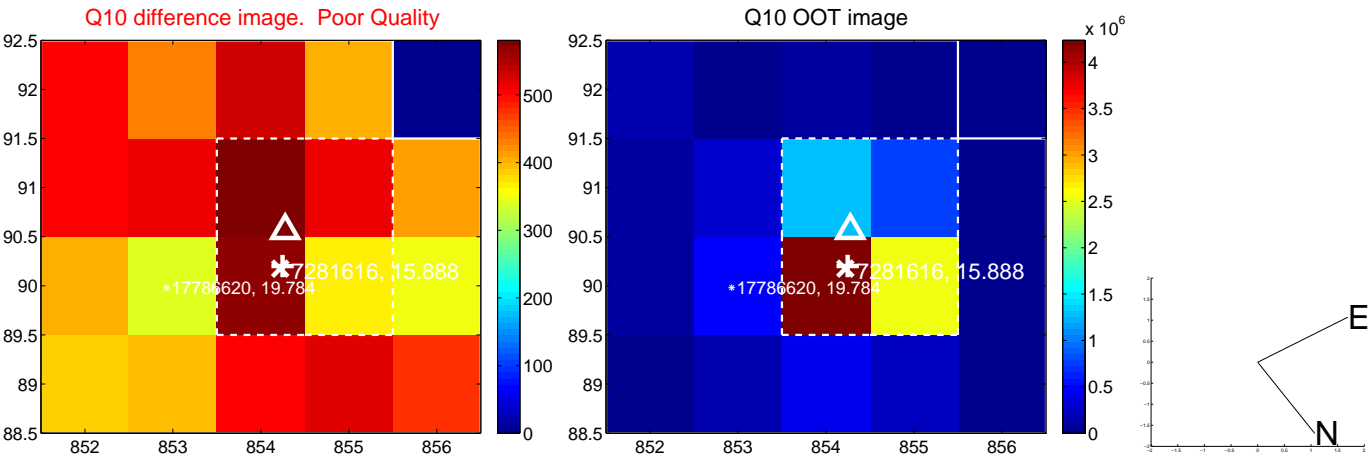
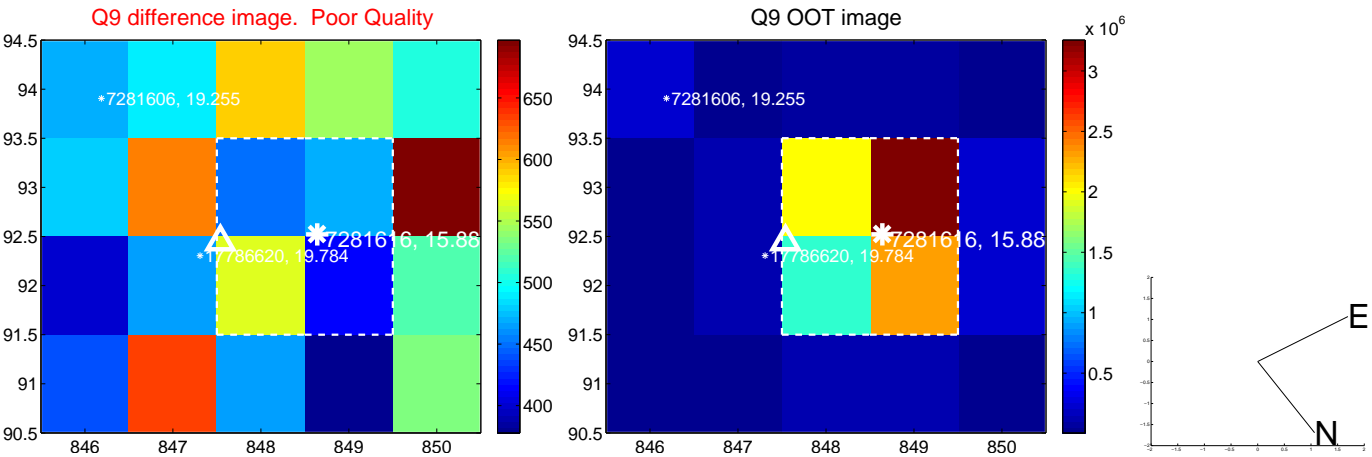


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

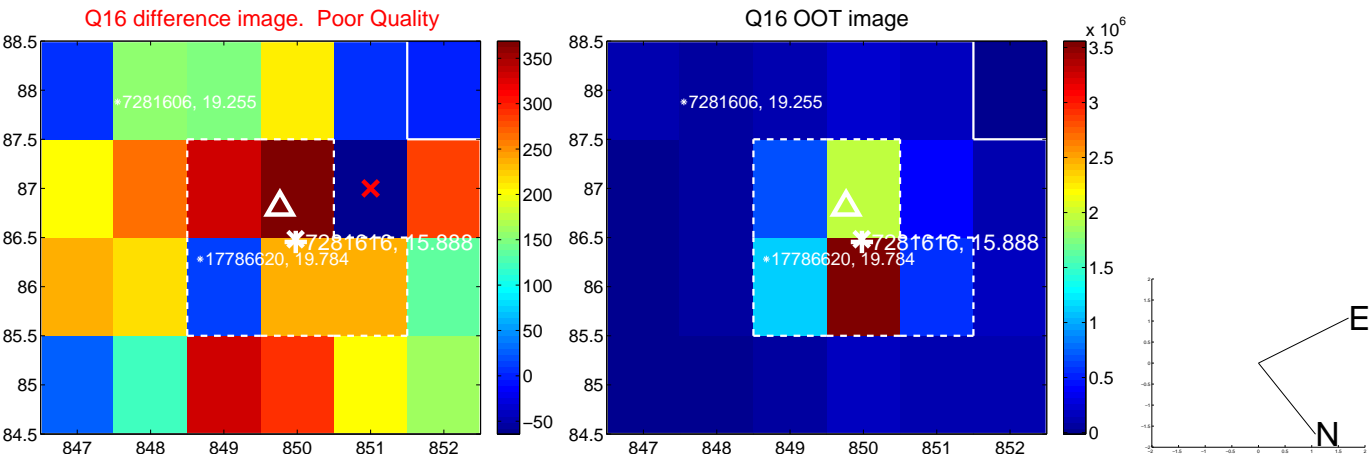
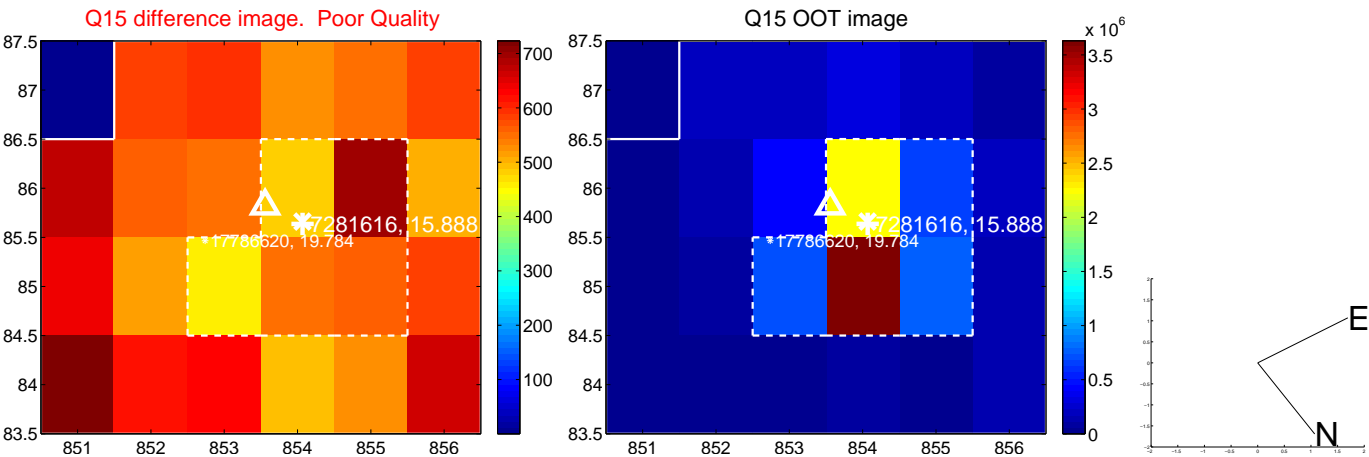
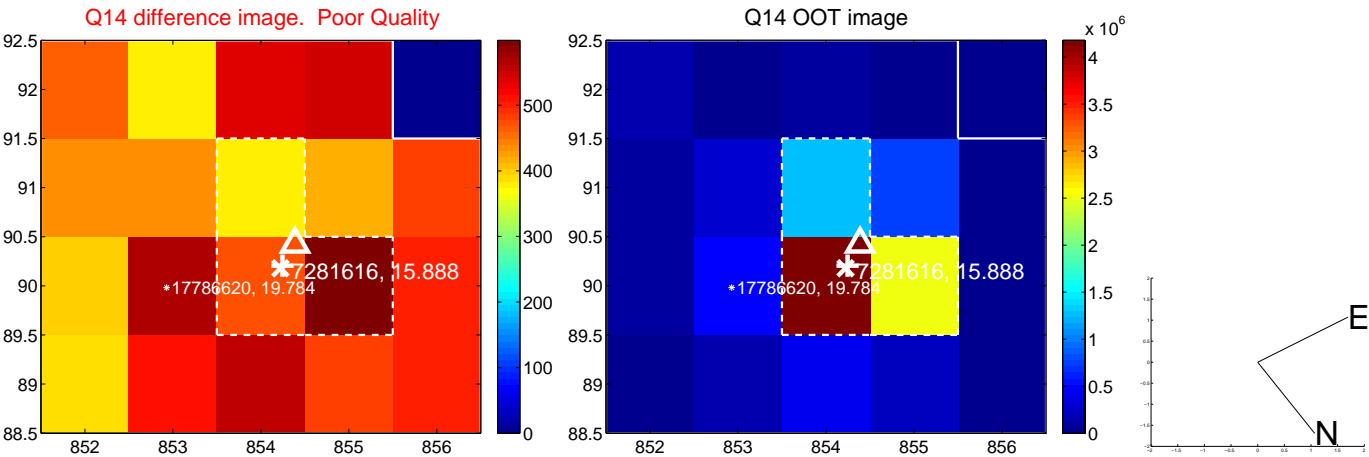
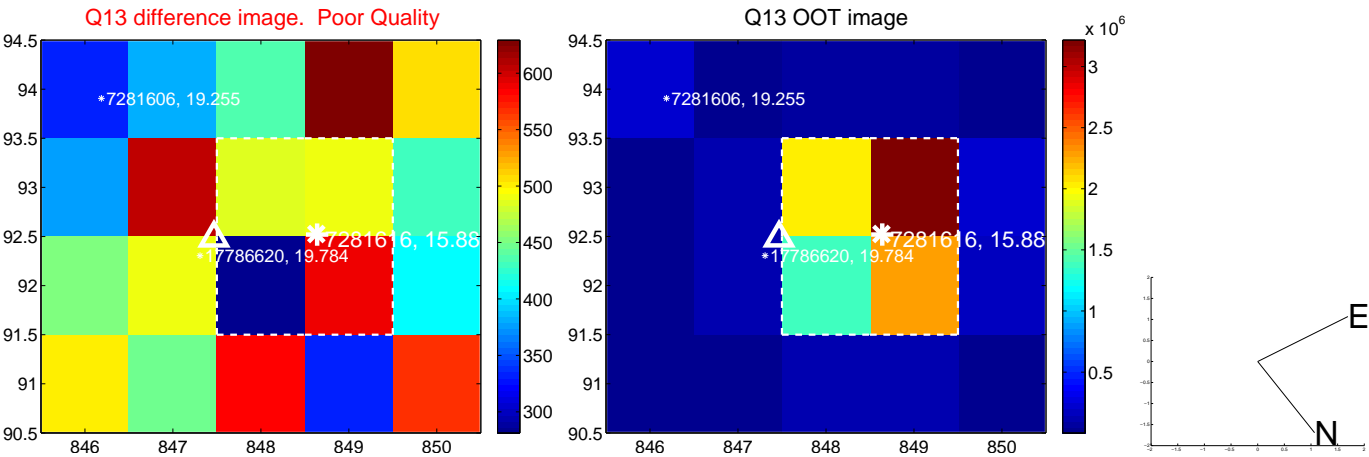
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



