# KIC 009216775

## 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) | $R_p$ ($R_\oplus$) | $S_p$ ($S_\oplus$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009216775-01 | OBS | 4513.01 | 3.917924 | 132.869214 | 115.8 | 2.630 | 11.5 | 12.6 | 0.87 | 5500 | 1.12 | 267.06 |

## Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|---|---|---|---|---|---|---|---|---|
| 009216775-01 | OBS | PC | 0.87 | 0 | 0 | 0 | 0 | NO_COMMENT |

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.
See `http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col` for comment definitions.

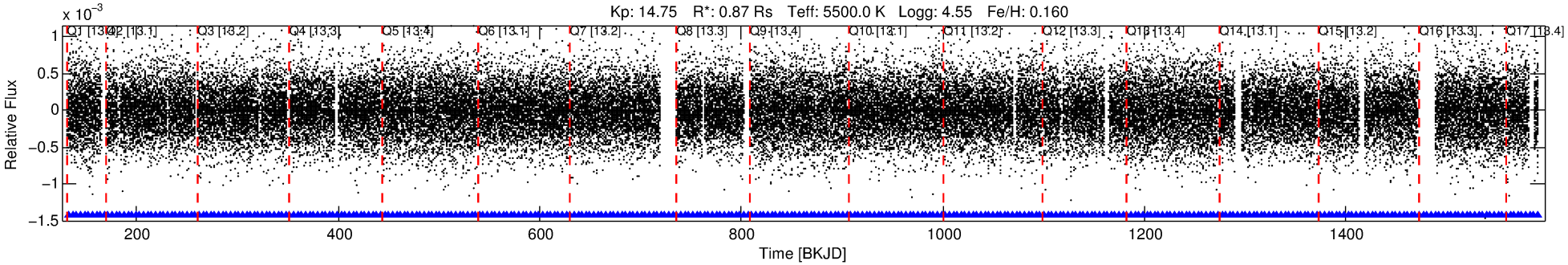
## Ephemeris Match Information For 009216775-01

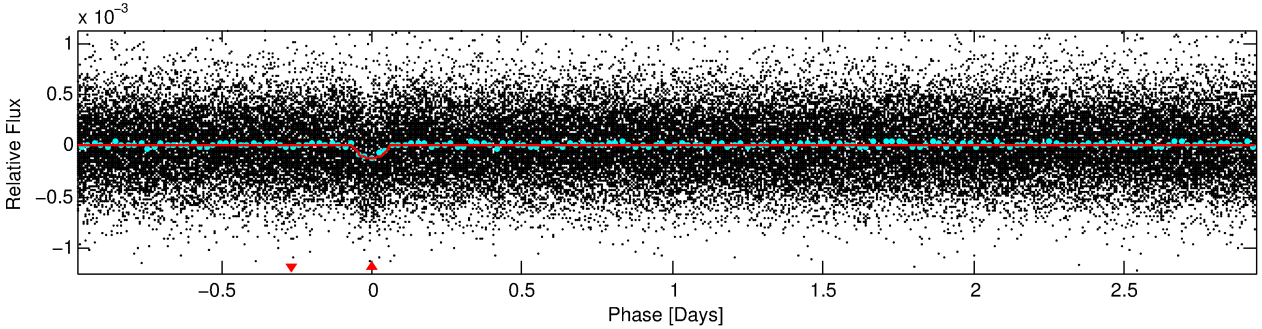
No Significant Match Found

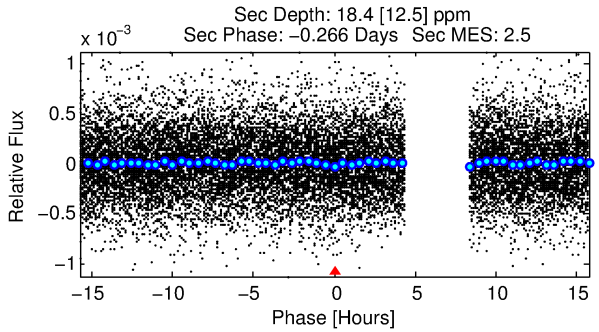
# DV One-Page Summary

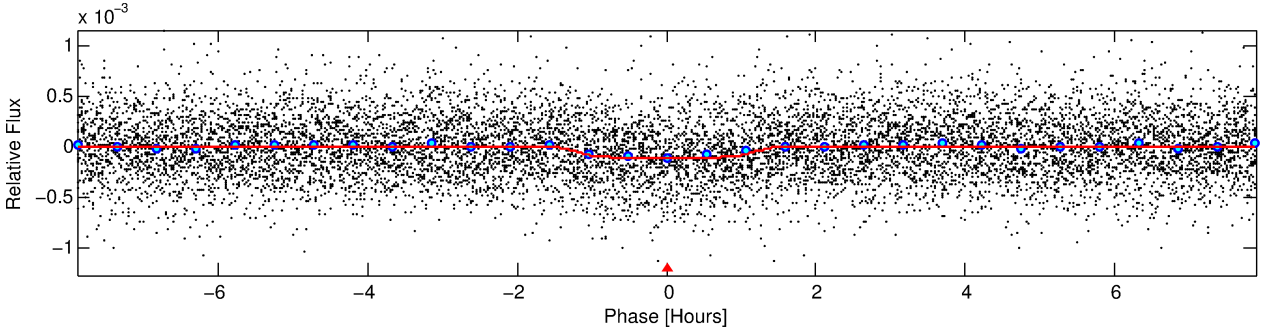
**KIC: 9216775 Candidate: 1 of 1 Period: 3.918 d**
**KOI: K04513.01 Corr: 0.977**

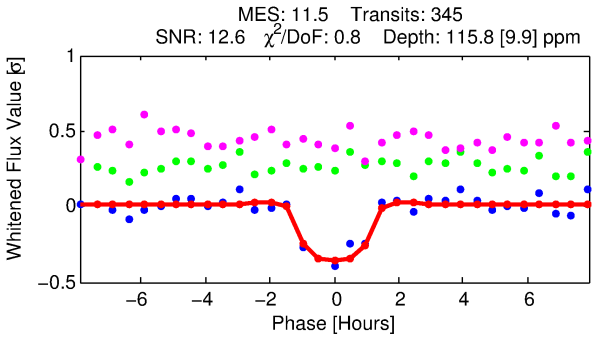
Kp: 14.75 R*: 0.87 Rs Teff: 5500.0 K Logg: 4.55 Fe/H: 0.160

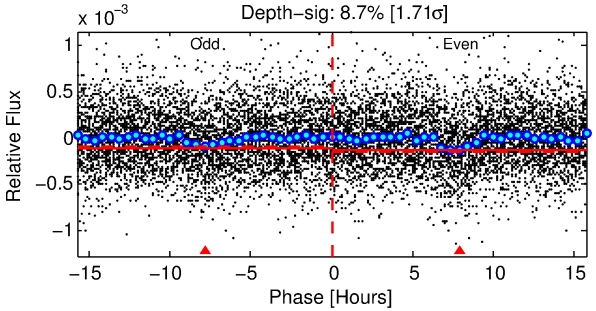


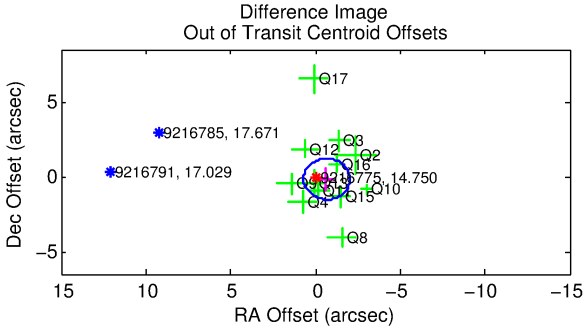




DV Fit Results:

Period = 3.91792 [0.00002] d
Epoch = 132.8692 [0.0035] BKJD
Rp/R* = 0.0118 [0.0076]
a/R* = 5.38 [14.79]
b = 0.90 [0.63]

Seff = 267.06 [52.43]
Teq = 1031 [51] K
Rp = 1.12 [0.74] Re
a = 0.0482 [0.0056] AU

Ag = 18.66 [27.36] [0.65σ]
Teffp = 3313 [1205] K [1.89σ]

DV Diagnostic Results:

