Data Validation (DV) Report
for TESS ID 169461816
Sectors 14 - 14

This Data Validation Report was produced in the
TESS Science Processing Operations Center (SPOC) Pipeline
at NASA Ames Research Center

13-Sep-2019 12:17:26 Z

Contents

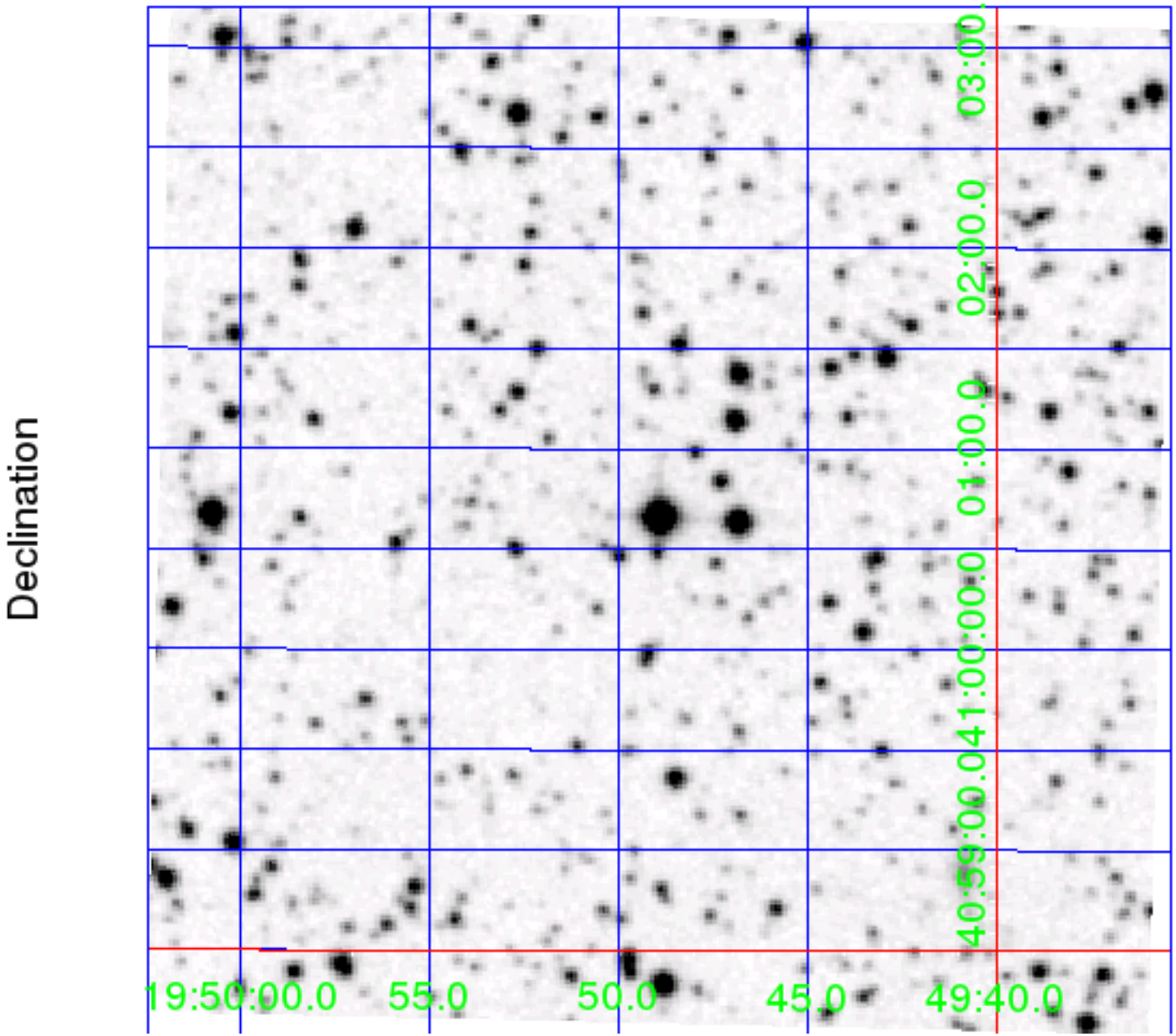
1 Summary

Target Properties	Value	Uncertainty	Units	Provenance
Catalog ID	169461816			
TOI ID	-			
TESS Name	-			
RA	297.45372285	0	degrees	TIC8
Dec	41.01100766	0	degrees	TIC8
Magnitude	10.931	0.0061		TIC8
Radius	1.491	0.067	Solar radii	TIC8
Effective Temperature	6779	106	Kelvin	TIC8
log(g)	4.254	0.088433	cm/sec^2	TIC8
[M/H]	0.081	0.0088569	Solar metallicity	TIC8
Stellar Density	0.439	0.091	Solar density	TIC8-Derived
Limb Darkening Coefficient 1	0.45874			
Limb Darkening Coefficient 2	0.51648			
Limb Darkening Coefficient 3	-0.55317			
Limb Darkening Coefficient 4	0.1846			
Number of Planet Candidates	3			
TOI Model	toi-plus-2019-08-29.csv			
TESS Names Model	-			
External TCE Model	-			
Software Revision	spoc-4.0.8-20190912			
Date Report Generated	13-Sep-2019 12:17:26 Z			

Sector	Target Table	Camera/ CCD	Crowding Metric	Flux Fraction
14	167	1:1	0.7586	0.8708

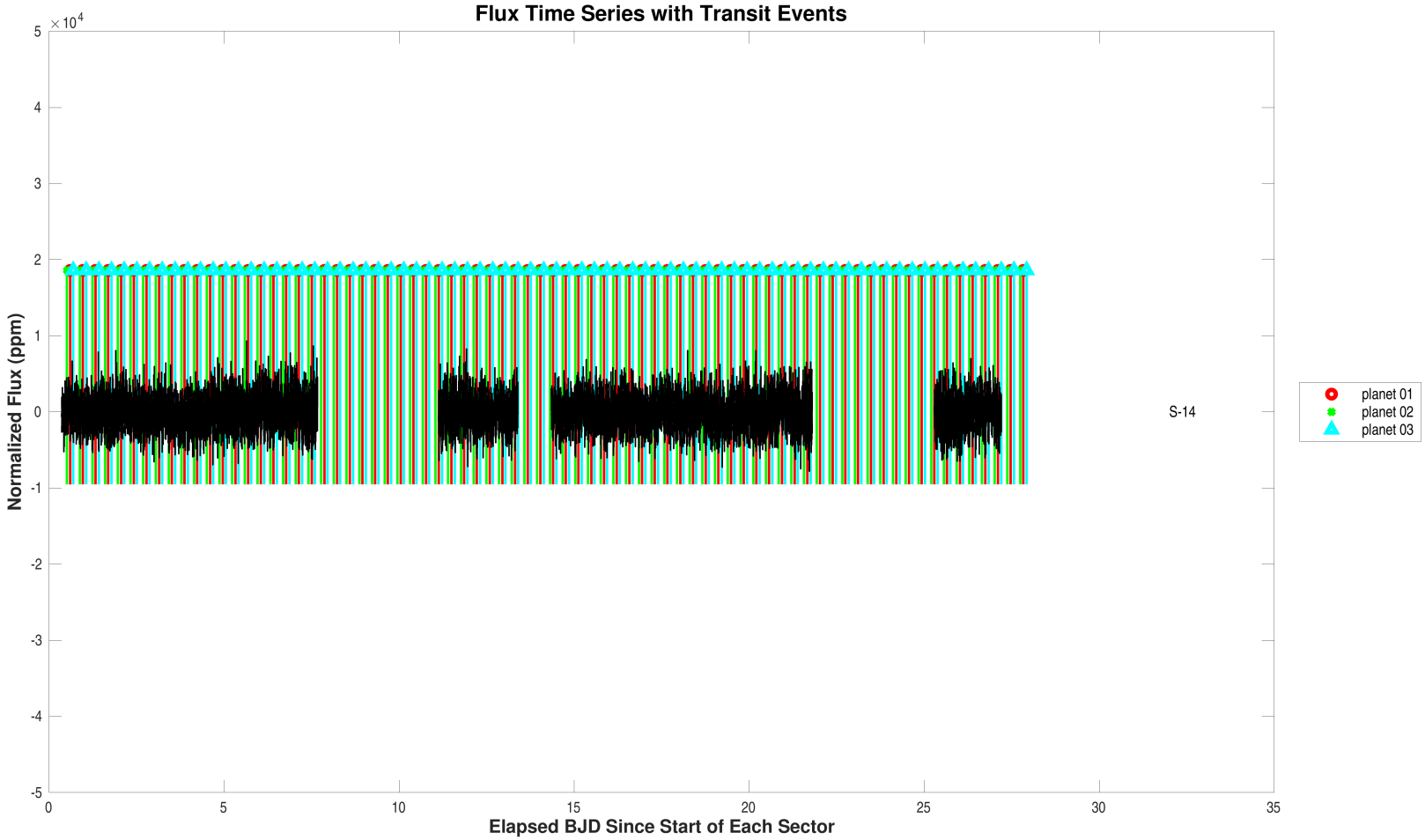
Planet Candidate	TOI ID	TESS Name	TOI Correlation	Period (days)	Period Ratio	Epoch (BTJD)	Semi-major Axis (AU)	Radius (Re)	Seff	Teq (K)	False Alarm	Suspected EB
1	-	-	-	0.363	1.00	1683.603	0.01	4.5	33009.4	3438	6.19e-09	false
2	-	-	-	0.363	1.00	1683.512	0.01	4.3	33009.7	3438	6.06e-09	false
3	-	-	-	0.363	1.00	1683.693	0.01	4.7	33005.4	3438	1.36e-08	false

2 Survey Image

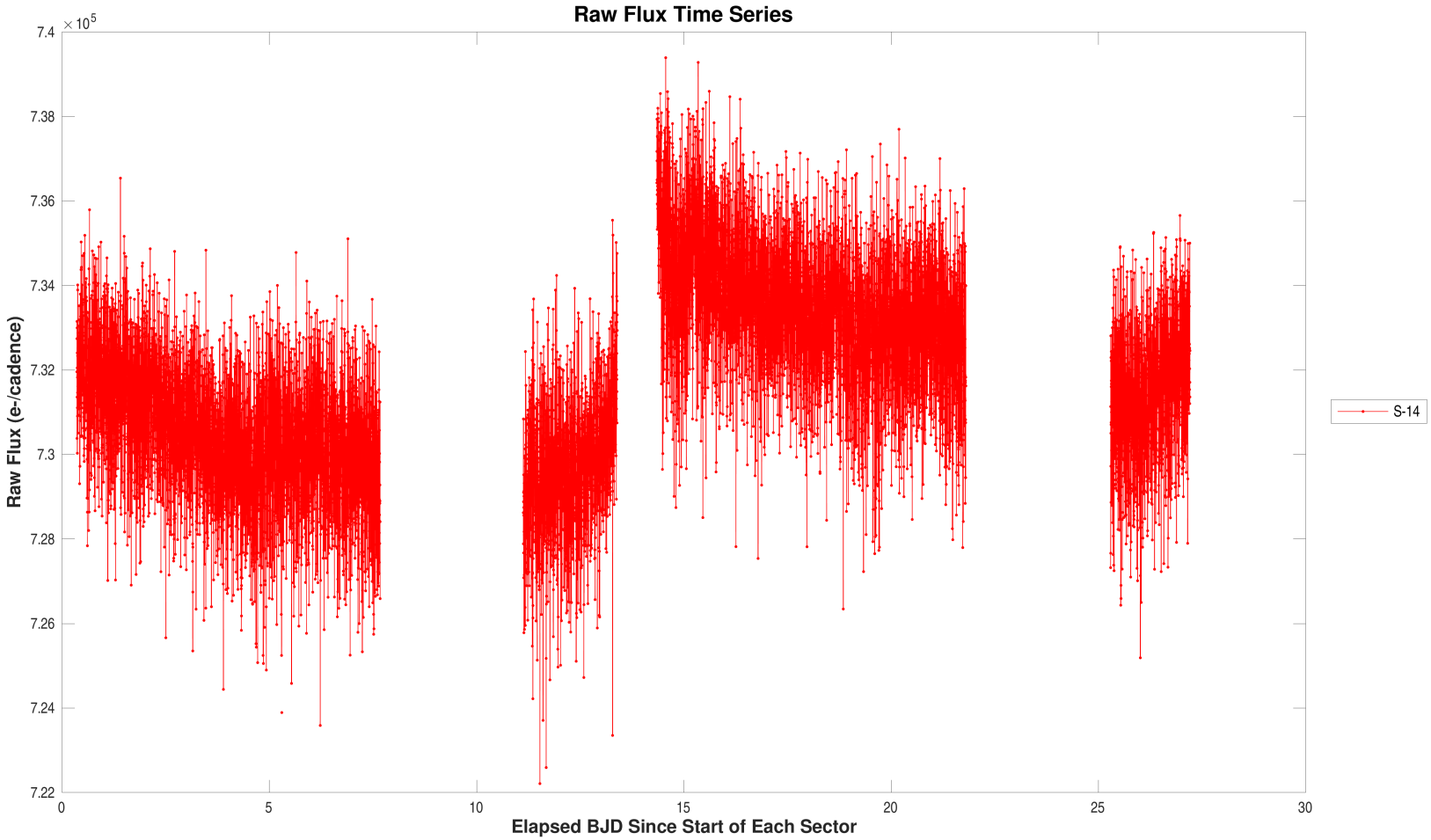


Digitized Sky Survey (DSS) red image. The 5' x 5' image is centered on the J2000 coordinates of target (169461816).

3 Flux Time Series



Summary plot of sector-stitched flux time series and transits for target 169461816, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BTJD and orbital period. For the data of sector 14, target table 167, start BJD is 2458683.
Open `./summary-plots/0000000169461816-00-flux-dv-fit-14-167.fig`



Summary plot of raw flux time series. For the data of sector 14, target table 167, start BJD is 2458683.
Open `./summary-plots/0000000169461816-00-raw-flux-14-167.fig`

4 Dashboards

Planet Candidate 1

<table>
<tr><td rowspan="2">Model Fitter</td><td colspan="2">Stellar Radius
1.5 ± 0.1 Solar units</td><td rowspan="2">Core Aperture Correlation Statistic
Value = 5.85
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = 3.79
Significance = 99.99%
Core/Halo Ratio
Ratio = 1.54</td><td rowspan="2">Ghost Diagnostic Test</td></tr>
<tr><td colspan="2">Period = 0.4 ± 0.0 days
Depth = 854 ± 103 ppm
Planet Radius = 4.5 ± 3.8 Earth radii
Semi-major Axis = 0.0 ± 0.0 AU
Effective Stellar Flux = 33009.4 ± 5034.4
Equilibrium Temperature = 3438 ± 131 Kelvin
Chi-squared/DoF = 0.8
SNR = 8.8</td></tr>
<tr><td rowspan="2">Eclipsing Binary Discrimination Test</td><td colspan="2">Odd-Even Depth Comparison Statistic
Value = 7.09e-01
Significance = 39.97%</td><td>Offsets Relative to Out of Transit Centroid
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A
Offsets Relative to TIC Position
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A</td><td>Difference Image Centroid Offsets</td></tr>
<tr><td>Shorter Period Comparison Statistic
Value = 5.15e-09
Significance = 0.01%</td><td>Longer Period Comparison Statistic
Value = 7.72e-07
Significance = 0.07%</td><td>False Alarm = 6.19e-09
Transit Count = 74
Max Multiple Event Statistic = 7.4</td><td>Bootstrap Test</td></tr>
</table>

Summary of model fitter results and validation test results for target 169461816, planet candidate 1. In general, green denotes that the candidate is likely a planet, while red denotes that the candidate is unlikely to be a planet. Cyan denotes that no data is available. The color of the Model Fitter block is: green, when the SNR of the fit is greater than or equal to 10; yellow, if the SNR is greater than or equal to 7.1 but less than 10; red, if the SNR is less than 7.1 or if the fitter failed. The color of the Ghost Diagnostic Test and Eclipsing Binary Discrimination Test blocks are: green, when the significance is within 2-sigma; yellow, when the significance is between 2- and 3-sigma; red when the significance is greater than 3-sigma. The color of the Difference Image Centroid Offsets block is: green, when the max offset distance sigma is less than or equal to 2; yellow, when the max sigma is between 2 and 3; red when the max sigma is greater than 3. The color of the Bootstrap Test block is green whenever the false alarm probability is less than 10^{-12}, low enough to limit the total number of false alarms from a four year mission to less than one. If the false alarm probability is greater than 10^{-12}, the color of the Bootstrap Test block is: green, when the false alarm probability is less than or equal to the CCDF of a Gaussian distribution at the observed maximum multiple event statistic; yellow when the false alarm probability is between 1 and 2 times that of a Gaussian distribution at the max multiple event statistic; and red when the false alarm probability is more than 2 times that of a Gaussian distribution at the max multiple event statistic.

Planet Candidate 2

<table>
<tr><td rowspan="2">Model Fitter</td><td colspan="2">Stellar Radius
1.5 ± 0.1 Solar units</td><td rowspan="2">Core Aperture Correlation Statistic
Value = 6.85
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = -0.63
Significance = 26.38%
Core/Halo Ratio
Ratio = -10.85</td><td rowspan="2">Ghost Diagnostic Test</td></tr>
<tr><td colspan="2">Period = 0.4 ± 0.0 days
Depth = 781 ± 103 ppm
Planet Radius = 4.3 ± 5.8 Earth radii
Semi-major Axis = 0.0 ± 0.0 AU
Effective Stellar Flux = 33009.7 ± 5034.4
Equilibrium Temperature = 3438 ± 131 Kelvin
Chi-squared/DoF = 0.8
SNR = 8.2</td></tr>
<tr><td rowspan="2">Eclipsing Binary Discrimination Test</td><td colspan="2">Odd-Even Depth Comparison Statistic
Value = 3.05e-01
Significance = 58.07%</td><td>Offsets Relative to Out of Transit Centroid
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A
Offsets Relative to TIC Position
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A</td><td>Difference Image Centroid Offsets</td></tr>
<tr><td>Shorter Period Comparison Statistic
Value = N/A
Significance = N/A</td><td>Longer Period Comparison Statistic
Value = 5.15e-09
Significance = 0.01%</td><td>False Alarm = 6.06e-09
Transit Count = 74
Max Multiple Event Statistic = 7.4</td><td>Bootstrap Test</td></tr>
</table>

Summary of model fitter results and validation test results for target 169461816, planet candidate 2. In general, green denotes that the candidate is likely a planet, while red denotes that the candidate is unlikely to be a planet. Cyan denotes that no data is available. The color of the Model Fitter block is: green, when the SNR of the fit is greater than or equal to 10; yellow, if the SNR is greater than or equal to 7.1 but less than 10; red, if the SNR is less than 7.1 or if the fitter failed. The color of the Ghost Diagnostic Test and Eclipsing Binary Discrimination Test blocks are: green, when the significance is within 2-sigma; yellow, when the significance is between 2- and 3-sigma; red when the significance is greater than 3-sigma. The color of the Difference Image Centroid Offsets block is: green, when the max offset distance sigma is less than or equal to 2; yellow, when the max sigma is between 2 and 3; red when the max sigma is greater than 3. The color of the Bootstrap Test block is green whenever the false alarm probability is less than 10^{-12}, low enough to limit the total number of false alarms from a four year mission to less than one. If the false alarm probability is greater than 10^{-12}, the color of the Bootstrap Test block is: green, when the false alarm probability is less than or equal to the CCDF of a Gaussian distribution at the observed maximum multiple event statistic; yellow when the false alarm probability is between 1 and 2 times that of a Gaussian distribution at the max multiple event statistic; and red when the false alarm probability is more than 2 times that of a Gaussian distribution at the max multiple event statistic.

Planet Candidate 3

<table>
<tr>
<td rowspan="2">Model Fitter</td>
<td colspan="2">Stellar Radius
1.5 ± 0.1 Solar units</td>
<td rowspan="2">Core Aperture Correlation Statistic
Value = 4.72
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = 5.44
Significance = 100.00%
Core/Halo Ratio
Ratio = 0.87</td>
<td rowspan="2">Ghost Diagnostic Test</td>
</tr>
<tr>
<td colspan="2">Period = 0.4 ± 0.0 days
Depth = 886 ± 98 ppm
Planet Radius = 4.7 ± 3.5 Earth radii
Semi-major Axis = 0.0 ± 0.0 AU
Effective Stellar Flux = 33005.4 ± 5033.8
Equilibrium Temperature = 3438 ± 131 Kelvin
Chi-squared/DoF = 0.9
SNR = 10.1</td>
</tr>
<tr>
<td rowspan="2">Eclipsing Binary Discrimination Test</td>
<td colspan="2">Odd-Even Depth Comparison Statistic
Value = 2.52e-01
Significance = 61.60%</td>
<td>Offsets Relative to Out of Transit Centroid
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A
Offsets Relative to TIC Position
Source RA Offset = N/A
Source Dec Offset = N/A
Source Offset Distance = N/A</td>
<td>Difference Image Centroid Offsets</td>
</tr>
<tr>
<td>Shorter Period Comparison Statistic
Value = 7.72e-07
Significance = 0.07%</td>
<td>Longer Period Comparison Statistic
Value = N/A
Significance = N/A</td>
<td>False Alarm = 1.36e-08
Transit Count = 74
Max Multiple Event Statistic = 7.2</td>
<td>Bootstrap Test</td>
</tr>
</table>

Summary of model fitter results and validation test results for target 169461816, planet candidate 3. In general, green denotes that the candidate is likely a planet, while red denotes that the candidate is unlikely to be a planet. Cyan denotes that no data is available. The color of the Model Fitter block is: green, when the SNR of the fit is greater than or equal to 10; yellow, if the SNR is greater than or equal to 7.1 but less than 10; red, if the SNR is less than 7.1 or if the fitter failed. The color of the Ghost Diagnostic Test and Eclipsing Binary Discrimination Test blocks are: green, when the significance is within 2-sigma; yellow, when the significance is between 2- and 3-sigma; red when the significance is greater than 3-sigma. The color of the Difference Image Centroid Offsets block is: green, when the max offset distance sigma is less than or equal to 2; yellow, when the max sigma is between 2 and 3; red when the max sigma is greater than 3. The color of the Bootstrap Test block is green whenever the false alarm probability is less than 10^{-12}, low enough to limit the total number of false alarms from a four year mission to less than one. If the false alarm probability is greater than 10^{-12}, the color of the Bootstrap Test block is: green, when the false alarm probability is less than or equal to the CCDF of a Gaussian distribution at the observed maximum multiple event statistic; yellow when the false alarm probability is between 1 and 2 times that of a Gaussian distribution at the max multiple event statistic; and red when the false alarm probability is more than 2 times that of a Gaussian distribution at the max multiple event statistic.

5 Pixel Level Diagnostics

To reduce clutter, the catalog IDs in the difference images have been replaced by indices representing distance from the target star. The mapping between the indices and the catalog IDs is found in a table at the end of this section.

5.1 Planet Candidate 1

Multi-Sector Average PRF Fit of the Difference Images

Mean offset from the PRF fit to the out of transit image

	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

Mean offset from the TIC RA and Dec

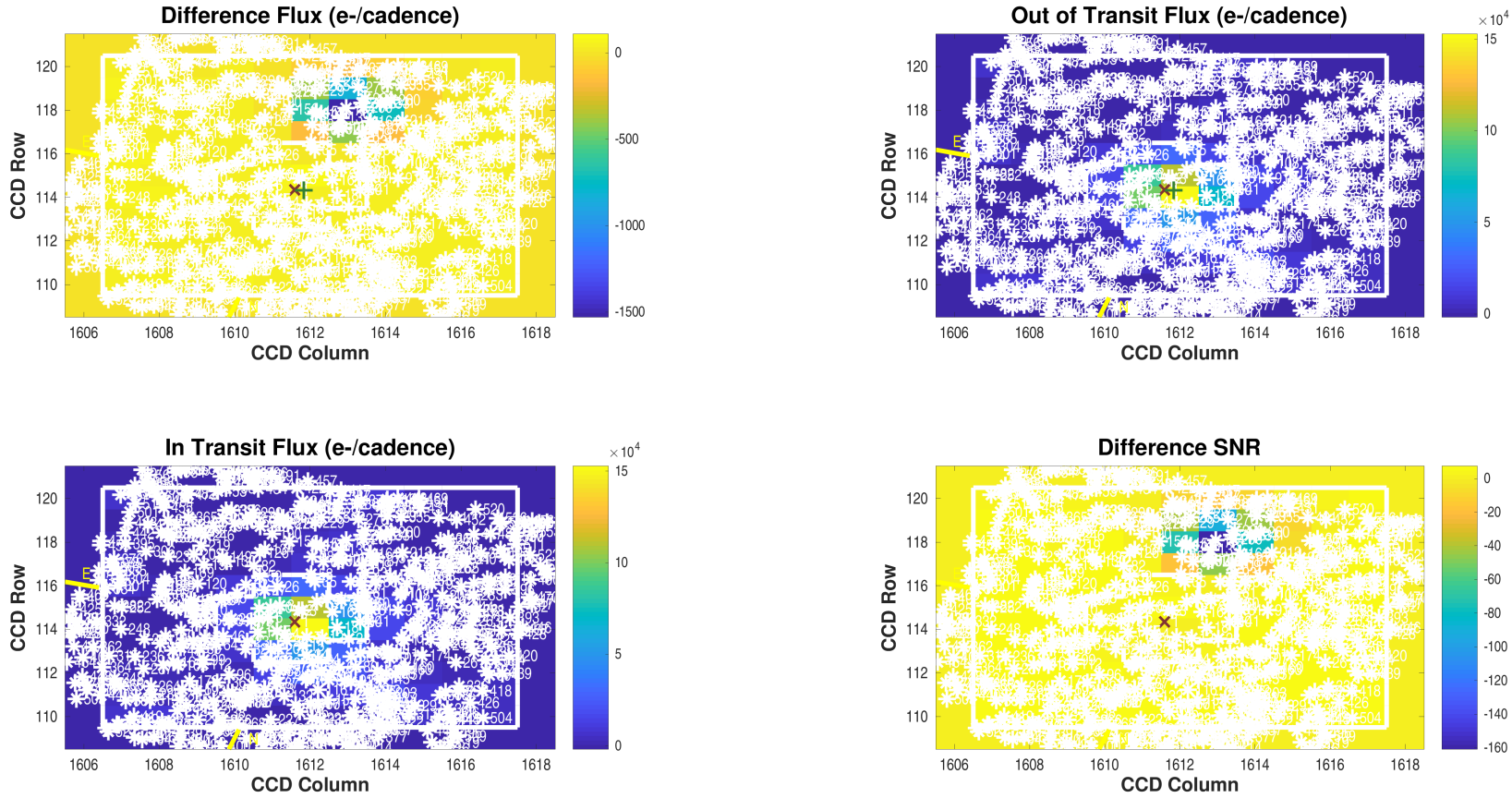
	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

`Difference image centroid offsets figure for this planet candidate is not available.`

Difference image centroid offsets figure on survey image for this planet candidate is not available.

Difference Image Summary Metrics

Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
N/A	*N/A*	*N/A*	*N/A*	*N/A*



Difference image for target 169461816, planet candidate 1, sector 14, target pixel table 167. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from TIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby TIC objects converted to CCD coordinates via motion polynomials; +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. Number of transits = 50; number of valid in-transit cadences = 798; number of in-transit cadence gaps = 5; number of valid out-of-transit cadences = 2346; number of out-of-transit cadence gaps = 22. Difference image quality metric = N/A. Transits used to compute this difference image are overlapped by those of other candidates on this target.
Open `./planet-01/difference-image/0000000169461816-01-difference-image-14-167.fig`

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 169461816, planet candidate 1, in target table 167.

5.2 Planet Candidate 2

Multi-Sector Average PRF Fit of the Difference Images

Mean offset from the PRF fit to the out of transit image

	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

Mean offset from the TIC RA and Dec

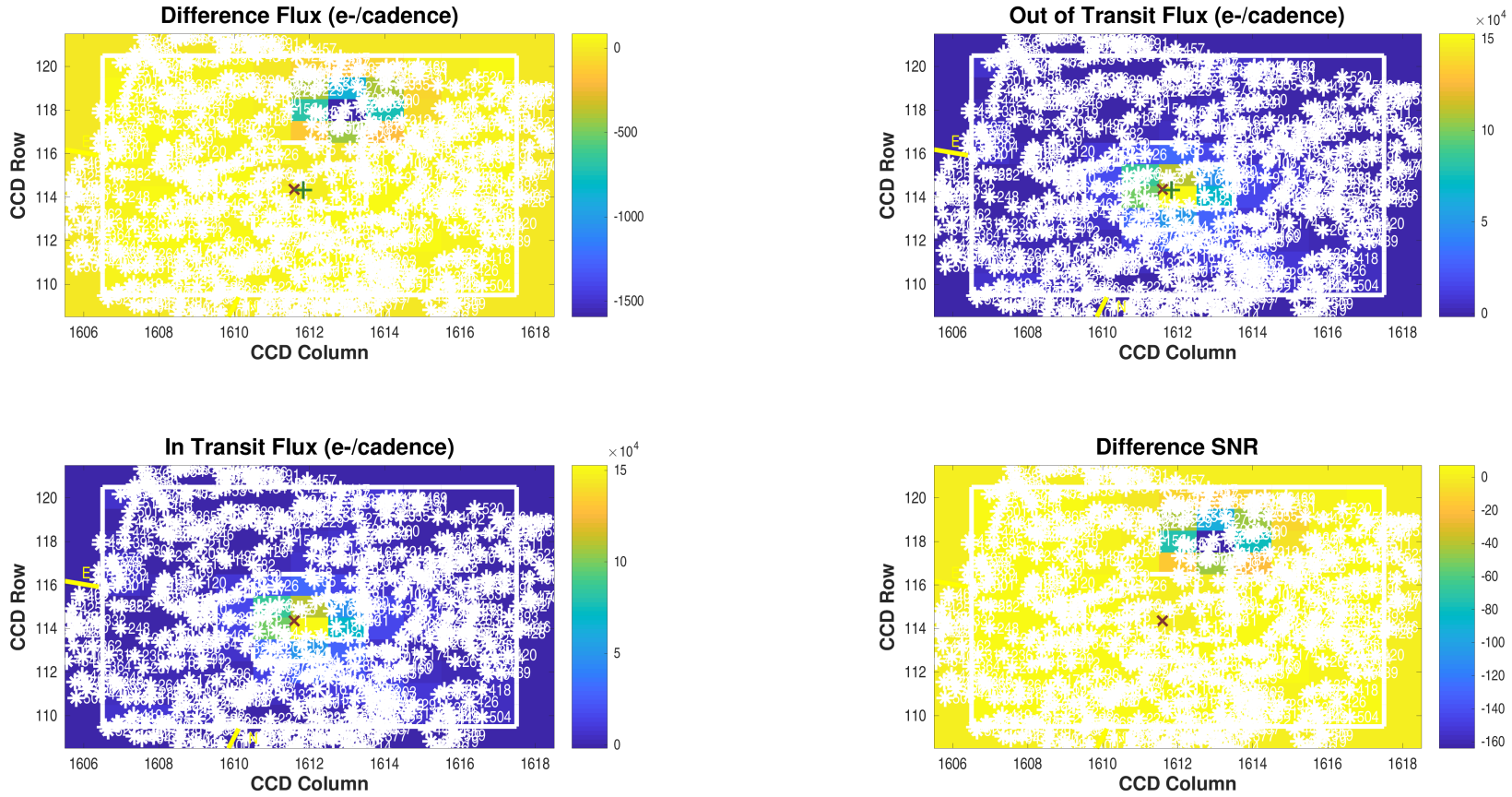
	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

`Difference image centroid offsets figure for this planet candidate is not available.`

Difference image centroid offsets figure on survey image for this planet candidate is not available.

Difference Image Summary Metrics

Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
N/A	*N/A*	*N/A*	*N/A*	*N/A*



Difference image for target 169461816, planet candidate 2, sector 14, target pixel table 167. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from TIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby TIC objects converted to CCD coordinates via motion polynomials; +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. Number of transits = 51; number of valid in-transit cadences = 760; number of in-transit cadence gaps = 1; number of valid out-of-transit cadences = 2255; number of out-of-transit cadence gaps = 22. Difference image quality metric = N/A. Transits used to compute this difference image are overlapped by those of other candidates on this target.
Open `./planet-02/difference-image/0000000169461816-02-difference-image-14-167.fig`

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 169461816, planet candidate 2, in target table 167.

5.3 Planet Candidate 3

Multi-Sector Average PRF Fit of the Difference Images

Mean offset from the PRF fit to the out of transit image

	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

Mean offset from the TIC RA and Dec

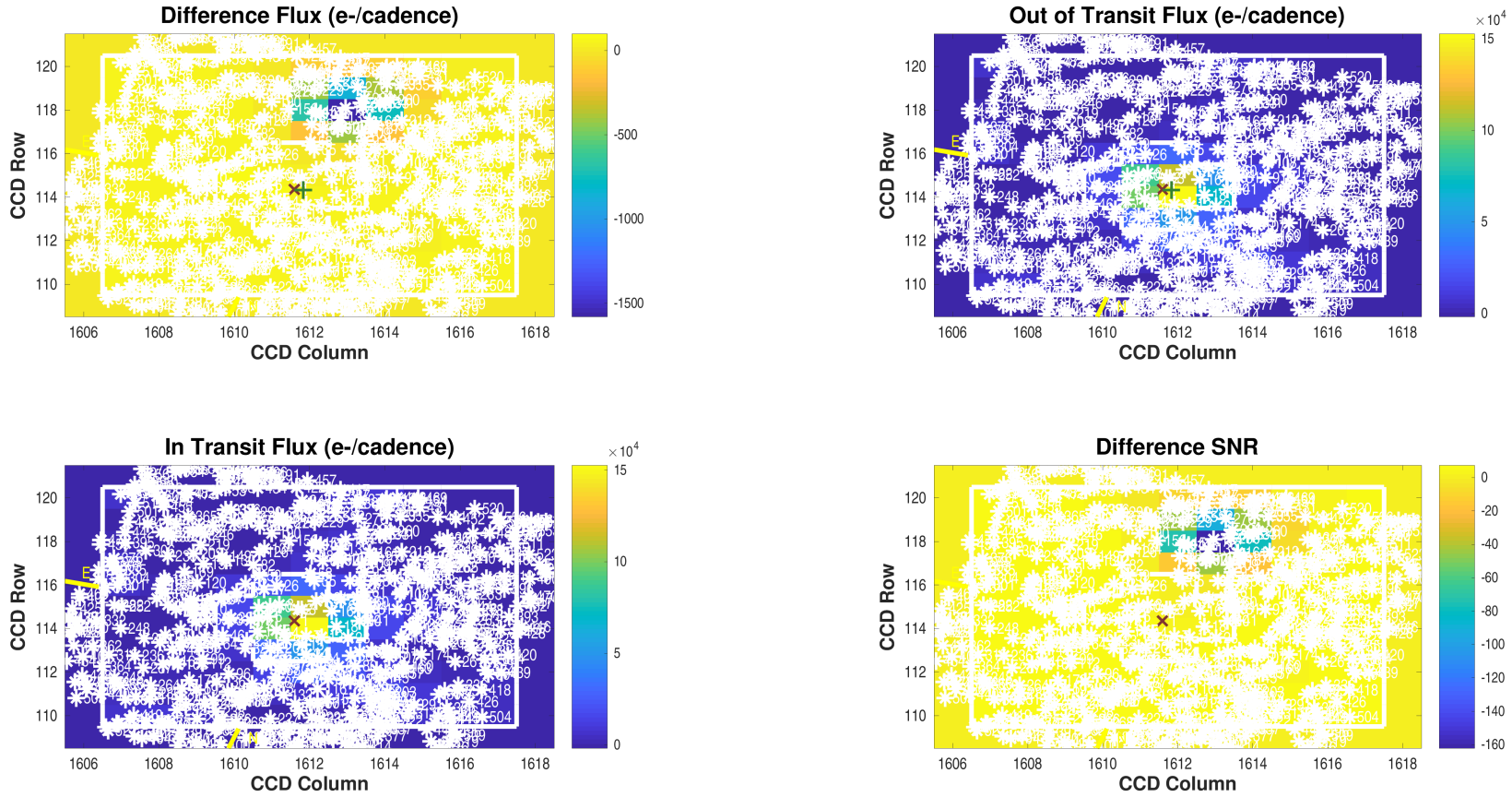
	RA	Dec	Units
Offset	N/A	N/A	arcseconds
Offset/σ	N/A	N/A	
Offset Distance	N/A		arcseconds
Offset Distance/σ	N/A		
3σ Radius	N/A		arcseconds

Difference image centroid offsets figure for this planet candidate is not available.