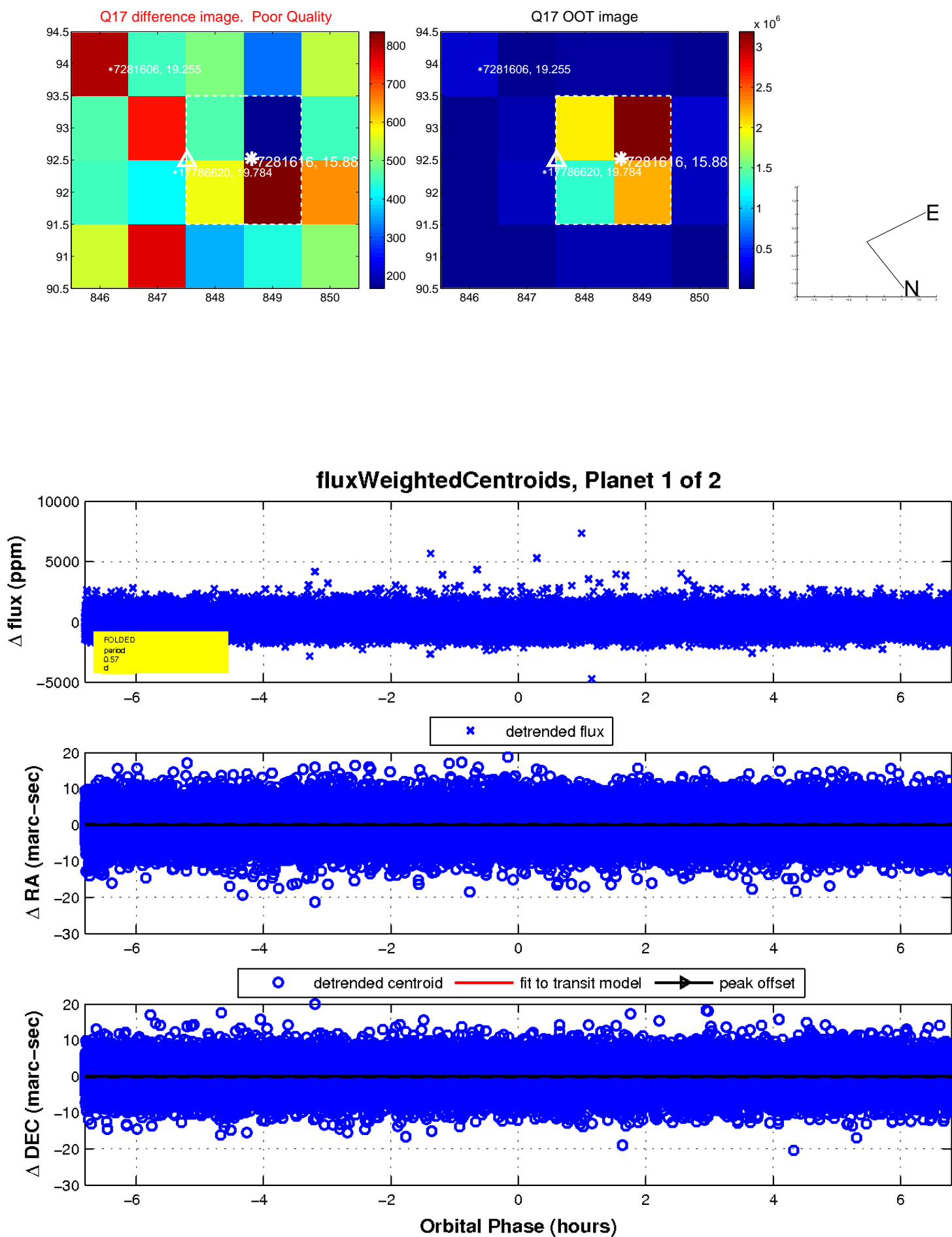
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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image



KIC 007281616

Q1-17 DR25 TCE Parameters

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Robovetter Results

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007281616-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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 for comment definitions.

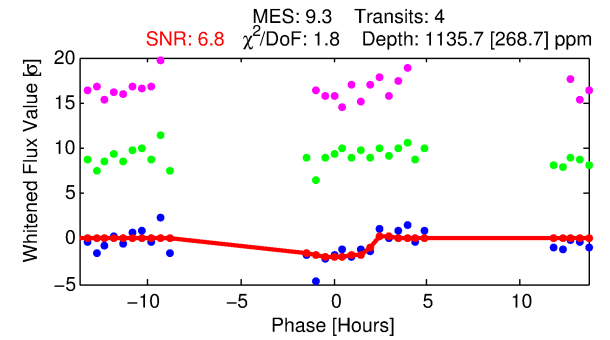
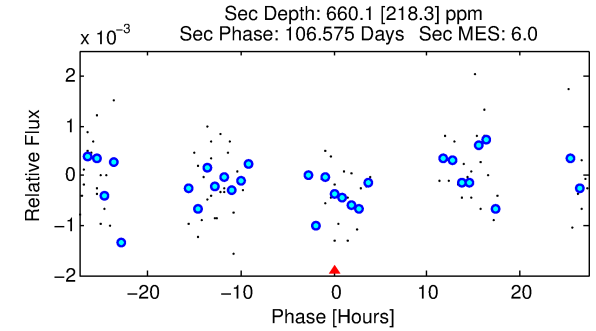
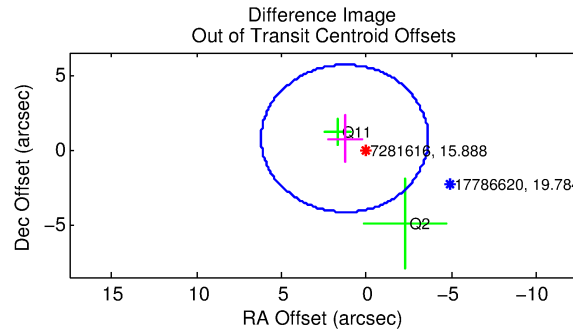
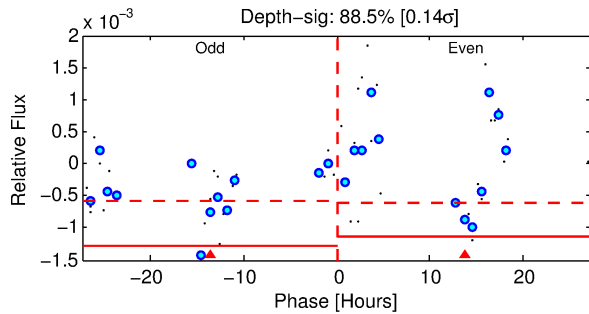
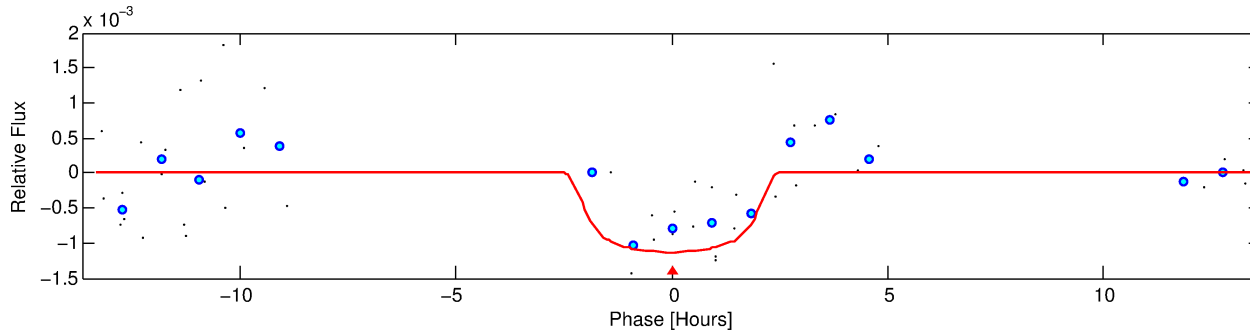
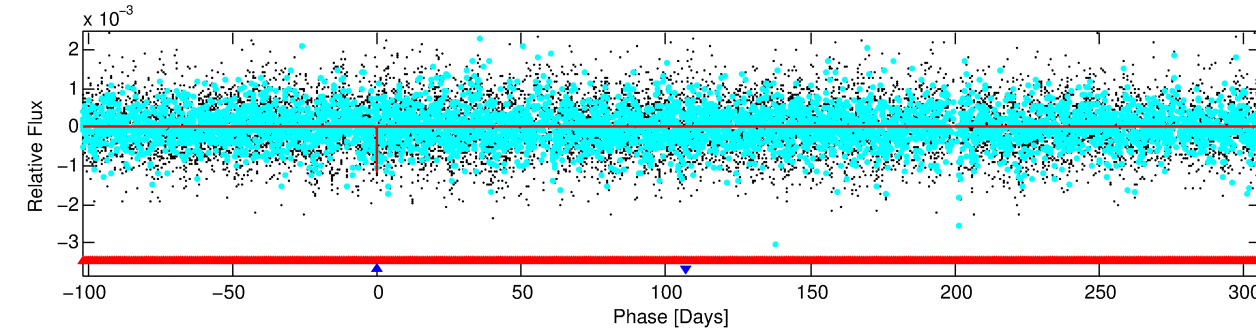
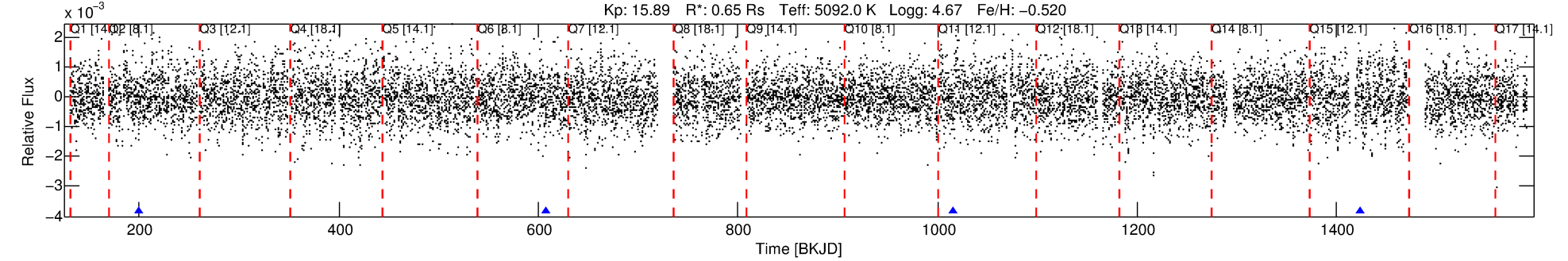
Ephemeris Match Information For 007281616-02