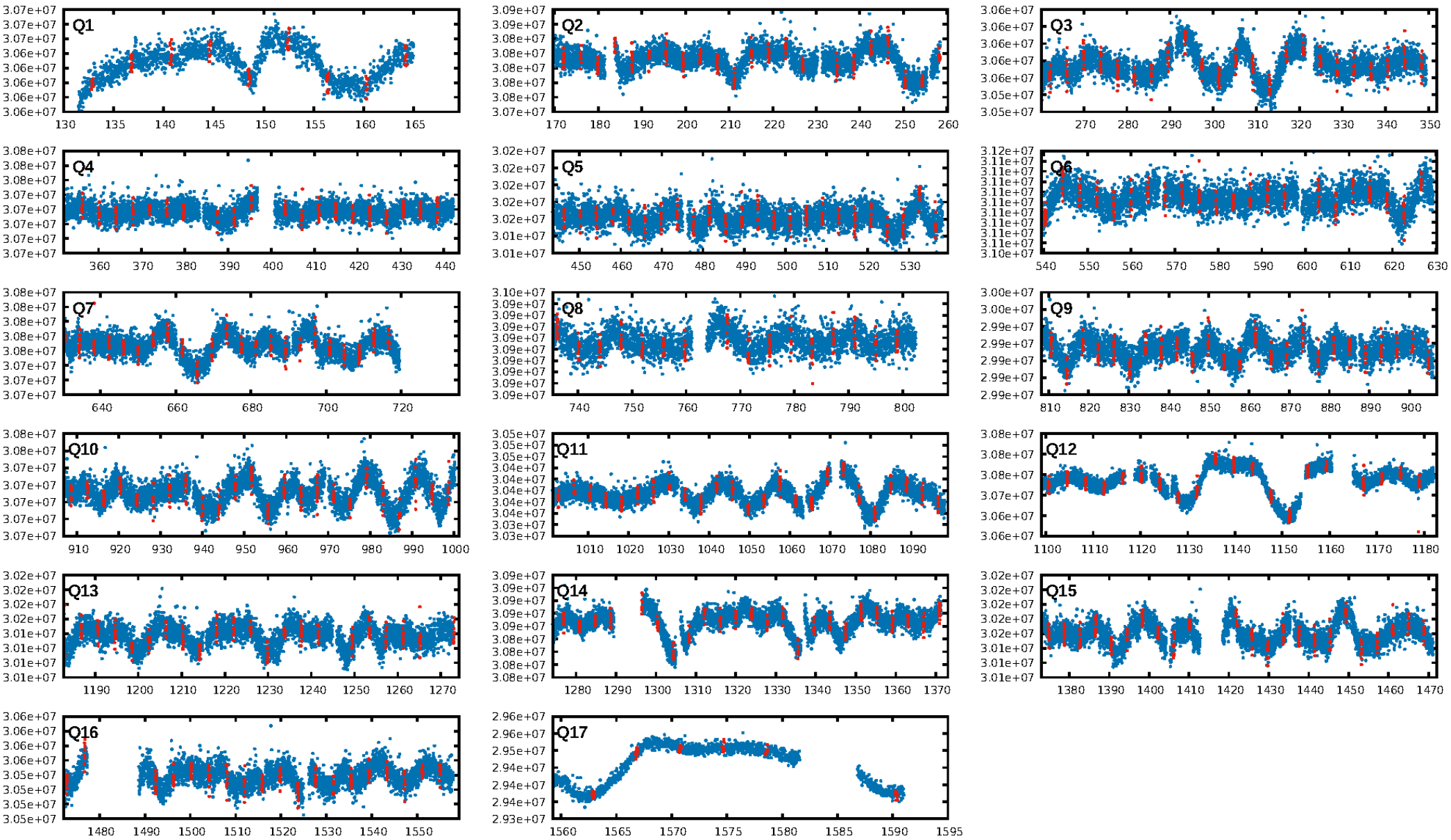
ShortPeriod−sig: N/A
LongPeriod−sig: N/A
ModelChiSquare2−sig: N/A
ModelChiSquareGof−sig: N/A
Bootstrap−pfa: 9.84e−30
RollingBand−fgt: 1.00 [330/330]
GhostDiagnostic−chr: 1.649

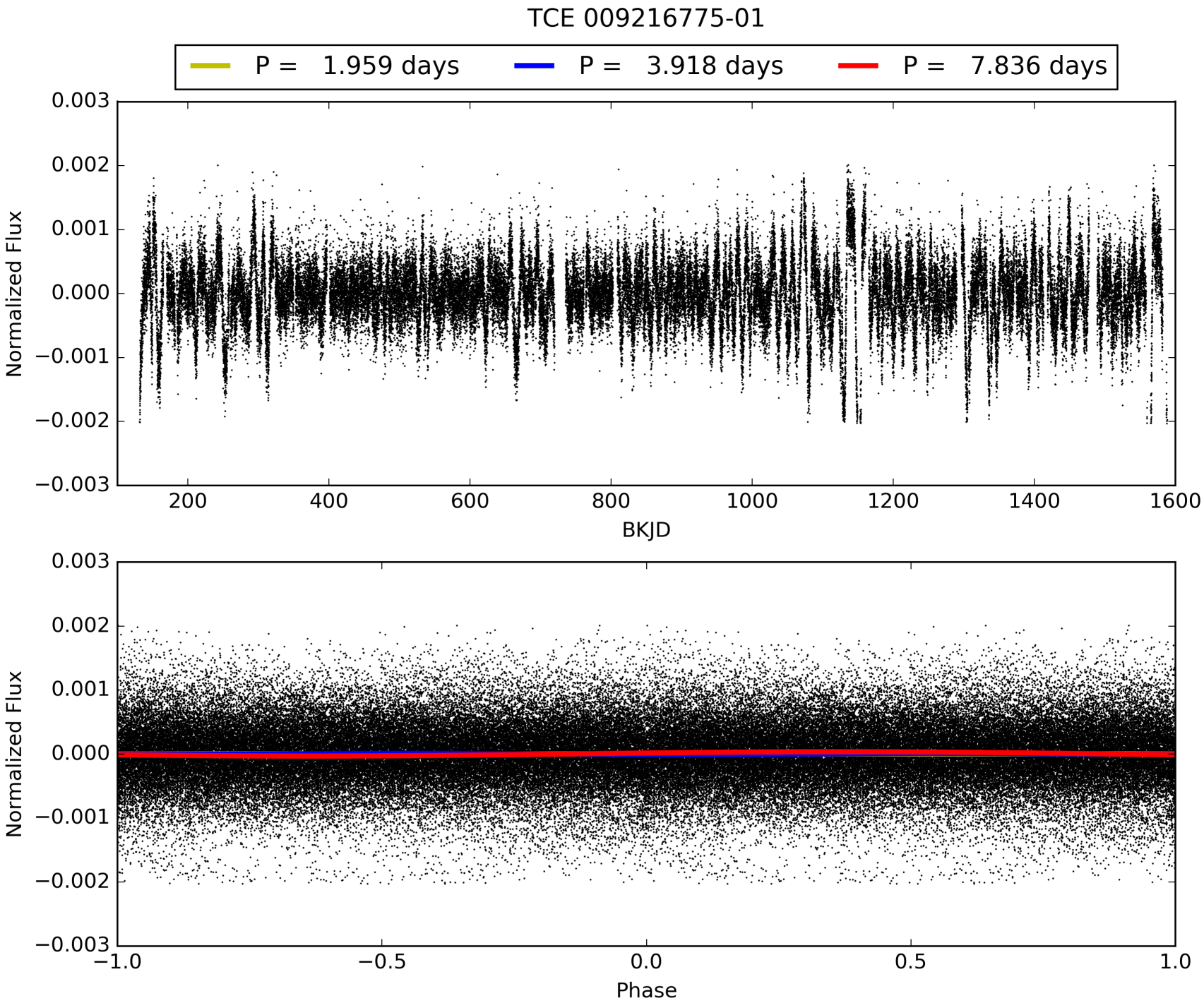
Centroid−sig: 1.9%
Centroid−so: 2.429 arcsec [2.26σ]
OotOffset−rm: 0.677 arcsec [1.49σ]
KicOffset−rm: 0.605 arcsec [1.38σ]
OotOffset−st: 2/3/4/3 [12]
KicOffset−st: 2/3/4/3 [12]
DiffImageQuality−fgm: 0.58 [7/12]
DiffImageOverlap−fno: 1.00 [17/17]

**Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30−Jan−2016 14:57:52 Z**

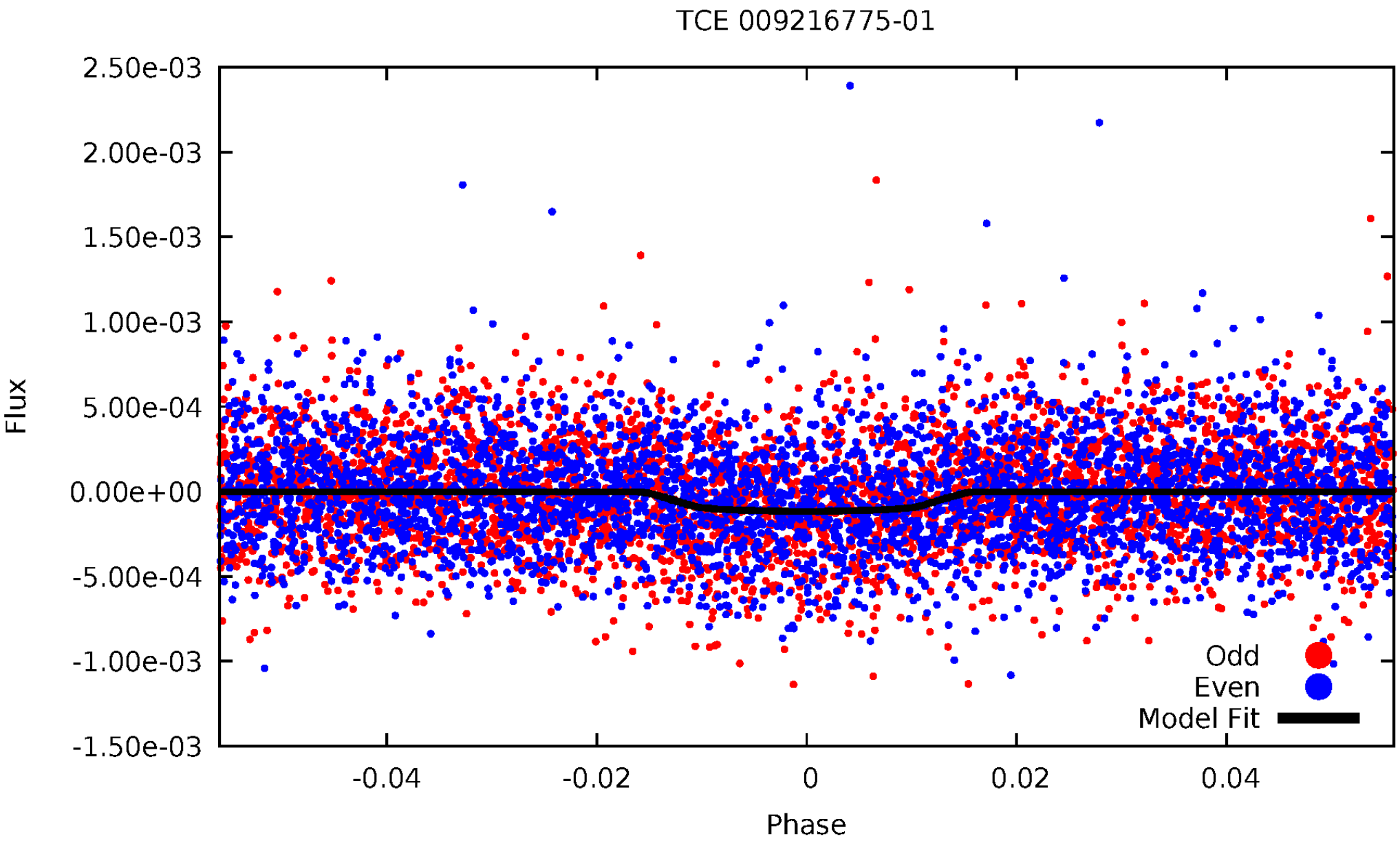
**This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center**