Difference image centroid offsets figure on survey image for this planet candidate is not available.

Difference Image Summary Metrics

Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
N/A	*N/A*	*N/A*	*N/A*	*N/A*



Difference image for target 169461816, planet candidate 3, sector 14, target pixel table 167. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from TIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby TIC objects converted to CCD coordinates via motion polynomials; +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. Number of transits = 51; number of valid in-transit cadences = 764; number of in-transit cadence gaps = 6; number of valid out-of-transit cadences = 2308; number of out-of-transit cadence gaps = 4. Difference image quality metric = N/A. Transits used to compute this difference image are overlapped by those of other candidates on this target.
Open `./planet-03/difference-image/0000000169461816-03-difference-image-14-167.fig`

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 169461816, planet candidate 3, in target table 167.

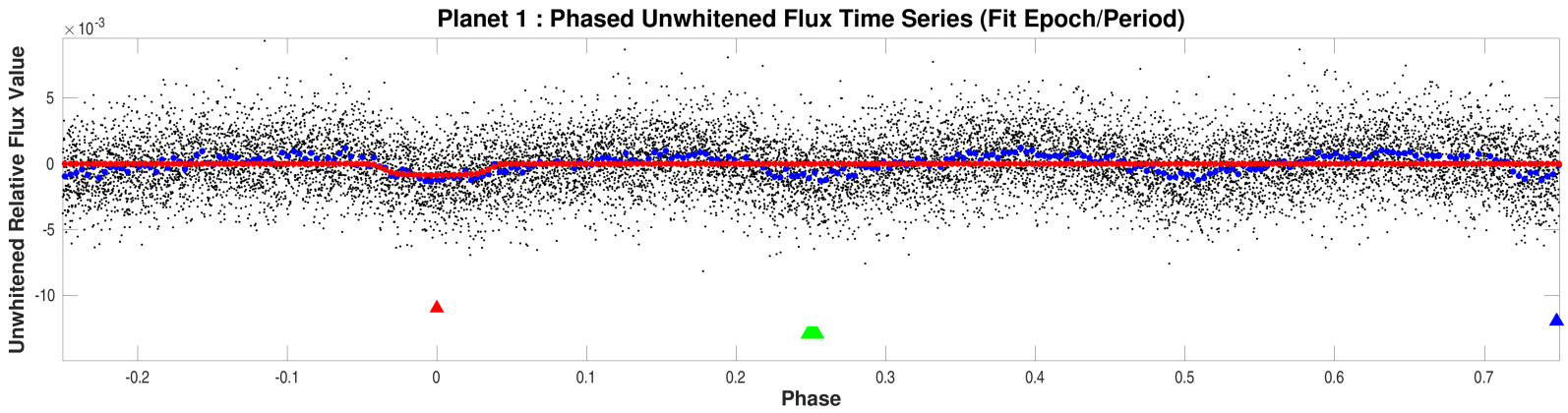
5.4 Difference Image TIC Key

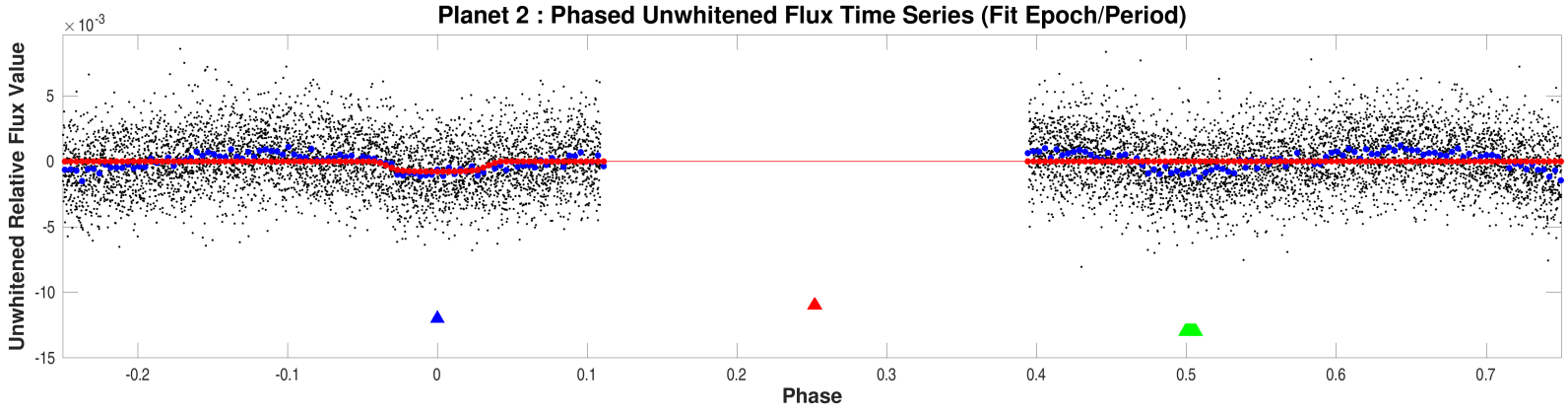
Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
1	169461816	10.931	297.45374477	41.01102178	0.00
2	169461804	15.953	297.45409590	41.00809671	10.57
3	1879946763	20.500	297.45343561	41.00799245	10.94
4	1879946765	20.341	297.45440783	41.01440232	12.30
5	1879946772	20.834	297.45625403	41.01398600	12.66
6	1879946767	19.591	297.45927862	41.01105232	15.03
7	1879946764	20.614	297.44991686	41.01417008	15.38
8	169461803	15.677	297.45820580	41.00778091	16.82
9	1879946766	19.851	297.45337617	41.01596017	17.81
10	169461807	17.264	297.45978962	41.00861479	18.57
11	1879946757	19.338	297.46094858	41.01176705	19.75
12	169461826	15.228	297.44687444	41.01380809	21.19
13	1879946753	19.938	297.45147189	41.00528907	21.54
14	1879946758	18.503	297.45978723	41.01505761	21.92
15	169461838	15.835	297.44983053	41.01638703	22.05
16	169461795	16.572	297.44749729	41.00708364	22.11
17	1879946662	19.728	297.46185513	41.00932745	22.86
18	169461813	12.562	297.44508429	41.01059358	23.58
19	1879946773	20.556	297.46214689	41.01267023	23.58
20	1879946768	19.003	297.45426162	41.01812650	25.62
21	169461781	18.596	297.44987648	41.00419906	26.72
22	1879946759	18.191	297.45562880	41.01855699	27.61
23	1879946774	20.396	297.46088566	41.01774877	31.03
24	1879946775	20.142	297.44810466	41.01851783	31.03
25	1879946740	17.660	297.44689375	41.00395002	31.54
26	169461774	17.288	297.46054705	41.00334326	33.25
27	1879946661	19.471	297.46266204	41.00467738	33.29
28	1879946790	20.783	297.44170481	41.01281984	33.34
29	1879946657	19.605	297.46620045	41.01299234	34.57
30	169461805	18.842	297.44121204	41.00829250	35.43
31	1879946668	19.558	297.46648721	41.01351387	35.76
32	1879946760	18.874	297.46042921	41.01965579	36.00
33	1879946752	20.360	297.44266836	41.00529668	36.47
34	169461844	13.535	297.44552036	41.01903430	36.49
35	169461767	18.335	297.45383705	41.00062239	37.44
36	169461864	17.115	297.45429780	41.02143294	37.51
37	1879946761	18.386	297.45127930	41.02139296	37.93
38	1879946777	18.105	297.45431237	41.02163299	38.23

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
39	1879946804	19.264	297.44632184	41.02006690	38.30
40	1879946770	20.155	297.45549008	41.02170346	38.75
41	1879946751	19.906	297.43965610	41.00786504	39.92
42	1879946741	17.868	297.44226872	41.00403988	40.05
43	169461772	17.243	297.44395590	41.00267276	40.13
44	1879946756	18.548	297.44141856	41.00468704	40.51
45	169461762	15.641	297.45502130	40.99979700	40.56
46	169461840	17.067	297.46601284	41.01750704	40.69
47	1879946769	18.870	297.45110875	41.02219508	40.86
48	1879946656	18.886	297.46766705	41.00648987	41.19
49	1879946771	19.253	297.45560989	41.02247656	41.55
50	1879946750	19.717	297.44157766	41.00351703	42.69
51	1879946742	18.461	297.44021259	41.00495815	42.75
52	1879946663	19.637	297.46676979	41.00416677	43.14
53	1879946652	17.158	297.45531131	40.99893632	43.72
54	1879946762	18.069	297.45549530	41.02310785	43.77
55	169461806	15.677	297.46949460	41.00824402	43.94
56	1879946780	17.879	297.43943299	41.01696260	44.37
57	1879946665	17.185	297.46993307	41.00877545	44.71
58	1879946776	20.441	297.45183877	41.02338379	44.80
59	1879946660	18.676	297.46490925	41.00161489	45.46
60	1879946781	18.754	297.43804281	41.01575979	45.94
61	1879946749	20.573	297.44311070	41.00109228	45.96
62	1879946803	19.152	297.44374433	41.02155939	46.66
63	1879946738	19.169	297.44698073	40.99908890	46.72
64	1879946816	19.117	297.46657431	41.01980544	47.06
65	1879946716	19.494	297.47066578	41.01428594	47.44
66	1879946802	19.305	297.44066809	41.02007035	48.20
67	1879946739	19.673	297.44446447	40.99955458	48.37
68	169461869	13.491	297.44495559	41.02286868	48.88
69	1879946714	20.301	297.47189240	41.00923964	49.71
70	169461817	18.229	297.47207527	41.01180461	49.87
71	1879946788	19.245	297.43595167	41.01490673	50.32
72	1879946748	20.208	297.44523213	40.99856095	50.47
73	1879946824	19.491	297.46934130	41.01867190	50.53
74	1879946805	18.960	297.44573485	41.02384355	51.03
75	169461866	17.669	297.44171374	41.02198691	51.25
76	169461835	17.759	297.43560602	41.01516777	51.48

RA, Dec and Distances are corrected for proper motion. This table may not contain all of the objects shown.

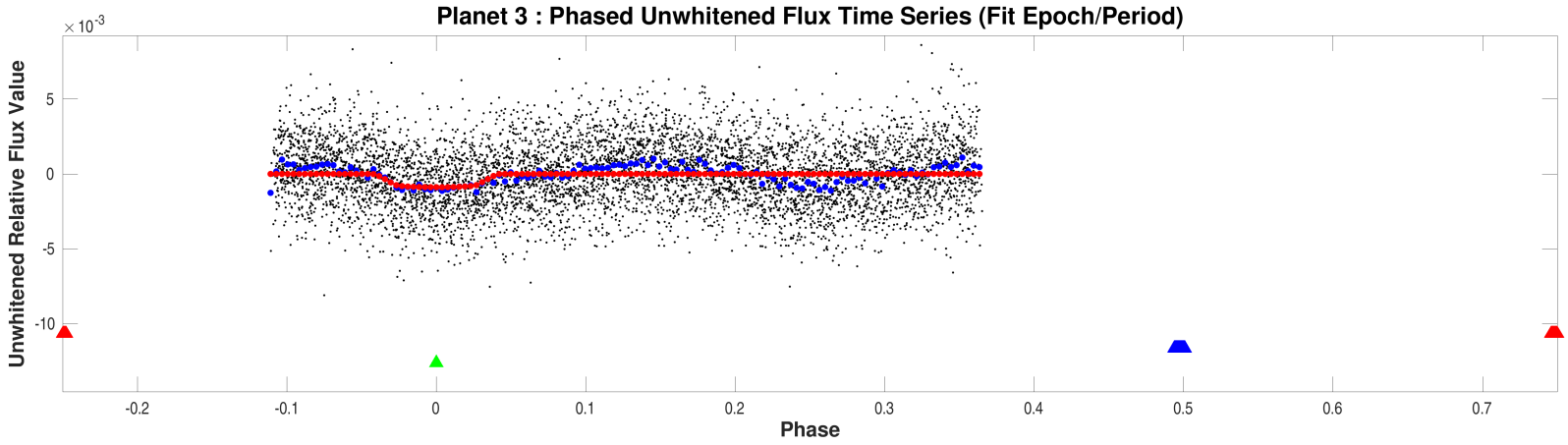
6 Phased Light Curves





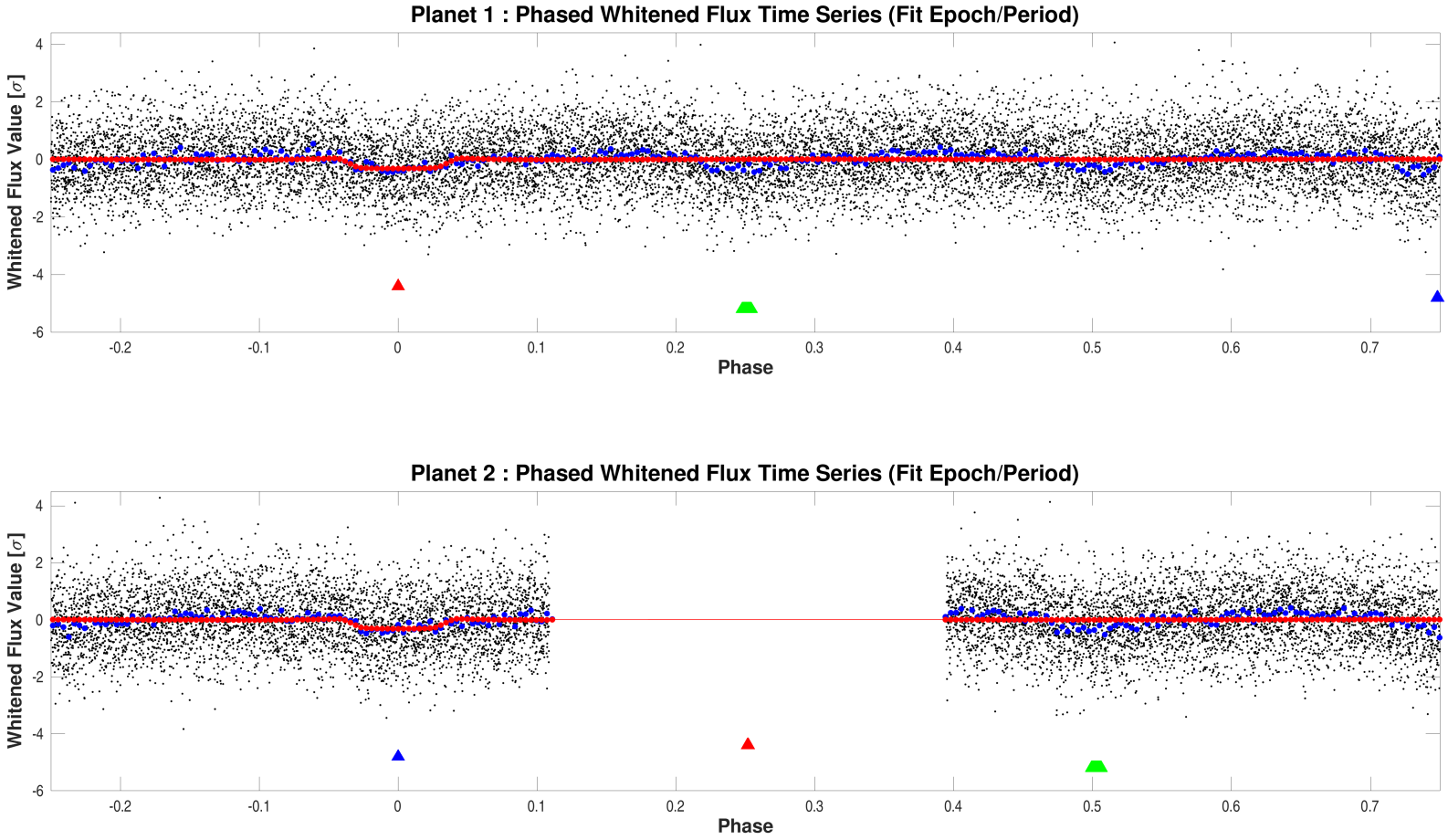
Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased unwhitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.

Open `./summary-plots/0000000169461816-01-phased-unwhitened-flux-time-series.fig`

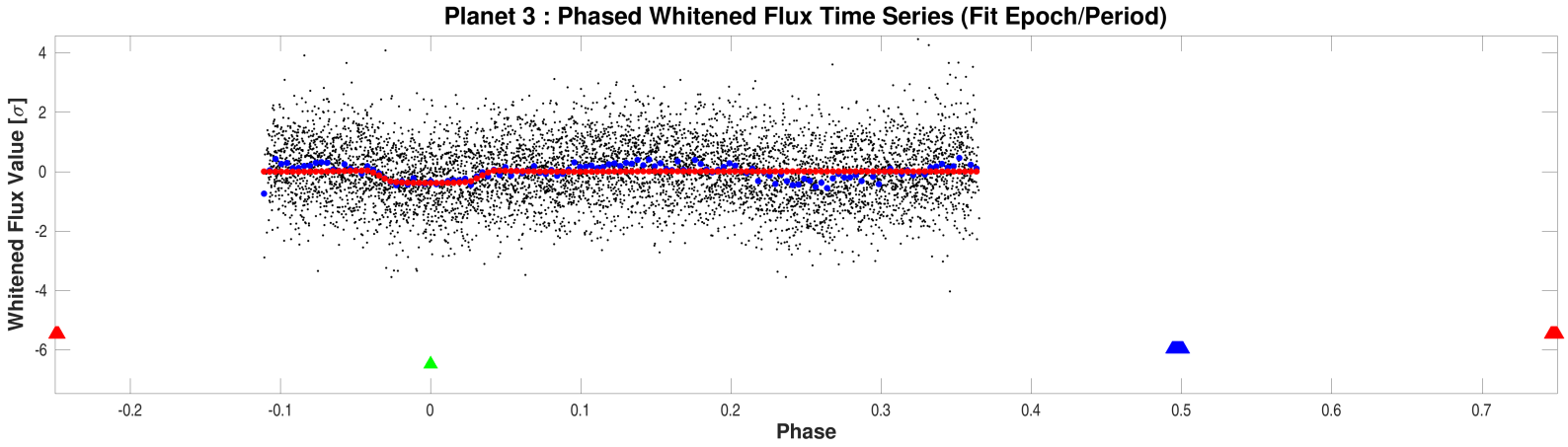


Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased unwhitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.

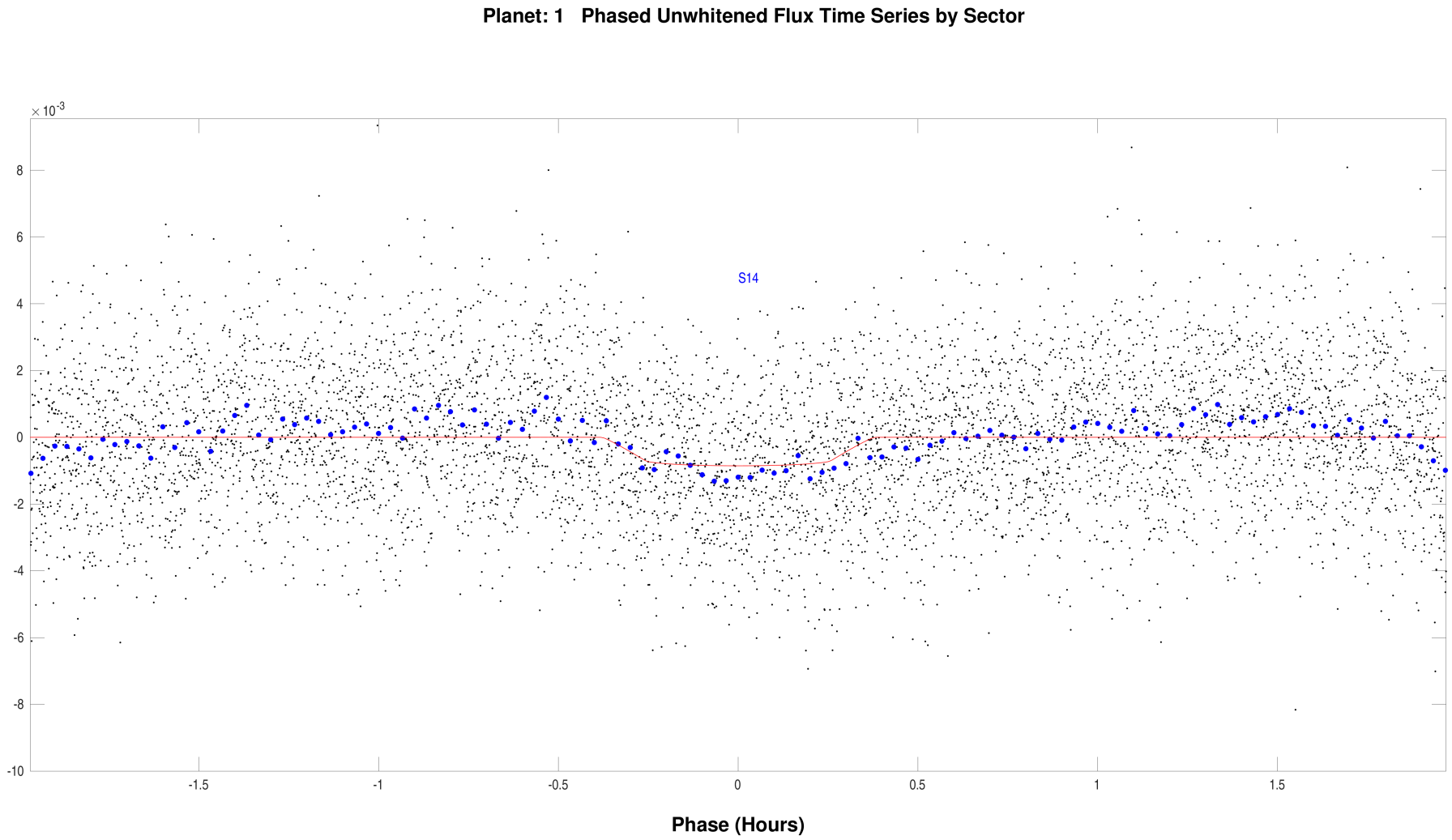
Open `./summary-plots/0000000169461816-03-phased-unwhitened-flux-time-series.fig`



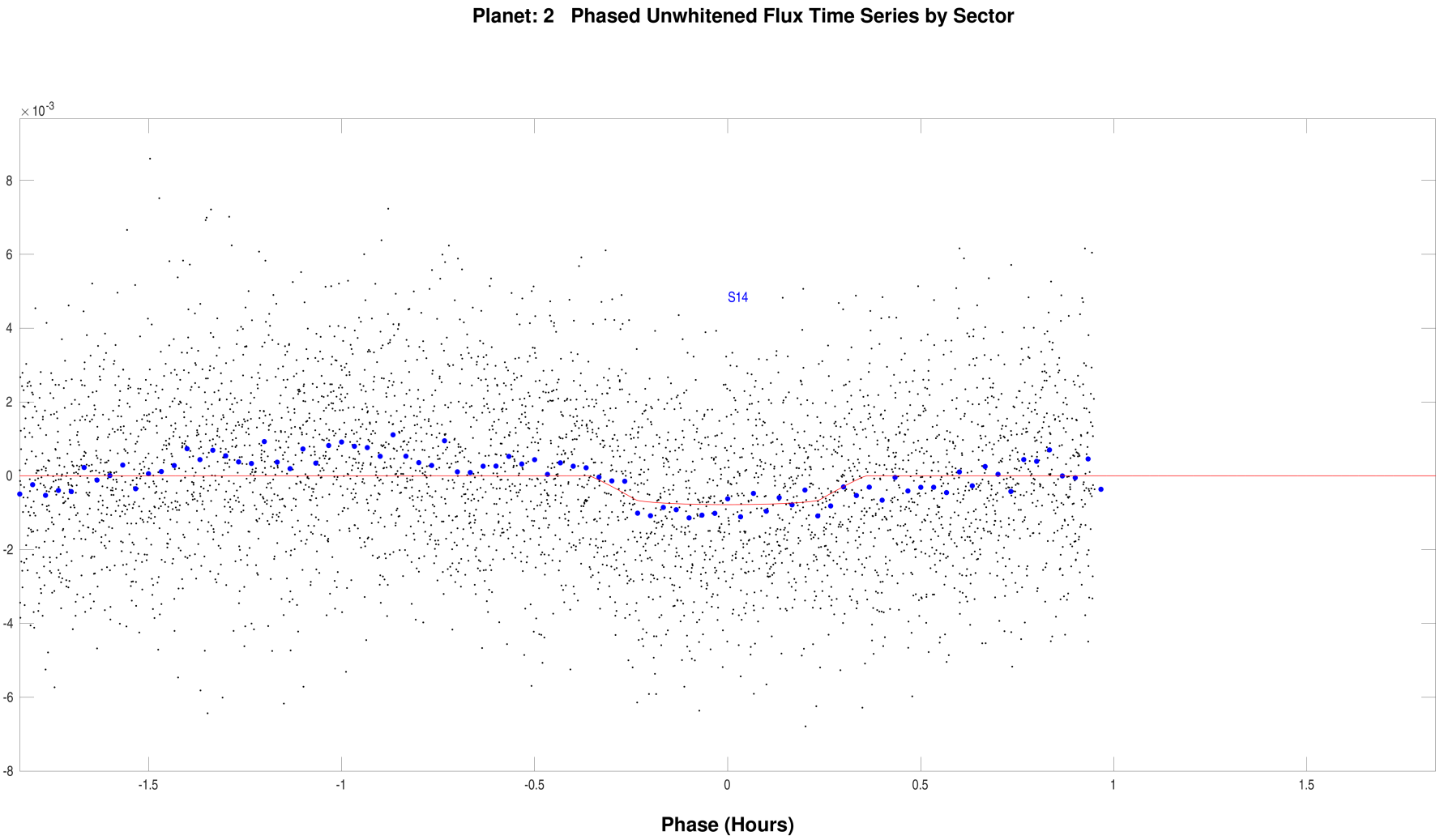
Phased whitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased whitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased whitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.
Open `./summary-plots/0000000169461816-01-phased-whitened-flux-time-series.fig`



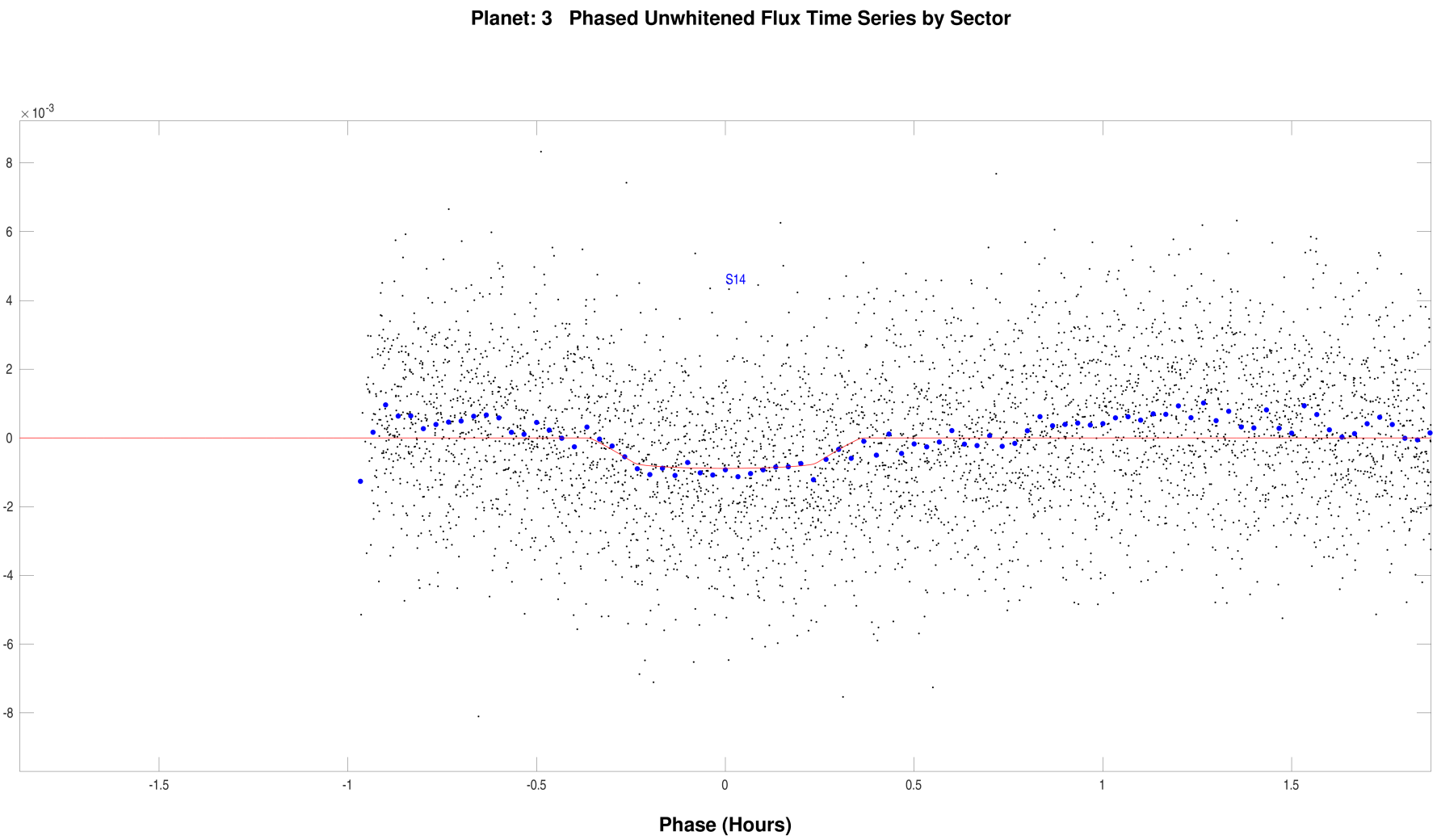
Phased whitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased whitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased whitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of plane candidate #1, red markers for transits of planet candidate #2, etc.
Open `./summary-plots/0000000169461816-03-phased-whitened-flux-time-series.fig`



Phased unwhitened flux time series by sector for target 169461816, planet candidate 1. Period = 0.36308 days; transit epoch = 1683.6028 BTJD.
Open `./summary-plots/0000000169461816-01-phased-unwhitened-flux-time-series-by-sector.fig`



Phased unwhitened flux time series by sector for target 169461816, planet candidate 2. Period = 0.36308 days; transit epoch = 1683.5115 BTJD.
Open `./summary-plots/0000000169461816-02-phased-unwhitened-flux-time-series-by-sector.fig`



Phased unwhitened flux time series by sector for target 169461816, planet candidate 3. Period = 0.36312 days; transit epoch = 1683.6927 BTJD.
Open `./summary-plots/0000000169461816-03-phased-unwhitened-flux-time-series-by-sector.fig`

7 Planet Candidate 1

7.1 Model Fitter: All Transits

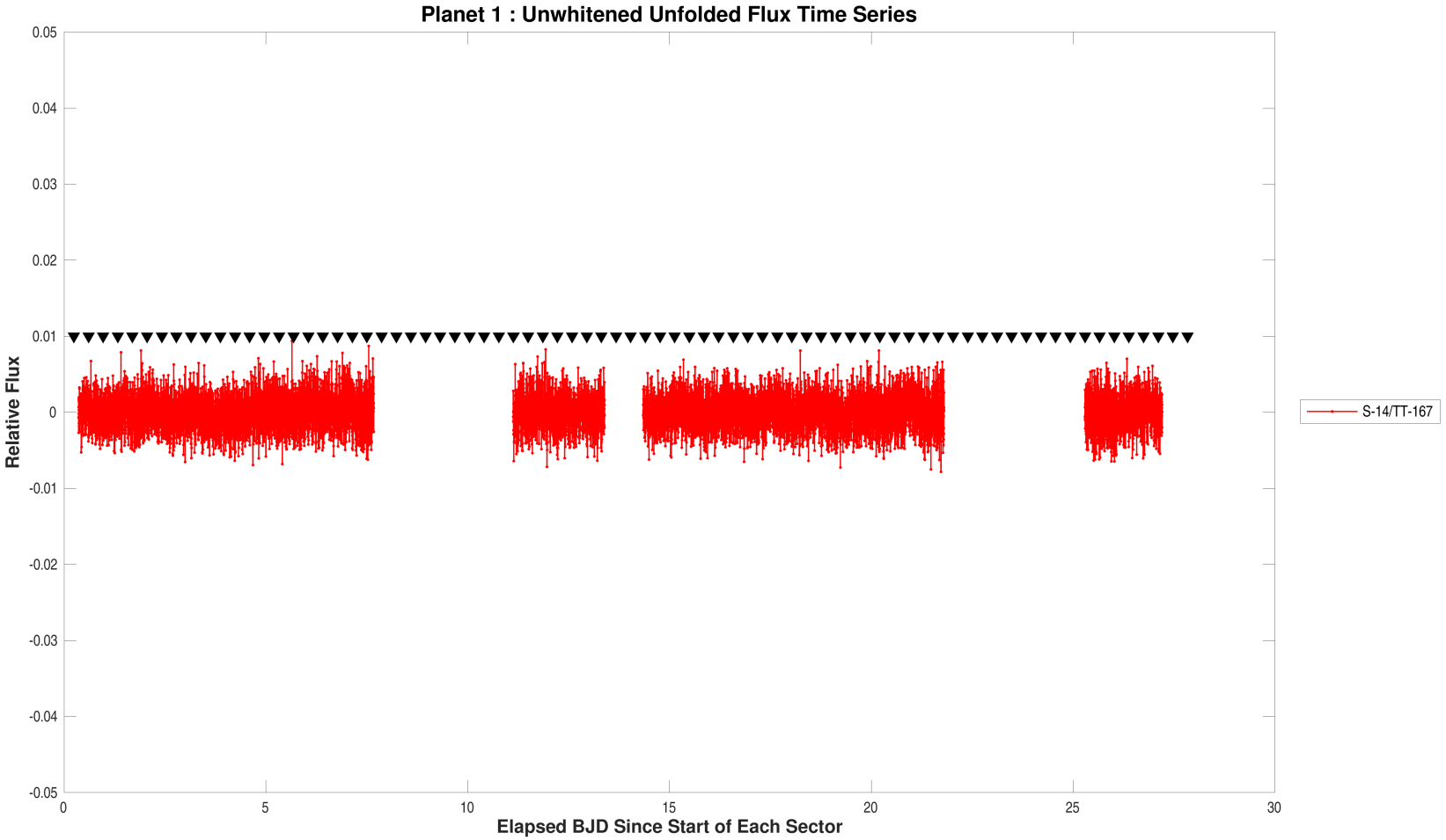
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.6025362	TJD
Orbital Period	0.3629928	days
Maximum SES	3.6	
Maximum MES	7.4	
Robust Statistic	7.9	
Chi Square Goodness of Fit Statistic (DoF)	599.9 (752)	
Chi Square2 Statistic (DoF)	25.7 (55.3)	
Threshold for Desired PFA		