No Significant Match Found

DV One-Page Summary

KIC: 7281616 Candidate: 2 of 2 Period: 408.020 d
KOI: K06856 Corr: No Ephemeris Match

Kp: 15.89 R*: 0.65 Rs Teff: 5092.0 K Logg: 4.67 Fe/H: -0.520



DV Fit Results:

Period = 408.01956 [0.02020] d
Epoch = 199.0244 [0.0536] BKJD
Rp/R* = 0.0338 [0.0468]
a/R* = 476.12 [2647.91]
b = 0.76 [2.86]
Seff = 0.27 [0.05]
Teq = 184 [9] K
Rp = 2.38 [3.31] Re
a = 0.9613 [0.1018] AU
Ag = 59199.33 [165149.19] [0.36σ]
Teffp = 4438 [3093] K [1.38σ]

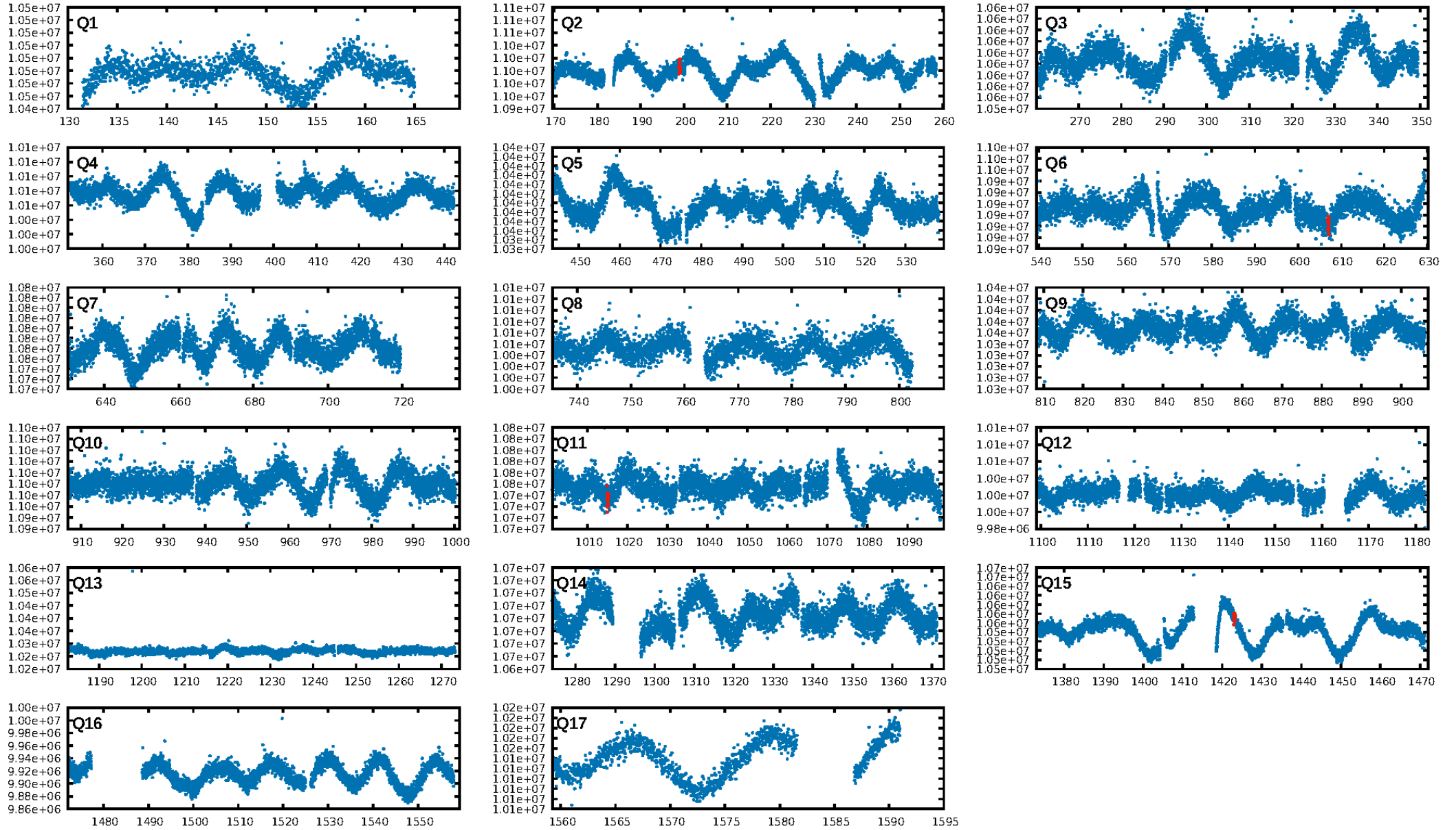
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1719.99σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 9.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.93e-13
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: 0.2143
Centroid-sig: 23.0%
Centroid-so: 1.968 arcsec [1.16σ]
OotOffset-rm: 1.468 arcsec [0.90σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-rm: 1.486 arcsec [0.88σ]
KicOffset-st: 1/1/0/0 [2]
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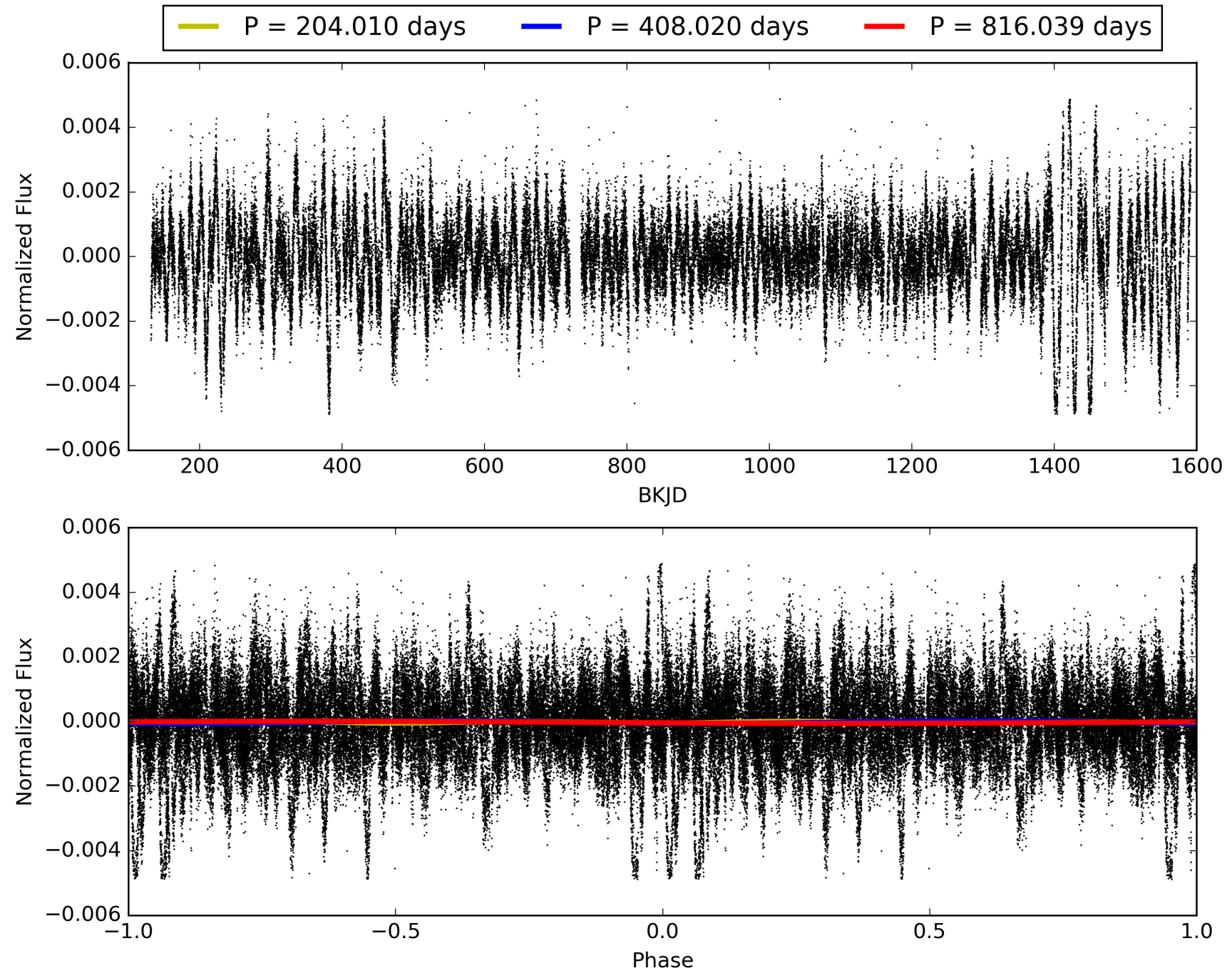
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 007281616-02, PDC Light Curves