# TCE 009216775-01, PDC Light Curves

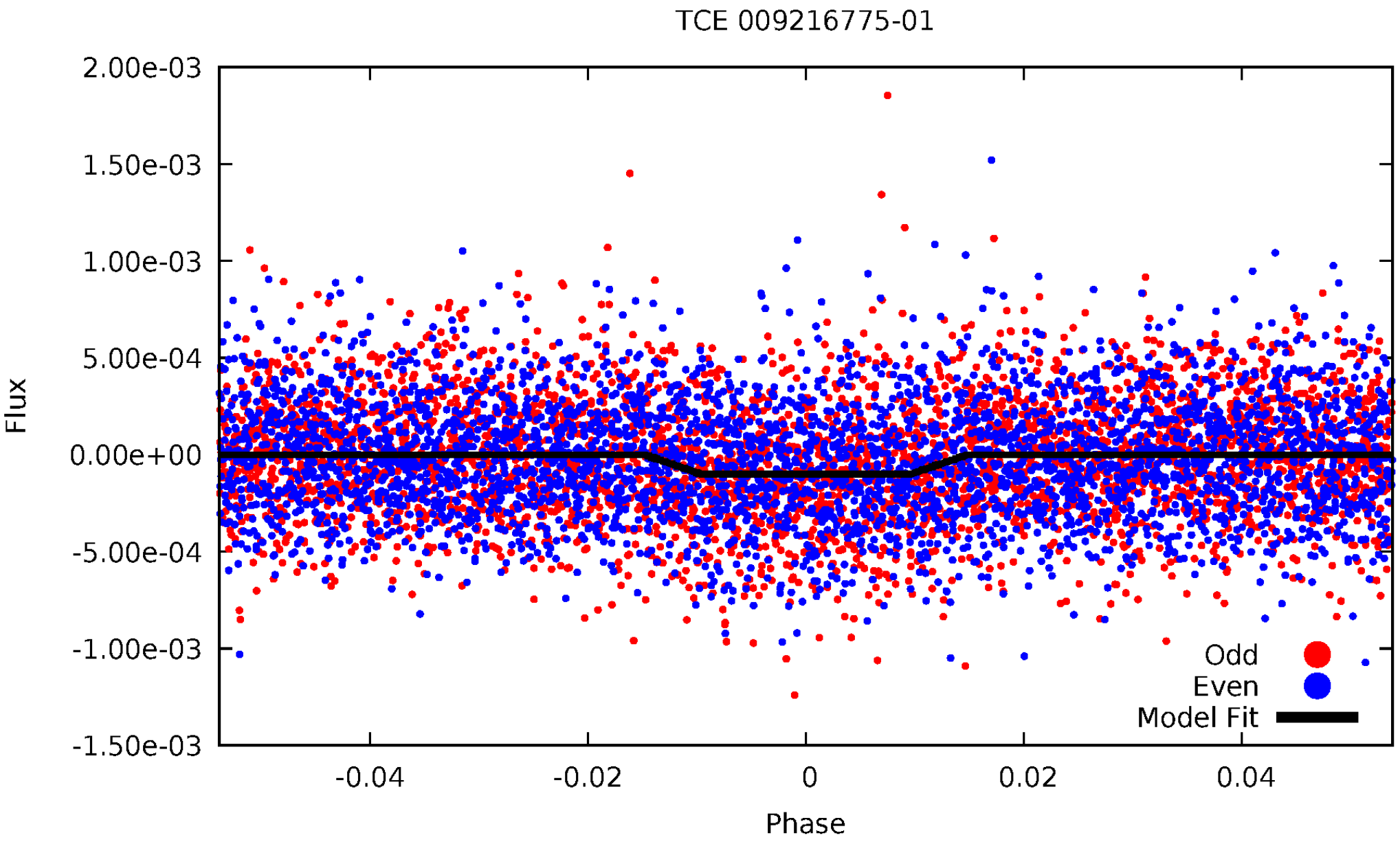



TCE 009216775-01
P = 1.959 days
P = 3.918 days
P = 7.836 days
Normalized Flux
BKJD
Normalized Flux
Phase

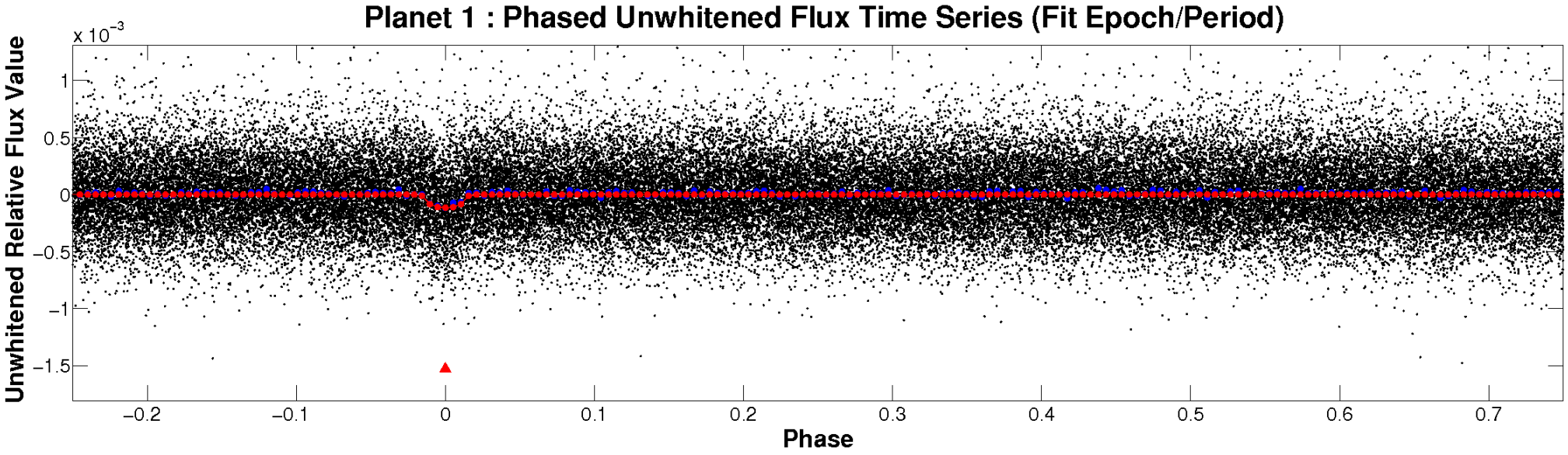
# DV Odd/Even

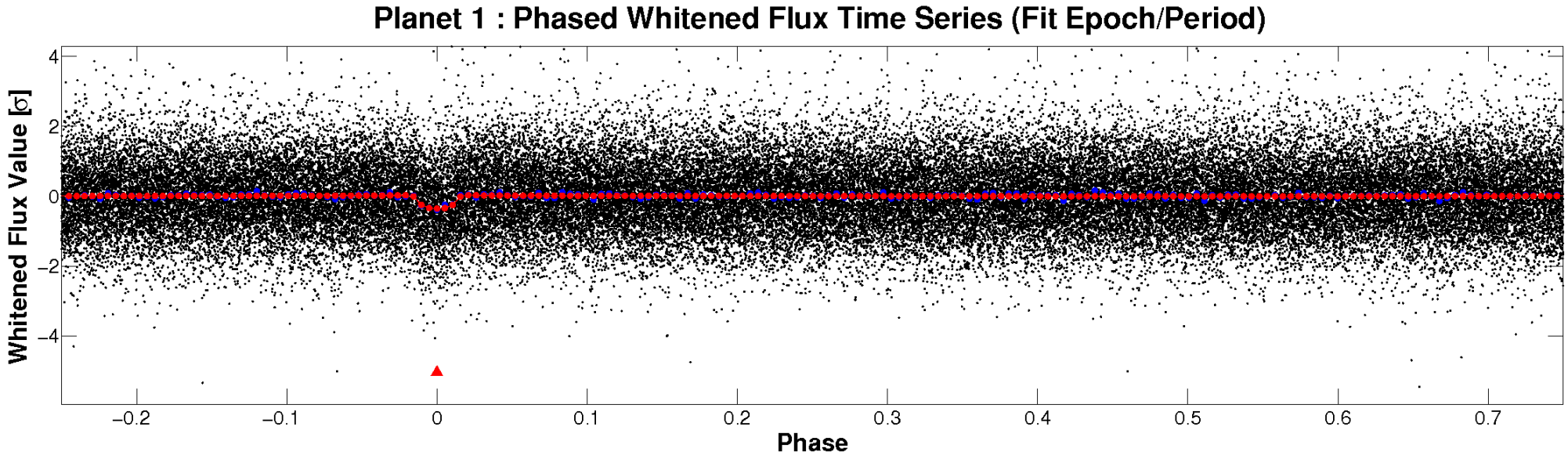

TCE 009216775-01
2.50e-03
2.00e-03
1.50e-03
1.00e-03
5.00e-04
0.00e+00
-5.00e-04
-1.00e-03
-1.50e-03
Flux
-0.04
-0.02
0
0.02
0.04
Phase
Odd
Even
Model Fit

**ALT Odd/Even**


TCE 009216775-01
2.00e-03
1.50e-03
1.00e-03
5.00e-04
0.00e+00
-5.00e-04
-1.00e-03
-1.50e-03
Flux
-0.04
-0.02
0
0.02
0.04
Phase
Odd
Even
Model Fit

