Data Validation (DV) Report
for TESS ID 273690178
Sectors 14 - 15

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

23-Apr-2020 03:59:32 Z

Contents

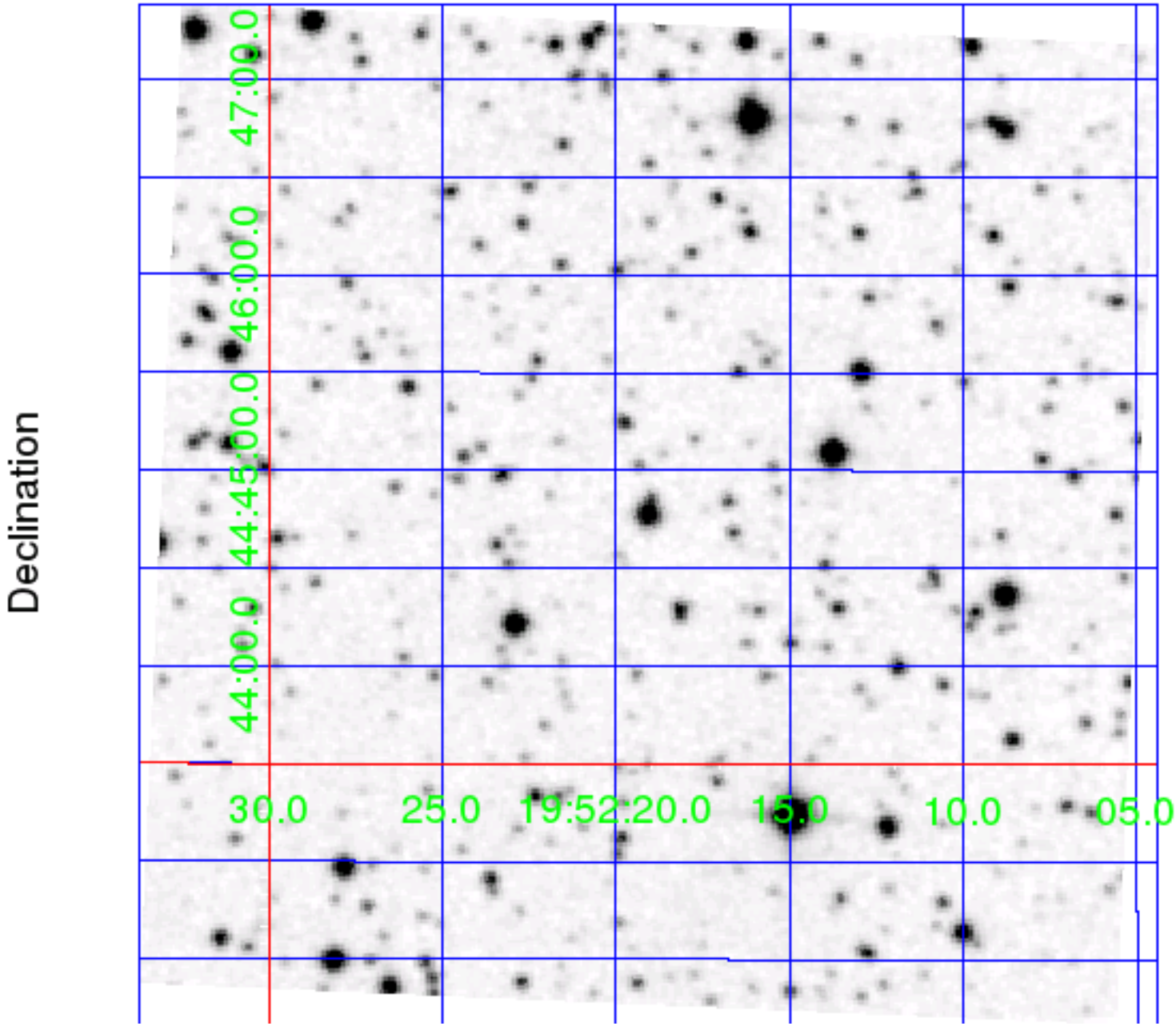
1 Summary

Target Properties	Value	Uncertainty	Units	Provenance
Catalog ID	273690178			
TOI ID	-			
TESS Name	-			
RA	298.07945344	0	degrees	TIC8
Dec	44.74633542	0	degrees	TIC8
Magnitude	12.9879	0.0061		TIC8
Radius	0.952	0.061	Solar radii	TIC8
Effective Temperature	5359	104	Kelvin	TIC8
log(g)	4.448	0.084815	cm/sec^2	TIC8
[M/H]	0.200	0.1	Solar metallicity	TIC8
Stellar Density	1.075	0.221	Solar density	TIC8-Derived
Limb Darkening Coefficient 1	0.70242			
Limb Darkening Coefficient 2	-0.50781			