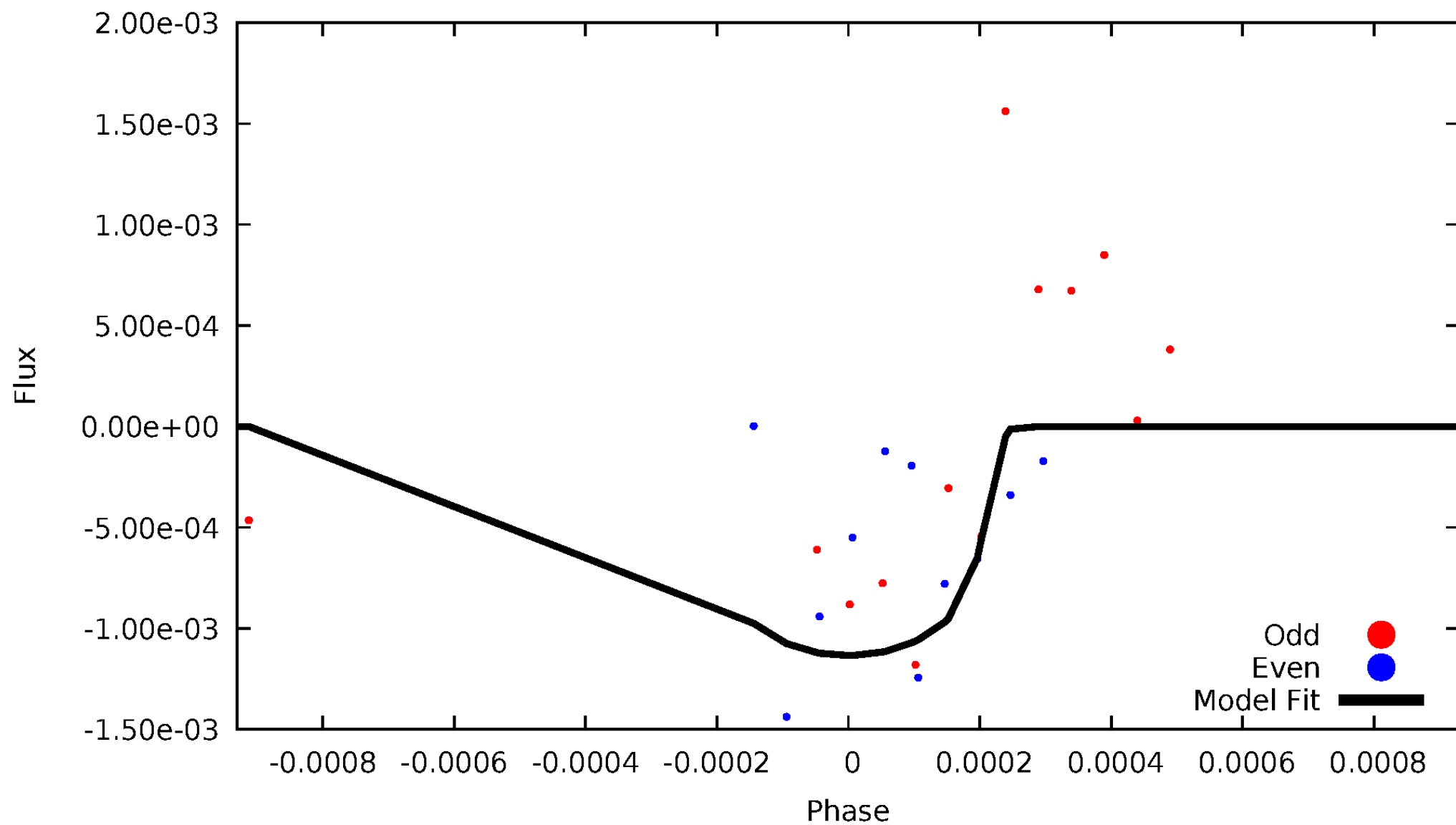


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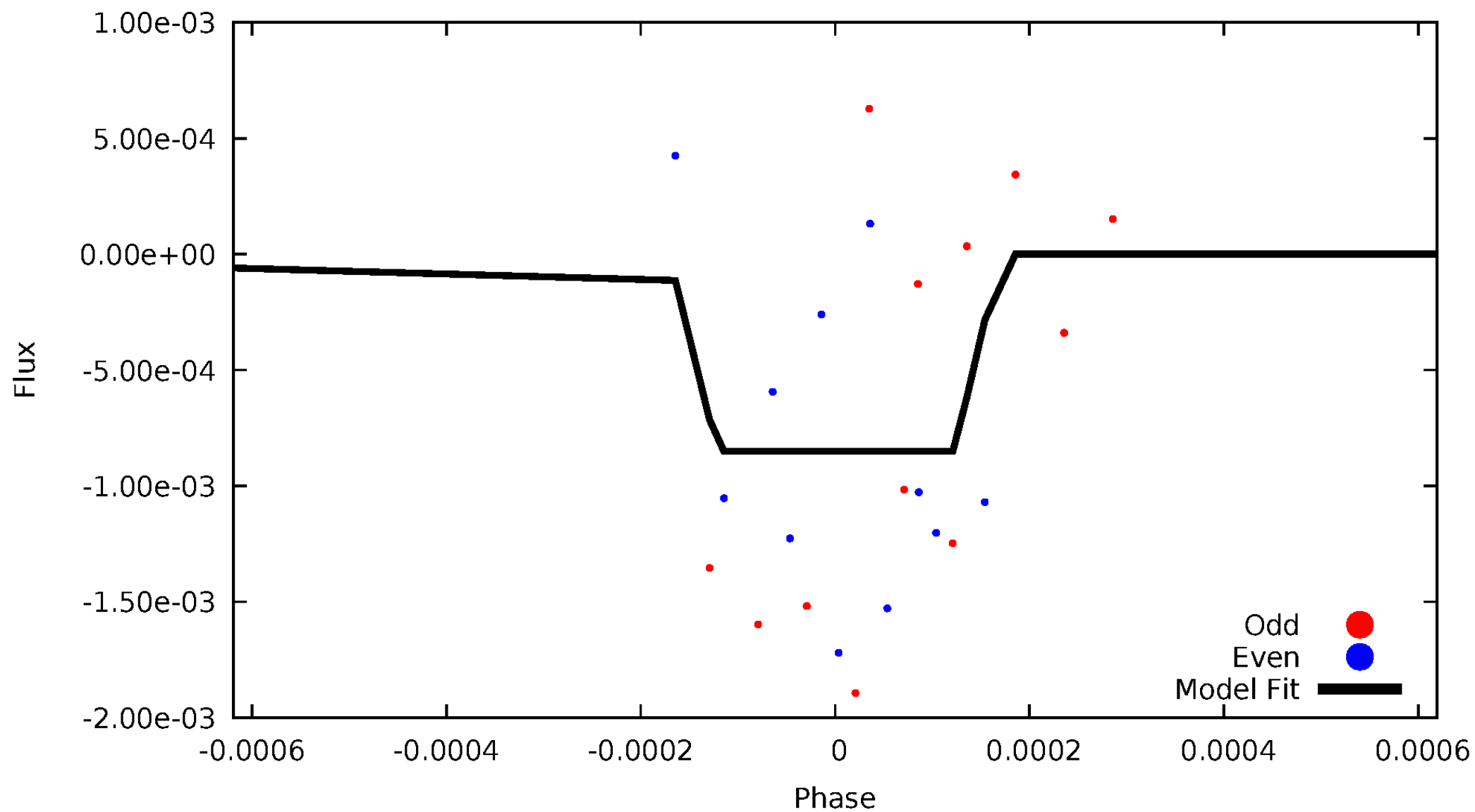
DV Odd/Even