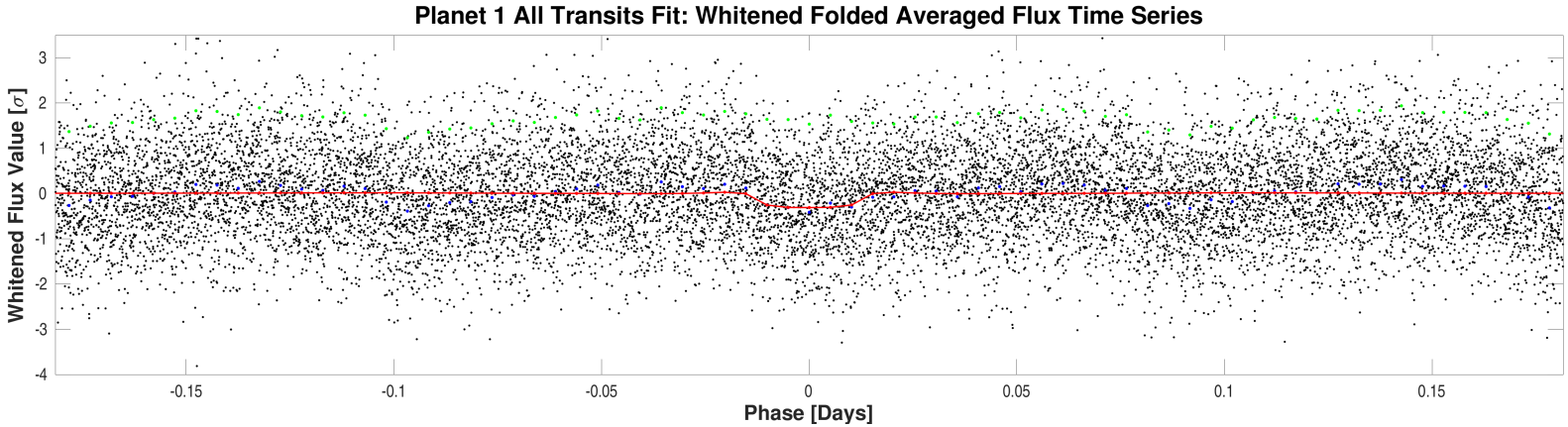
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	8.8		
Orbital Period	0.3630828	3.1646e-05	days
Transit Epoch	1683.6028467	1.0307e-03	BTJD
Impact Parameter	0.4581	1.0301e+01	
Planet Radius to Star Radius Ratio	0.0279149	2.3385e-02	
Semi-major Axis to Star Radius Ratio	3.9526	2.1991e+01	
Planet Radius	4.5442	3.8123e+00	Earth radii
Semi-major Axis	0.0113	8.3761e-04	AU
Effective Stellar Flux	33009.3911	5.0344e+03	Goldilocks
Equilibrium Temperature	3438	1.3108e+02	Kelvin
Stellar Density	6.2933	1.0504e+02	Solar density
Transit Depth	854	1.0338e+02	ppm
Transit Duration	0.6562	2.7122e-01	hours
Transit Ingress Duration	0.0228	2.9072e-01	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	4560.0 (5652.2)		
Model Chi Square Goodness of Fit Statistic (DoF)	712.2 (1244)		
Model Chi Square2 Statistic (DoF)	17.4 (53)		

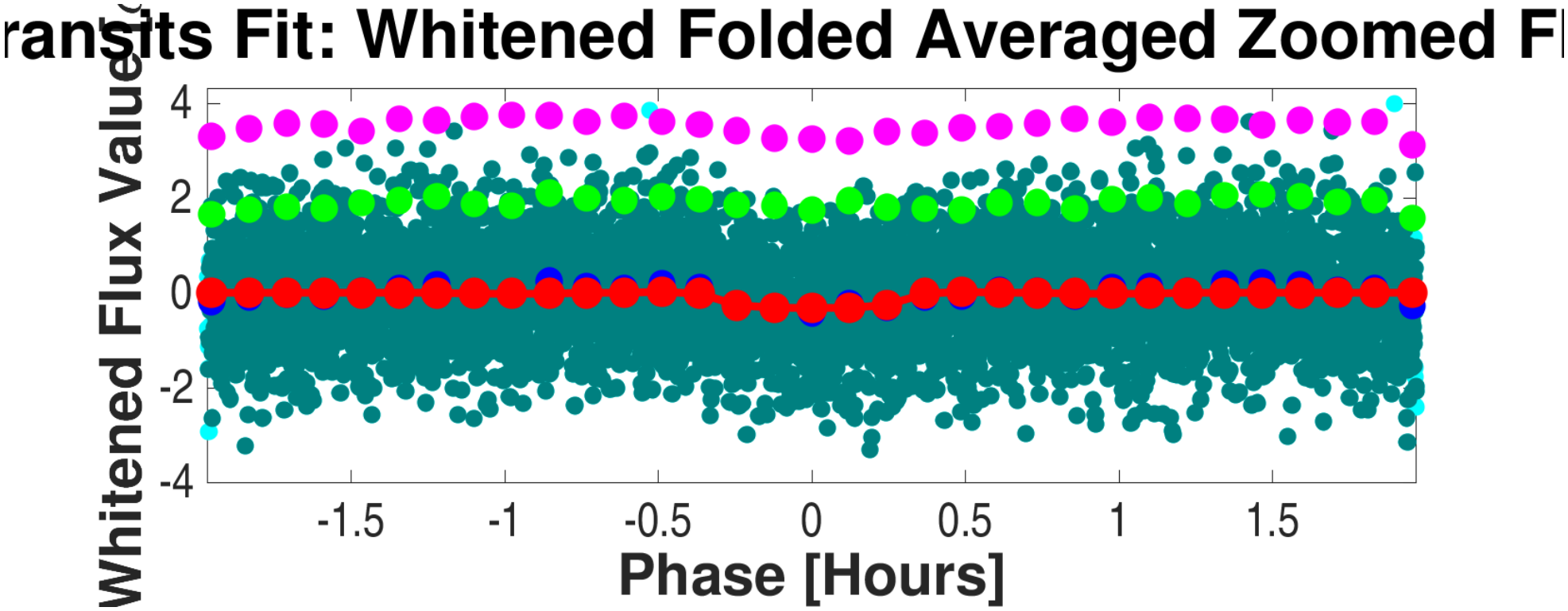
DoF: Degrees of Freedom



Flux time series for CatId 169461816, Planet candidate 1 in the unwhitened domain. For the data of Sector-14/TargetTableId-167, start BJD is 2458683. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-unwhitened-14-167.fig`



Folded flux time series for CatId 169461816, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-whitened.fig`



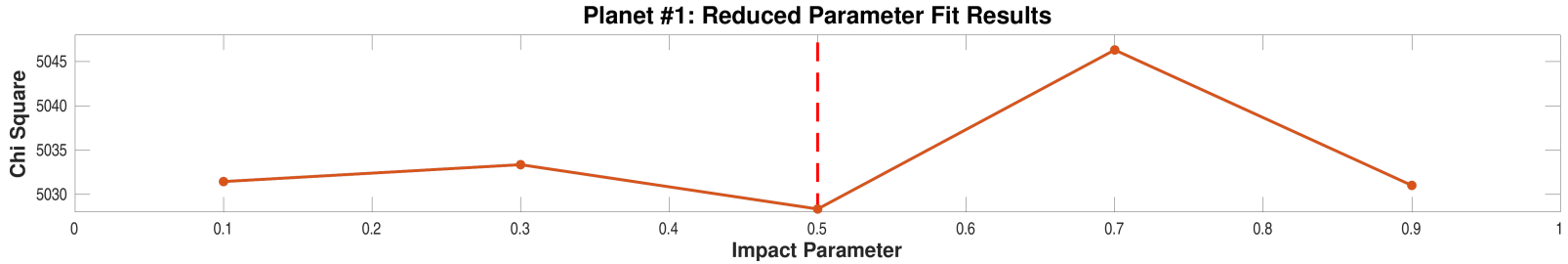
Folded flux time series for CatId 169461816, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux

time series; the red dots represent the averaged values of the fitted model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-whitened-zoomed.fig`

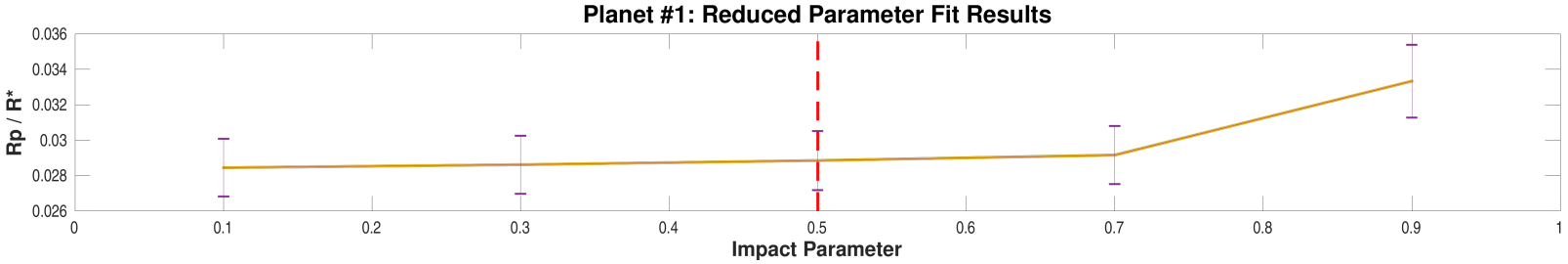
7.2 Model Fitter: Reduced Parameter Fit Results

Impact Parameter	SNR	Model Chi Square	Planet Radius to Star Radius	Uncert	Semi-major Axis to Star Radius	Uncert	Transit Depth (ppm)	Uncert	Transit Duration (hours)	Uncert
0.10	9.5	5031.4	0.0284500	1.6251e-03	4.7377	3.3656e-01	916	1.0400e+02	0.6042	4.3386e-02
0.30	9.5	5033.4	0.0286198	1.6363e-03	4.5392	3.2411e-01	916	1.0408e+02	0.6074	4.4004e-02
0.50	9.5	5028.3	0.0288555	1.6669e-03	4.0339	3.0325e-01	906	1.0404e+02	0.6285	4.8480e-02
0.70	9.4	5046.3	0.0291626	1.6378e-03	3.2317	1.8713e-01	877	9.7950e+01	0.6698	4.1060e-02
0.90	9.2	5031.0	0.0333355	2.0571e-03	2.8880	2.3366e-01	1001	1.2242e+02	0.5161	4.5519e-02

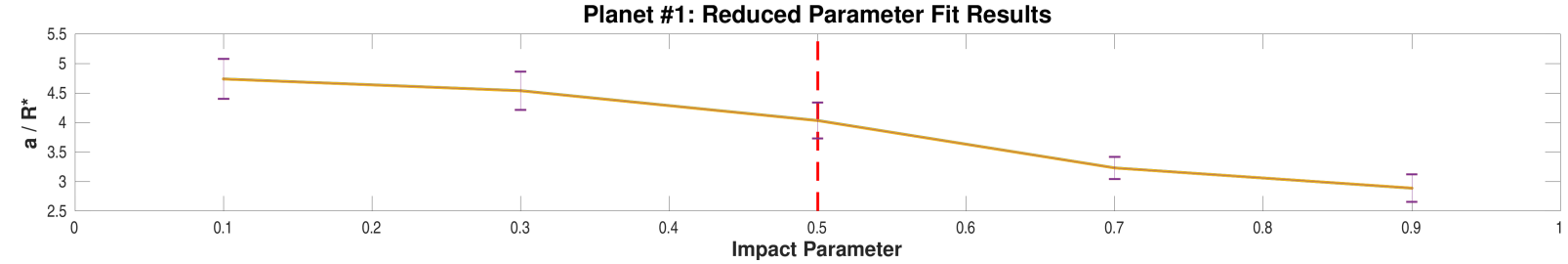
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-01-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-01-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-01-reduced-fits-a-over-rstar.fig`

7.3 Model Fitter: Trapezoidal Fit Results

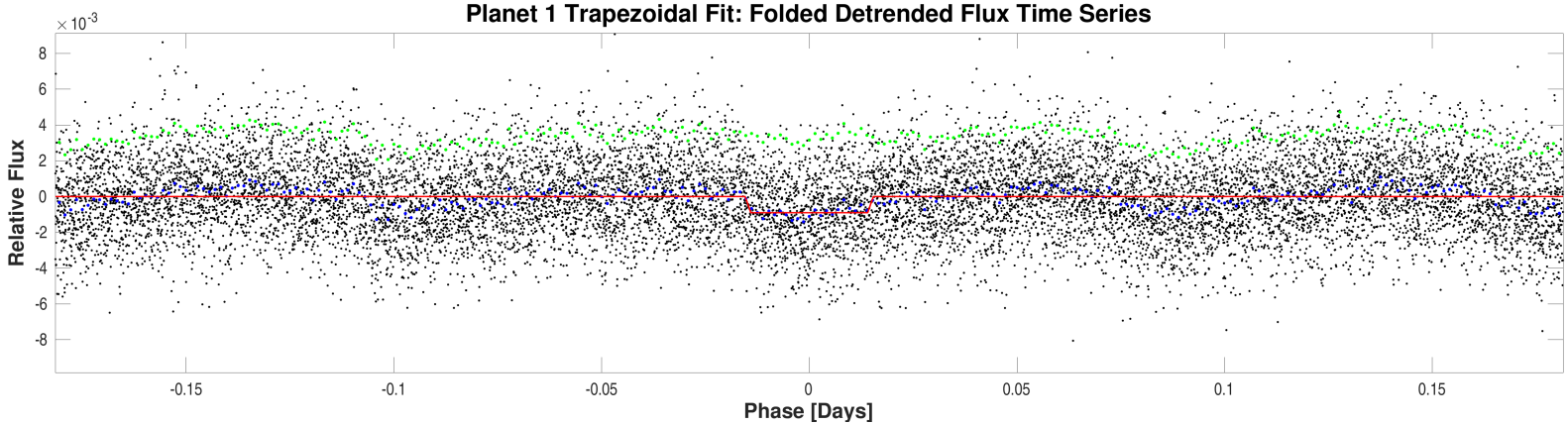
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.6025362	TJD
Orbital Period	0.3629928	days
Maximum SES	3.6	
Maximum MES	7.4	
Robust Statistic	7.9	
Chi Square Goodness of Fit Statistic (DoF)	599.9 (752)	
Chi Square2 Statistic (DoF)	25.7 (55.3)	
Threshold for Desired PFA		

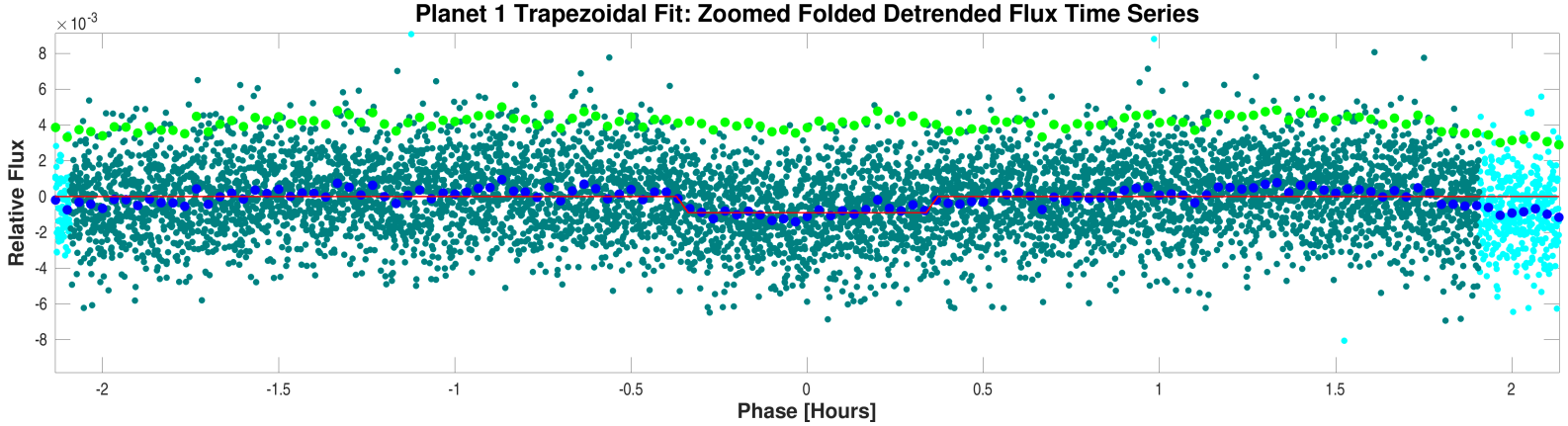
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	14.4		
Orbital Period	0.3629928		days
Transit Epoch	1683.6091399		BTJD
Transit Depth	905		ppm
Transit Duration	0.7114		hours
Transit Ingress Duration	0.0033		hours
Model Chi Square Statistic (DoF)	13535.4 (6283)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 169461816, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-01-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 169461816, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-01-all-trapezoidal-zoomed.fig`

7.4 Validation Tests

The Centroid Test and Eclipsing Binary Discrimination Test are chi-squared hypothesis tests. For these tests, a significance of 100% favors a planet, while 0% indicates an unlikely planet.

7.4.1 Weak Secondary Test

Result	Value	Uncertainty	Units	Statistic in Sigmas	Significance (%)
Orbital Period	0.36299		days		
Transit Duration	0.5		hours		
Maximum MES	7.4				
Secondary Phase	0.27028		days		
Secondary MES	7.6				
Minimum Phase	0.13695		days		
Minimum MES	-4.8				
Median MES	-0.4				
MAD MES	2.708				
Robust Statistic	7.0				
Secondary Depth	854.5	1.0656e+02	ppm		
Geometric Albedo	2.9	4.8922e+00		0.3888	34.87
Planet Effective Temperature	6937	2.9159e+03	Kelvin	1.1990	11.53

7.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	7.0908e-01	0.8421	39.97
Shorter Period Comparison Statistic	5.1475e-09	0.0001	0.01
Longer Period Comparison Statistic	7.7160e-07	0.0009	0.07

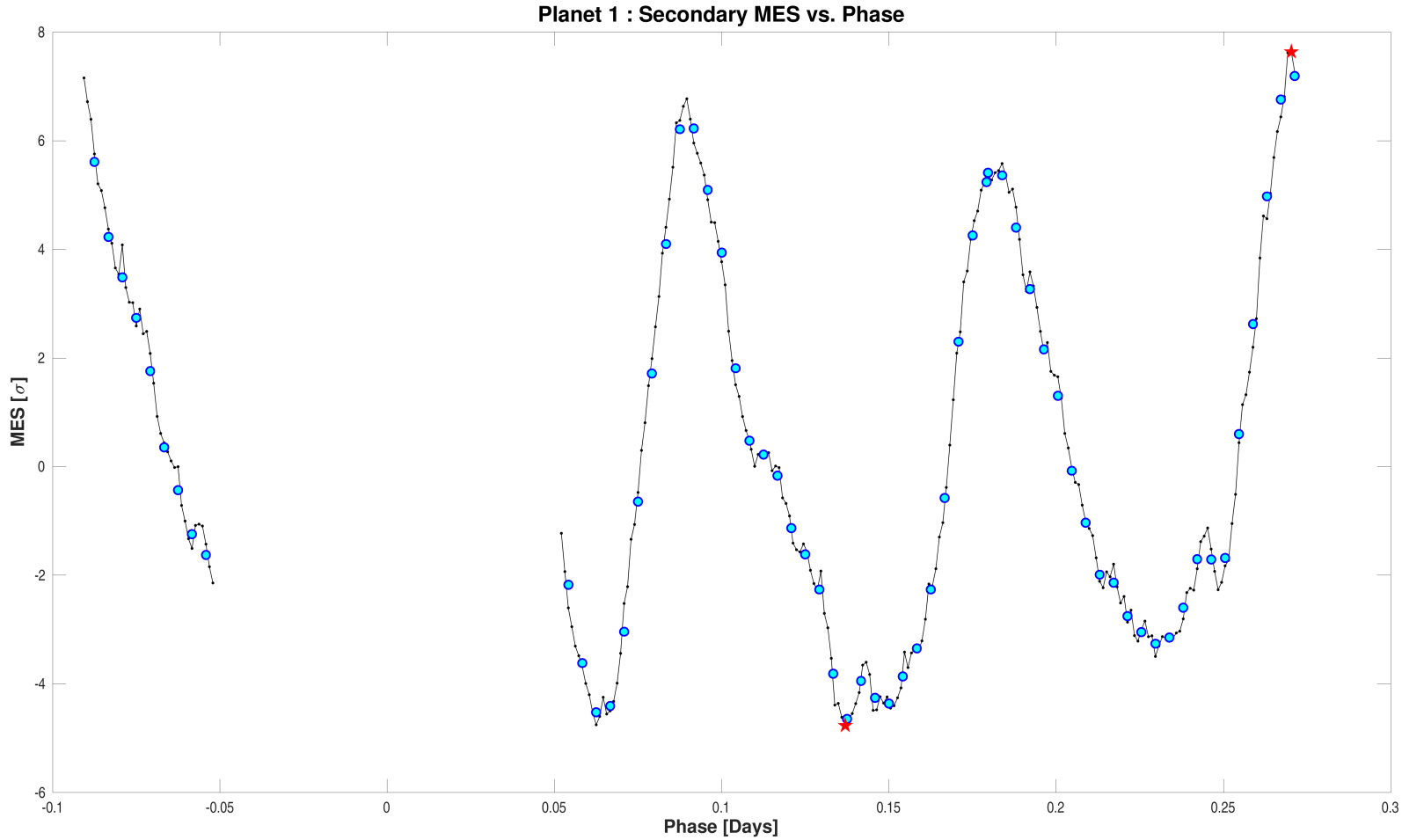
7.4.3 Bootstrap Test

Result	Value
False Alarm Probability	6.1924e-09
Bootstrap Threshold for Desired PFA	9.1
MES Mean	0.19
MES Standard Deviation	1.26
Transit Count	74

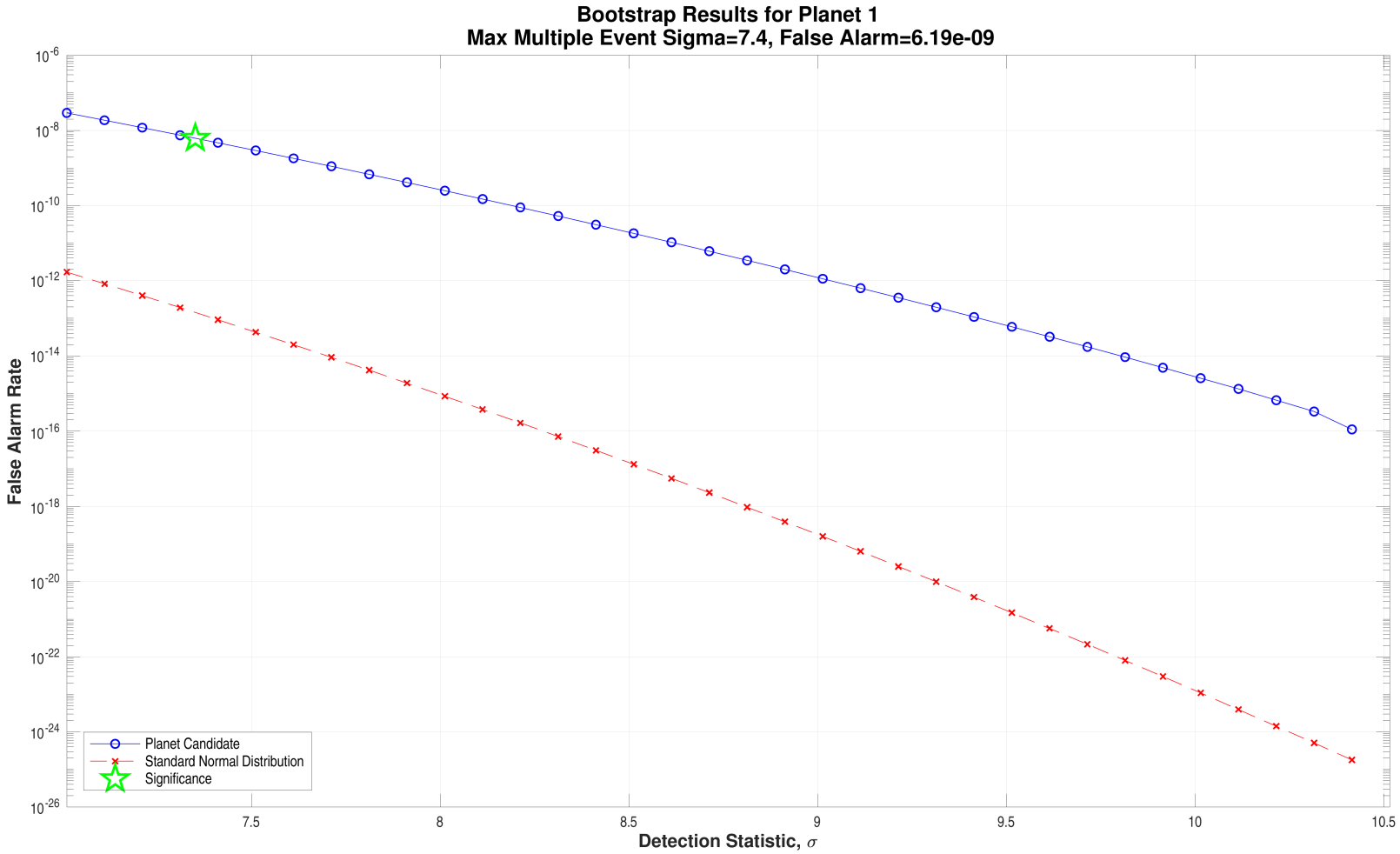
7.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	7.4	
SNR	8.8	
Core Aperture Statistic	5.8466e+00	100.00
Halo Aperture Statistic	3.7879e+00	99.99
Ratio of Core/Halo Aperture Statistics	1.5435e+00	

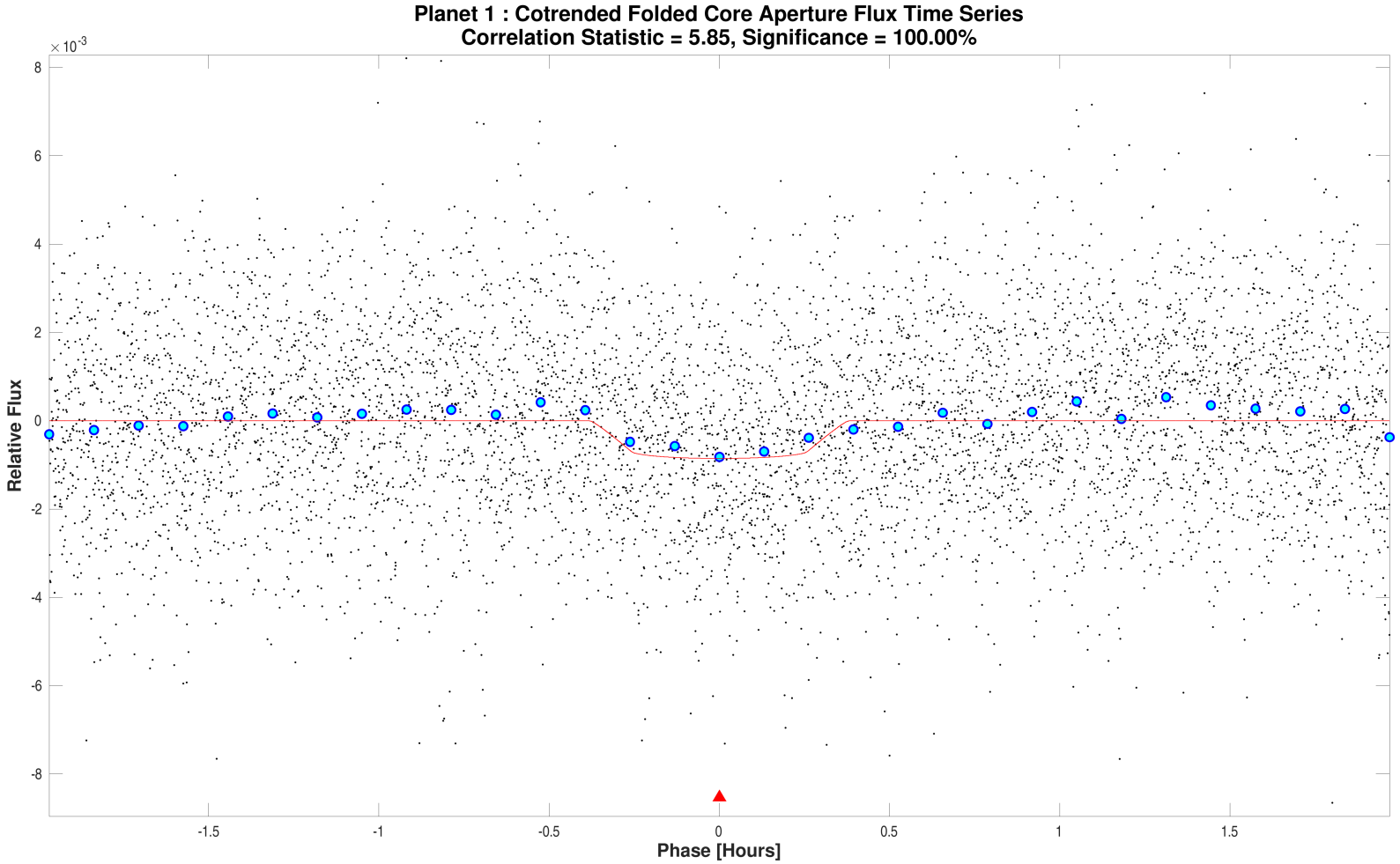
7.4.5 Validation Test Figures



The primary event has been set to zero and both the max and min of the resulting MES vs. Phase are marked with a red star. The best matched pulse duration in hours is 0.5. The maximum secondary MES and corresponding phase are 7.6367 and 0.27028 days respectively. The minimum secondary MES and corresponding phase are -4.766 and 0.13695 days respectively.
Open `./planet-01/report-summary/0000000169461816-01-weak-secondary-diagnostic.fig`

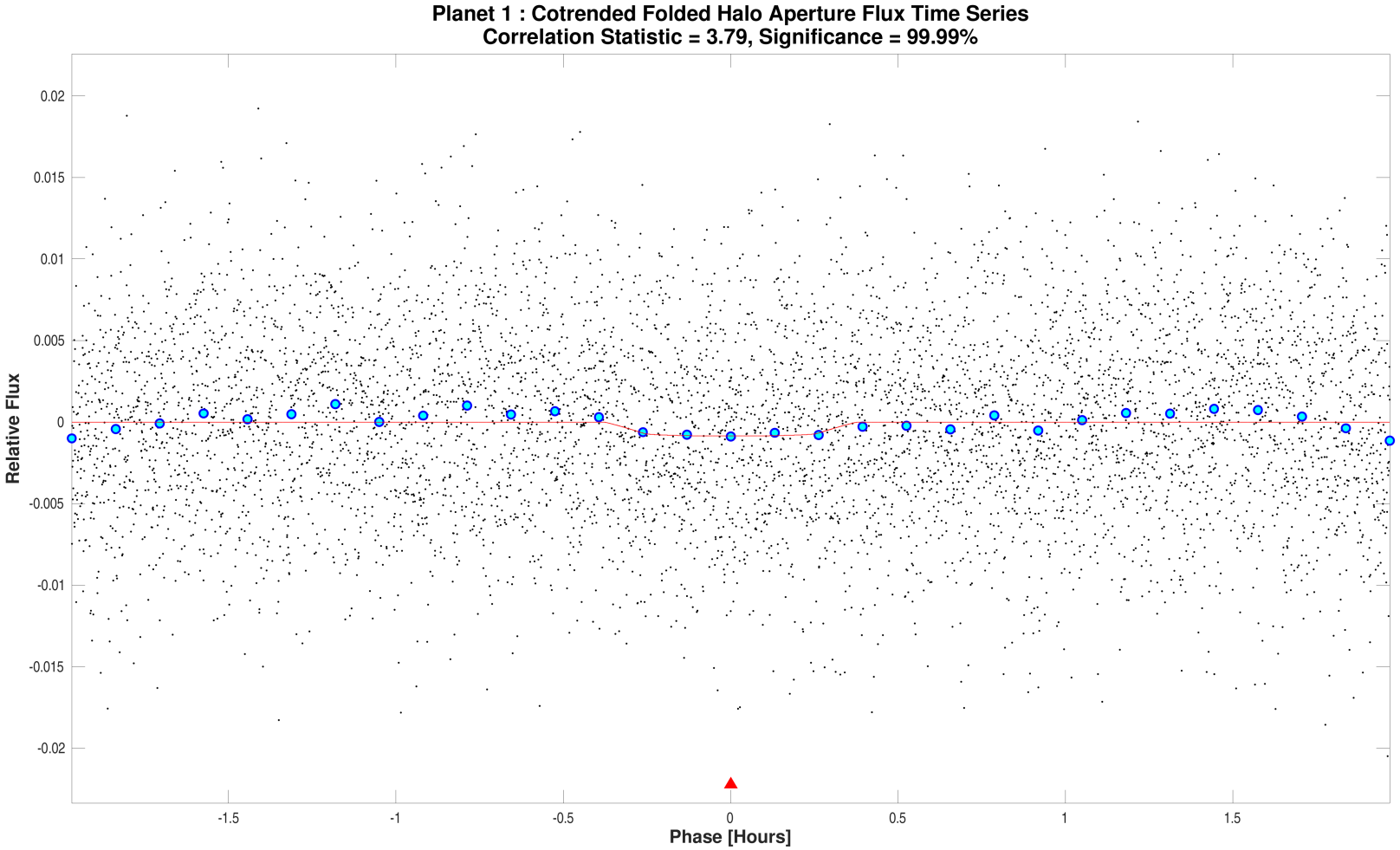


Bootstrap results for target 169461816, planet 1. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 5.6943. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 9.1178.
Open `./planet-01/bootstrap-results/0000000169461816-01-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 169461816, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the core aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-01/ghost-diagnostic-results/0000000169461816-01-core-unwhitened-cotrended-zoomed-model.fig`