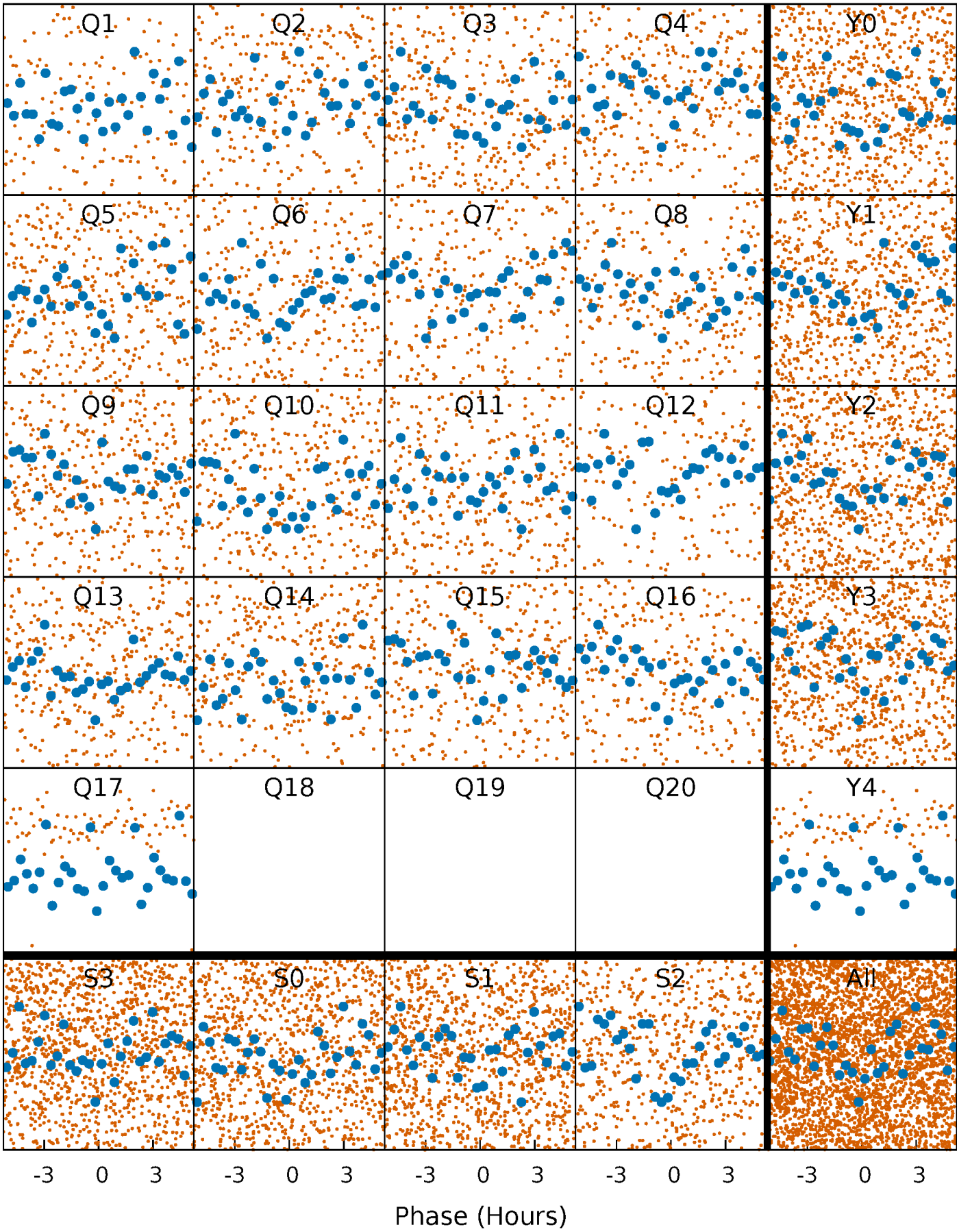
# Non-Whitened Vs. Whitened Light Curve



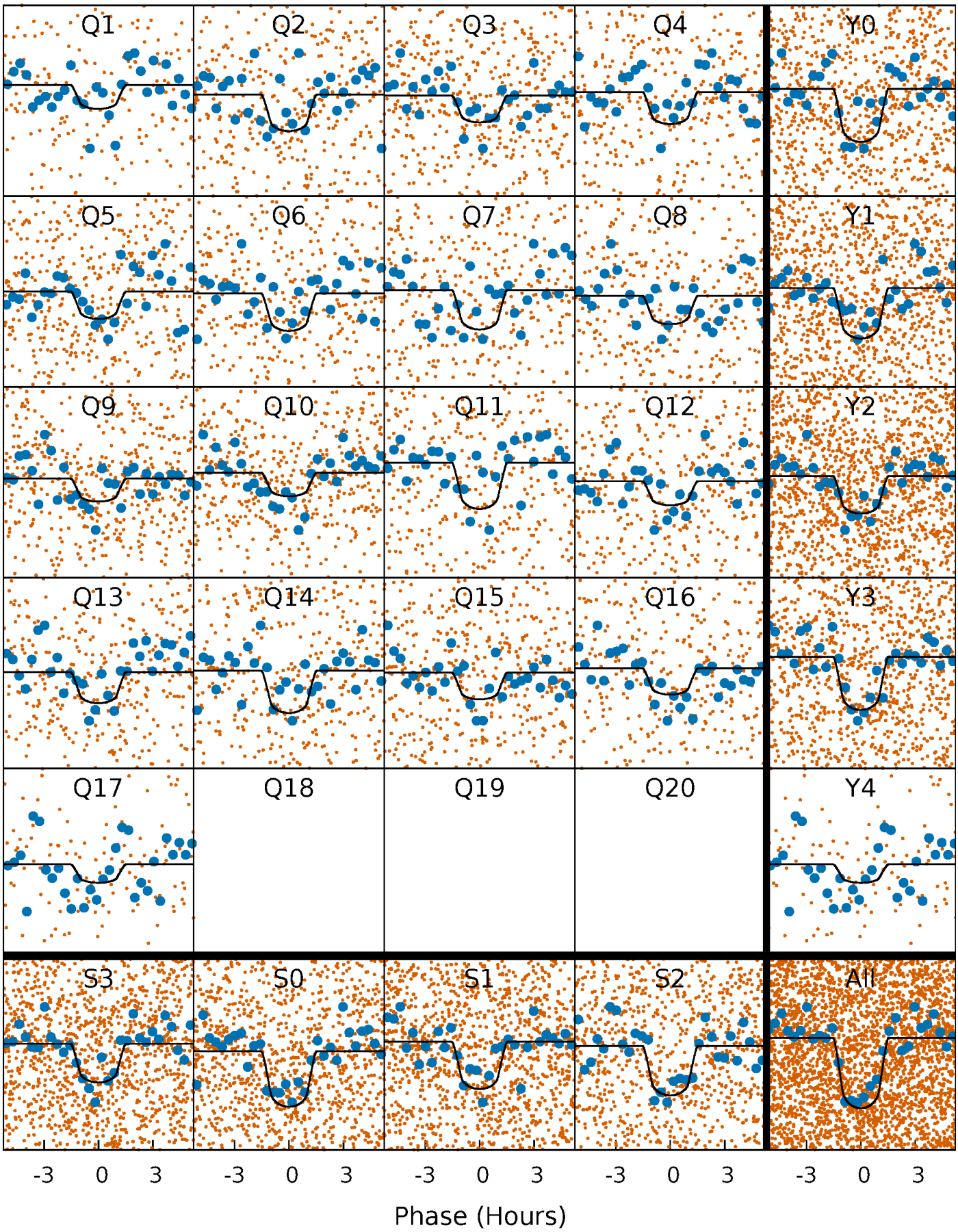
# PDC Quarter-Phased Transit Curves

TCE 009216775-01 P= 3.917924 Days $T_0$=132.869214 (BKJD)



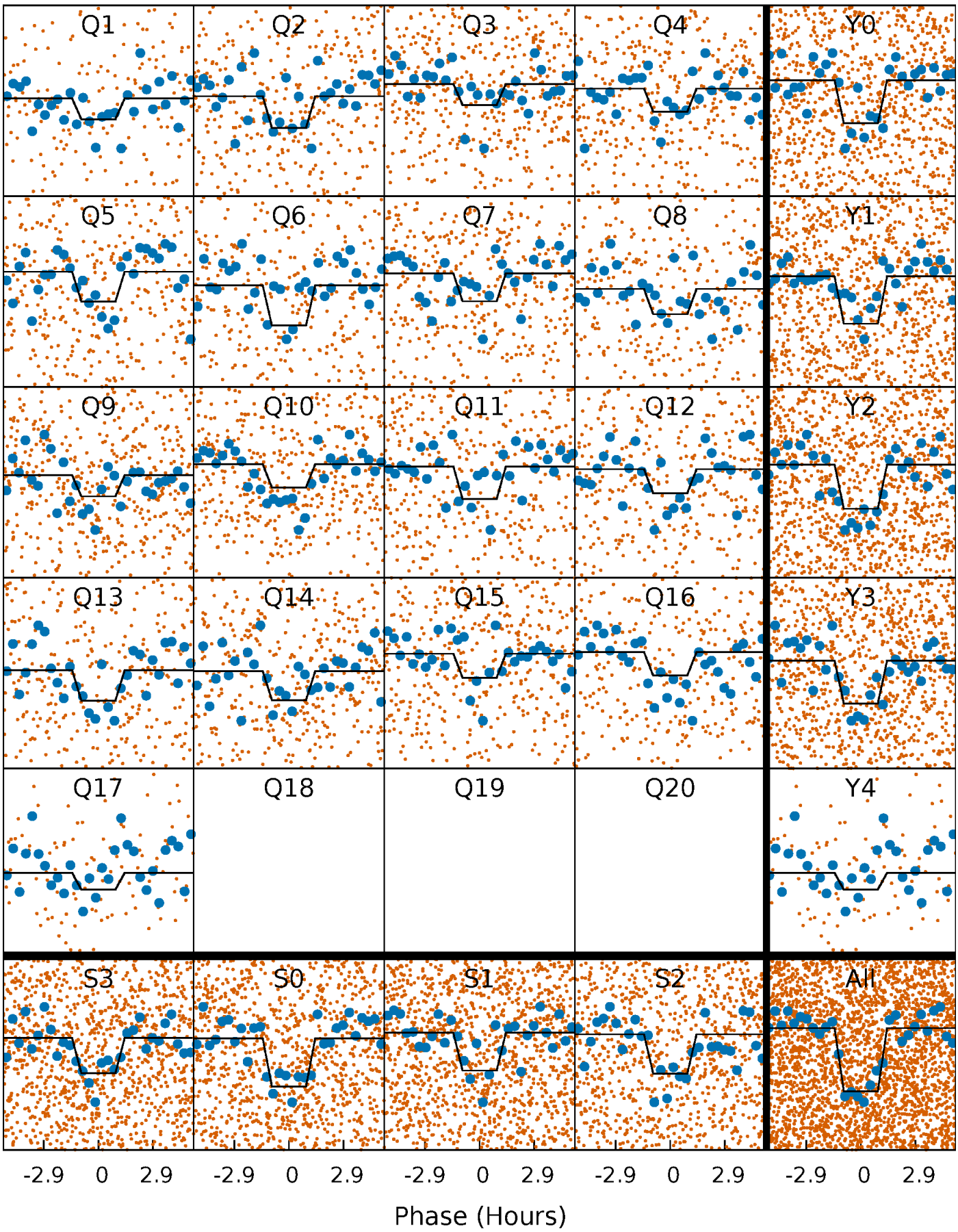
# DV Quarter-Phased Transit Curves

TCE 009216775-01 P= 3.917924 Days $T_0$=132.869214 (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