TCE 007281616-02



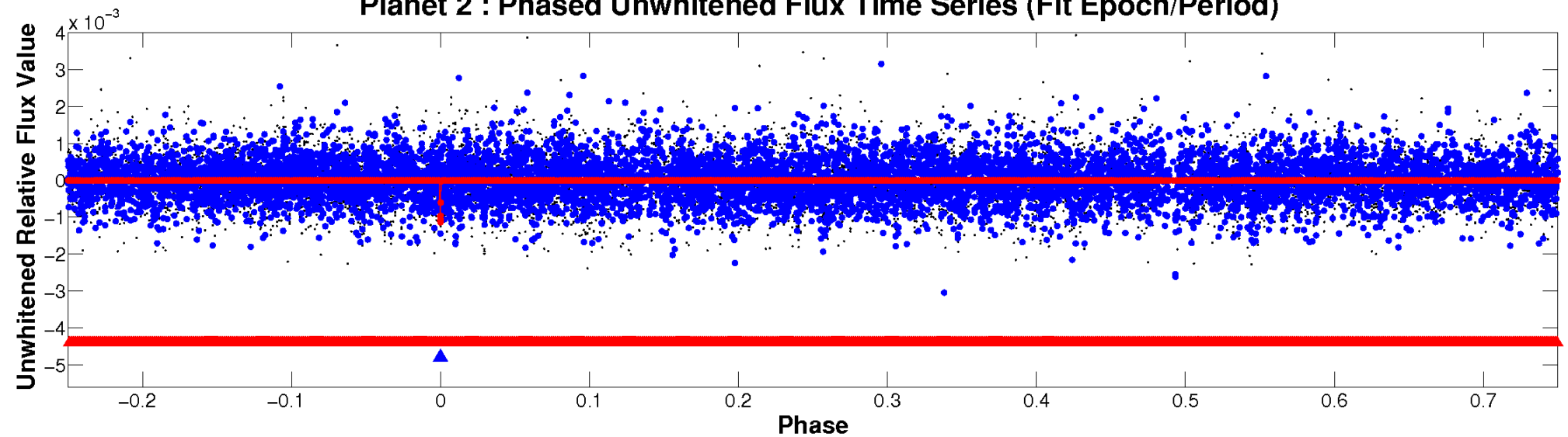
ALT Odd/Even

TCE 007281616-02

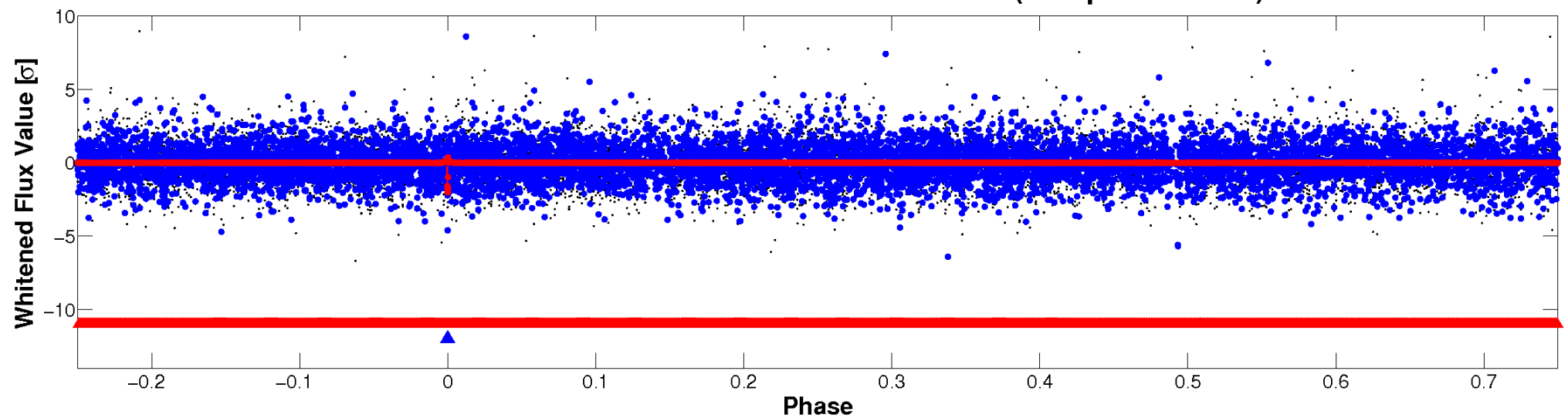


Non-Whitened Vs. Whitened Light Curve

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

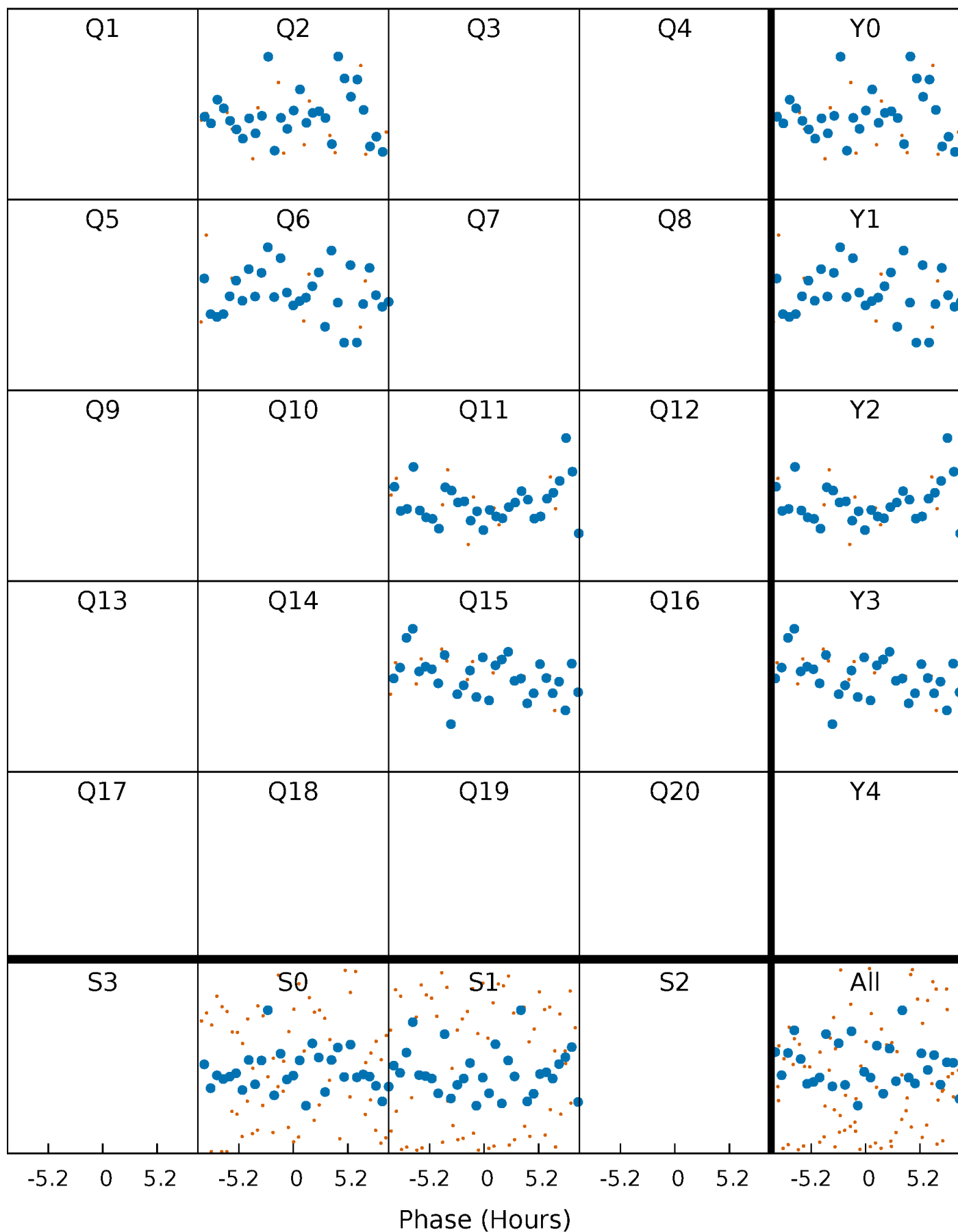


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



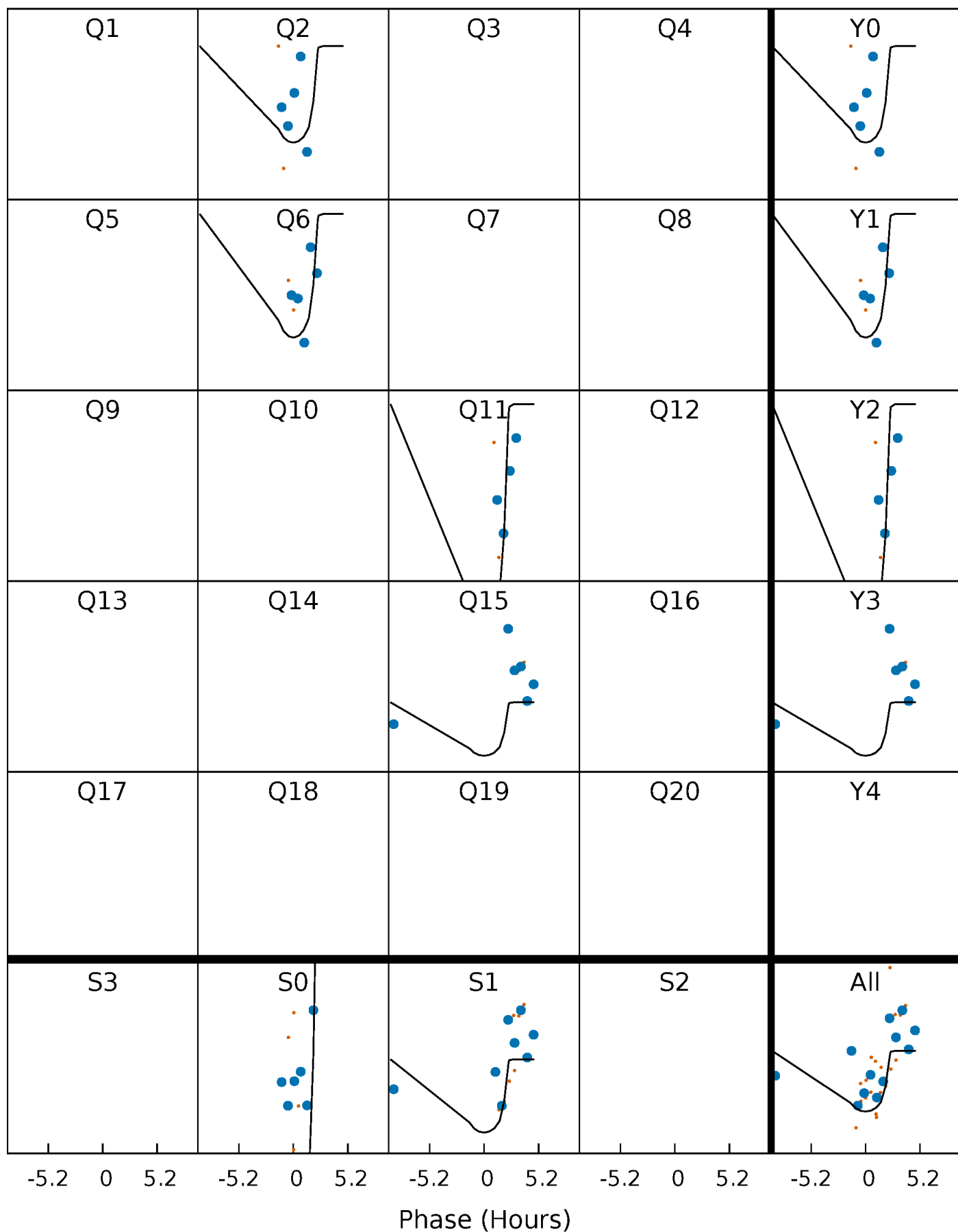
PDC Quarter-Phased Transit Curves

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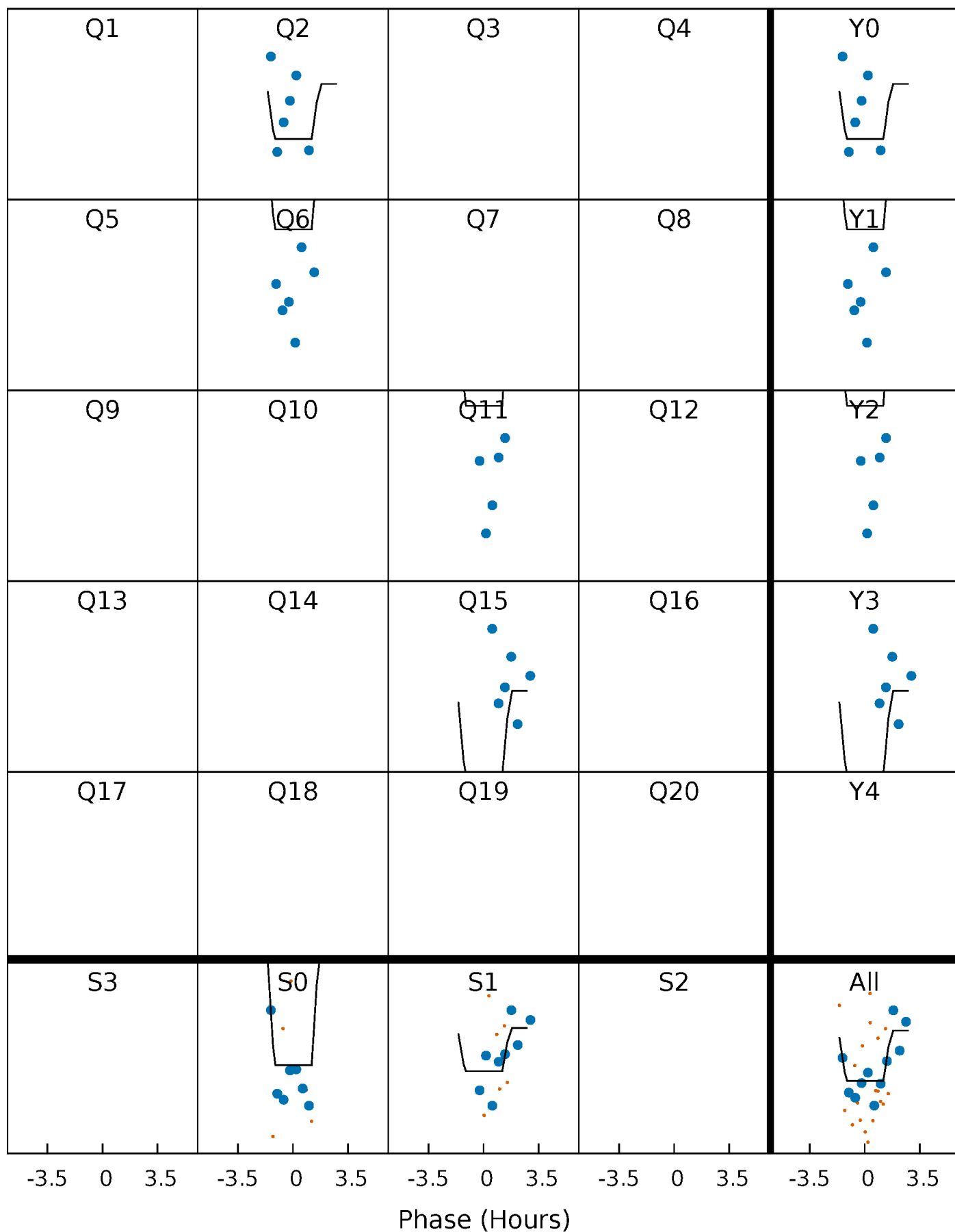
DV Quarter-Phased Transit Curves