Optical ghost diagnostic halo aperture flux time series for target 169461816, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the halo aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-01/ghost-diagnostic-results/0000000169461816-01-halo-unwhitened-cotrended-zoomed-model.fig`

8 Planet Candidate 2

8.1 Model Fitter: All Transits

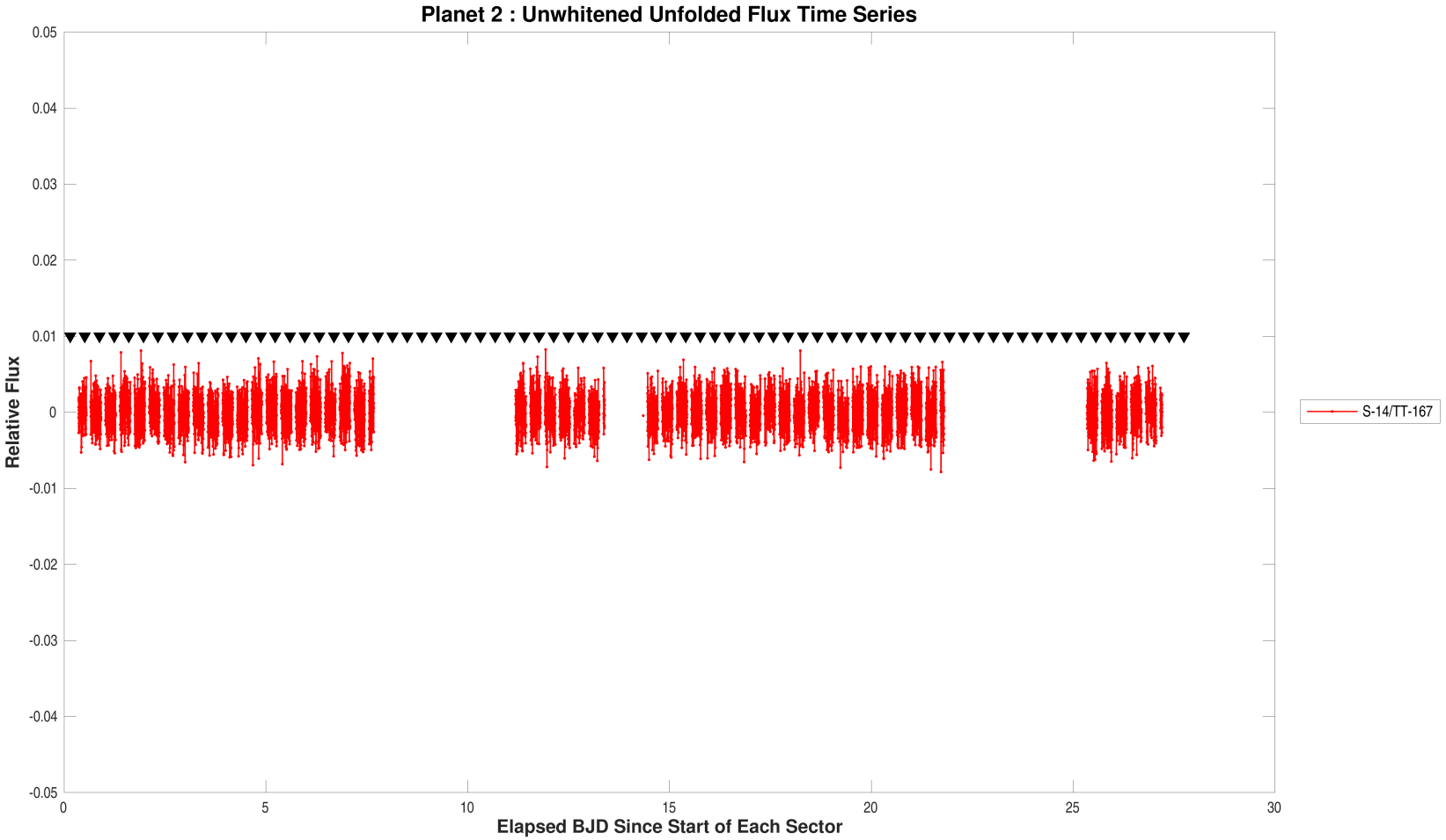
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.5067029	TJD
Orbital Period	0.3631054	days
Maximum SES	3.9	
Maximum MES	7.4	
Robust Statistic	7.6	
Chi Square Goodness of Fit Statistic (DoF)	668.5 (733)	
Chi Square2 Statistic (DoF)	47.5 (53.4)	
Threshold for Desired PFA		

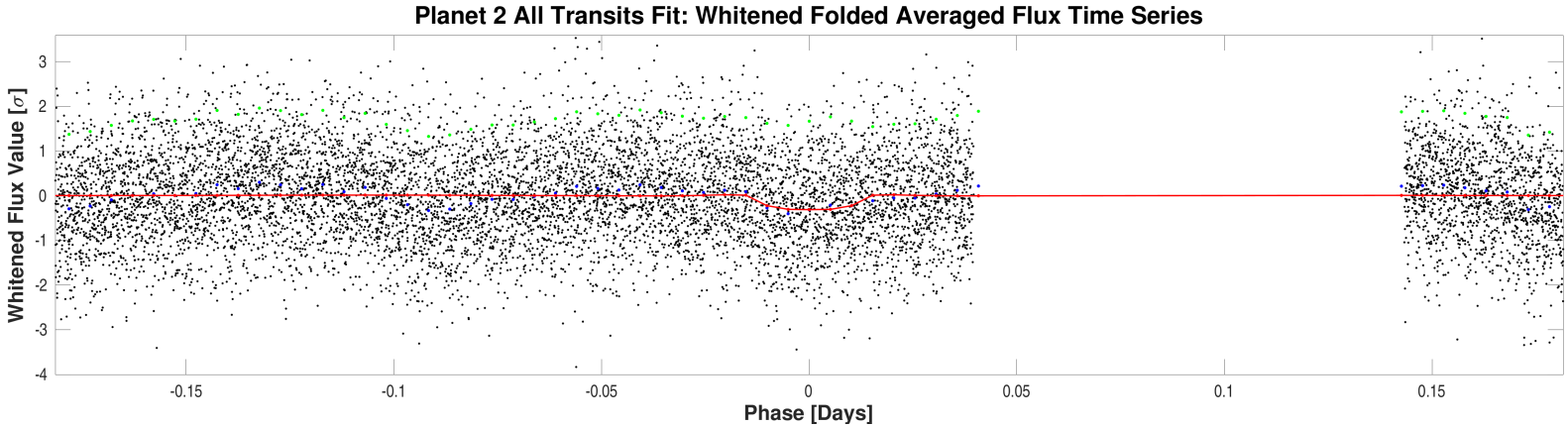
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	8.2		
Orbital Period	0.3630802	3.4003e-05	days
Transit Epoch	1683.5115284	1.1001e-03	BTJD
Impact Parameter	0.0100	9.6485e+02	
Planet Radius to Star Radius Ratio	0.0262550	3.5794e-02	
Semi-major Axis to Star Radius Ratio	4.6952	4.3055e+01	
Planet Radius	4.2740	5.8300e+00	Earth radii
Semi-major Axis	0.0113	8.3760e-04	AU
Effective Stellar Flux	33009.7161	5.0344e+03	Goldilocks
Equilibrium Temperature	3438	1.3108e+02	Kelvin
Stellar Density	10.5487	2.9019e+02	Solar density
Transit Depth	781	1.0284e+02	ppm
Transit Duration	0.6112	3.0187e-01	hours
Transit Ingress Duration	0.0159	3.2740e-01	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	3268.3 (3883.2)		
Model Chi Square Goodness of Fit Statistic (DoF)	667.0 (1104)		
Model Chi Square2 Statistic (DoF)	35.1 (50)		

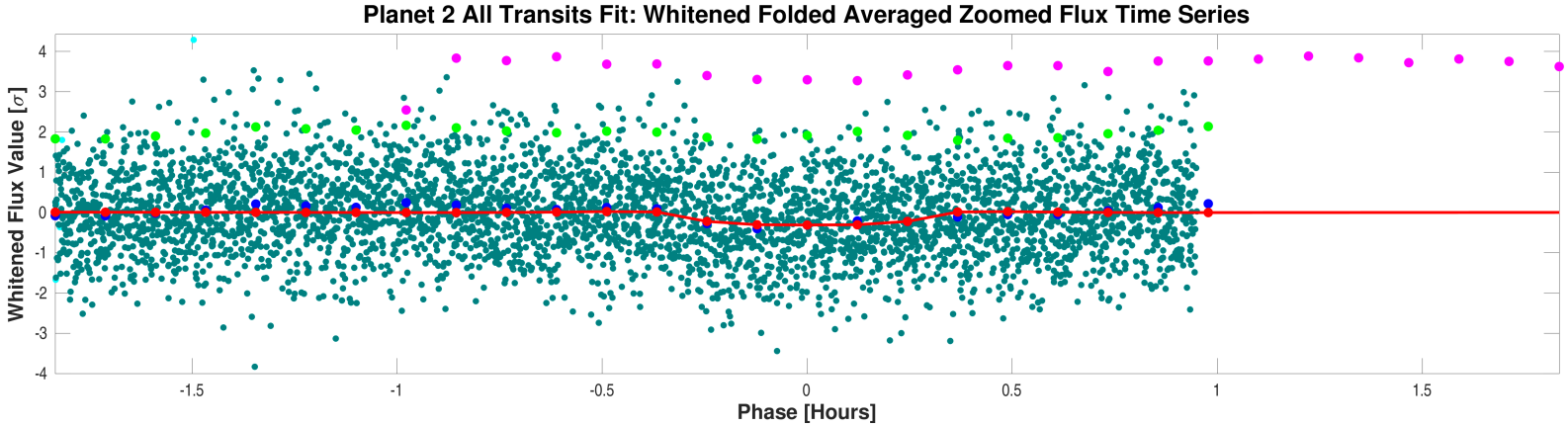
DoF: Degrees of Freedom



Flux time series for CatId 169461816, Planet candidate 2 in the unwhitened domain. For the data of Sector-14/TargetTableId-167, start BJD is 2458683. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-unwhitened-14-167.fig`



Folded flux time series for CatId 169461816, Planet candidate 2 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-whitened.fig`

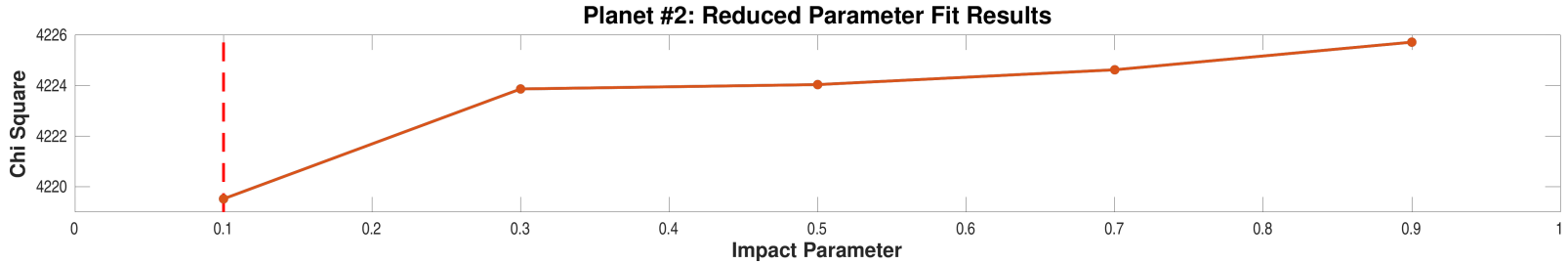


Folded flux time series for CatId 169461816, Planet candidate 2 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-whitened-zoomed.fig`

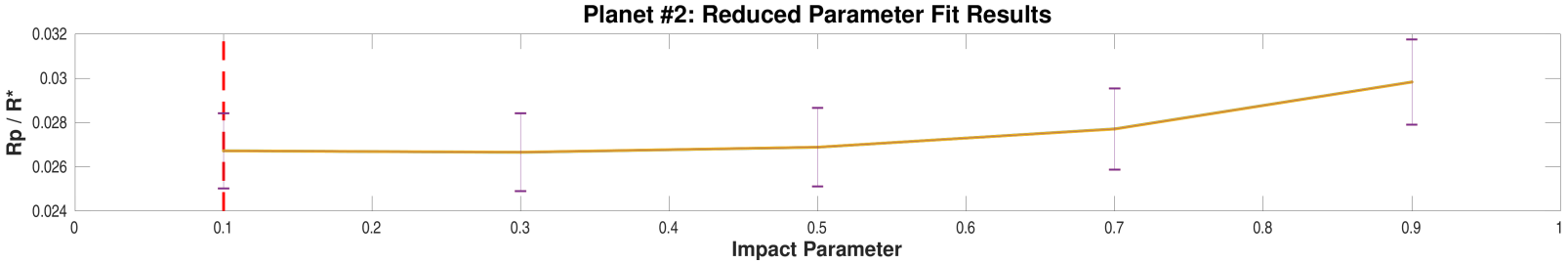
8.2 Model Fitter: Reduced Parameter Fit Results

Impact Parameter	SNR	Model Chi Square	Planet Radius to Star Radius	Uncert	Semi-major Axis to Star Radius	Uncert	Transit Depth (ppm)	Uncert	Transit Duration (hours)	Uncert
0.10	8.7	4219.5	0.0267219	1.6942e-03	4.9402	3.7074e-01	808	1.0181e+02	0.5781	4.3784e-02
0.30	8.6	4223.9	0.0266540	1.7598e-03	4.7206	3.8175e-01	794	1.0423e+02	0.5825	4.7711e-02
0.50	8.5	4224.0	0.0268843	1.7726e-03	4.2440	3.3477e-01	786	1.0306e+02	0.5950	4.7985e-02
0.70	8.6	4224.6	0.0277115	1.8335e-03	3.5661	2.7862e-01	792	1.0413e+02	0.6017	4.9160e-02
0.90	8.7	4225.7	0.0298292	1.9243e-03	2.3173	1.5893e-01	803	1.0279e+02	0.6564	5.2728e-02

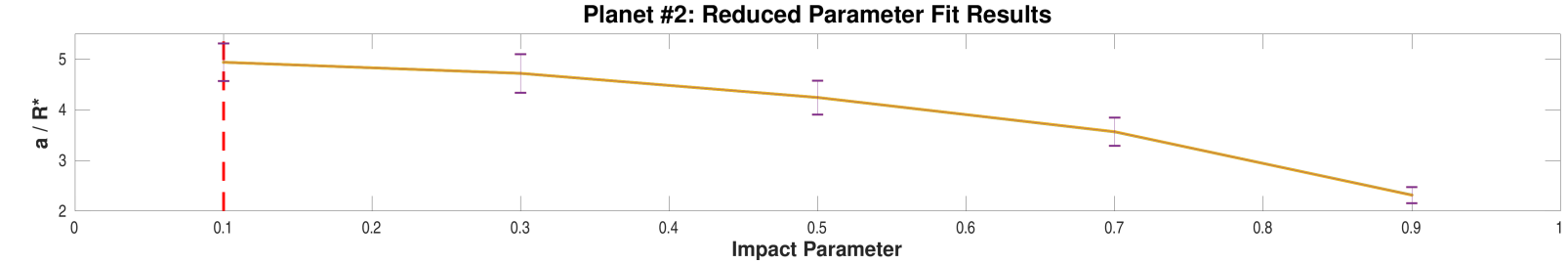
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 2. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-02/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-02-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 2. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-02/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-02-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 2. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-02/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-02-reduced-fits-a-over-rstar.fig`

8.3 Model Fitter: Trapezoidal Fit Results

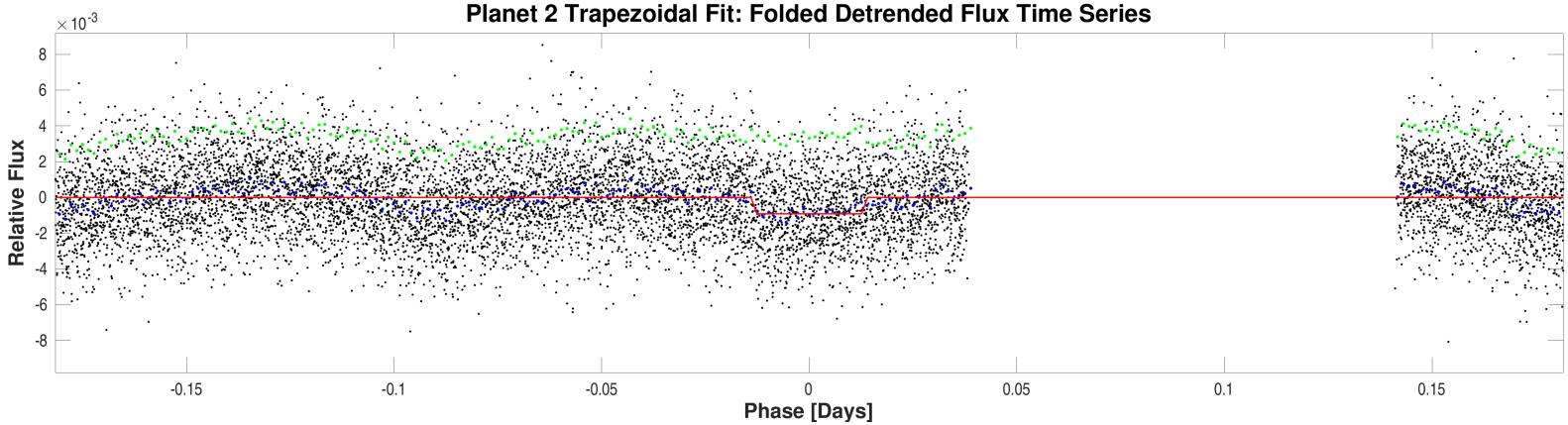
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.5067029	TJD
Orbital Period	0.3631054	days
Maximum SES	3.9	
Maximum MES	7.4	
Robust Statistic	7.6	
Chi Square Goodness of Fit Statistic (DoF)	668.5 (733)	
Chi Square2 Statistic (DoF)	47.5 (53.4)	
Threshold for Desired PFA		

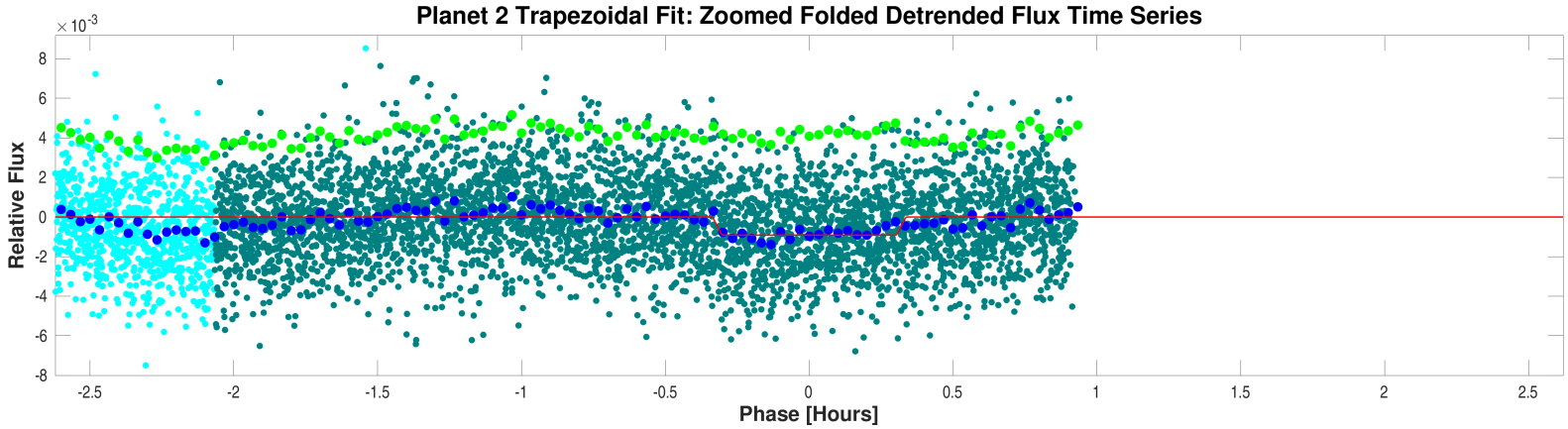
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	12.0		
Orbital Period	0.3631054		days
Transit Epoch	1683.5121974		BTJD
Transit Depth	915		ppm
Transit Duration	0.8734		hours
Transit Ingress Duration	0.2340		hours
Model Chi Square Statistic (DoF)	9934.7 (4523)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 169461816, Planet candidate 2 and folded trapezoidal model light curve.
Open `./planet-02/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-02-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 169461816, Planet candidate 2 and folded trapezoidal model light curve.
Open `./planet-02/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-02-all-trapezoidal-zoomed.fig`

8.4 Validation Tests

The Centroid Test and Eclipsing Binary Discrimination Test are chi-squared hypothesis tests. For these tests, a significance of 100% favors a planet, while 0% indicates an unlikely planet.

8.4.1 Weak Secondary Test

Result	Value	Uncertainty	Units	Statistic in Sigmas	Significance (%)
Orbital Period	0.36311		days		
Transit Duration	0.5		hours		
Maximum MES	7.4				
Secondary Phase	0.18333		days		
Secondary MES	7.1				
Minimum Phase	0.23081		days		
Minimum MES	-5.5				
Median MES	-0.7				
MAD MES	3.0806				
Robust Statistic	7.0				
Secondary Depth	832.8	9.9443e+01	ppm		
Geometric Albedo	3.2	8.7374e+00		0.2515	40.07
Planet Effective Temperature	7107	4.8508e+03	Kelvin	0.7562	22.48

8.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	3.0512e-01	0.5524	58.07
Longer Period Comparison Statistic	5.1475e-09	0.0001	0.01

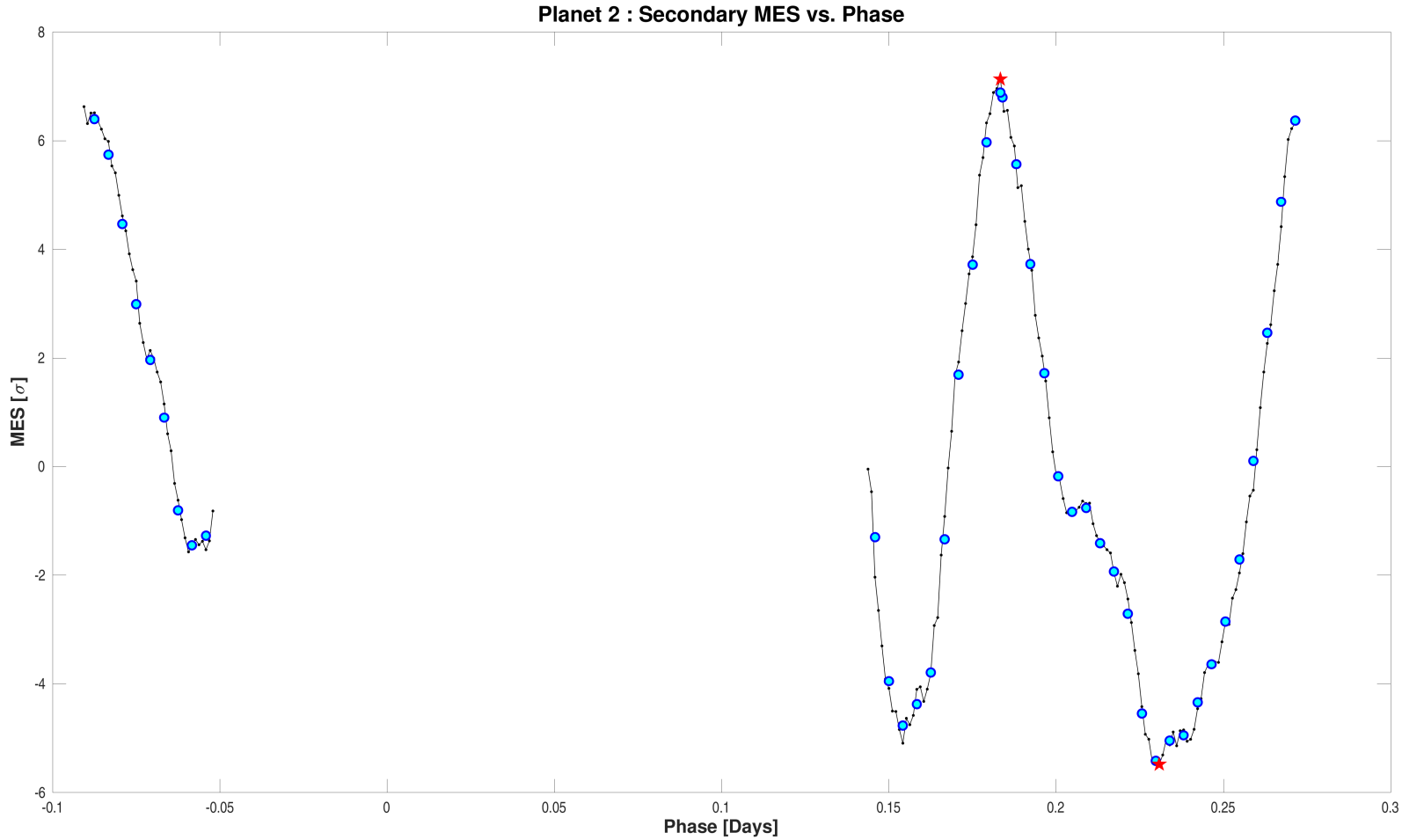
8.4.3 Bootstrap Test

Result	Value
False Alarm Probability	6.0575e-09
Bootstrap Threshold for Desired PFA	9.1
MES Mean	0.19
MES Standard Deviation	1.26
Transit Count	74

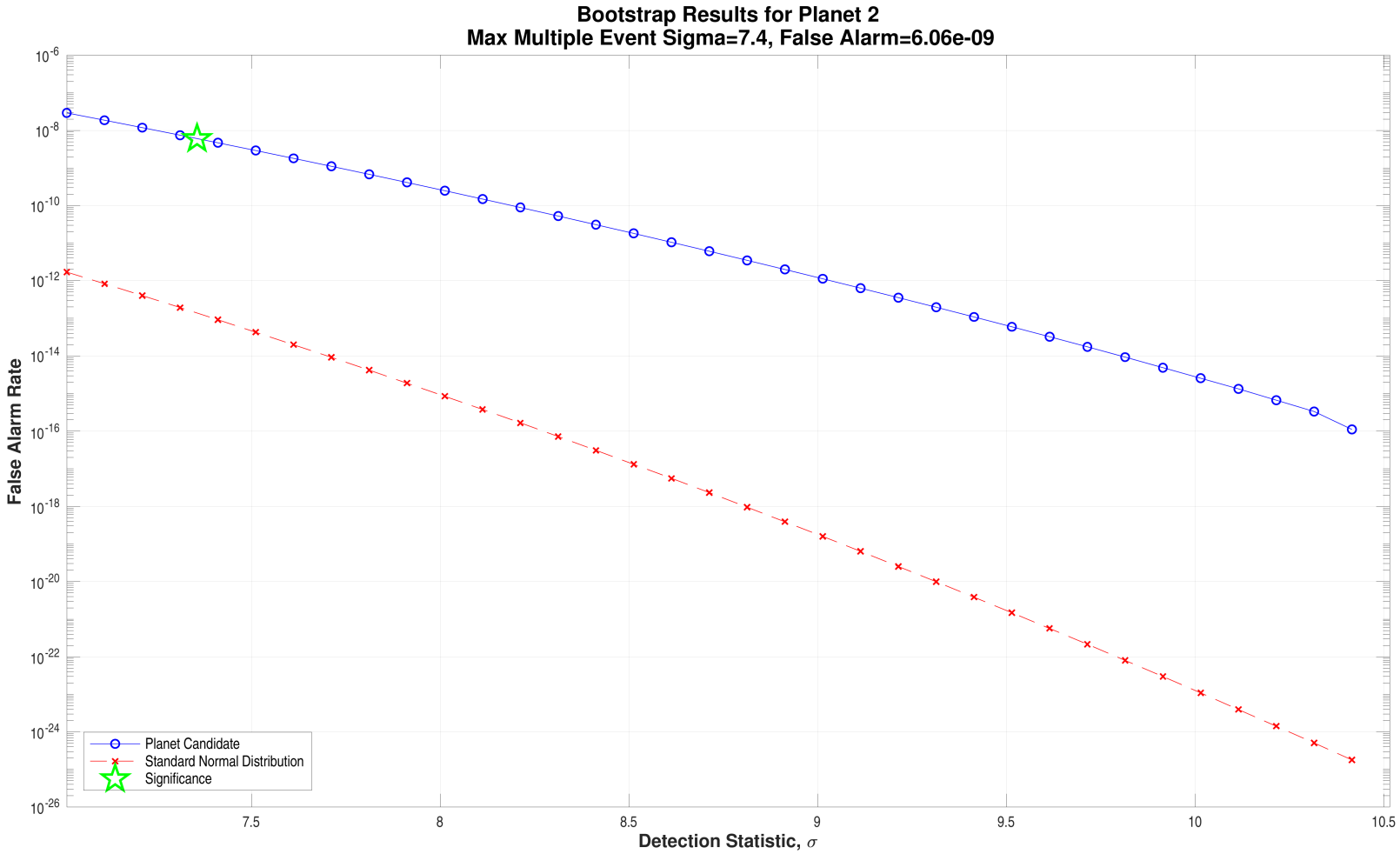
8.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	7.4	
SNR	8.2	
Core Aperture Statistic	6.8519e+00	100.00
Halo Aperture Statistic	-6.3162e-01	26.38
Ratio of Core/Halo Aperture Statistics	-1.0848e+01	

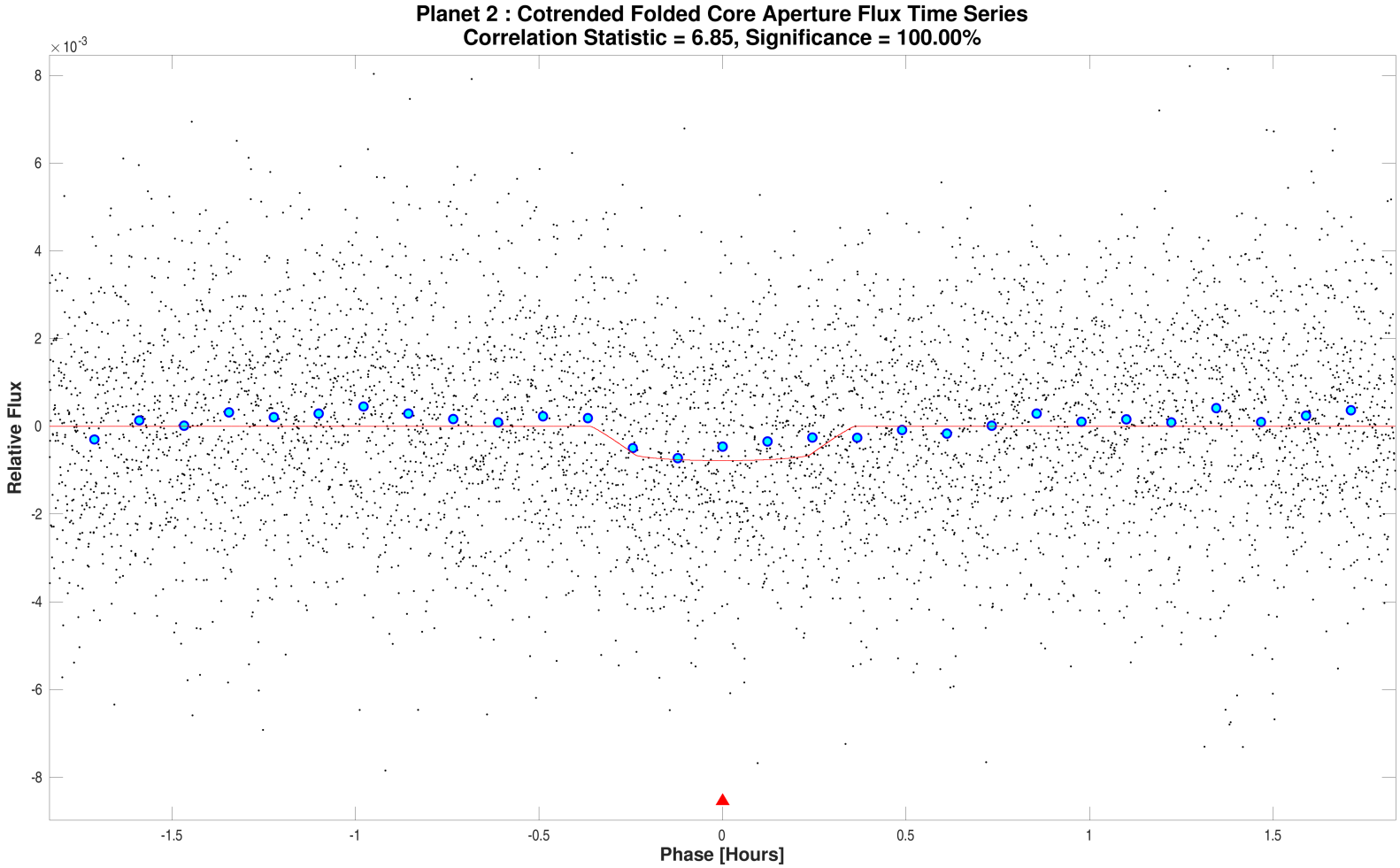
8.4.5 Validation Test Figures



The primary event has been set to zero and both the max and min of the resulting MES vs. Phase are marked with a red star. The best matched pulse duration in hours is 0.5. The maximum secondary MES and corresponding phase are 7.1342 and 0.18333 days respectively. The minimum secondary MES and corresponding phase are -5.4794 and 0.23081 days respectively.
Open `./planet-02/report-summary/0000000169461816-02-weak-secondary-diagnostic.fig`