Limb Darkening Coefficient 3	0.94973			
Limb Darkening Coefficient 4	-0.42732			
Number of Planet Candidates	1			
TOI Model	csv-file-toi-catalog-04-19-20-edited.csv			
TESS Names Model	-			
External TCE Model	-			
Software Revision	spoc-4.0.32-20200422			
Date Report Generated	23-Apr-2020 03:59:32 Z			

Sector	Target Table	Camera/ CCD	Crowding Metric	Flux Fraction
14	167	2:4	0.7829	0.6236
15	169	2:3	0.6524	0.6905

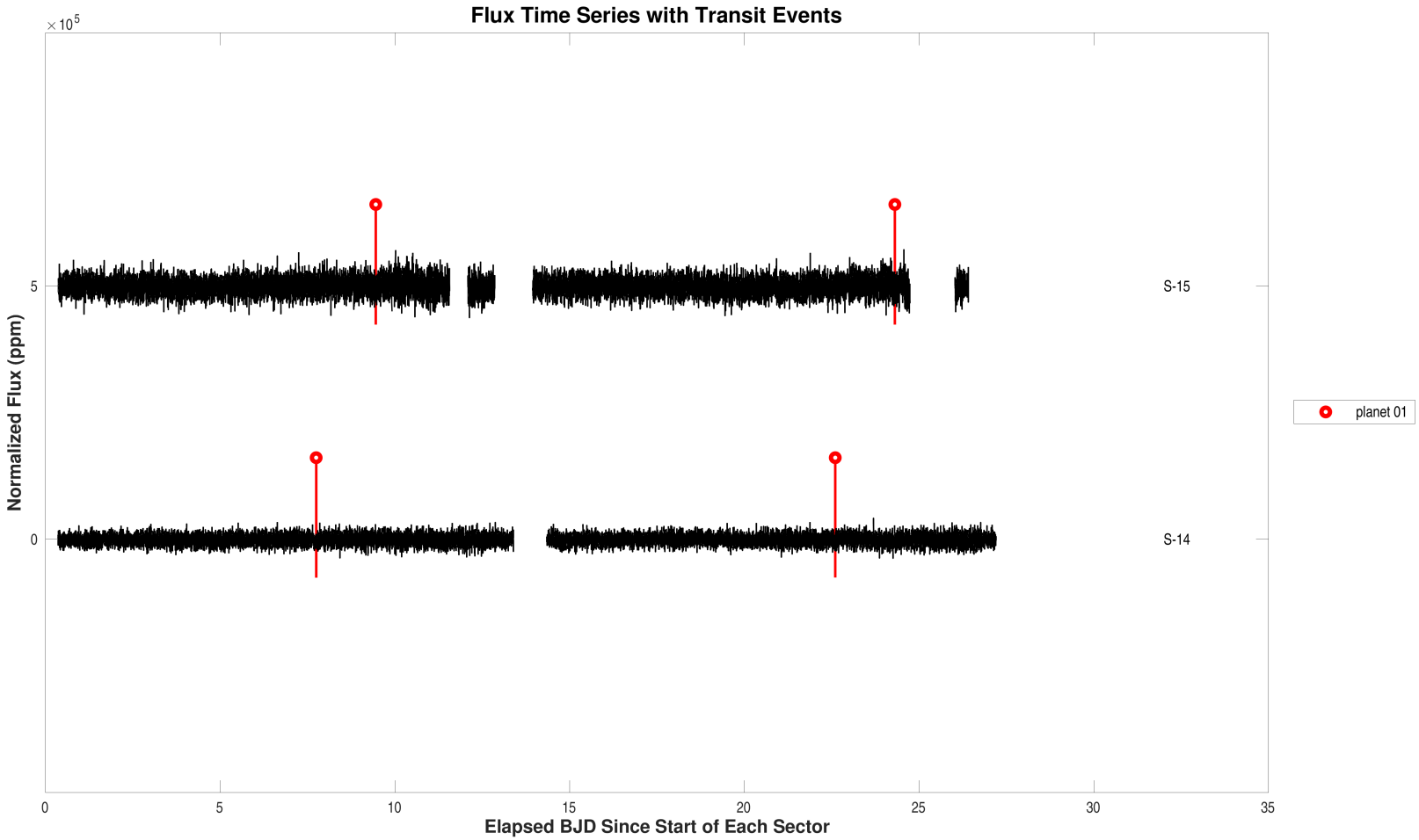
Planet Candidate	TOI ID	TESS Name	TOI Correlation	Period (days)	Period Ratio	Epoch (BTJD)	Semi-major Axis (AU)	Radius (Re)	Seff	Teq (K)	False Alarm	Suspected EB
1	-	-	-	14.853	1.00	1690.749	0.12	7.7	50.3	679	1.48e-21	false