TCE 007281616-02 $P=408.019563$ Days $T_0=199.024443$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

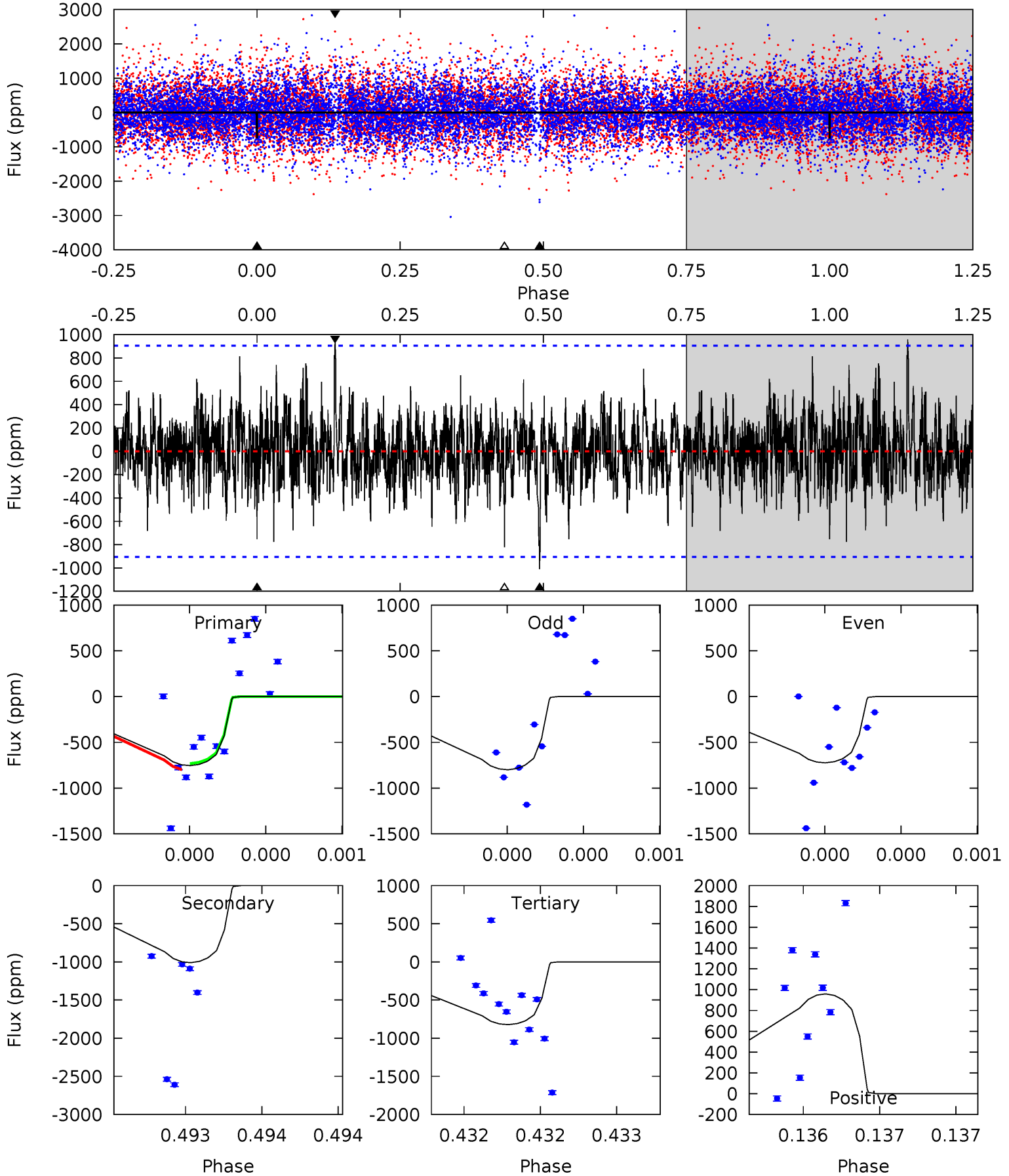
TCE 007281616-02 P=408.044571 Days $T_0=199.032706$ (BKJD)



DV Model-Shift Uniqueness Test

007281616-02, P = 408.019563 Days, E = 199.024443 Days

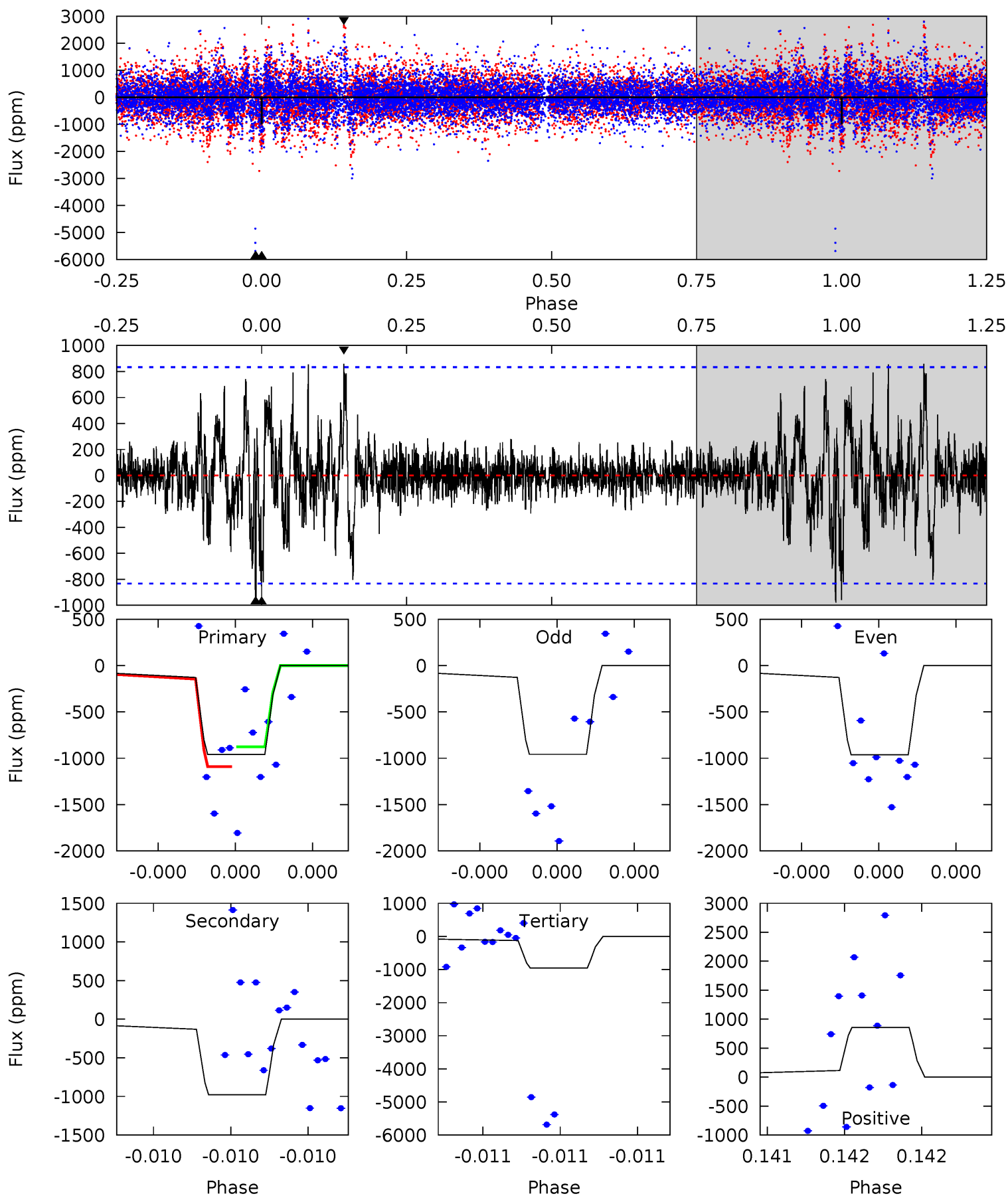
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.66	6.24	5.08	5.93	5.60	3.52	1.35	-0.42	-1.27	1.16	0.31	0.23	0.97	0.49	0.17



Alt Model-Shift Uniqueness Test

007281616-02, P = 408.044571 Days, E = 199.032706 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.51	6.64	6.49	5.82	5.65	3.60	1.28	0.03	0.69	0.16	0.82	0.01	0.81	0.47	0.71



Stellar Parameters For KIC 007281616

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5092^{+151}_{-151}	$4.671^{+0.028}_{-0.077}$	$-0.520^{+0.300}_{-0.300}$	$0.645^{+0.085}_{-0.039}$	$0.712^{+0.067}_{-0.067}$	$3.728^{+0.498}_{-0.947}$
	+3%/-3%	+1%/-2%	+58%/-58%	+13%/-6%	+9%/-9%	+13%/-25%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 007281616-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1010 ± 162	$3.53^{+2.96}_{-2.41}$	260^{+11}_{-10}	4308^{+2931}_{-865}	$41562^{+362798}_{-29778}$
Alt.	-979 ± 147	$3.12^{+2.92}_{-2.12}$	259^{+11}_{-10}	4457^{+3224}_{-936}	$49993^{+431722}_{-36591}$