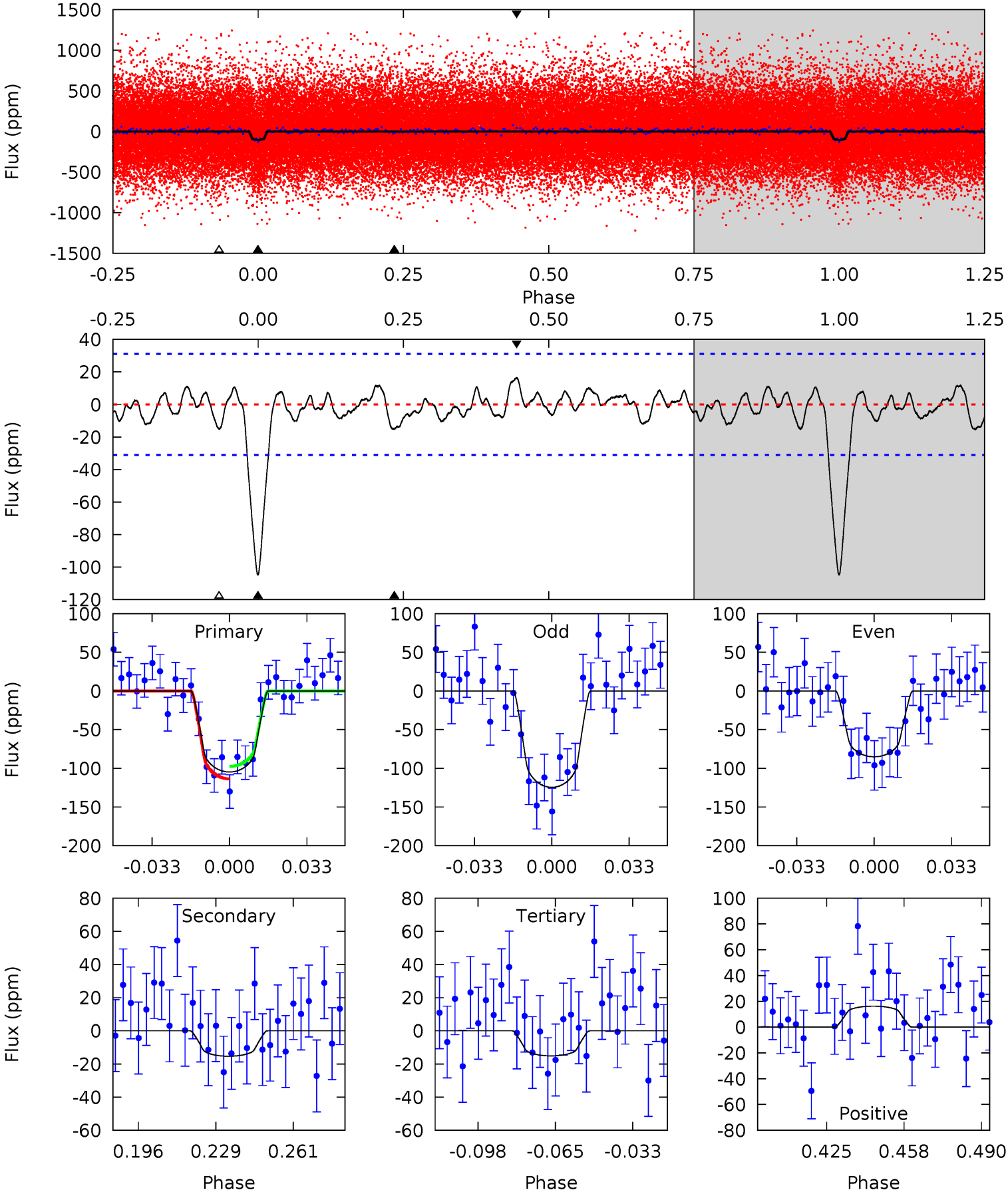
TCE 009216775-01 P= 3.917953 Days $T_0$=132.861987 (BKJD)



# DV Model-Shift Uniqueness Test

009216775-01, P = 3.917924 Days, E = 128.951290 Days

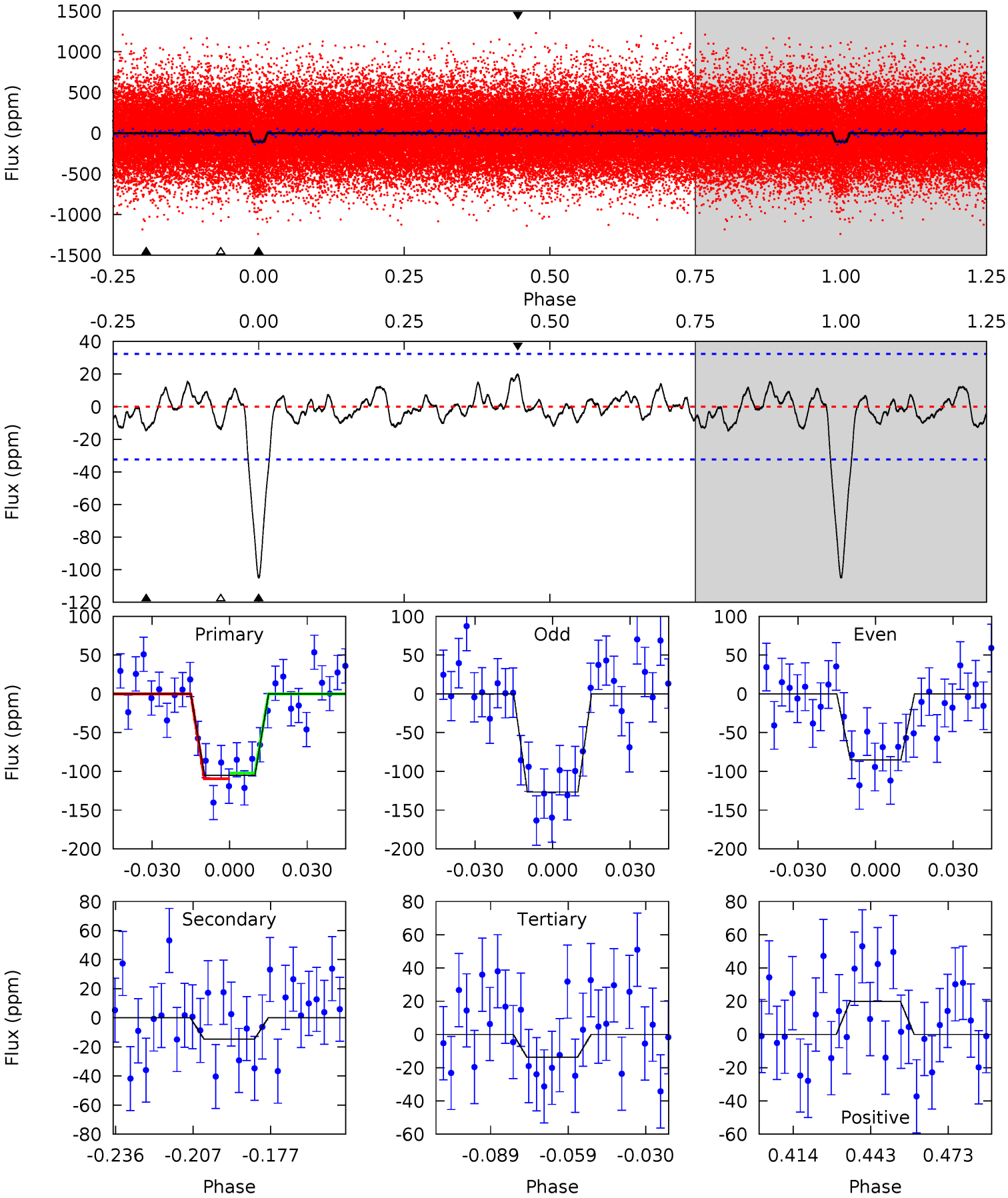
| Pri | Sec | Ter | Pos | $FA_1$ | $FA_2$ | $F_{Red}$ | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.2 | 2.37 | 2.33 | 2.51 | 4.79 | 2.14 | 0.92 | 13.8 | 13.7 | 0.04 | -0.14 | 3.05 | 1.09 | 0.13 | 1.24 |



# Alt Model-Shift Uniqueness Test

009216775-01, P = 3.917953 Days, E = 128.944034 Days

| Pri | Sec | Ter | Pos | $FA_1$ | $FA_2$ | $F_{Red}$ | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15.6 | 2.18 | 2.04 | 2.96 | 4.81 | 2.18 | 0.96 | 13.6 | 12.7 | 0.13 | -0.78 | 3.08 | 1.00 | 0.16 | 0.54 |