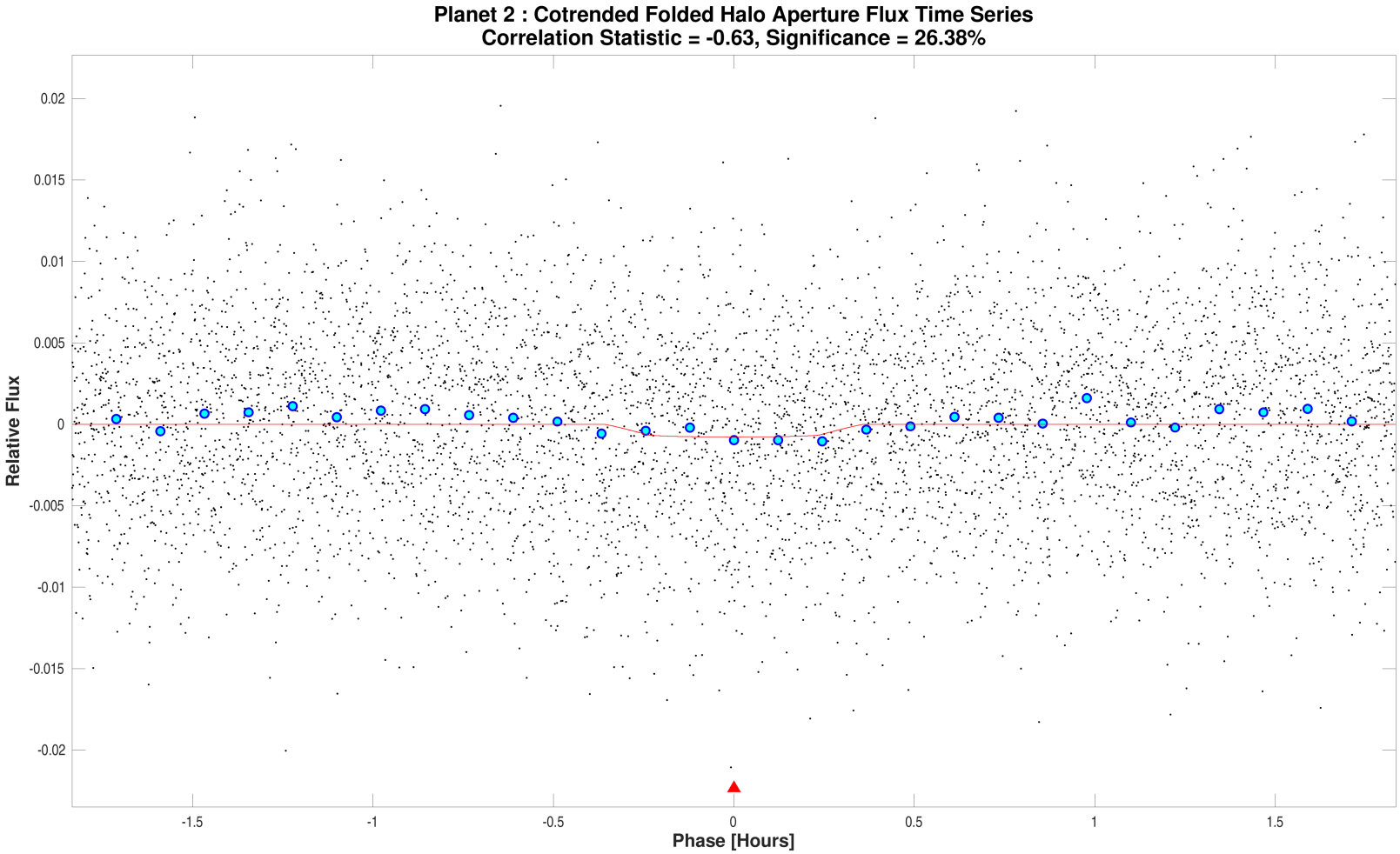


Bootstrap results for target 169461816, planet 2. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 5.6981. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 9.1178.
Open `./planet-02/bootstrap-results/0000000169461816-02-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 169461816, planet candidate 2. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the core aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-02/ghost-diagnostic-results/0000000169461816-02-core-unwhitened-cotrended-zoomed-model.fig`



Optical ghost diagnostic halo aperture flux time series for target 169461816, planet candidate 2. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the halo aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-02/ghost-diagnostic-results/0000000169461816-02-halo-unwhitened-cotrended-zoomed-model.fig`

9 Planet Candidate 3

9.1 Model Fitter: All Transits

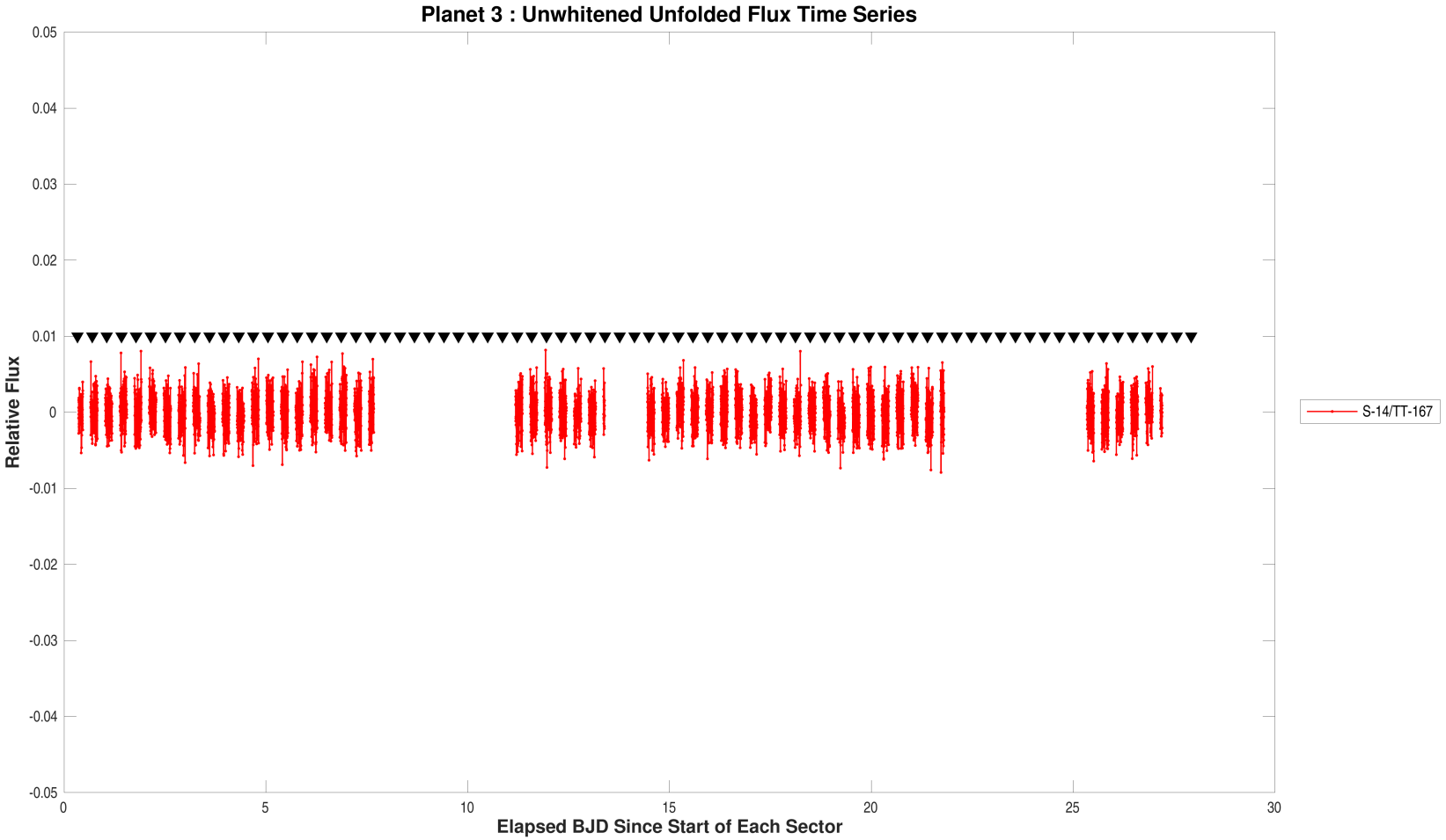
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.6900363	TJD
Orbital Period	0.3630491	days
Maximum SES	3.9	
Maximum MES	7.2	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	674.0 (730)	
Chi Square2 Statistic (DoF)	33.2 (53.5)	
Threshold for Desired PFA		

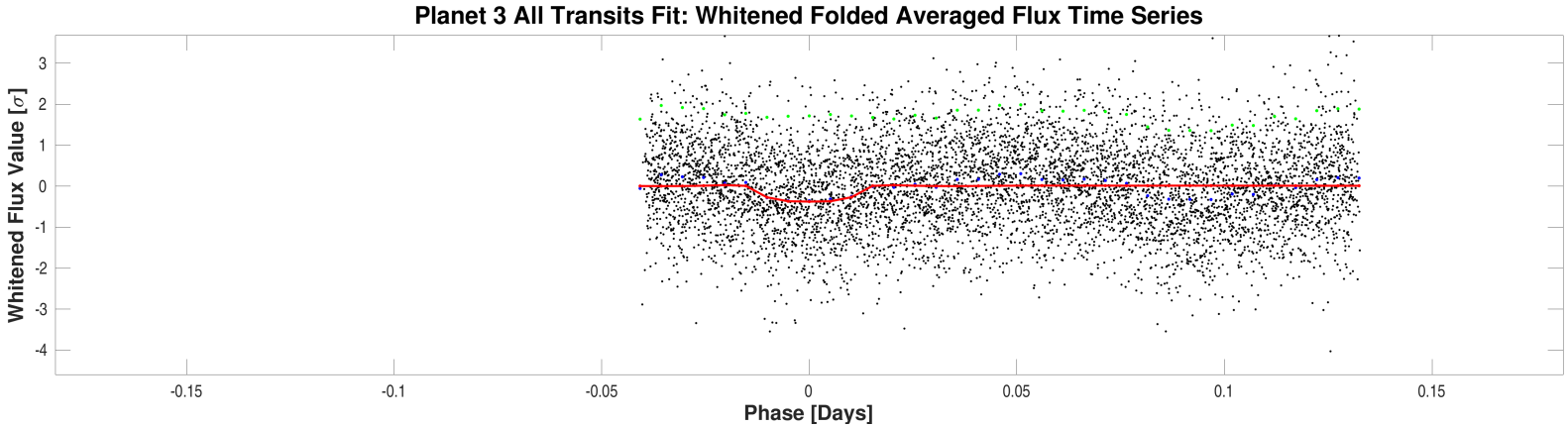
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	10.1		
Orbital Period	0.3631160	2.9733e-05	days
Transit Epoch	1683.6927495	9.4391e-04	BTJD
Impact Parameter	0.5372	7.1815e+00	
Planet Radius to Star Radius Ratio	0.0286531	2.1706e-02	
Semi-major Axis to Star Radius Ratio	3.9746	2.0098e+01	
Planet Radius	4.6644	3.5396e+00	Earth radii
Semi-major Axis	0.0113	8.3766e-04	AU
Effective Stellar Flux	33005.3765	5.0338e+03	Goldilocks
Equilibrium Temperature	3438	1.3107e+02	Kelvin
Stellar Density	6.3977	9.7053e+01	Solar density
Transit Depth	886	9.7844e+01	ppm
Transit Duration	0.6232	2.6606e-01	hours
Transit Ingress Duration	0.0245	2.8394e-01	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	3376.7 (3963.6)		
Model Chi Square Goodness of Fit Statistic (DoF)	676.5 (1181)		
Model Chi Square2 Statistic (DoF)	27.1 (53)		

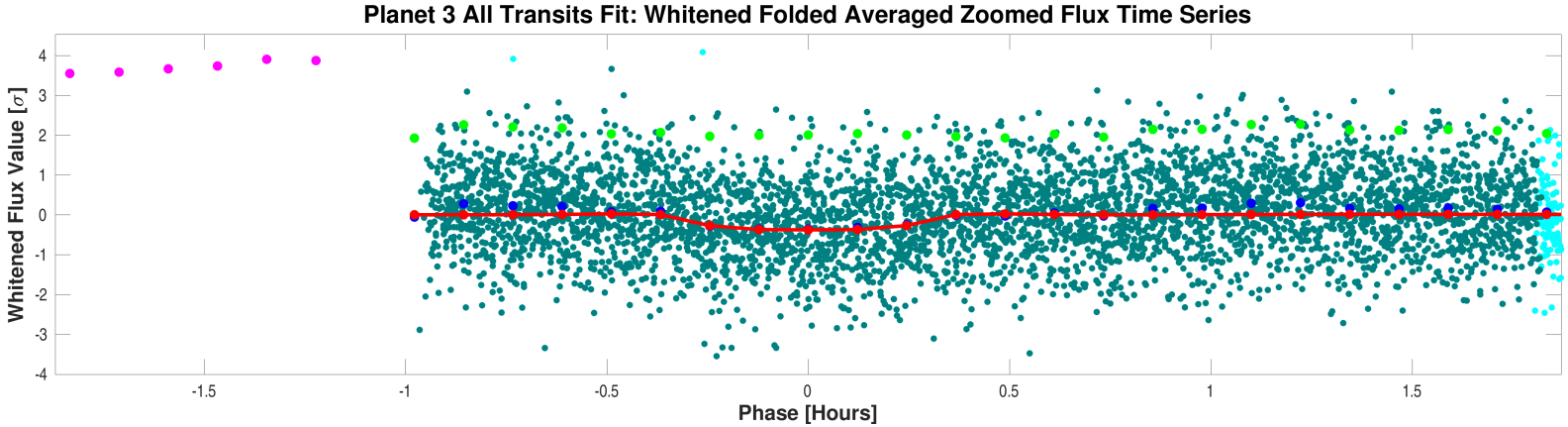
DoF: Degrees of Freedom



Flux time series for CatId 169461816, Planet candidate 3 in the unwhitened domain. For the data of Sector-14/TargetTableId-167, start BJD is 2458683. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-unwhitened-14-167.fig`



Folded flux time series for CatId 169461816, Planet candidate 3 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-whitened.fig`

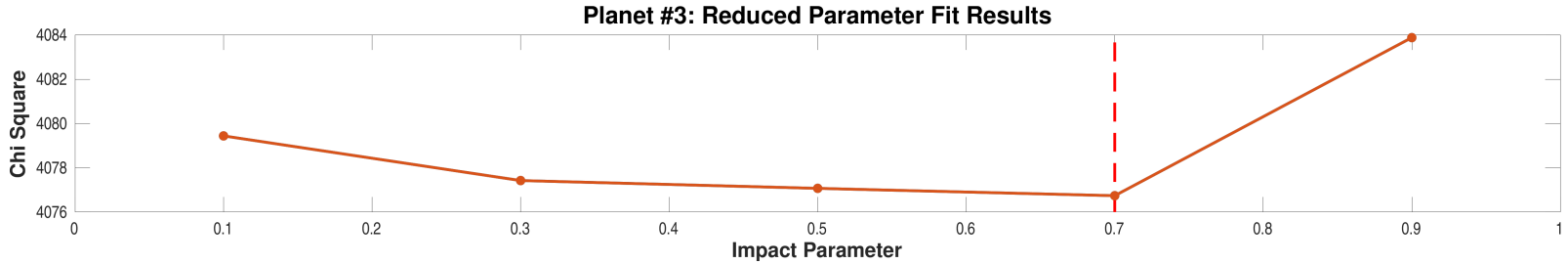


Folded flux time series for CatId 169461816, Planet candidate 3 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. All transits fit completed with full convergence.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-whitened-zoomed.fig`

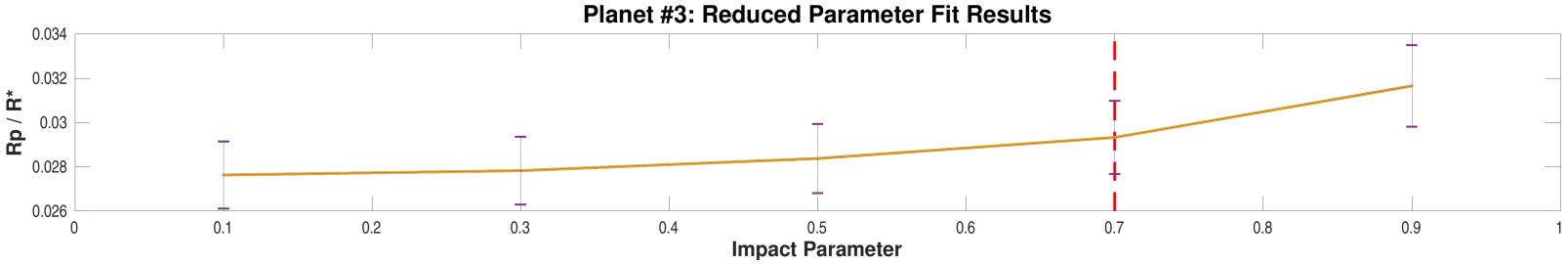
9.2 Model Fitter: Reduced Parameter Fit Results

Impact Parameter	SNR	Model Chi Square	Planet Radius to Star Radius	Uncert	Semi-major Axis to Star Radius	Uncert	Transit Depth (ppm)	Uncert	Transit Duration (hours)	Uncert
0.10	10.3	4079.4	0.0276303	1.5174e-03	4.5847	3.2088e-01	864	9.4317e+01	0.6242	4.4206e-02
0.30	10.2	4077.4	0.0278254	1.5295e-03	4.6100	3.0890e-01	865	9.4581e+01	0.5974	4.0570e-02
0.50	10.2	4077.1	0.0283749	1.5618e-03	4.2916	2.9046e-01	876	9.5825e+01	0.5893	4.0730e-02
0.70	10.2	4076.7	0.0293238	1.6553e-03	3.7177	2.9009e-01	886	9.9422e+01	0.5775	4.6876e-02
0.90	10.2	4083.9	0.0316518	1.8344e-03	2.4791	1.8790e-01	903	1.0385e+02	0.6105	5.2783e-02

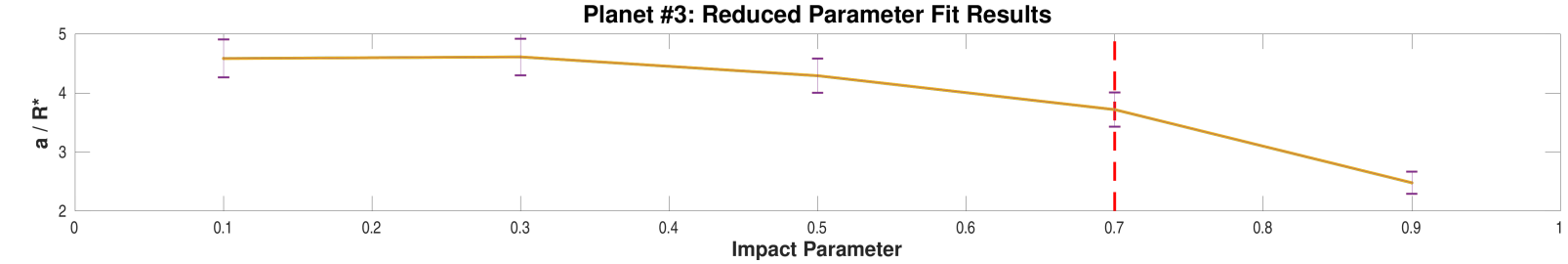
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 3. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-03/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-03-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 3. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-03/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-03-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 169461816, Planet candidate 3. The fit result with the minimum chi square is marked with a dashed line in the plot.
Open `./planet-03/planet-search-and-model-fitting-results/reduced-parameter-fits/0000000169461816-03-reduced-fits-a-over-rstar.fig`

9.3 Model Fitter: Trapezoidal Fit Results

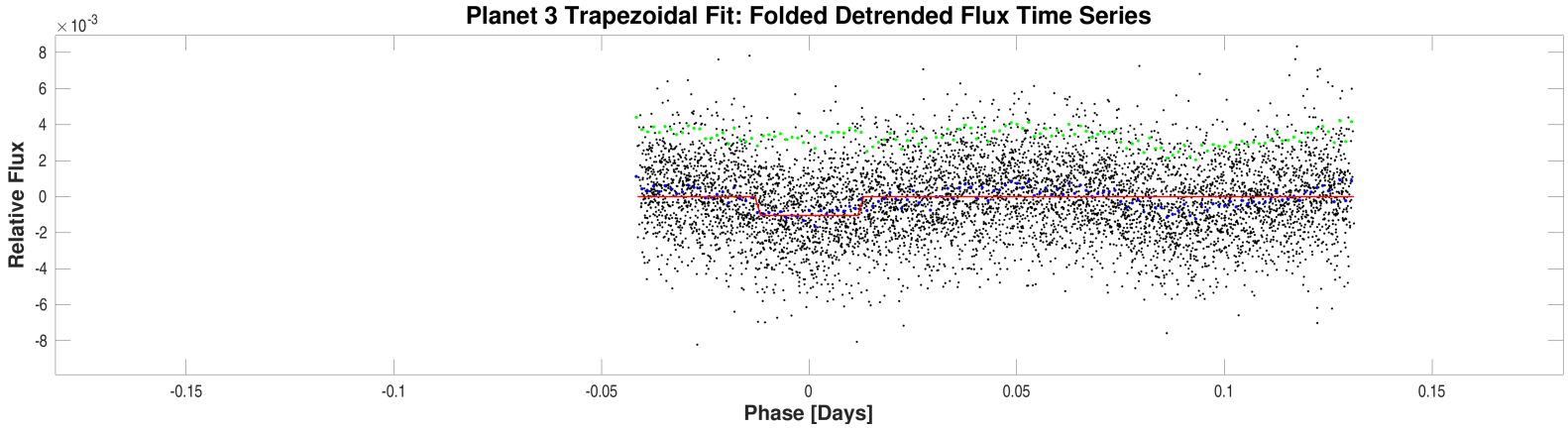
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	0.5	hours
Transit Epoch	1683.6900363	TJD
Orbital Period	0.3630491	days
Maximum SES	3.9	
Maximum MES	7.2	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	674.0 (730)	
Chi Square2 Statistic (DoF)	33.2 (53.5)	
Threshold for Desired PFA		

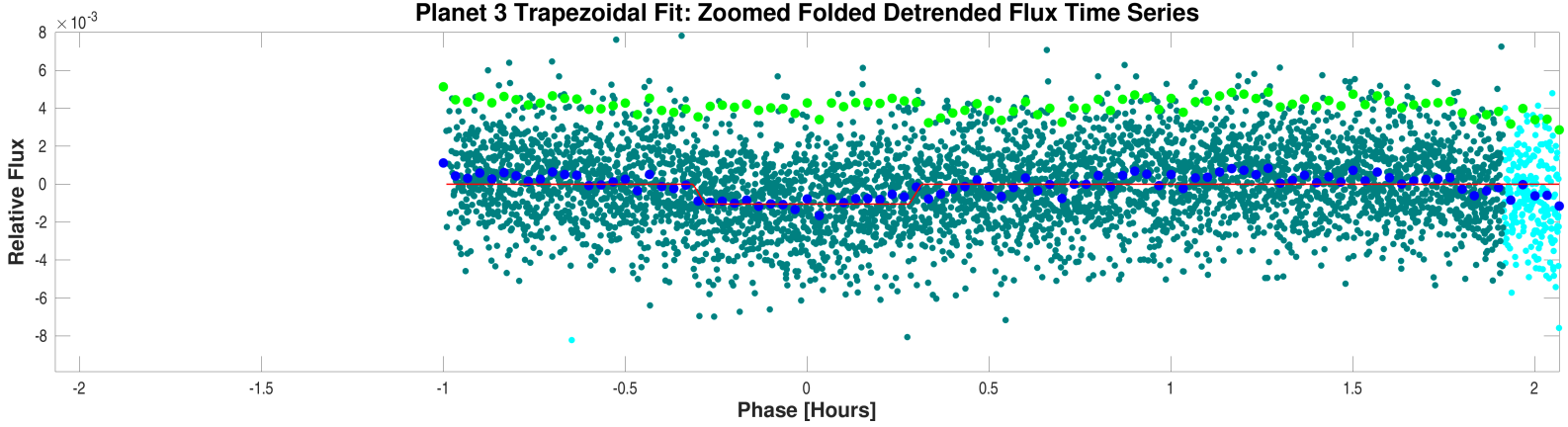
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	13.0		
Orbital Period	0.3630491		days
Transit Epoch	1683.6963456		BTJD
Transit Depth	1046		ppm
Transit Duration	0.8721		hours
Transit Ingress Duration	0.2779		hours
Model Chi Square Statistic (DoF)	6657.4 (4550)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 169461816, Planet candidate 3 and folded trapezoidal model light curve.
Open `./planet-03/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-03-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 169461816, Planet candidate 3 and folded trapezoidal model light curve.
Open `./planet-03/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000169461816-03-all-trapezoidal-zoomed.fig`

9.4 Validation Tests

The Centroid Test and Eclipsing Binary Discrimination Test are chi-squared hypothesis tests. For these tests, a significance of 100% favors a planet, while 0% indicates an unlikely planet.

9.4.1 Weak Secondary Test

Result	Value	Uncertainty	Units	Statistic in Sigmas	Significance (%)
Orbital Period	0.36305		days		
Transit Duration	0.5		hours		
Maximum MES	7.2				
Secondary Phase	0.093257		days		
Secondary MES	7.7				
Minimum Phase	0.062007		days		
Minimum MES	-5.5				
Median MES	-0.6				
MAD MES	3.3014				
Robust Statistic	8.0				
Secondary Depth	811.4	9.8125e+01	ppm		
Geometric Albedo	2.6	3.9924e+00		0.4047	34.28
Planet Effective Temperature	6759	2.5706e+03	Kelvin	1.2905	9.84

9.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	2.5160e-01	0.5016	61.60
Shorter Period Comparison Statistic	7.7160e-07	0.0009	0.07

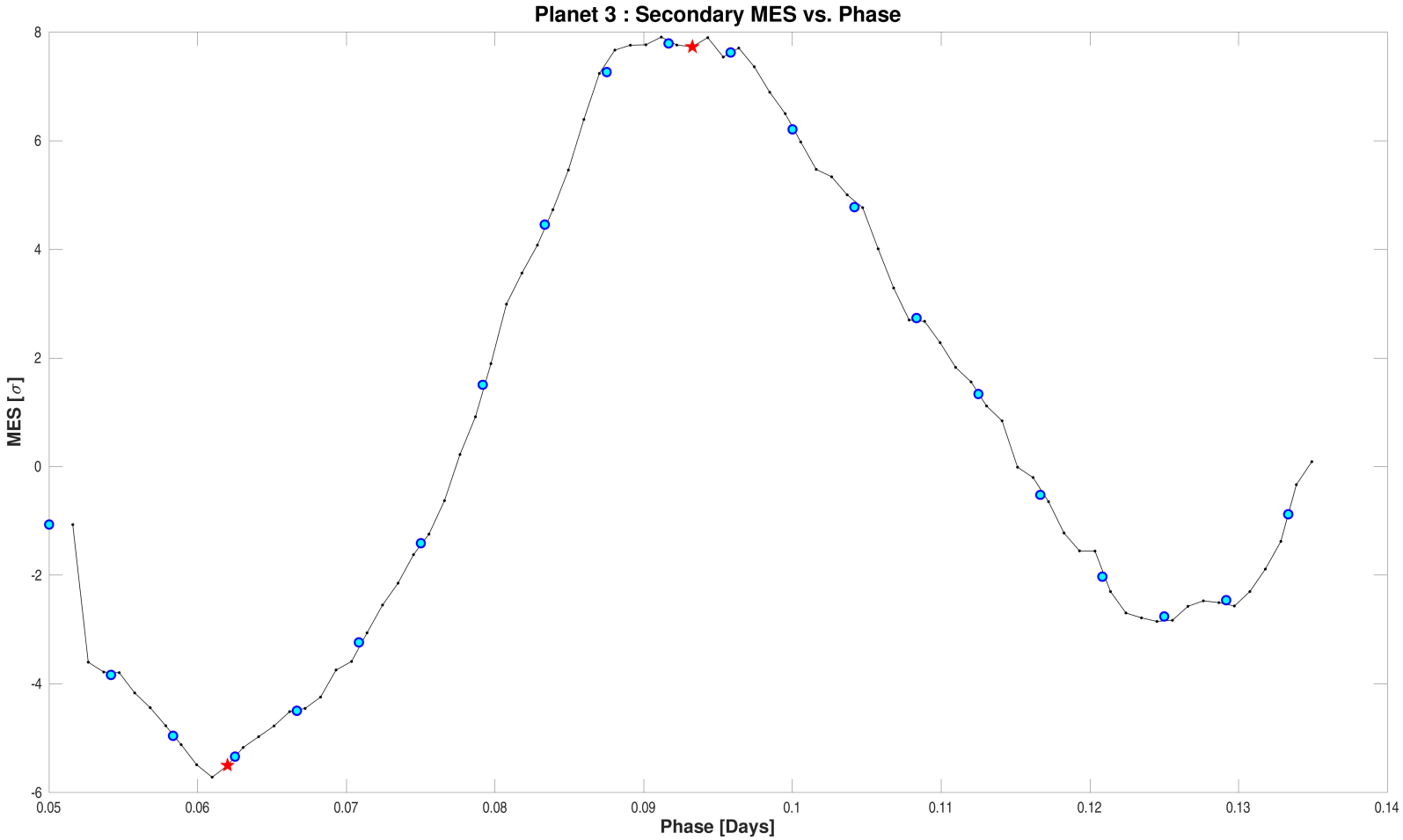
9.4.3 Bootstrap Test

Result	Value
False Alarm Probability	1.3611e-08
Bootstrap Threshold for Desired PFA	9.1
MES Mean	0.19
MES Standard Deviation	1.26
Transit Count	74

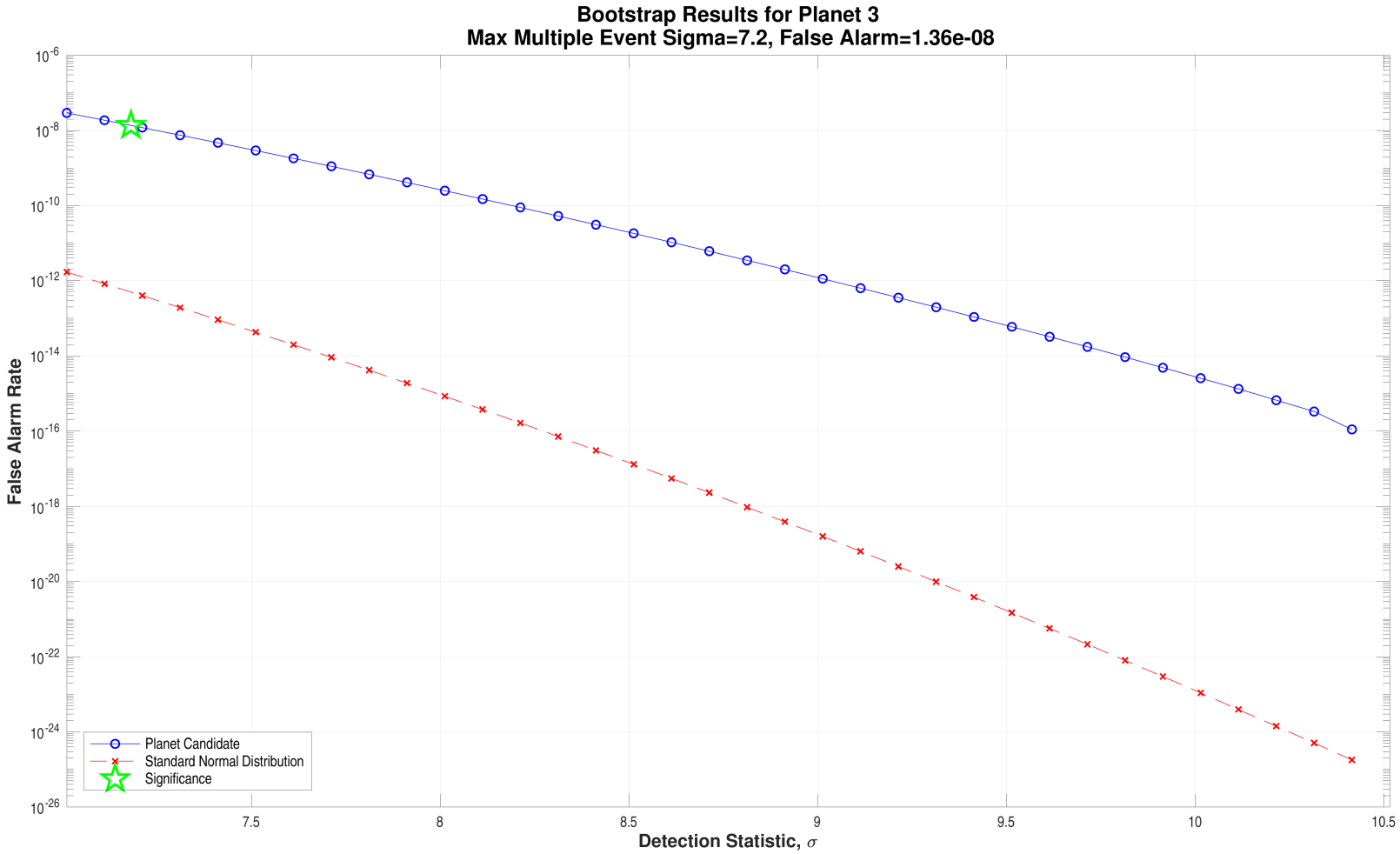
9.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	7.2	
SNR	10.1	
Core Aperture Statistic	4.7246e+00	100.00
Halo Aperture Statistic	5.4365e+00	100.00
Ratio of Core/Halo Aperture Statistics	8.6906e-01	