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 $A_{obs} \gg 1.0$

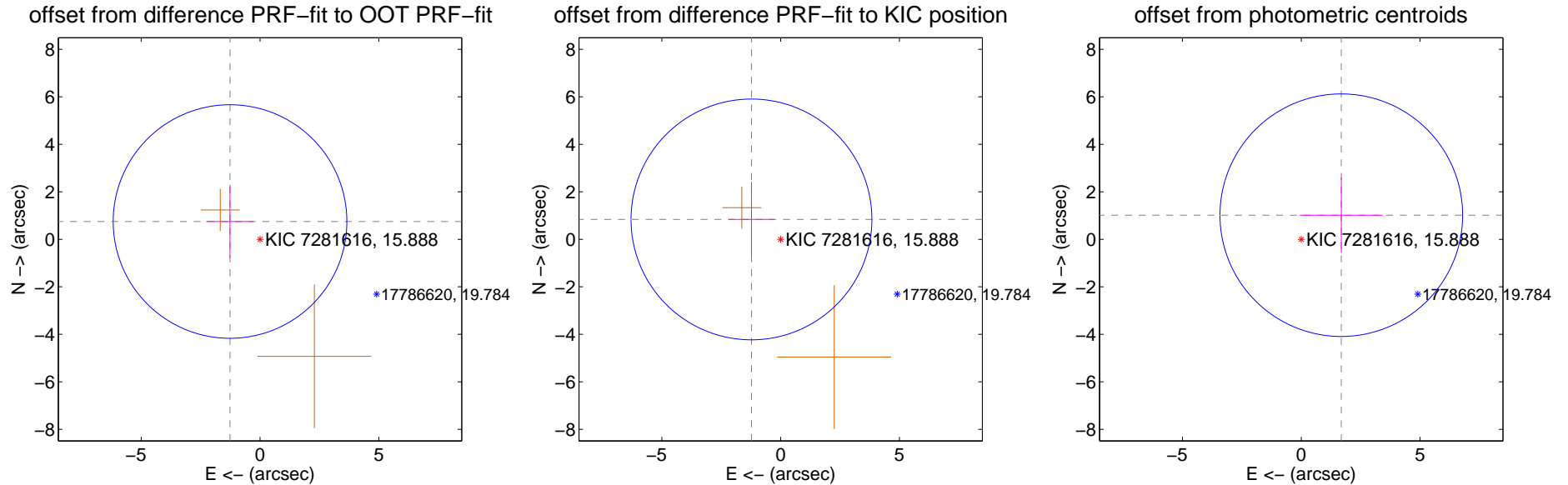
DV Centroid Data

Supplemental centroid analysis for 007281616-02. Kepler magnitude: 15.89. Transit SNR 6.78

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.468 ± 1.639	0.90	1.262 ± 0.992	0.749 ± 1.542
PRF-fit source offset from KIC position	1.486 ± 1.690	0.88	1.228 ± 0.974	0.837 ± 1.574
photometric centroid source offset	1.97 ± 1.70	1.16	-1.69 ± 1.74	1.02 ± 1.59



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- σ uncertainty. Blue circle: three- σ . 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.

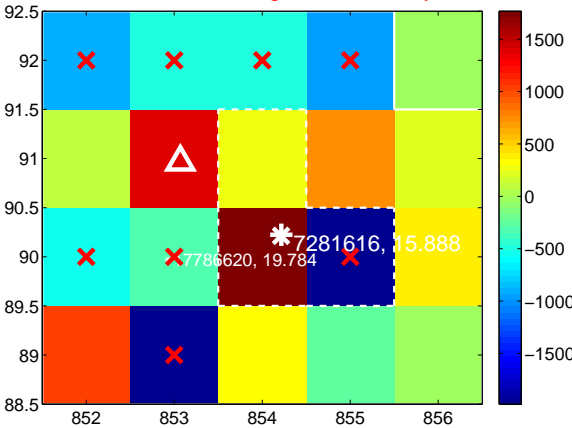
Q1 no difference image



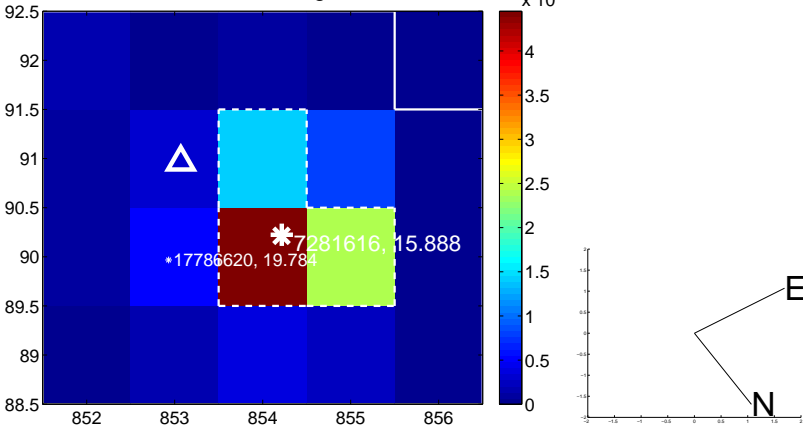
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no OOT image



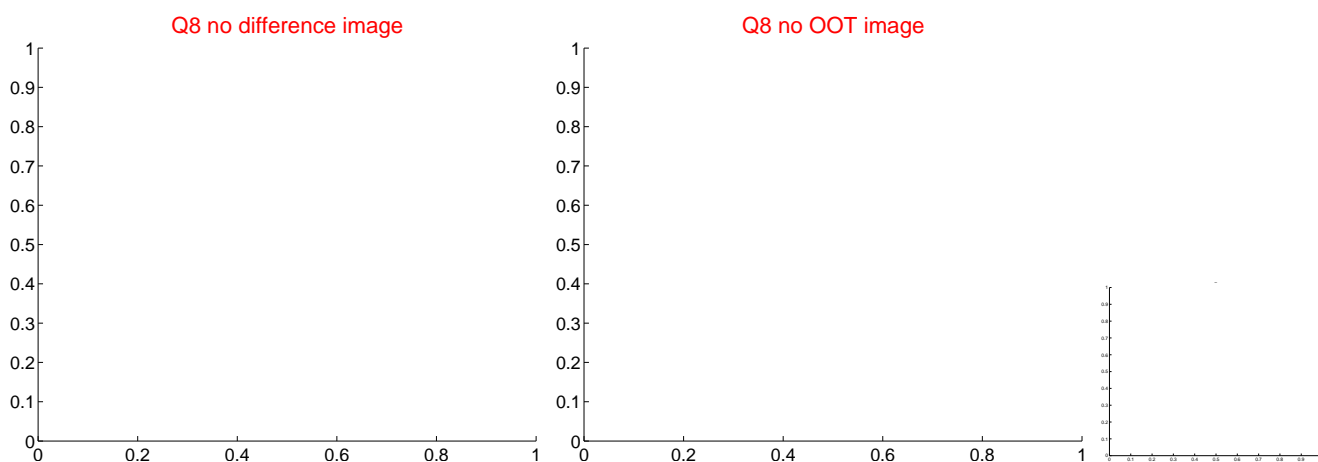
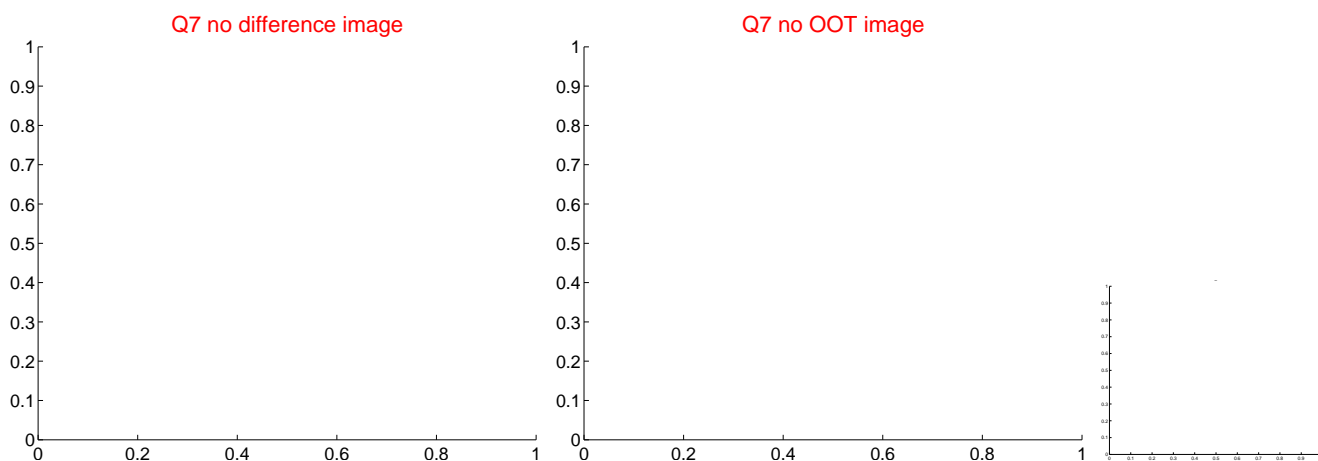
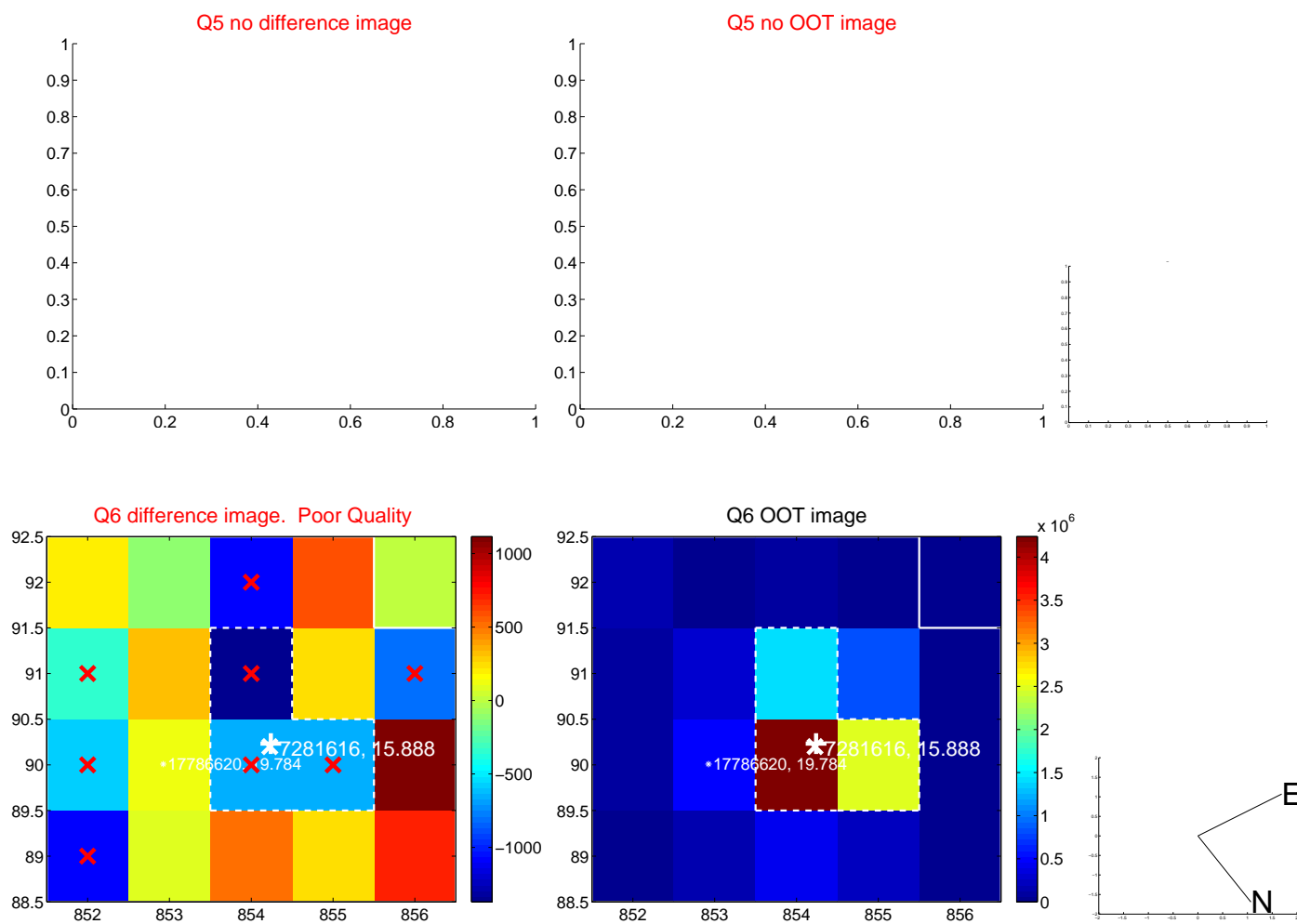
Q4 no difference image



Q4 no 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.