Stellar Parameters For KIC 009216775

| | $T_{\rm eff}(K)$ | $\log(g)$ | [Fe/H] | $R$ ($R_\odot$) | $M(M_\odot)$ | $p_\star$ (g·cm$^{-3}$) |
|---|---|---|---|---|---|---|
| | $5500^{+74}_{-82}$ | $4.547^{+0.019}_{-0.110}$ | $0.160^{+0.150}_{-0.150}$ | $0.870^{+0.105}_{-0.035}$ | $0.974^{+0.035}_{-0.076}$ | $2.081^{+0.199}_{-0.637}$ |
| | +1%/-1% | +0%/-2% | +94%/-94% | +12%/-4% | +4%/-8% | +10%/-31% |
| Source | SPE90 | SPE90 | SPE90 | DSEP | | |

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

Secondary Eclipse Parameters for KIC 009216775-01 / KOI 4513.01

| Detrend | Depth (ppm) | $R_p$ ($R_\oplus$) | $T_{max}$ (K) | $T_{obs}$ (K) | $A_{obs}$ |
|---|---|---|---|---|---|
| DV | -15±6 | $1.25^{+0.70}_{-0.65}$ | $1456^{+46}_{-31}$ | $3496^{+951}_{-547}$ | $13^{+36}_{-9}$ |
| Alt. | -15±7 | $1.08^{+0.68}_{-0.70}$ | $1457^{+42}_{-32}$ | $3631^{+1687}_{-642}$ | $15^{+97}_{-11}$ |

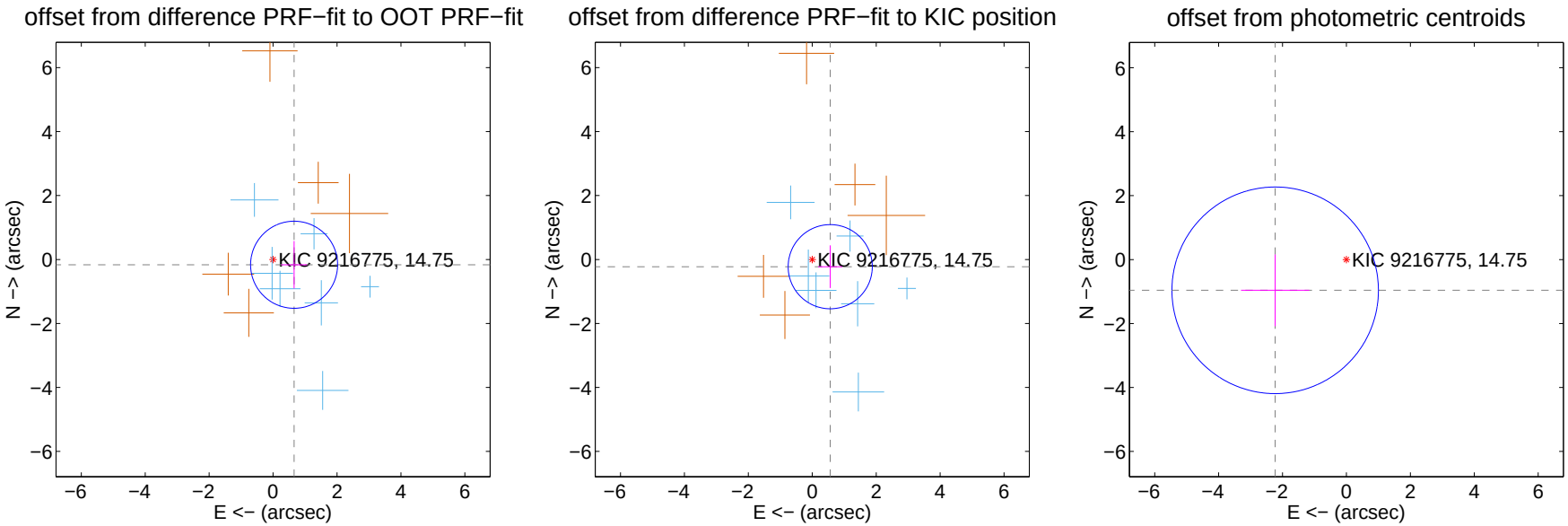
$T_{max}$ = Theoretical Maximum Planetary Temperature
$T_{obs}$ = Observed Planetary Temperature (Assuming A=0.3)
$A_{obs}$ = Observed Albedo (Assuming T=0)

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

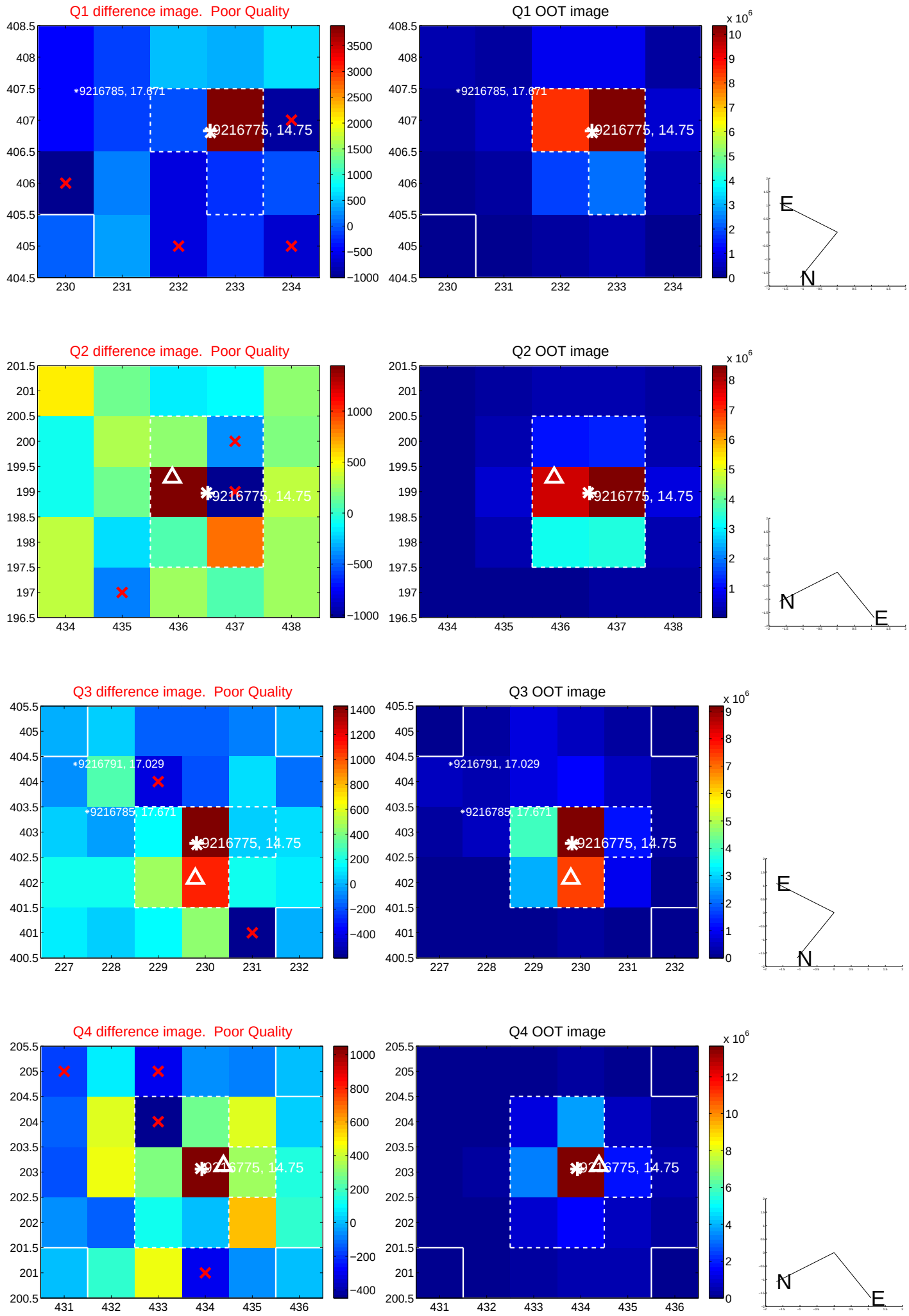
Supplemental centroid analysis for 009216775-01. Kepler magnitude: 14.75. Transit SNR 12.64
There are 7 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

| | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA | $\Delta$ Dec |
|---|---|---|---|---|
| PRF-fit source offset from OOT | 0.677 ± 0.454 | 1.49 | -0.657 ± 0.404 | -0.164 ± 0.743 |
| PRF-fit source offset from KIC position | 0.605 ± 0.439 | 1.38 | -0.562 ± 0.377 | -0.225 ± 0.666 |
| photometric centroid source offset | 2.43 ± 1.08 | 2.26 | 2.23 ± 1.07 | -0.96 ± 1.12 |