2 Survey Image

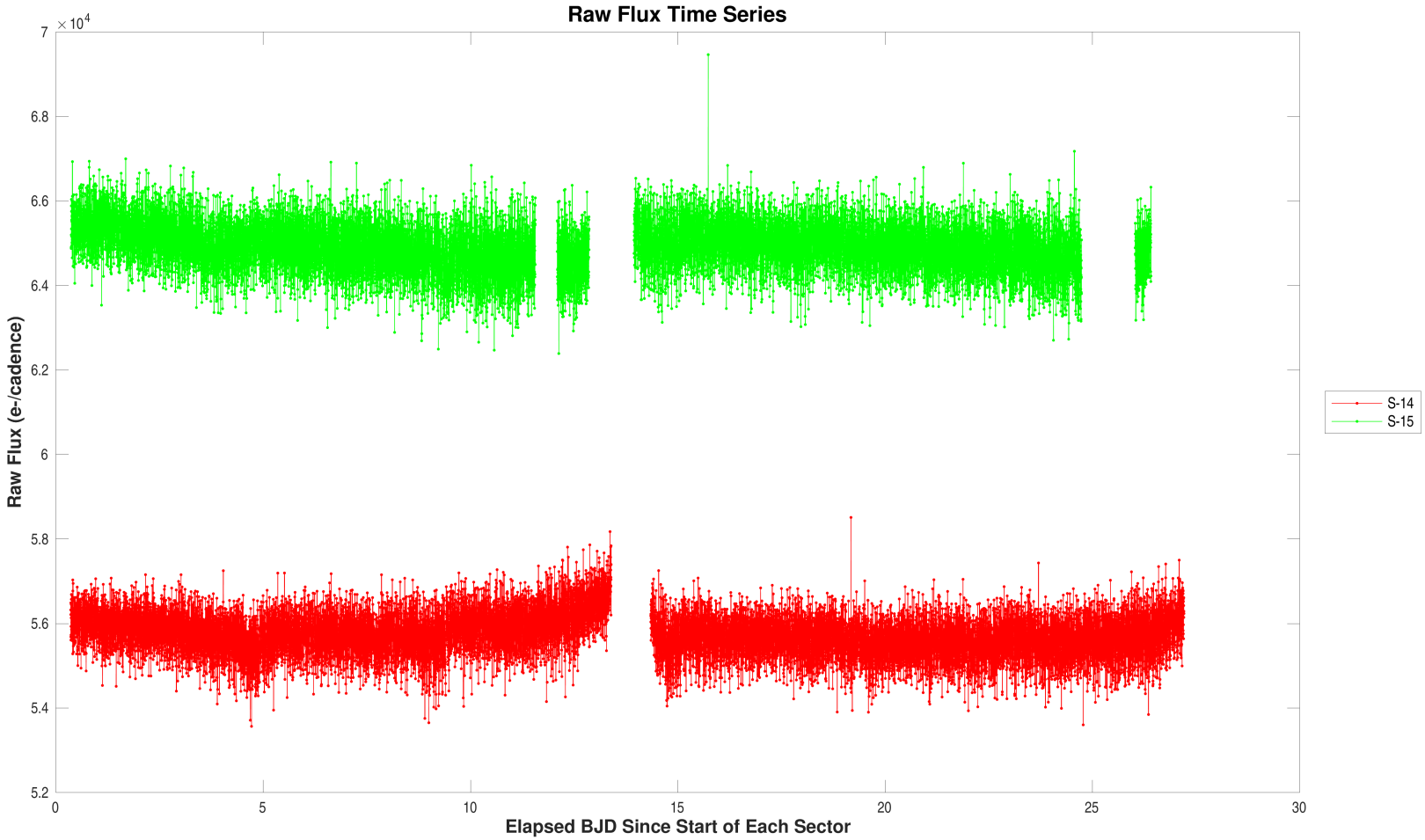


Digitized Sky Survey (DSS) red image. The 5' x 5' image is centered on the J2000 coordinates of target (273690178).