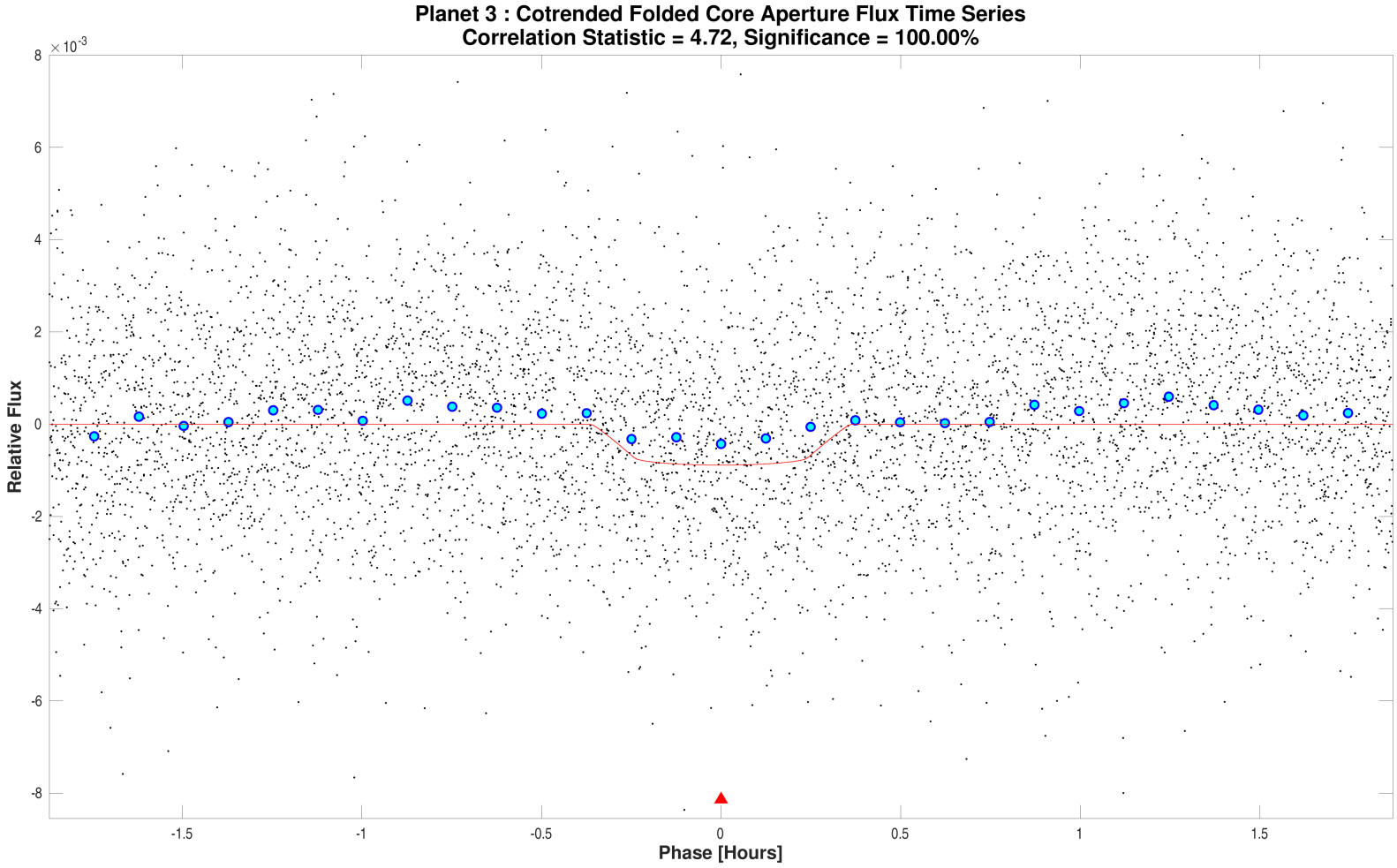
9.4.5 Validation Test Figures



The primary event has been set to zero and both the max and min of the resulting MES vs. Phase are marked with a red star. The best matched pulse duration in hours is 0.5. The maximum secondary MES and corresponding phase are 7.731 and 0.093257 days respectively. The minimum secondary MES and corresponding phase are -5.4989 and 0.062007 days respectively.
Open `./planet-03/report-summary/0000000169461816-03-weak-secondary-diagnostic.fig`

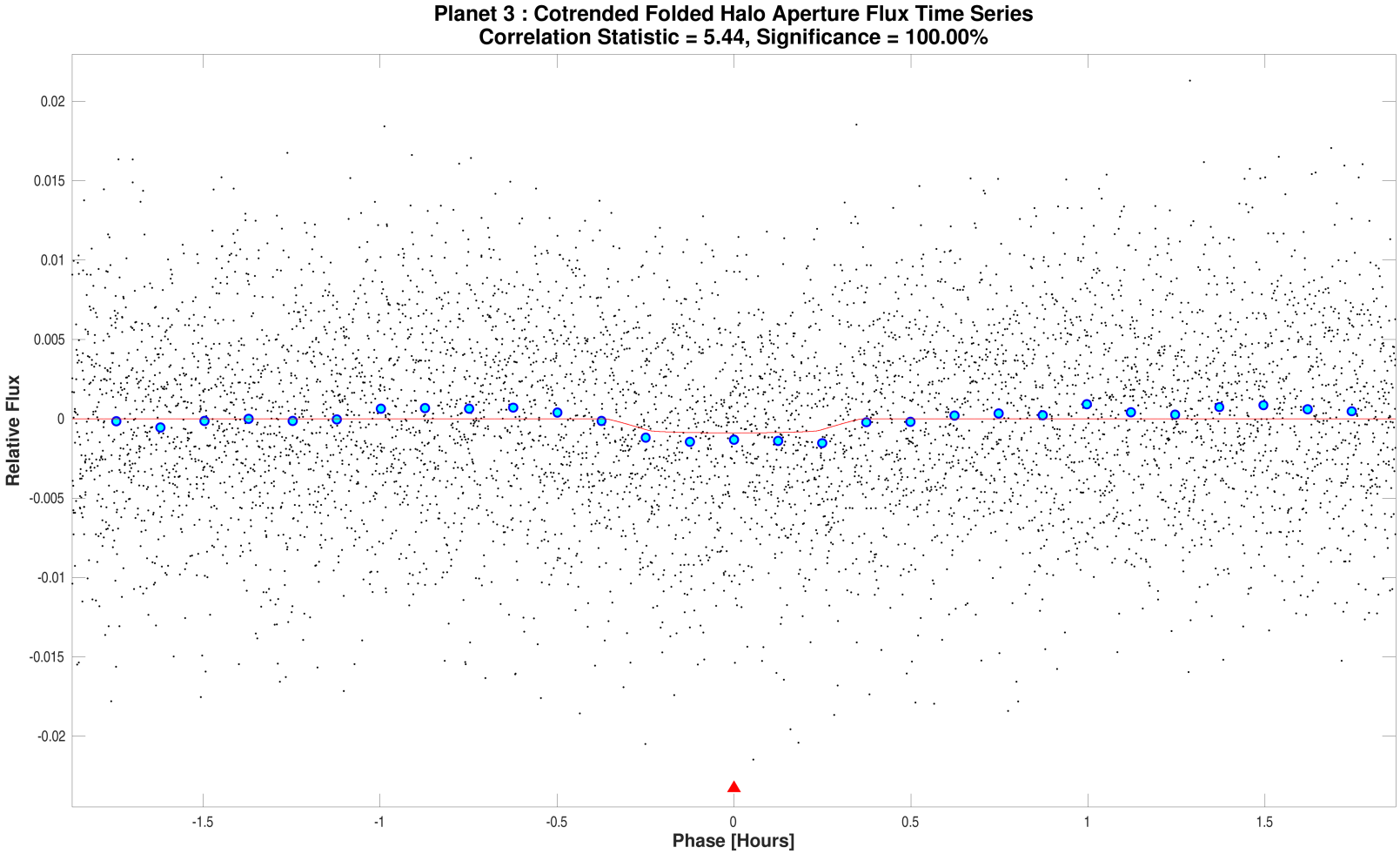


Bootstrap results for target 169461816, planet 3. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 5.5584. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 9.1178.
Open `./planet-03/bootstrap-results/0000000169461816-03-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 169461816, planet candidate 3. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the core aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

Open `./planet-03/ghost-diagnostic-results/0000000169461816-03-core-unwhitened-cotrended-zoomed-model.fig`

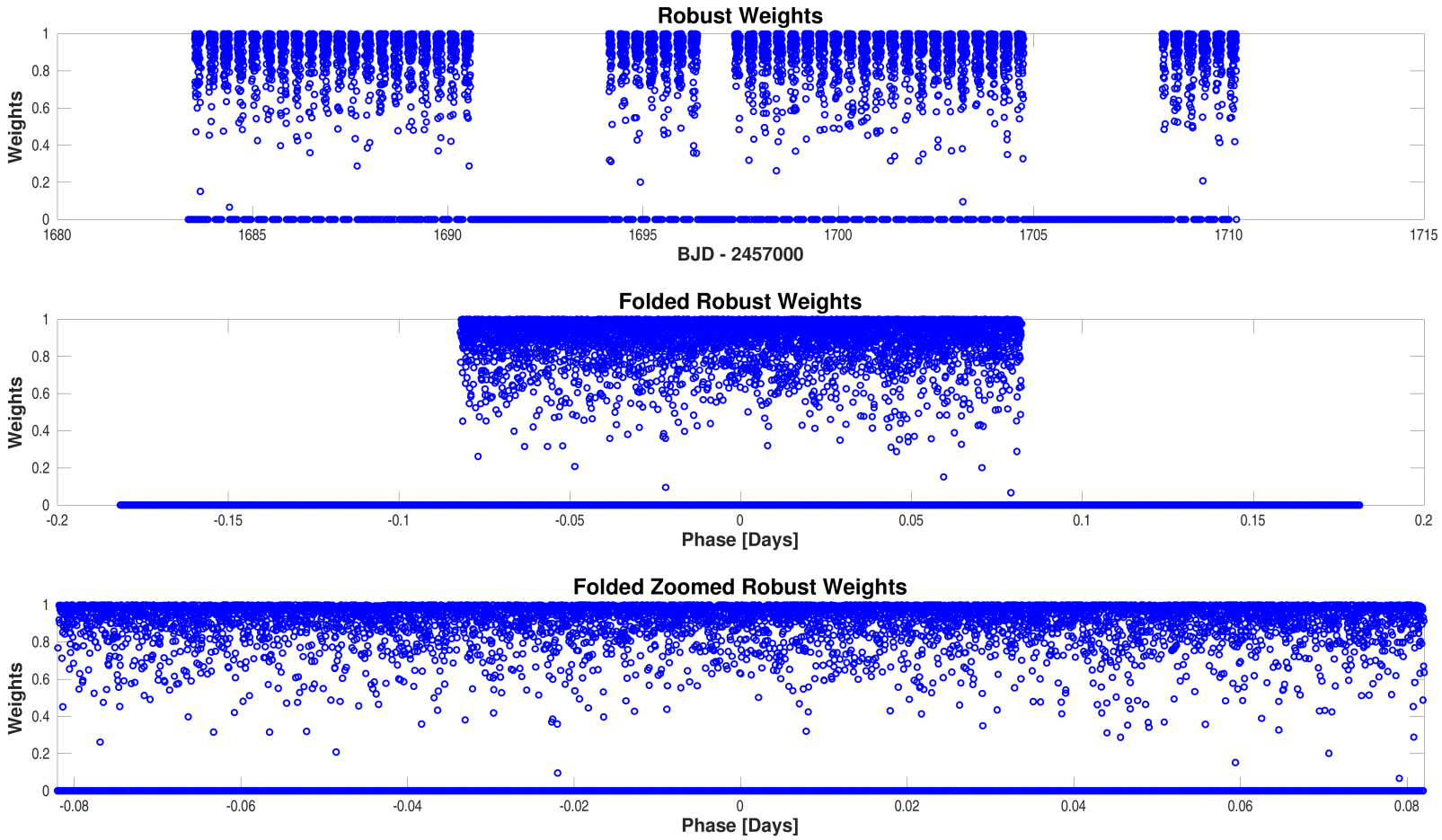


Optical ghost diagnostic halo aperture flux time series for target 169461816, planet candidate 3. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft engineering data, motion proxies, and/or cotrending basis vectors (CBVs) to remove systematic effects. Flux time series data represent the mean per pixel flux in the core or haloaperture; phase folded data points are shown in the figure with black dots. Binned and averaged phase folded flux values are marked with filled blue circles. The unwhitened transit model light curve is displayed in the figure with a red line. The value and significance of the halo aperture correlation statistic are displayed in the figure title if the statistic was successfully computed.

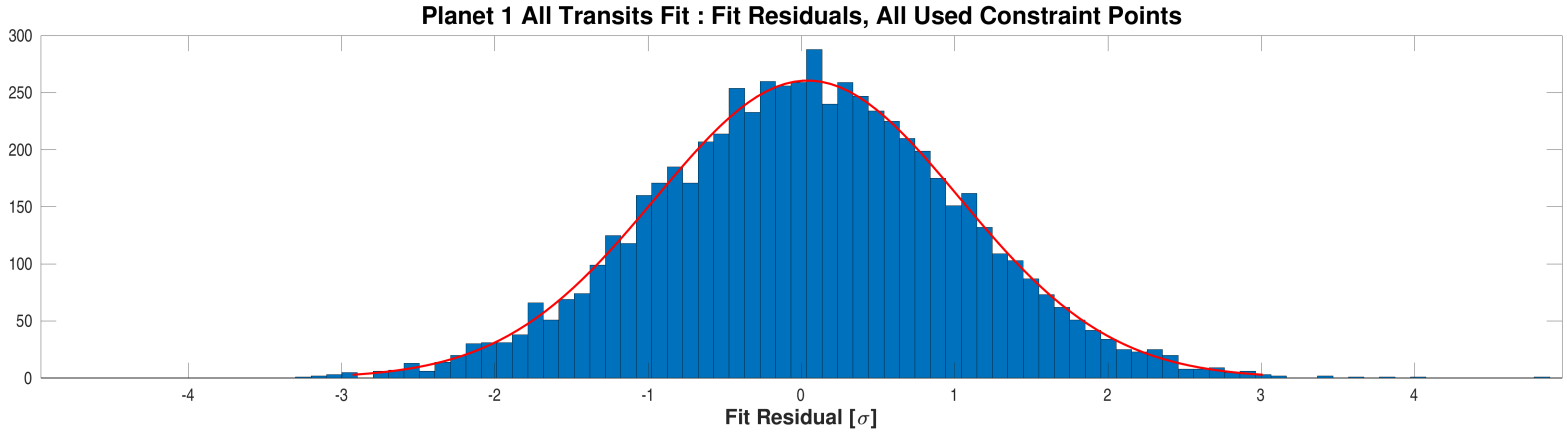
Open `./planet-03/ghost-diagnostic-results/0000000169461816-03-halo-unwhitened-cotrended-zoomed-model.fig`

Appendix A Planet Candidate 1

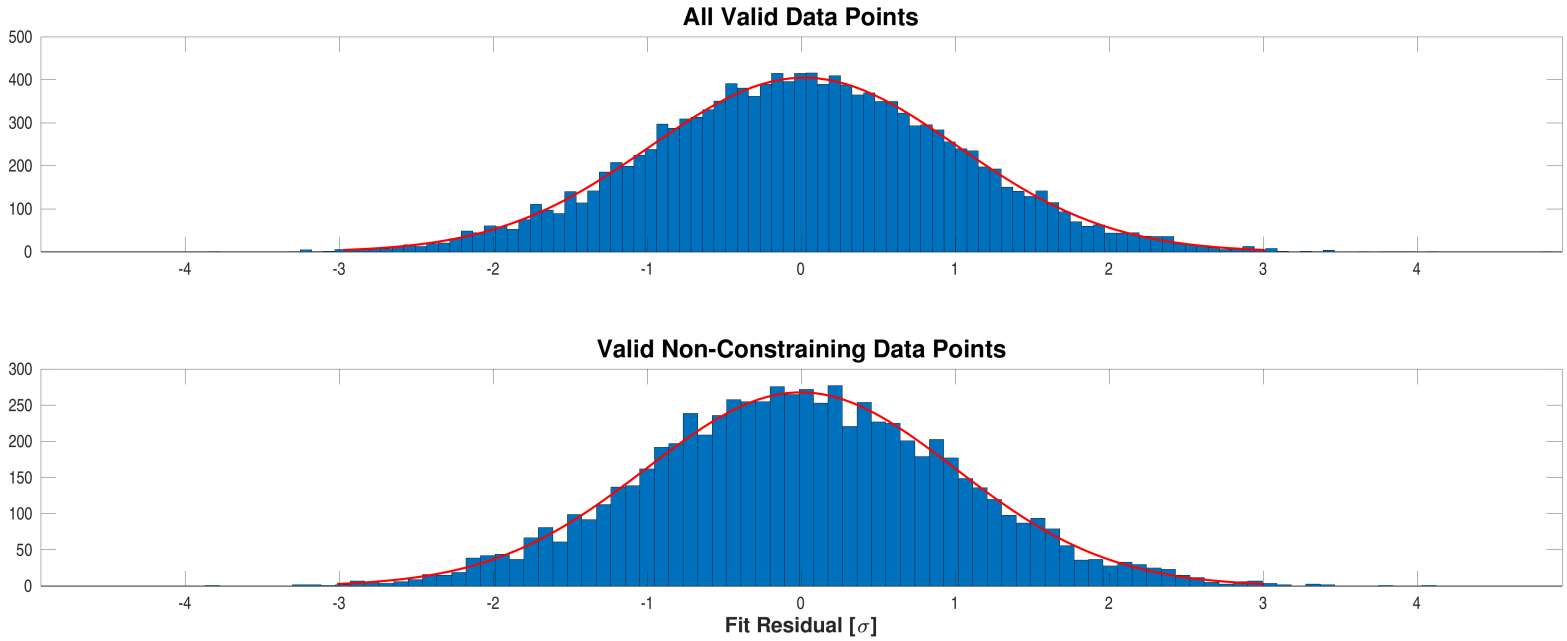
A.1 Model Fitter: All Transits



Robust weights distribution for CatId 169461816, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-robust-weights.fig`



Fit residuals distribution for CatId 169461816, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-histo-used.fig`

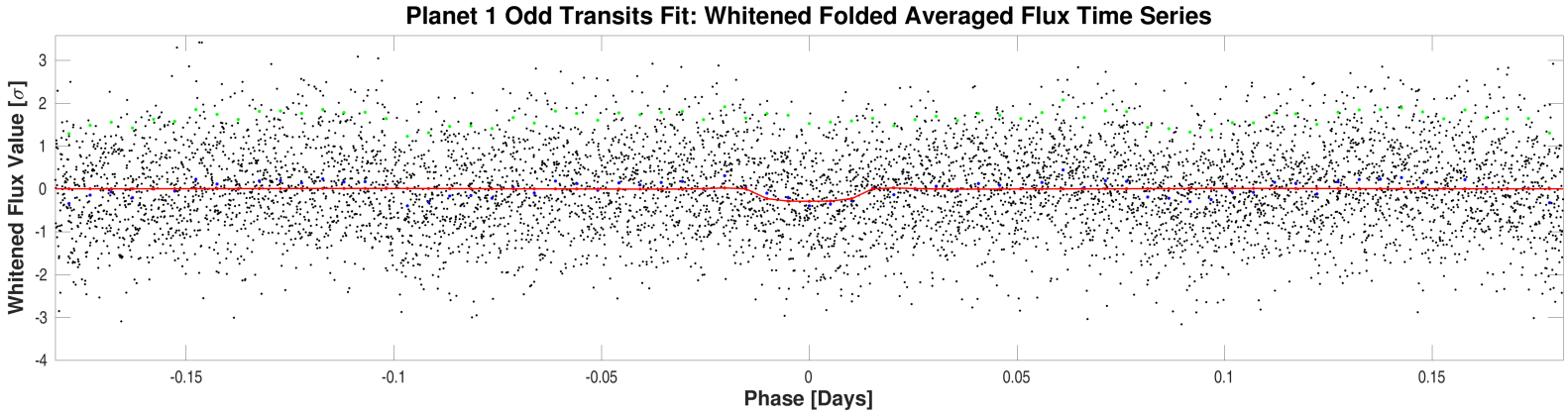


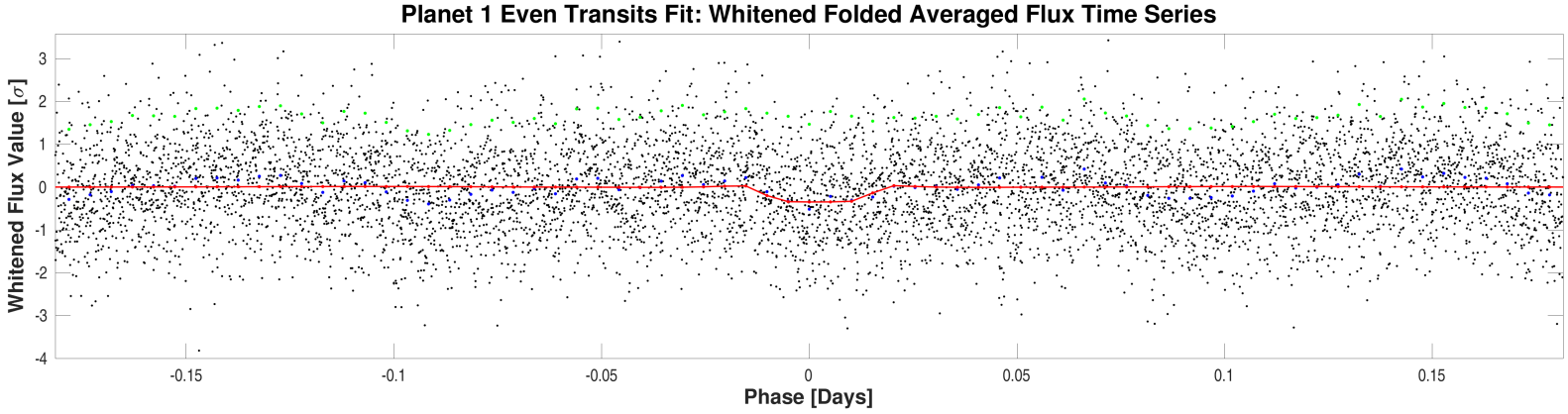
Fit residuals distribution for CatId 169461816, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-01-all-histo-all-and-unused.fig`

A.2 Model Fitter: Odd & Even Transits

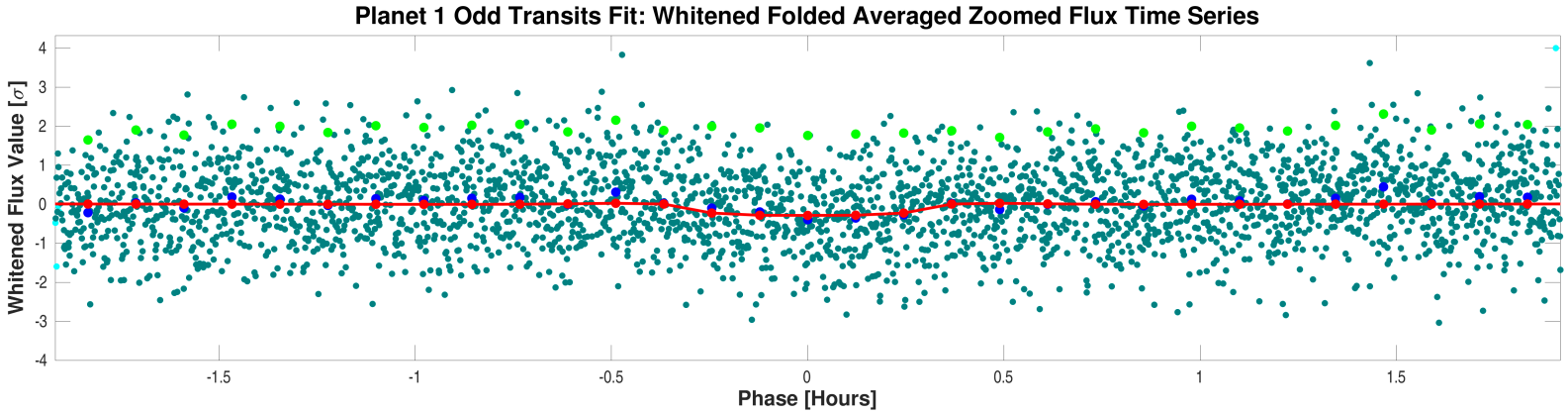
Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / Uncertainty
SNR	5.6		7.0			
Orbital Period	0.3630459	4.8993e-05	0.3630967	4.0044e-05	days	8.0346e-01
Transit Epoch	1683.6025698	1.5928e-03	1683.9659348	1.2825e-03	BTJD	1.3798e-01
Impact Parameter	0.3906	2.9858e+01	0.4780	1.2223e+01		2.7101e-03
Planet Radius to Star Radius Ratio	0.0265725	5.1269e-02	0.0296183	3.1455e-02		5.0639e-02
Semi-major Axis to Star Radius Ratio	4.1761	5.3951e+01	3.8052	2.6683e+01		6.1621e-03
Planet Radius	4.3257	8.3482e+00	4.8215	5.1251e+00	Earth radii	5.0616e-02
Semi-major Axis	0.0113	8.3755e-04	0.0113	8.3763e-04	AU	8.8975e-04
Effective Stellar Flux	33013.8723	5.0351e+03	33007.7091	5.0341e+03	Goldilocks	8.6562e-04
Equilibrium Temperature	3438	1.3108e+02	3438	1.3108e+02	Kelvin	8.6562e-04
Stellar Density	7.4236	2.8772e+02	5.6145	1.1811e+02	Solar density	5.8165e-03
Transit Depth	781	1.5038e+02	958	1.4659e+02	ppm	8.4207e-01
Transit Duration	0.6389	5.4129e-01	0.6768	3.8156e-01	hours	5.7153e-02
Transit Ingress Duration	0.0197	5.8074e-01	0.0255	4.1227e-01	hours	8.0522e-03
Eccentricity	0.0000	0.0000e+00	0.0000	0.0000e+00		
Peri Longitude	0.0000	0.0000e+00	0.0000	0.0000e+00	degrees	
Model Chi Square Statistic (DoF)	4551.1 (5644.5)		4551.1 (5644.5)			

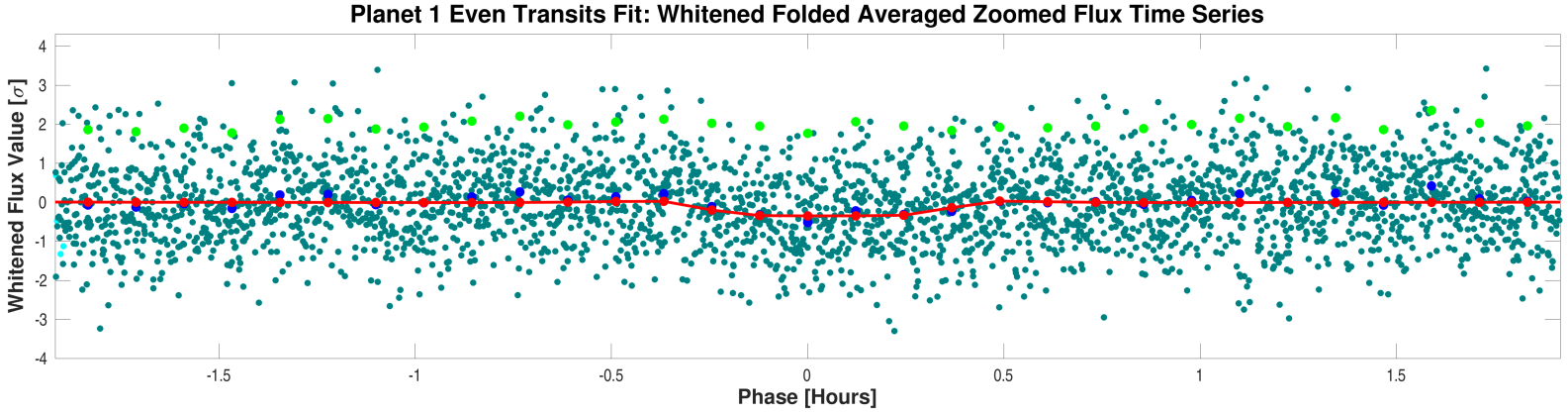
DoF: Degrees of Freedom



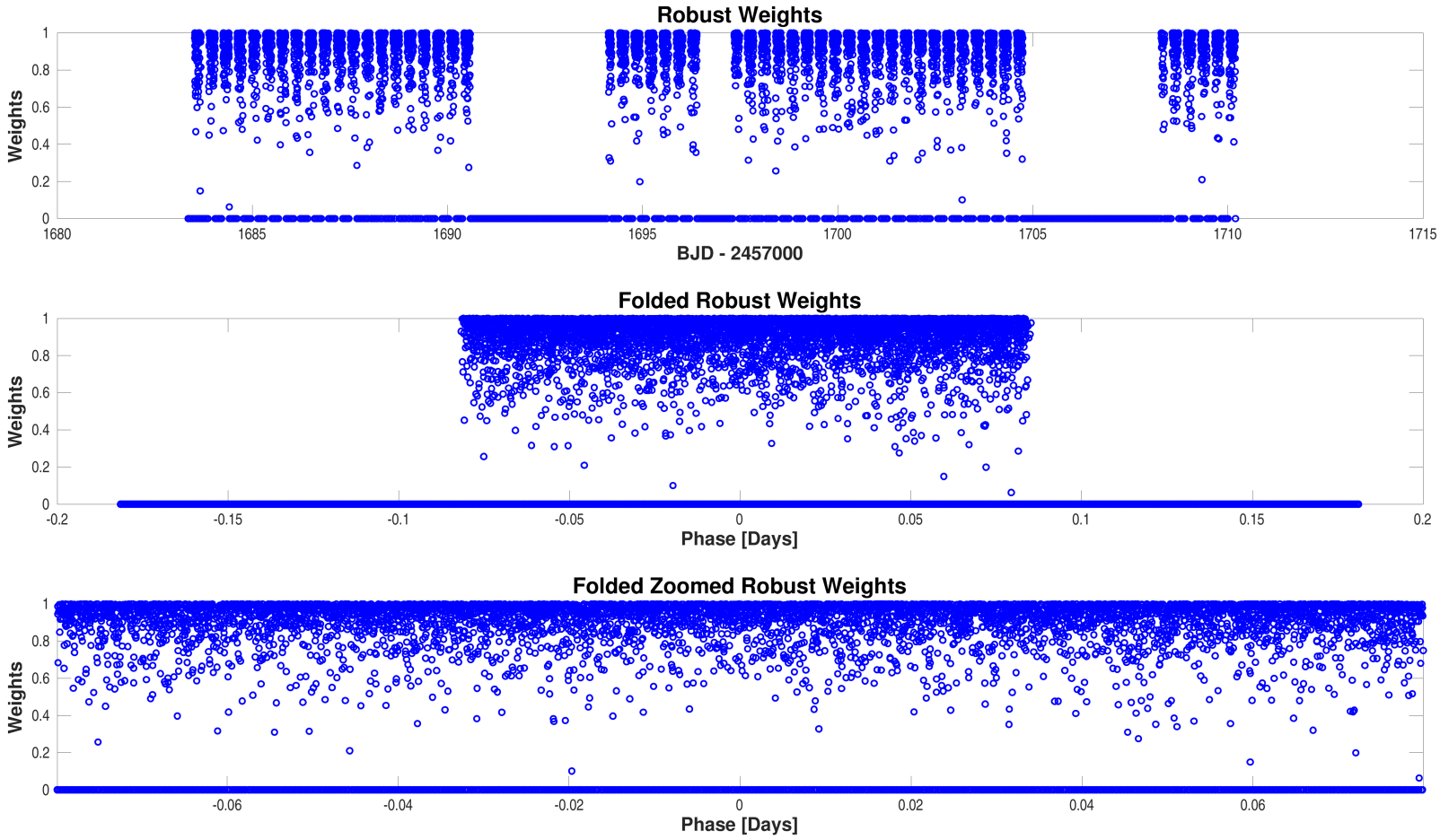


Folded flux time series for CatId 169461816, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-01-odd-even-whitened.fig`

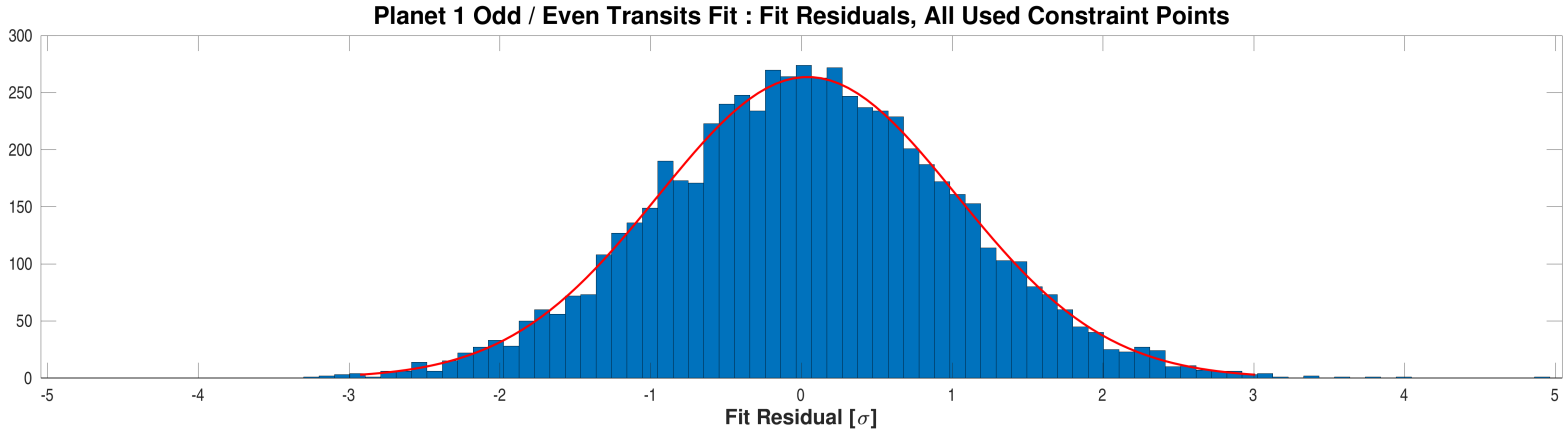




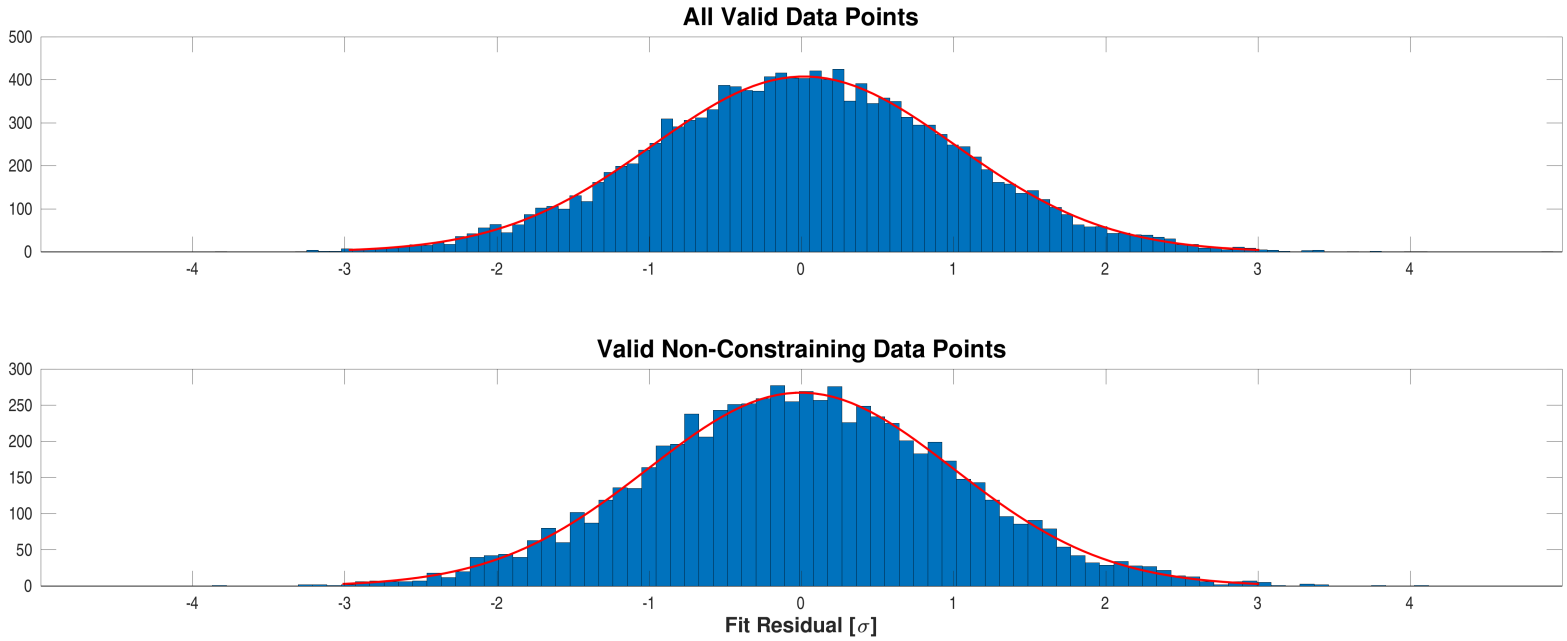
Folded flux time series for CatId 169461816, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-01-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 169461816, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-01-odd-even-robust-weights.fig`