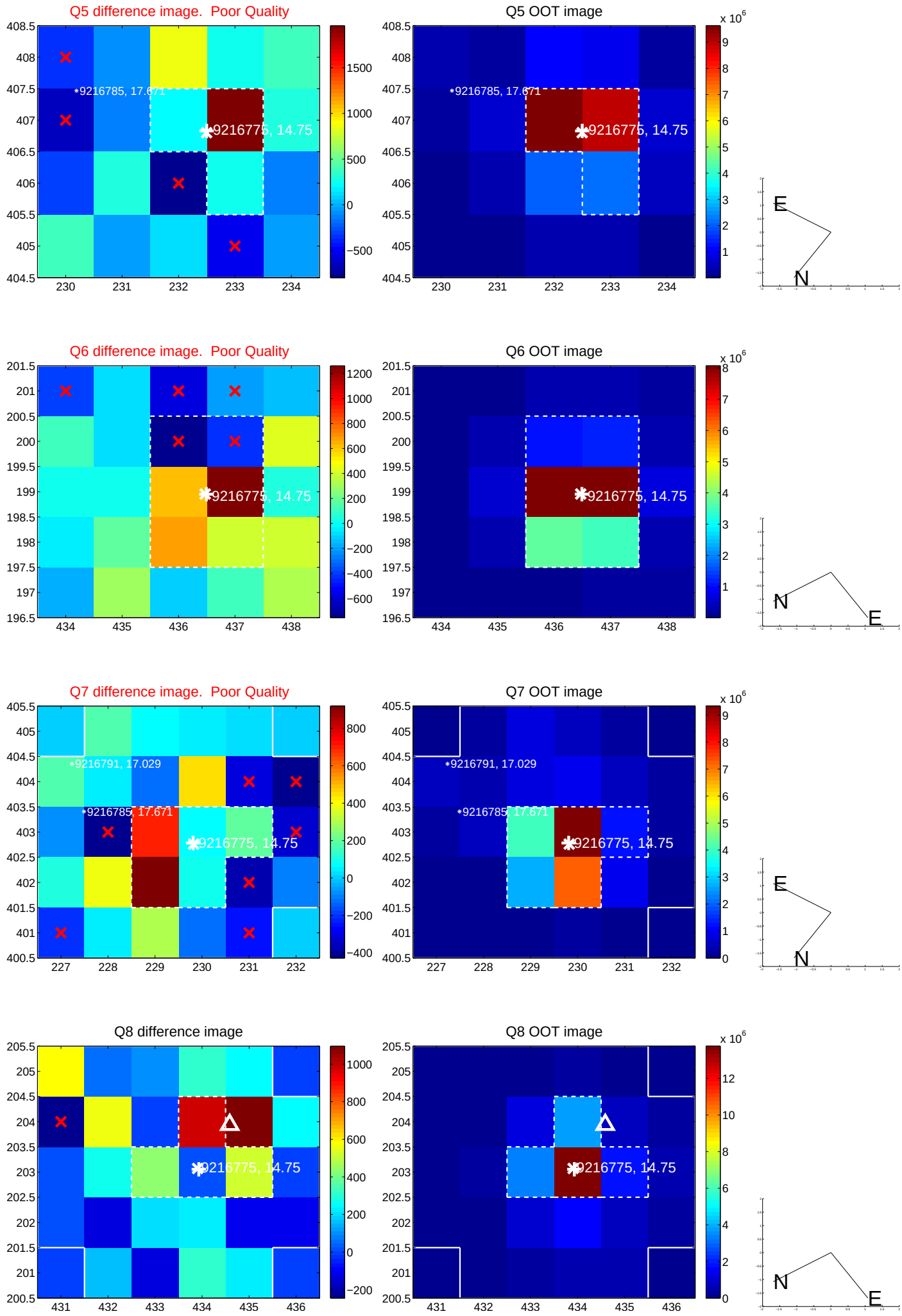



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-$\sigma$ uncertainty. Blue circle: three-$\sigma$.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