Q9 no difference image



Q9 no OOT image



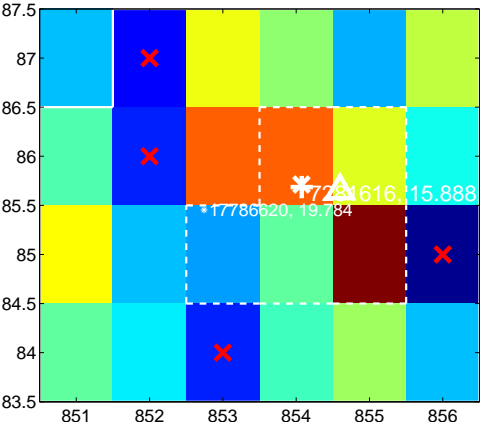
Q10 no difference image



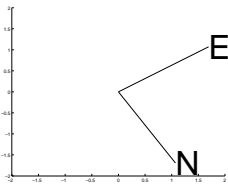
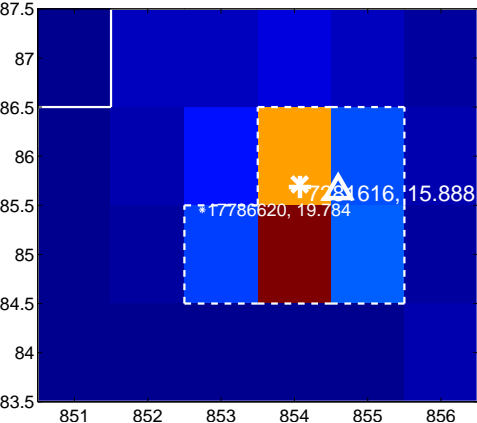
Q10 no OOT image



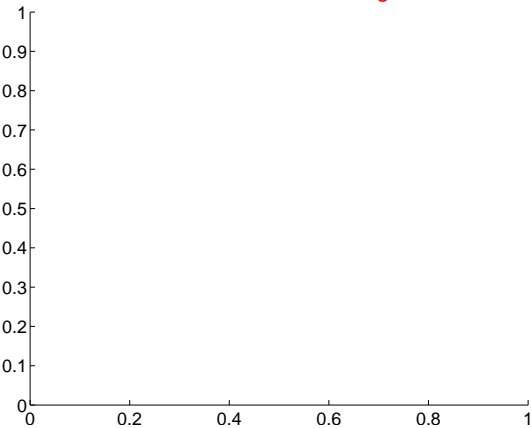
Q11 difference image. Poor Quality



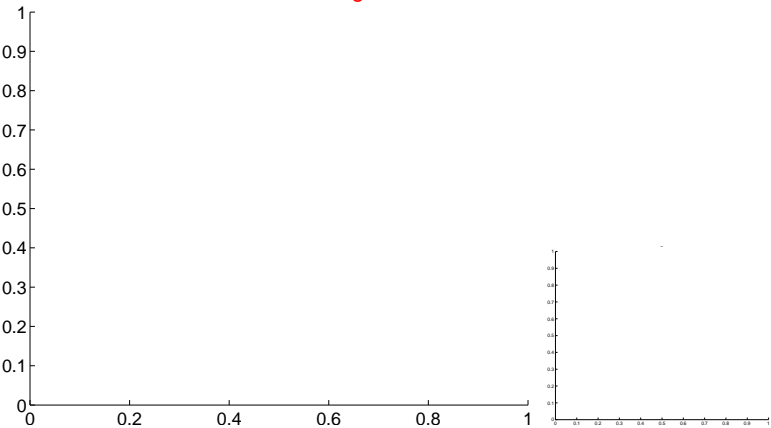
Q11 OOT image



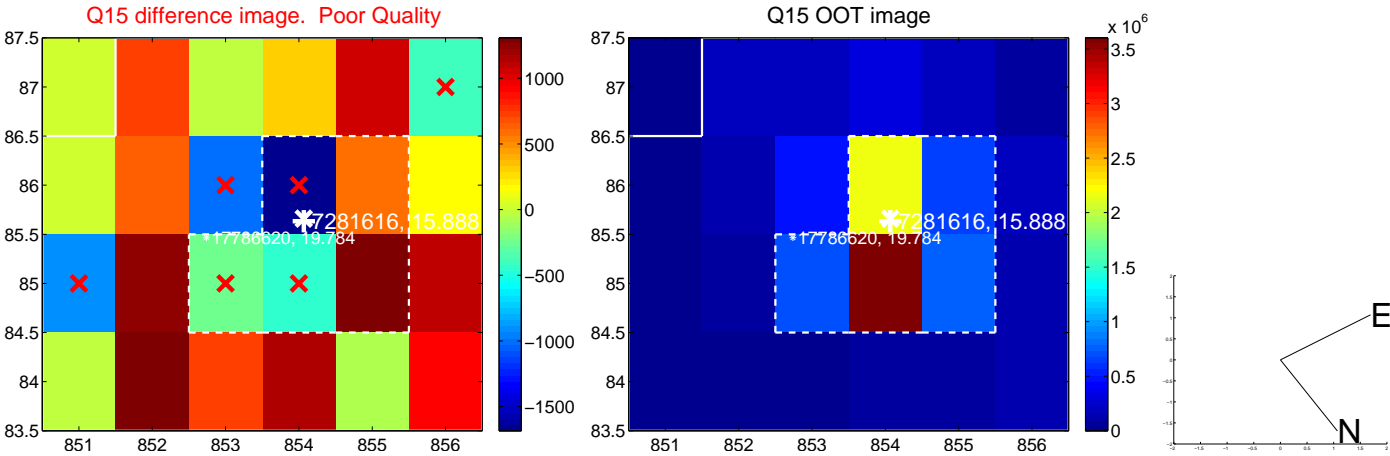
Q12 no difference image



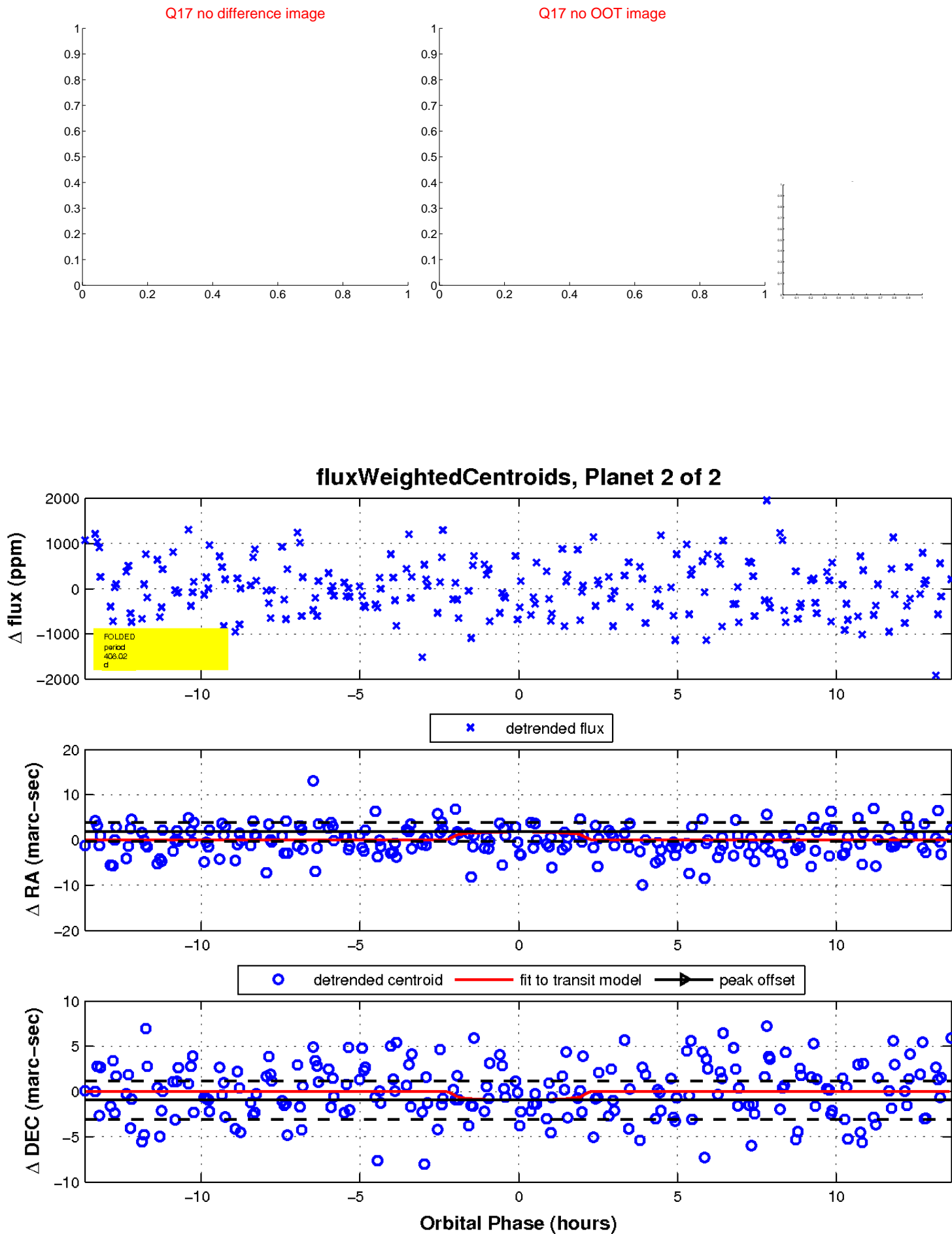
Q12 no OOT image



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.



UKIRT Image