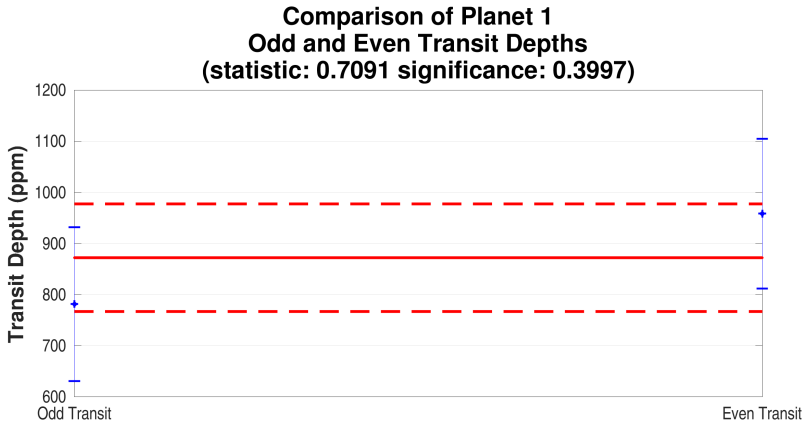


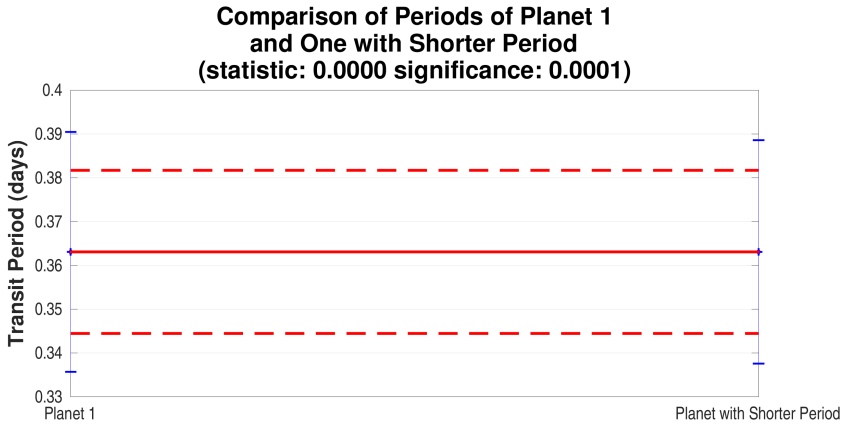
Fit residuals distribution for CatId 169461816, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-01-odd-even-histo-used.fig`

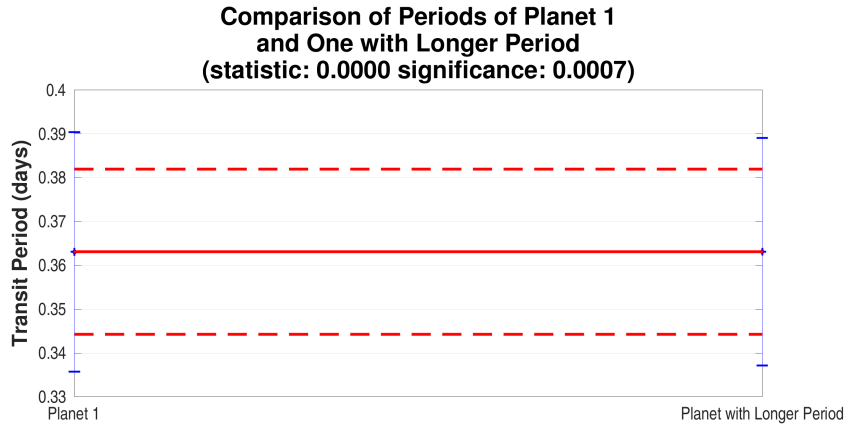


Fit residuals distribution for CatId 169461816, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-01-odd-even-histo-all-and-unused.fig`

A.3 Eclipsing Binary Discrimination Test



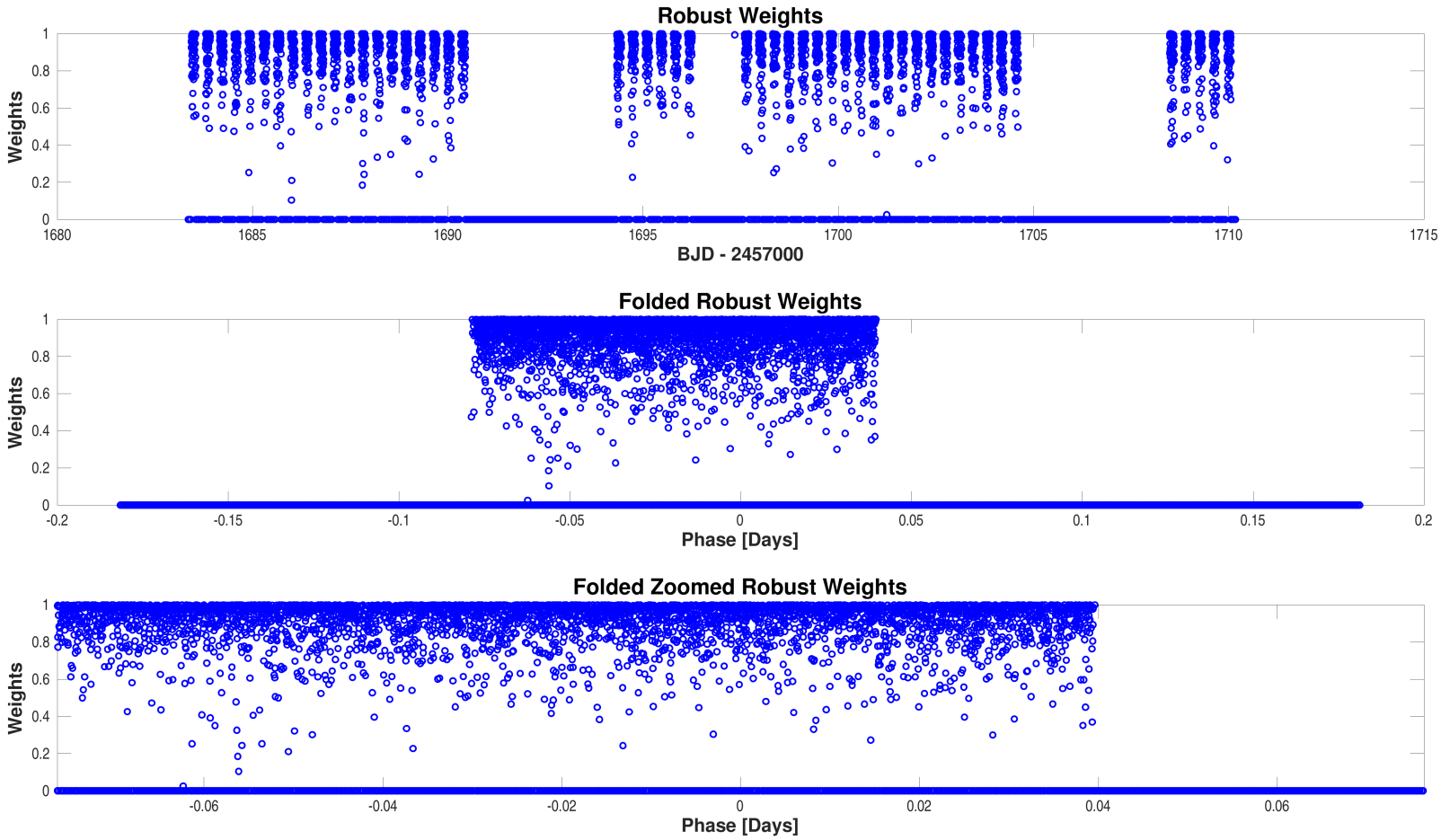




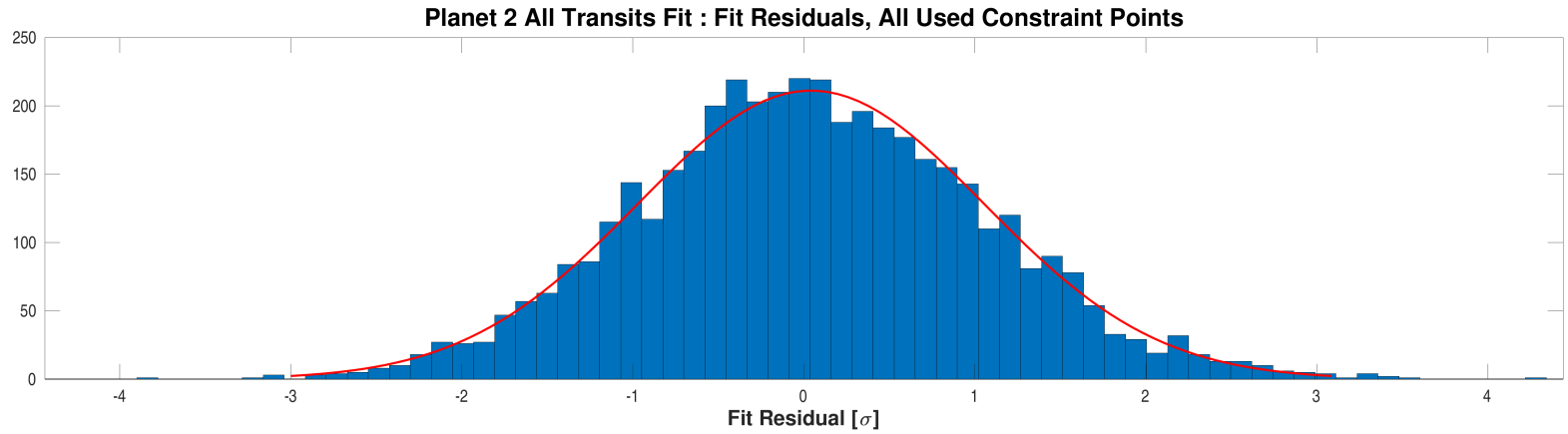
Top-left: Diagnostic plot of Odd/Even Transit Depth Test for catId 169461816, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Top-right: Diagnostic plot of Orbital Period Test for catId 169461816. Orbital periods of planet 1 and the planet with shorter period are compared. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Bottom-left: Diagnostic plot of Orbital Period Test for catId 169461816. Orbital periods of planet 1 and the planet with longer period are compared. A significance level close to 1/0 favors a transiting planet/an eclipsing binary.
Open `./planet-01/binary-discrimination-test-results/0000000169461816-01-eclipsing-binary-discrimination-tests.fig`

Appendix B Planet Candidate 2

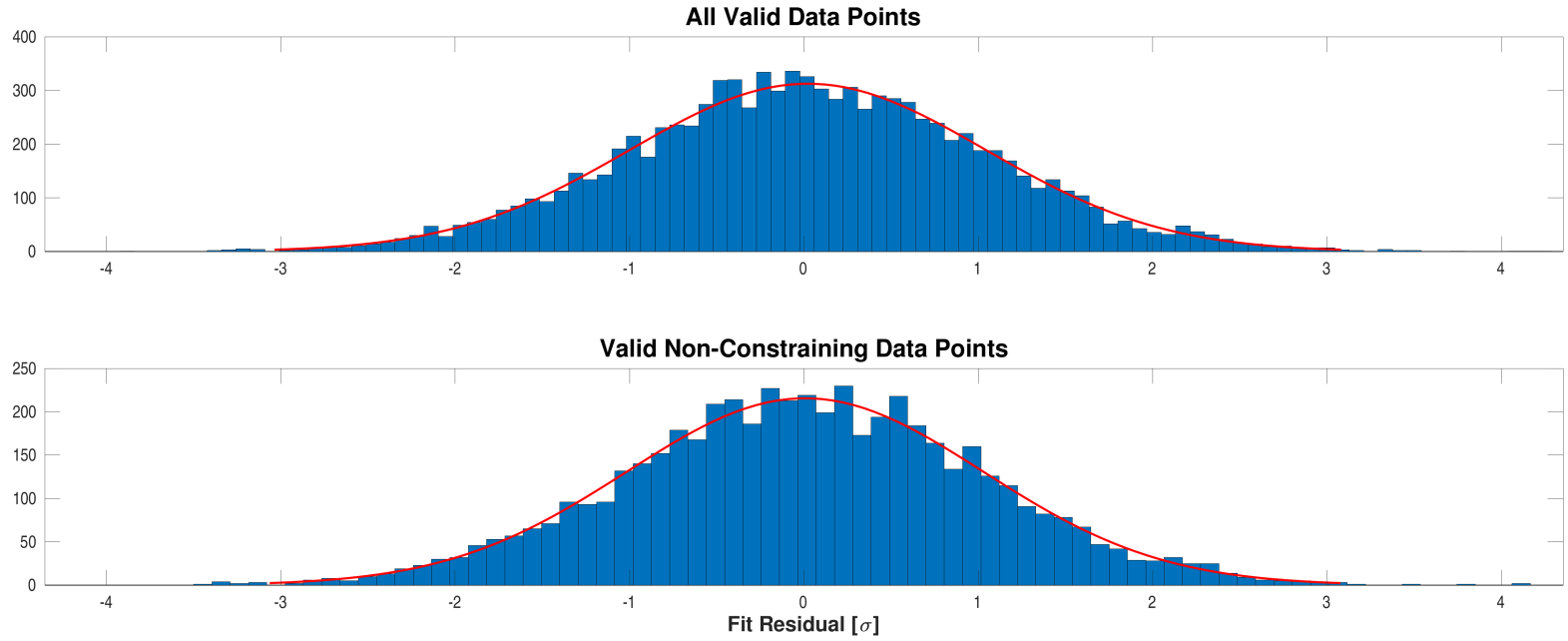
B.1 Model Fitter: All Transits



Robust weights distribution for CatId 169461816, Planet candidate 2. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-robust-weights.fig`



Fit residuals distribution for CatId 169461816, Planet candidate 2. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-histo-used.fig`

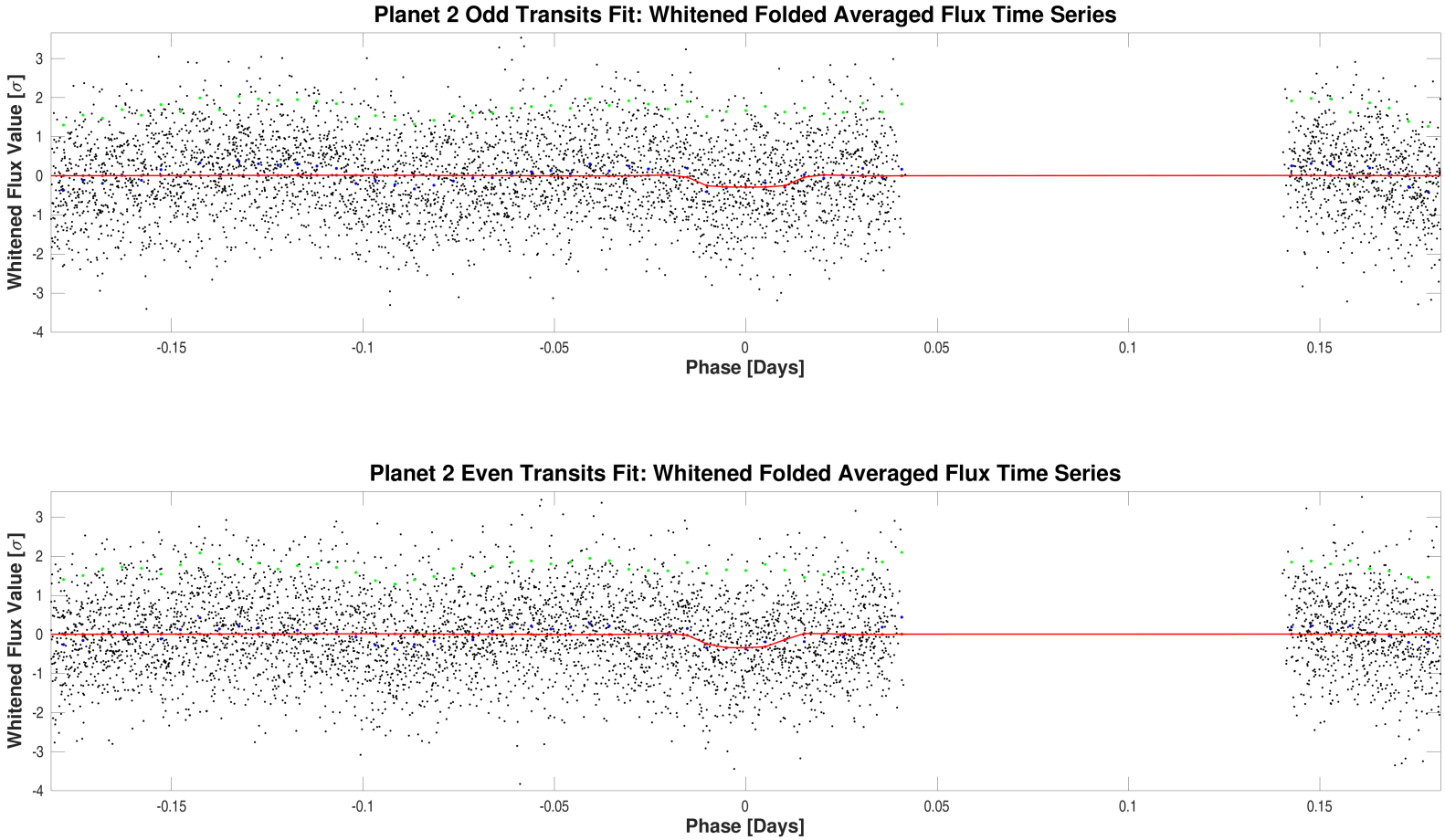


Fit residuals distribution for CatId 169461816, Planet candidate 2. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-02/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-02-all-histo-all-and-unused.fig`

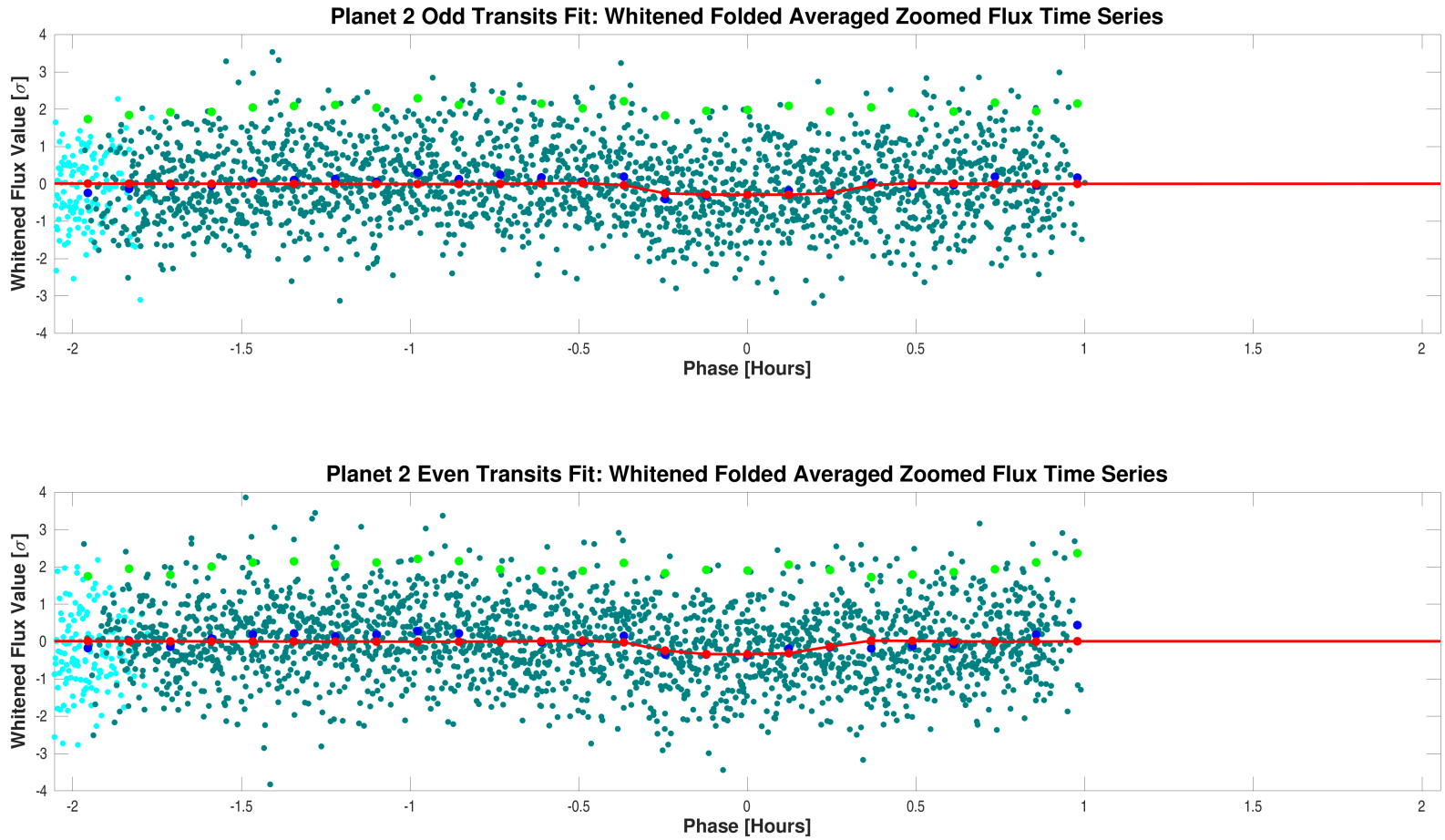
B.2 Model Fitter: Odd & Even Transits

Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / ‖Uncertainty‖
SNR	5.7		6.3			
Orbital Period	0.3630044	5.4182e-05	0.3630881	4.2363e-05	days	1.2174e+00
Transit Epoch	1683.5148998	1.7081e-03	1683.8739388	1.3615e-03	BTJD	1.8500e+00
Impact Parameter	0.2336	7.2866e+01	0.1465	8.4976e+01		7.7761e-04
Planet Radius to Star Radius Ratio	0.0256091	6.4905e-02	0.0274572	4.9365e-02		2.2663e-02
Semi-major Axis to Star Radius Ratio	4.0922	6.8955e+01	4.9465	6.0096e+01		9.3396e-03
Planet Radius	4.1688	1.0567e+01	4.4697	8.0385e+00	Earth radii	2.2658e-02
Semi-major Axis	0.0113	8.3749e-04	0.0113	8.3761e-04	AU	1.4654e-03
Effective Stellar Flux	33018.9038	5.0358e+03	33008.7519	5.0343e+03	Goldilocks	1.4257e-03
Equilibrium Temperature	3438	1.3109e+02	3438	1.3108e+02	Kelvin	1.4257e-03
Stellar Density	6.9870	3.5320e+02	12.3340	4.4955e+02	Solar density	9.3528e-03
Transit Depth	737	1.4175e+02	851	1.4958e+02	ppm	5.5238e-01
Transit Duration	0.6848	6.5099e-01	0.5746	3.9943e-01	hours	1.4426e-01
Transit Ingress Duration	0.0184	7.0808e-01	0.0159	4.3226e-01	hours	3.0296e-03
Eccentricity	0.0000	0.0000e+00	0.0000	0.0000e+00		
Peri Longitude	0.0000	0.0000e+00	0.0000	0.0000e+00	degrees	
Model Chi Square Statistic (DoF)	3268.3 (3882.3)		3268.3 (3882.3)			

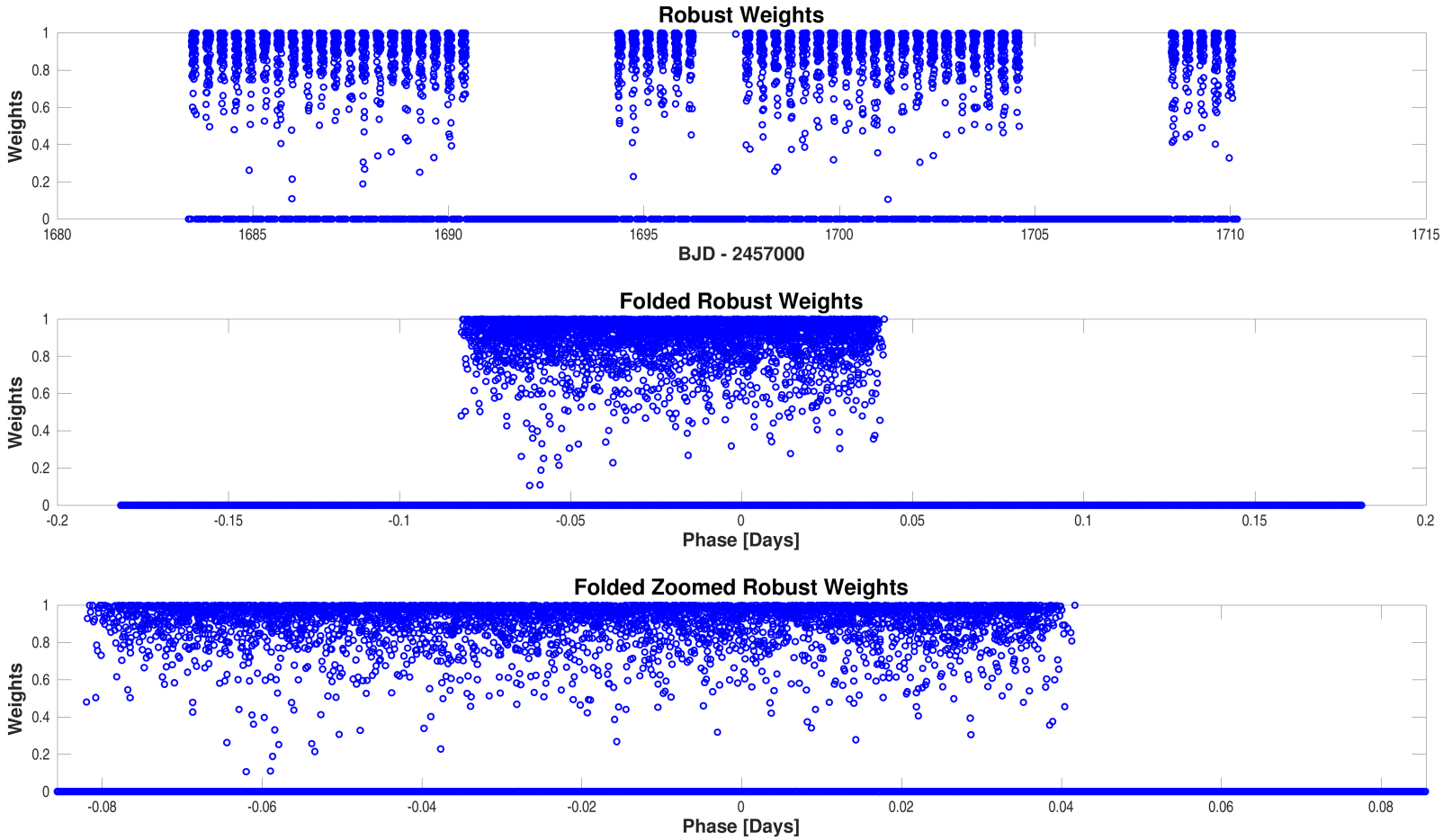
DoF: Degrees of Freedom



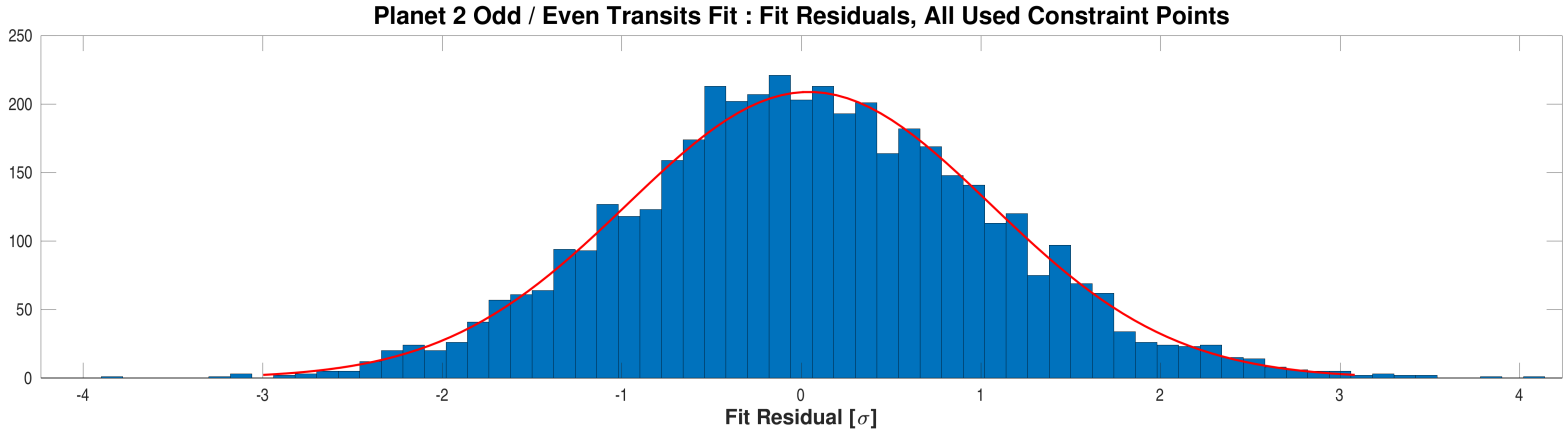
Folded flux time series for CatId 169461816, Planet candidate 2 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-02/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-02-odd-even-whitened.fig`



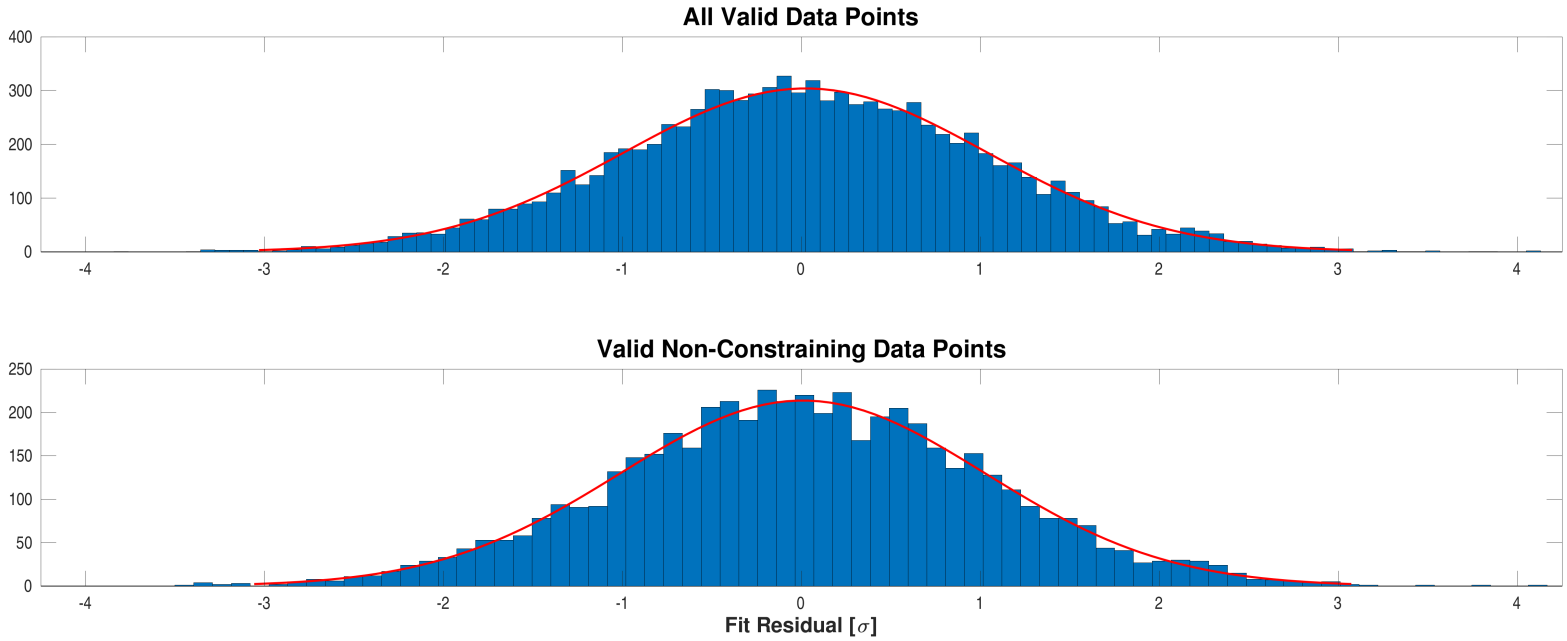
Folded flux time series for CatId 169461816, Planet candidate 2 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-02/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-02-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 169461816, Planet candidate 2. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-02/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-02-odd-even-robust-weights.fig`