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



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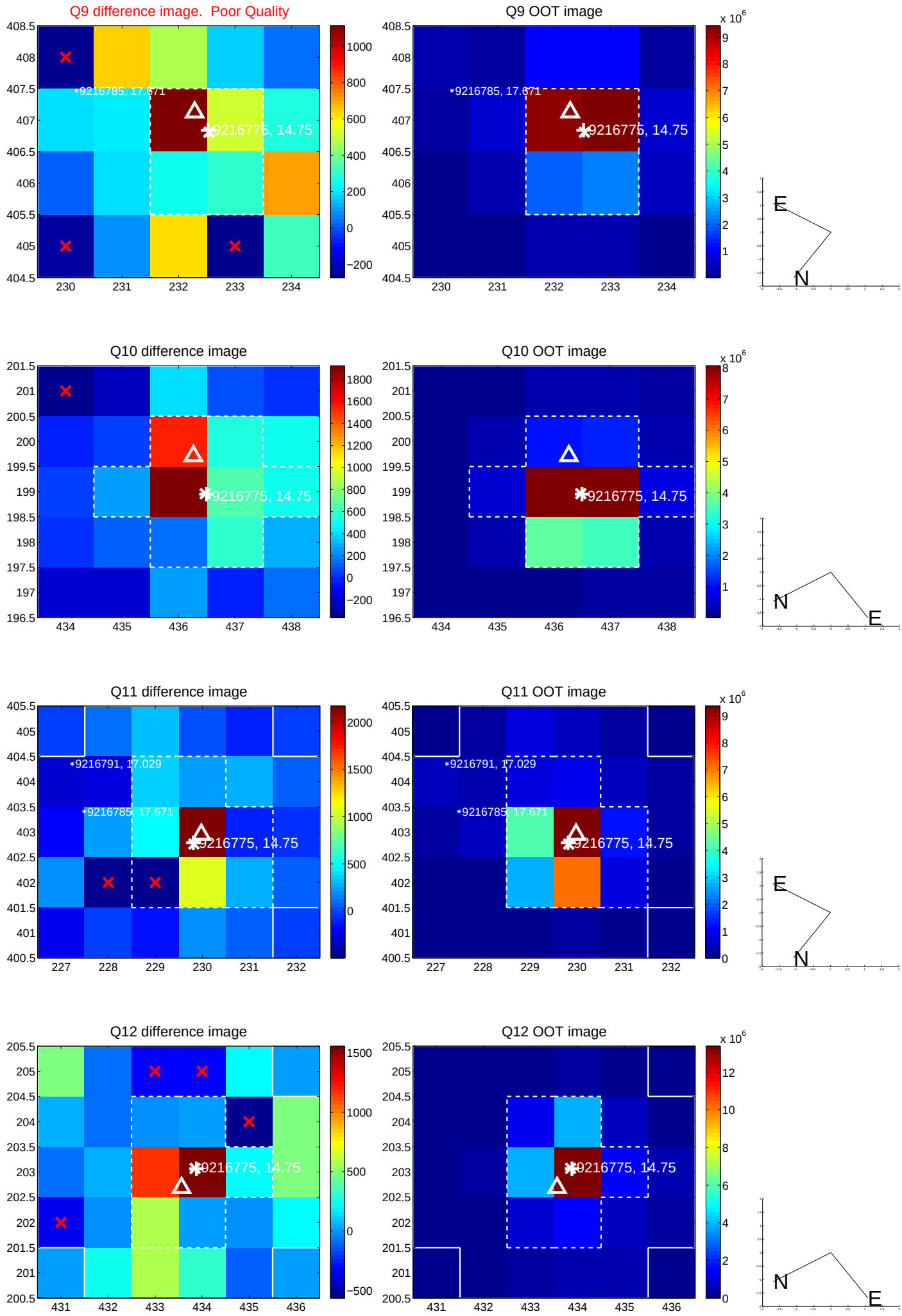
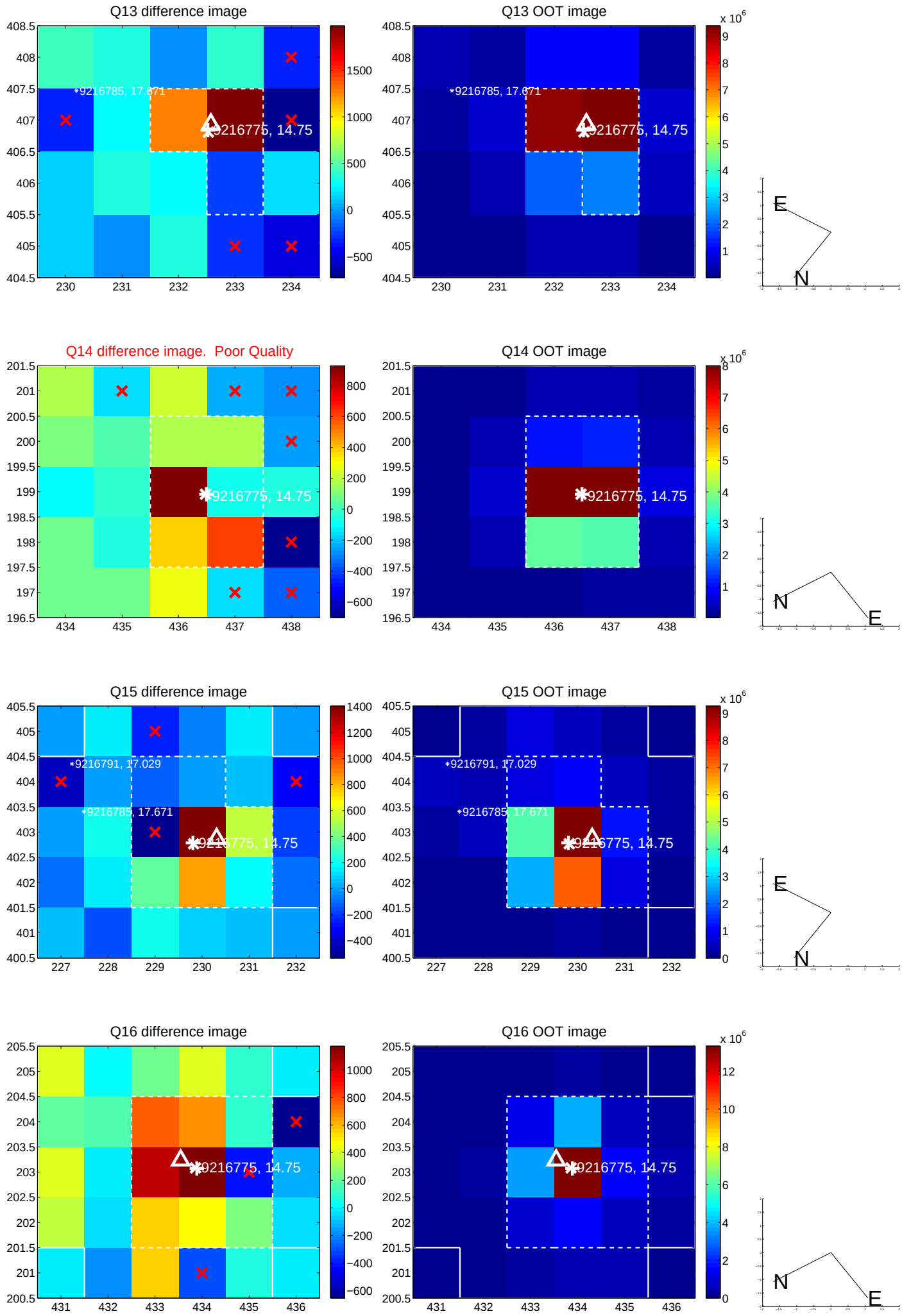
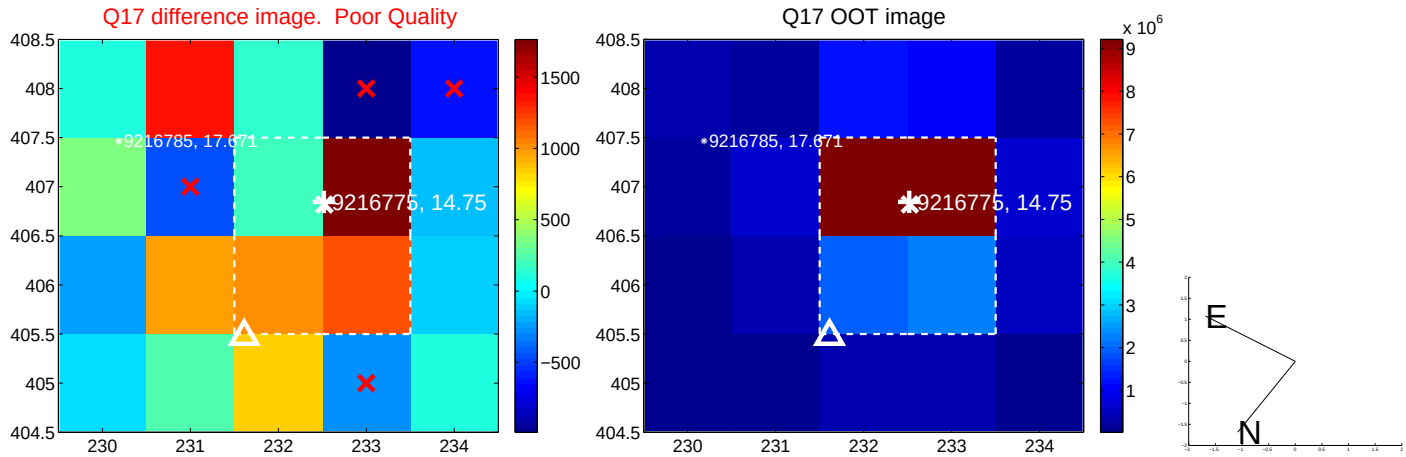
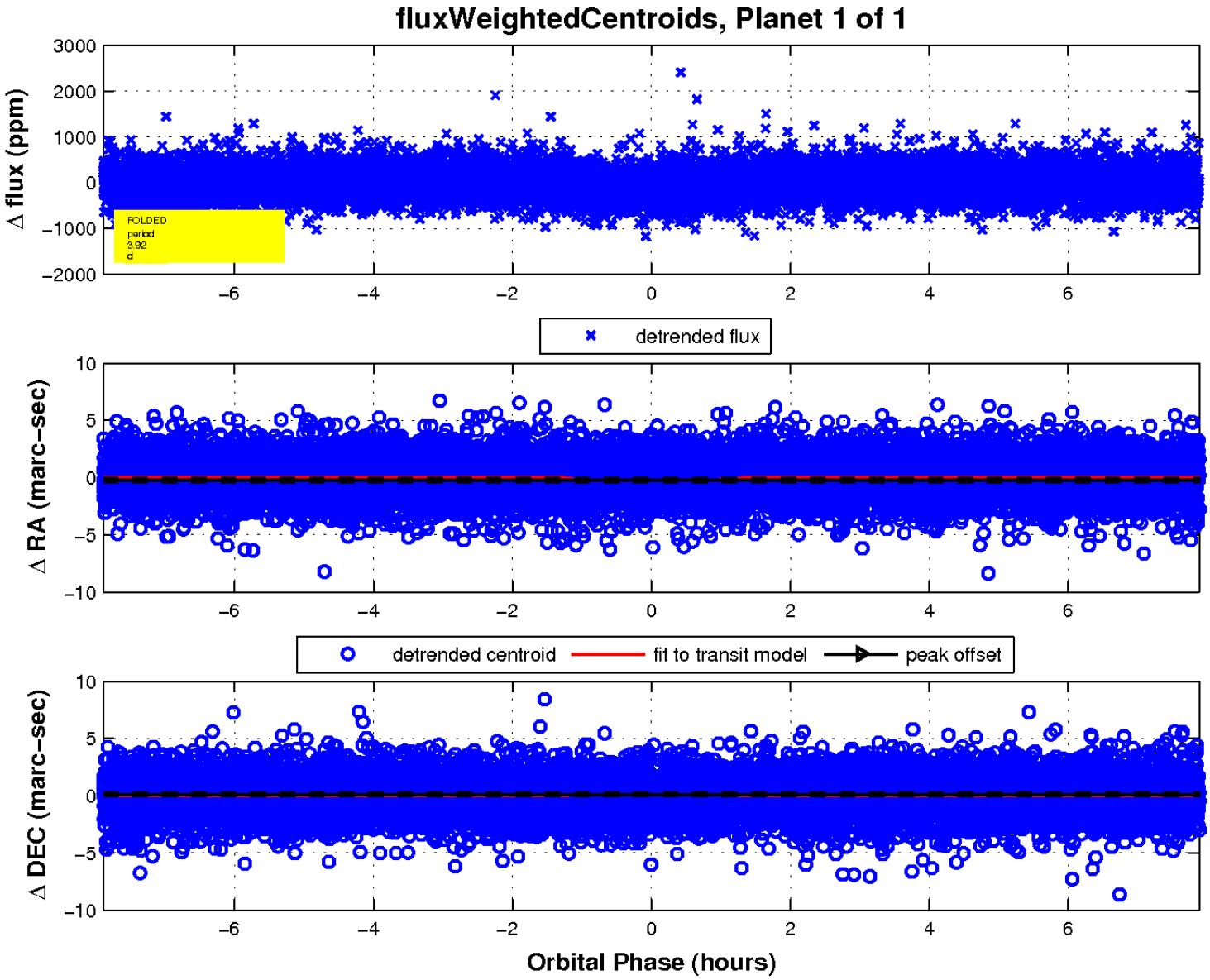
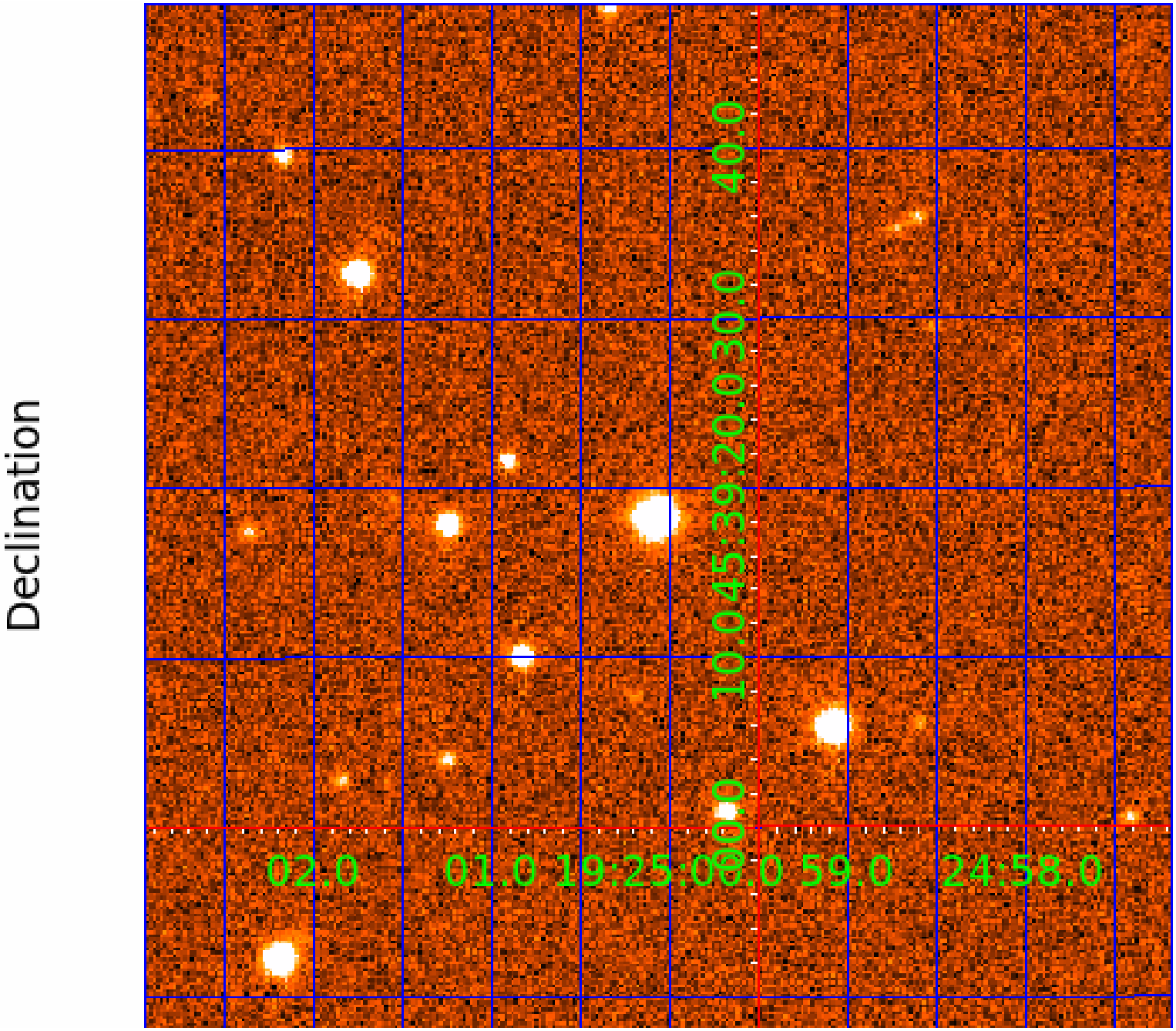


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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






**UKIRT Image**