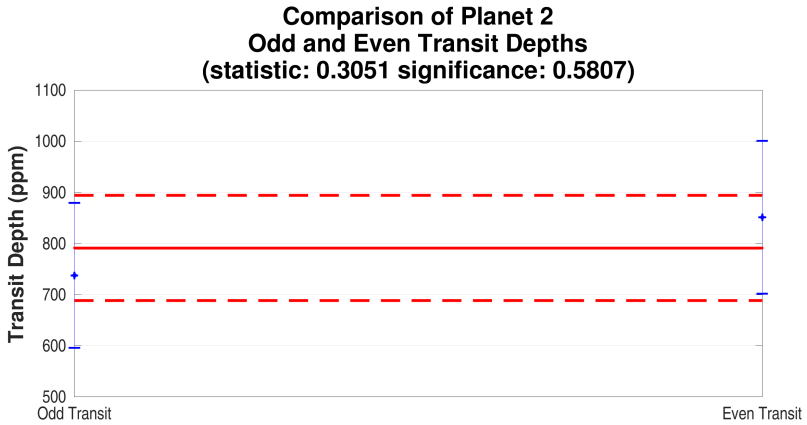


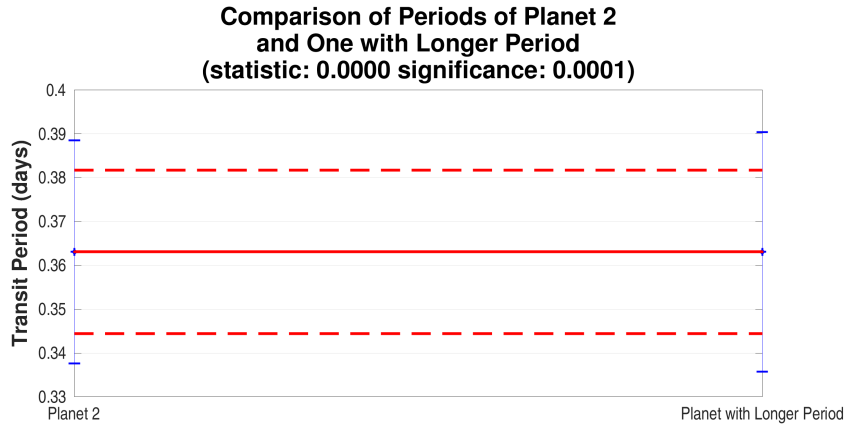
Fit residuals distribution for CatId 169461816, Planet candidate 2. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-02/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-02-odd-even-histo-used.fig`



Fit residuals distribution for CatId 169461816, Planet candidate 2. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-02/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-02-odd-even-histo-all-and-unused.fig`

B.3 Eclipsing Binary Discrimination Test

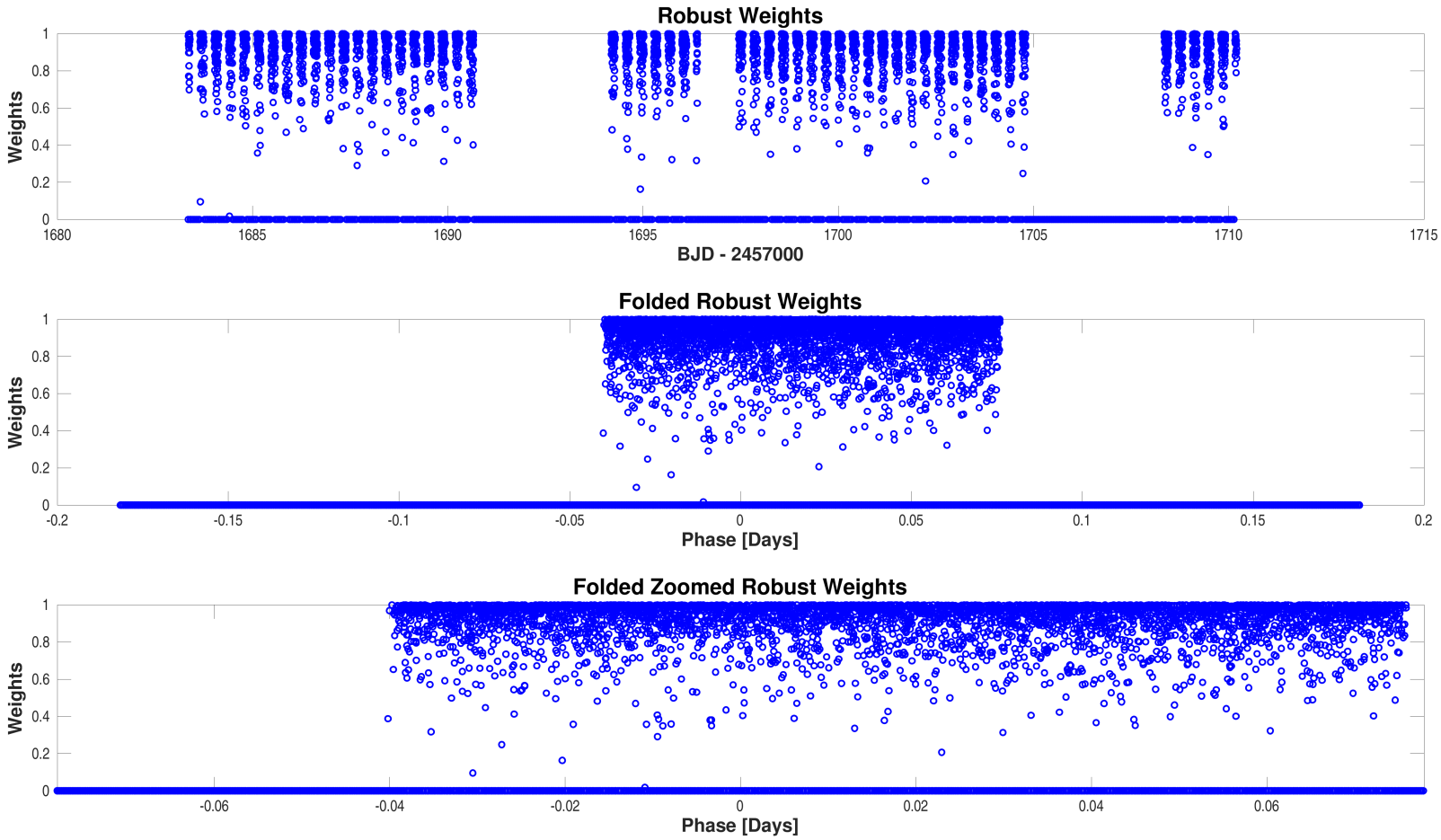




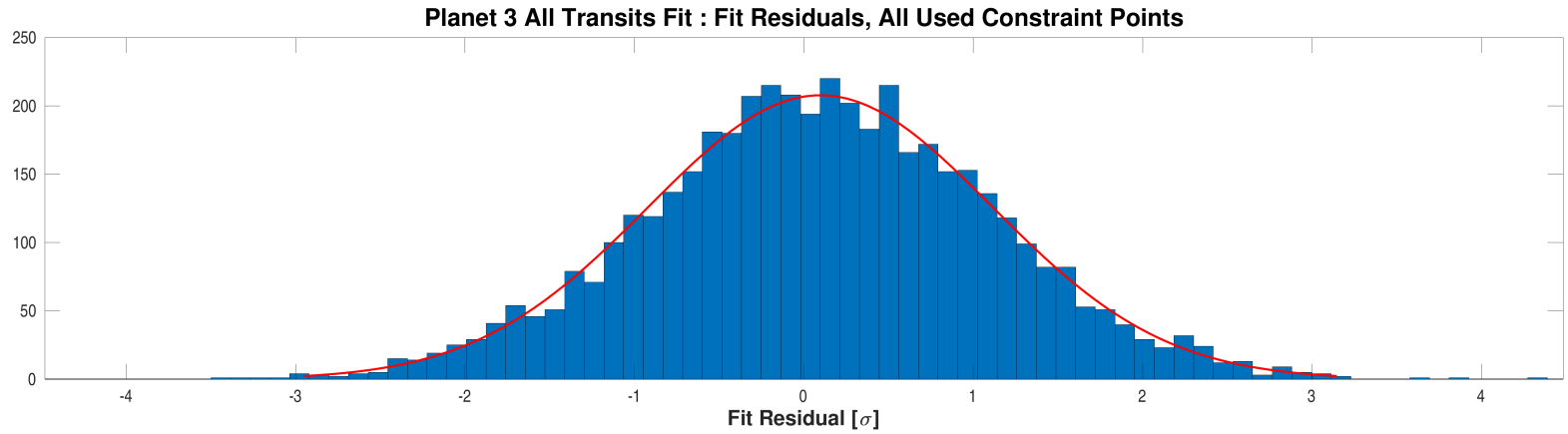
Top-left: Diagnostic plot of Odd/Even Transit Depth Test for catId 169461816, planet 2. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Bottom-left: Diagnostic plot of Orbital Period Test for catId 169461816. Orbital periods of planet 2 and the planet with longer period are compared. A significance level close to 1/0 favors a transiting planet/an eclipsing binary.
Open `./planet-02/binary-discrimination-test-results/0000000169461816-02-eclipsing-binary-discrimination-tests.fig`

Appendix C Planet Candidate 3

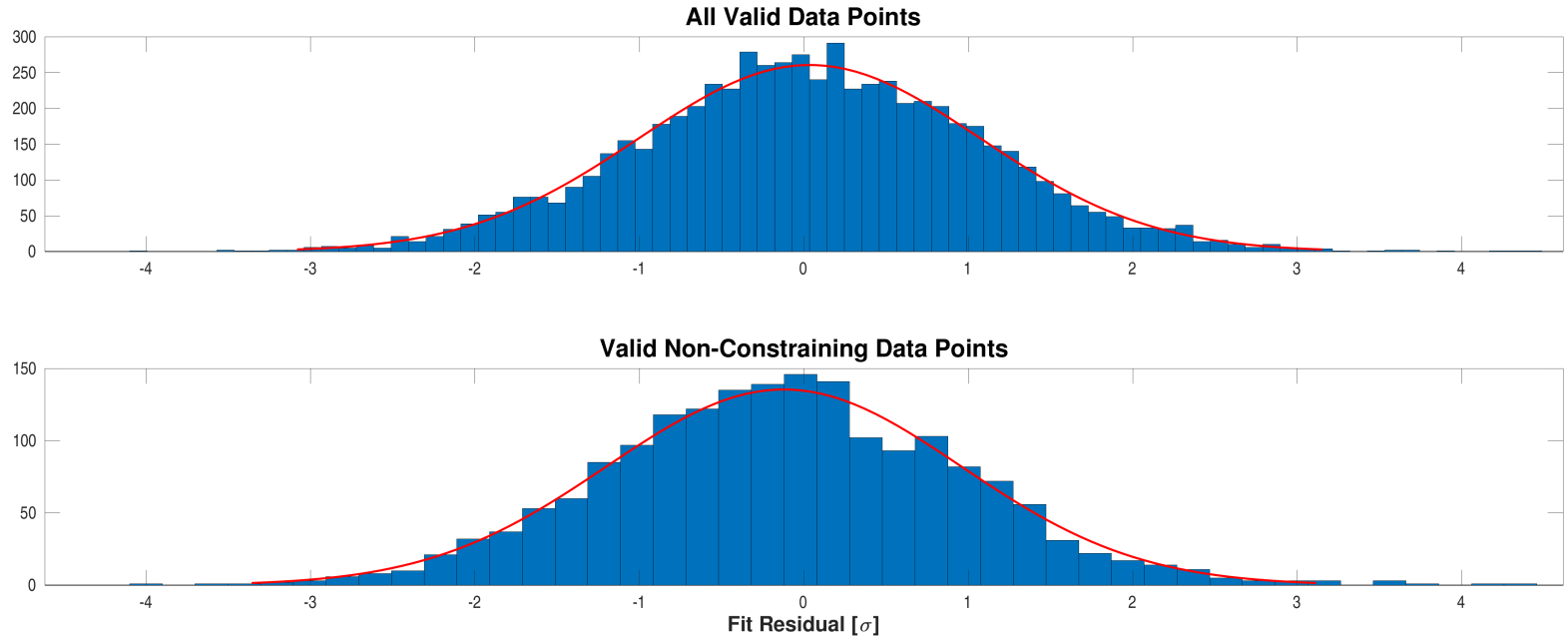
C.1 Model Fitter: All Transits



Robust weights distribution for CatId 169461816, Planet candidate 3. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-robust-weights.fig`



Fit residuals distribution for CatId 169461816, Planet candidate 3. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-histo-used.fig`

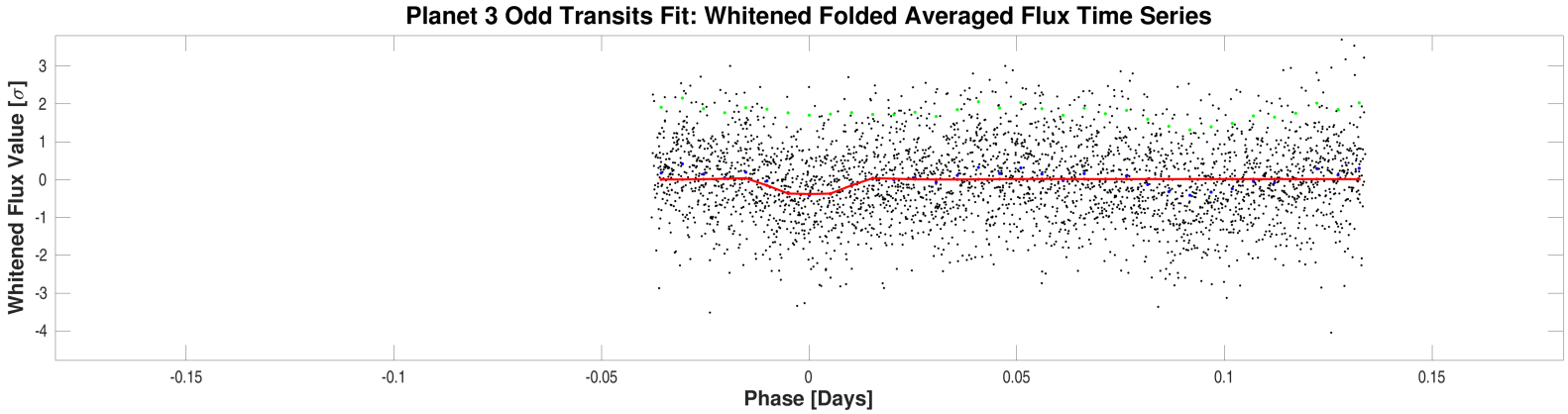


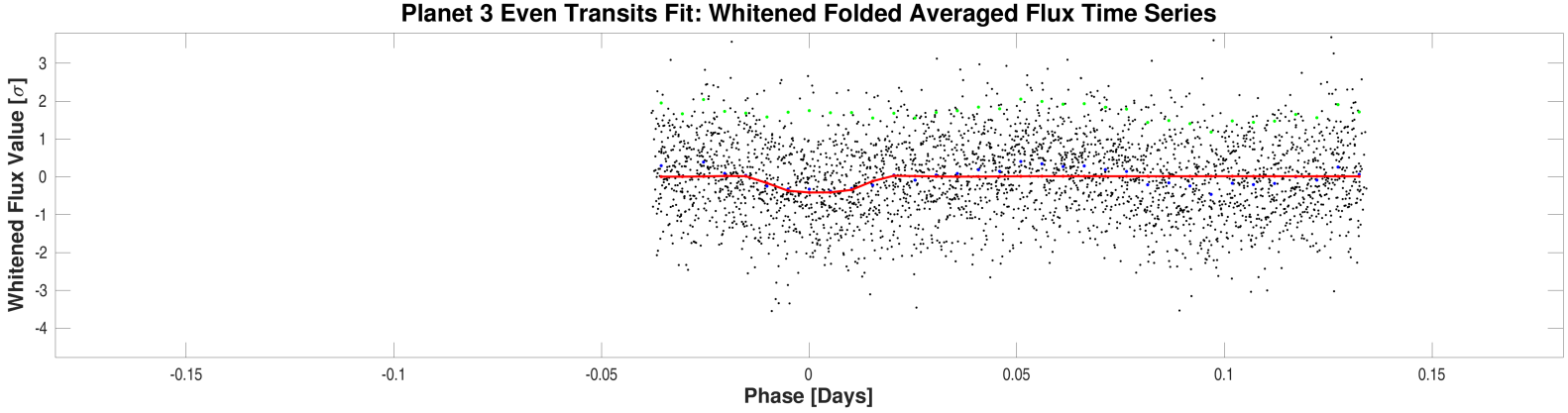
Fit residuals distribution for CatId 169461816, Planet candidate 3. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-03/planet-search-and-model-fitting-results/all-transits-fit/0000000169461816-03-all-histo-all-and-unused.fig`

C.2 Model Fitter: Odd & Even Transits

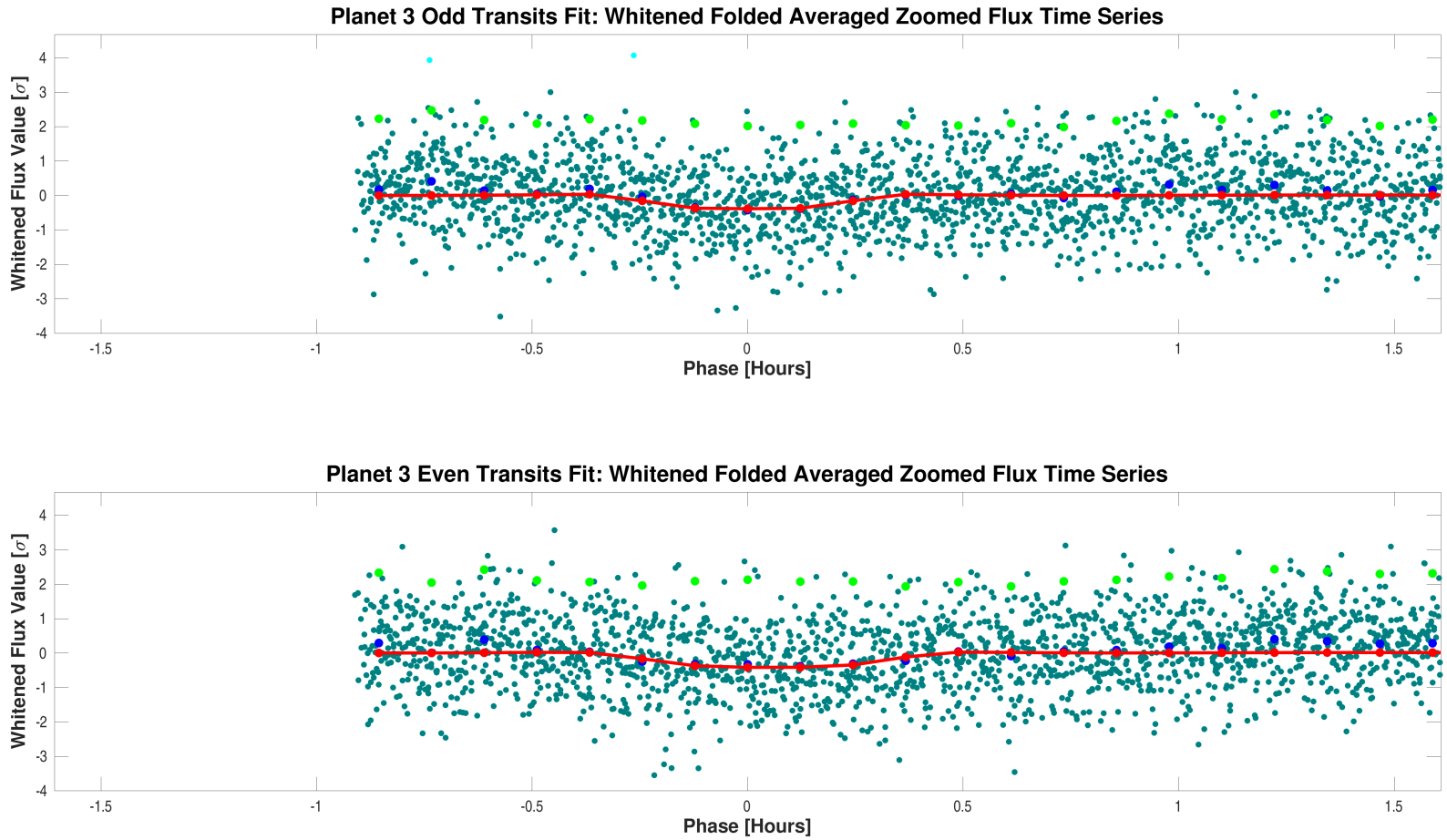
Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / Uncertainty
SNR	7.8		6.7			
Orbital Period	0.3630549	4.0562e-05	0.3631649	3.8798e-05	days	1.9604e+00
Transit Epoch	1683.6929640	1.2865e-03	1684.0545842	1.1913e-03	BTJD	8.5312e-01
Impact Parameter	0.7529	3.2967e+00	0.5378	1.0473e+01		1.9594e-02
Planet Radius to Star Radius Ratio	0.0296502	2.3605e-02	0.0302923	3.3546e-02		1.5653e-02
Semi-major Axis to Star Radius Ratio	3.7339	1.9726e+01	3.9599	2.9206e+01		6.4126e-03
Planet Radius	4.8267	3.8487e+00	4.9312	5.4653e+00	Earth radii	1.5636e-02
Semi-major Axis	0.0113	8.3756e-04	0.0113	8.3773e-04	AU	1.9256e-03
Effective Stellar Flux	33012.7826	5.0349e+03	32999.4460	5.0329e+03	Goldilocks	1.8734e-03
Equilibrium Temperature	3438	1.3108e+02	3438	1.3107e+02	Kelvin	1.8734e-03
Stellar Density	5.3061	8.4094e+01	6.3252	1.3995e+02	Solar density	6.2418e-03
Transit Depth	886	1.5366e+02	991	1.4251e+02	ppm	5.0159e-01
Transit Duration	0.5360	3.8863e-01	0.6268	4.0567e-01	hours	1.6164e-01
Transit Ingress Duration	0.0348	4.2632e-01	0.0260	4.4047e-01	hours	1.4285e-02
Eccentricity	0.0000	0.0000e+00	0.0000	0.0000e+00		
Peri Longitude	0.0000	0.0000e+00	0.0000	0.0000e+00	degrees	
Model Chi Square Statistic (DoF)	3382.4 (3961.7)		3382.4 (3961.7)			

DoF: Degrees of Freedom

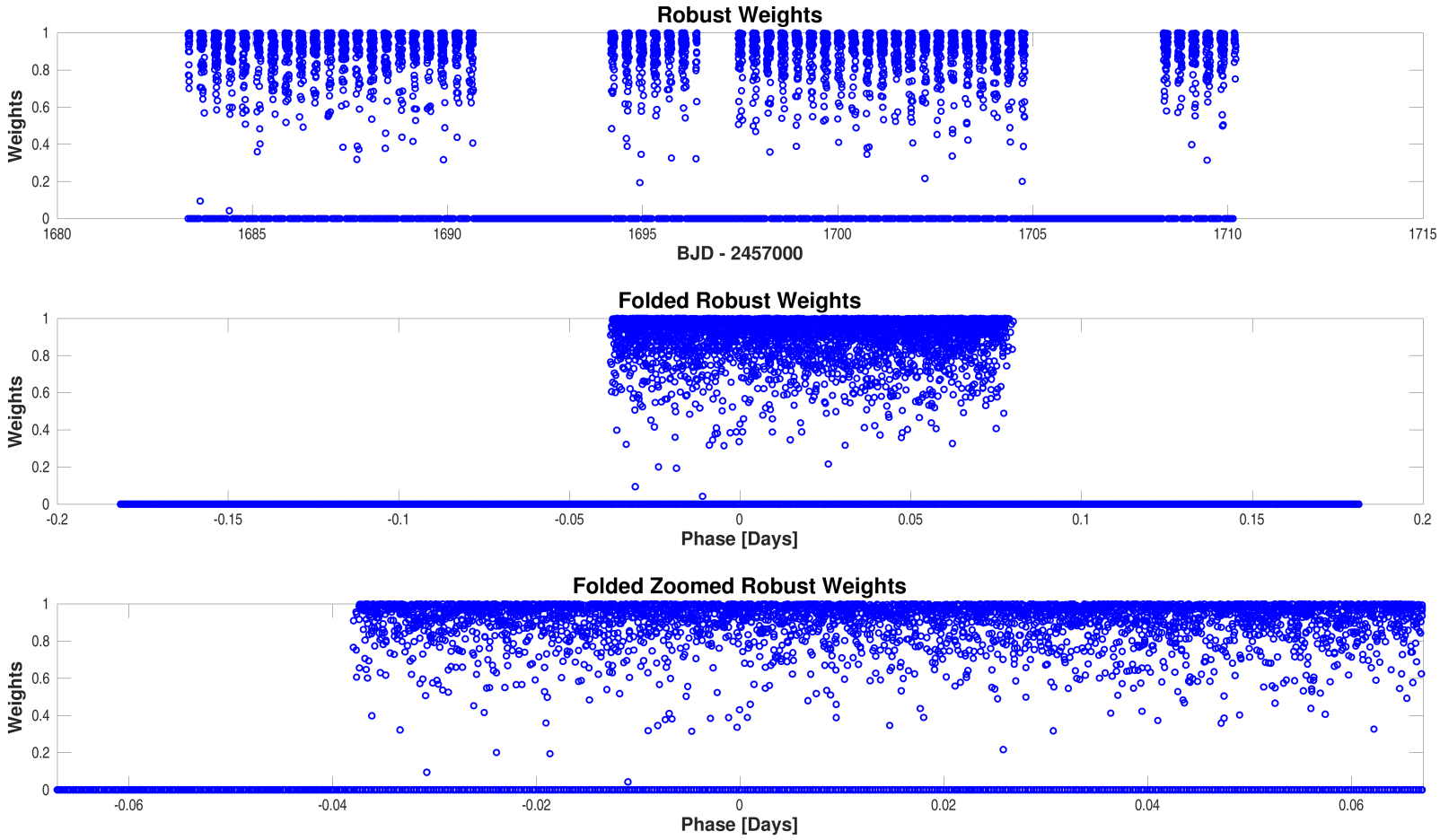




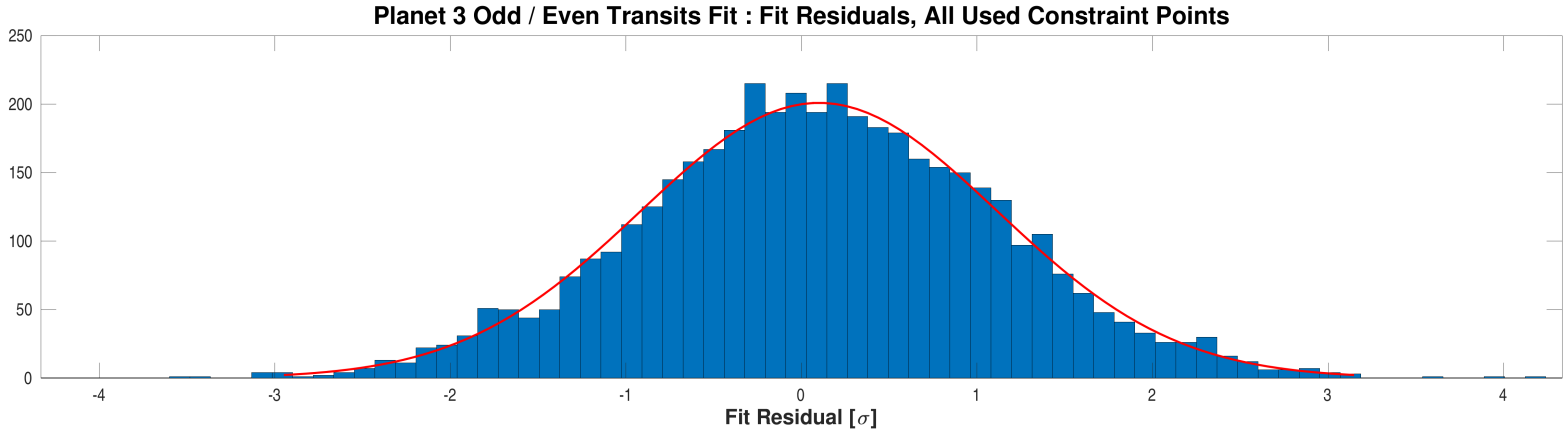
Folded flux time series for CatId 169461816, Planet candidate 3 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-03/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-03-odd-even-whitened.fig`



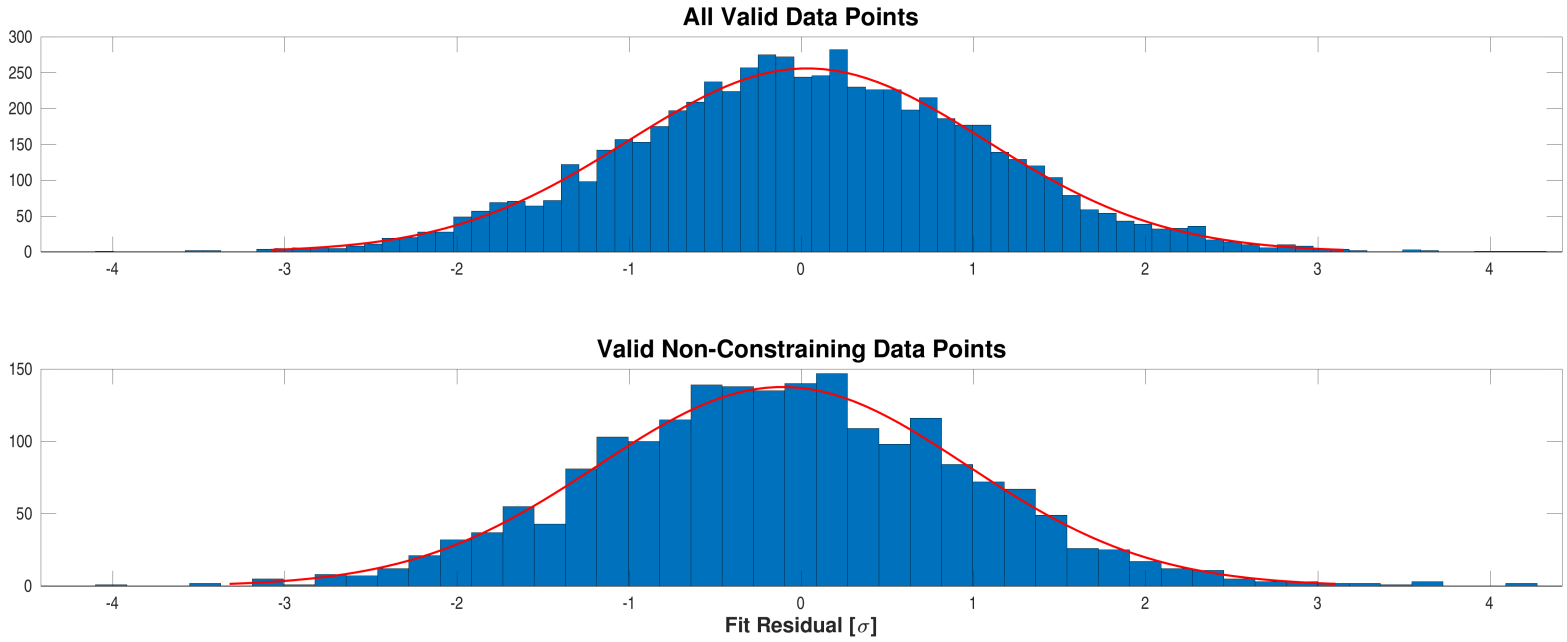
Folded flux time series for CatId 169461816, Planet candidate 3 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. Odd-even transits fit completed with full convergence.
Open `./planet-03/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-03-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 169461816, Planet candidate 3. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.
Open `./planet-03/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-03-odd-even-robust-weights.fig`

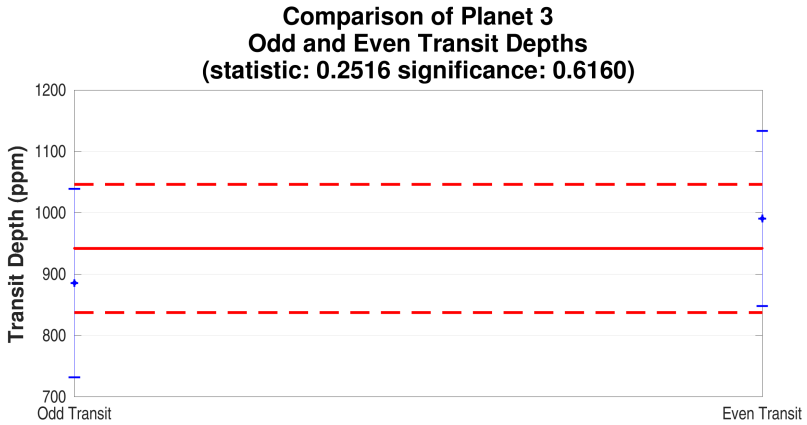


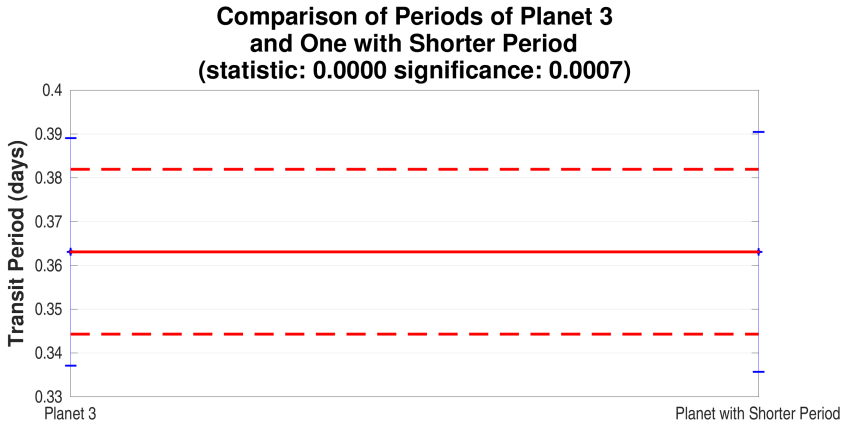
Fit residuals distribution for CatId 169461816, Planet candidate 3. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-03/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-03-odd-even-histo-used.fig`



Fit residuals distribution for CatId 169461816, Planet candidate 3. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-03/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000169461816-03-odd-even-histo-all-and-unused.fig`

C.3 Eclipsing Binary Discrimination Test





Top-left: Diagnostic plot of Odd/Even Transit Depth Test for catId 169461816, planet 3. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Top-right: Diagnostic plot of Orbital Period Test for catId 169461816. Orbital periods of planet 3 and the planet with shorter period are compared. A significance level close to 1/0 favors a transiting planet/an eclipsing binary.
Open `./planet-03/binary-discrimination-test-results/0000000169461816-03-eclipsing-binary-discrimination-tests.fig`

Appendix D Alerts

Time	Severity	Message
1740.0094	warning	Not excluding transits that overlap those of another candidate in S14 (target=1, catId=169461816, planet=1, targetTable=167, component=generateDvDifferenceImages)
1740.0094	warning	Not excluding transits that overlap those of another candidate in S14 (target=1, catId=169461816, planet=2, targetTable=167, component=generateDvDifferenceImages)
1740.0094	warning	Not excluding transits that overlap those of another candidate in S14 (target=1, catId=169461816, planet=3, targetTable=167, component=generateDvDifferenceImages)
1740.0116	warning	Centroid offsets figure cannot be generated because there are no valid centroid offsets (target=1, catId=169461816, planet=1, component=generateDvDifferenceImages)
1740.0116	warning	Centroid offsets figure cannot be generated because there are no valid centroid offsets (target=1, catId=169461816, planet=2, component=generateDvDifferenceImages)
1740.0116	warning	Centroid offsets figure cannot be generated because there are no valid centroid offsets (target=1, catId=169461816, planet=3, component=generateDvDifferenceImages)