3 Flux Time Series



Summary plot of sector-stitched flux time series and transits for target 273690178, 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 and the vertical offset is 0 ppm. For the data of sector 15, target table 169, start BJD is 2458711 and the vertical offset is 500000 ppm.
Open `./summary-plots/0000000273690178-00-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 and the vertical offset is 0 electrons/cadence. For the data of sector 15, target table 169, start BJD is 2458711 and the vertical offset is 9200 electrons/cadence.
Open `./summary-plots/0000000273690178-00-raw-flux-14-167.fig`

4 Dashboards

Planet Candidate 1

<table>
<tr><td rowspan="2">Model Fitter</td><td colspan="2">Stellar Radius
1.0 ± 0.1 Solar units</td><td rowspan="2">Core Aperture Correlation Statistic
Value = 4.98
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = 1.51
Significance = 93.40%
Core/Halo Ratio
Ratio = 3.30</td><td rowspan="2">Ghost Diagnostic Test</td></tr>
<tr><td colspan="2">Period = 14.9 ± 0.0 days
Depth = 6466 ± 823 ppm
Planet Radius = 7.7 ± 2.2 Earth radii
Semi-major Axis = 0.1 ± 0.0 AU
Effective Stellar Flux = 50.3 ± 7.9
Equilibrium Temperature = 679 ± 27 Kelvin
Chi-squared/DoF = 0.9
SNR = 8.2</td></tr>
<tr><td rowspan="2">Eclipsing Binary Discrimination Test</td><td colspan="2">Odd-Even Depth Comparison Statistic
Value = 1.56e+00
Significance = 21.21%</td><td>Offsets Relative to Out of Transit Centroid
Source RA Offset = 5.07e+01 ± 3.45e+00 arcsec (14.67 σ)
Source Dec Offset = -2.04e+01 ± 4.79e+00 arcsec (-4.26 σ)
Source Offset Distance = 5.46e+01 ± 3.67e+00 arcsec (14.89 σ)
Offsets Relative to TIC Position
Source RA Offset = -6.01e+00 ± 3.44e+00 arcsec (-1.75 σ)
Source Dec Offset = 6.77e-01 ± 4.79e+00 arcsec (0.14 σ)
Source Offset Distance = 6.05e+00 ± 3.46e+00 arcsec (1.75 σ)</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 = N/A
Significance = N/A</td><td>False Alarm = 1.48e-21
Transit Count = 4
Max Multiple Event Statistic = 7.9</td><td>Bootstrap Test</td></tr>
</table>

Summary of model fitter results and validation test results for target 273690178, 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.

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

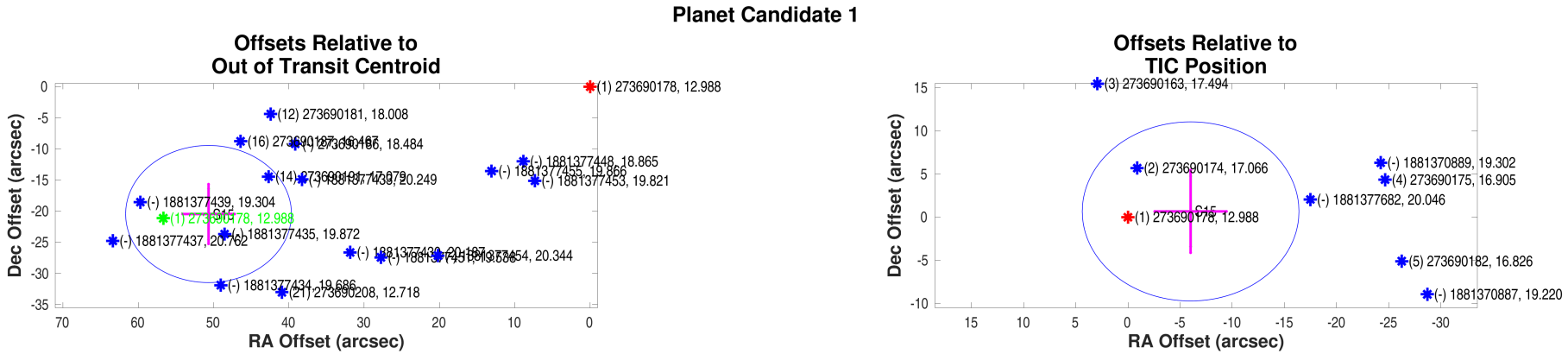
Multi-Sector Average PRF Fit of the Difference Images

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

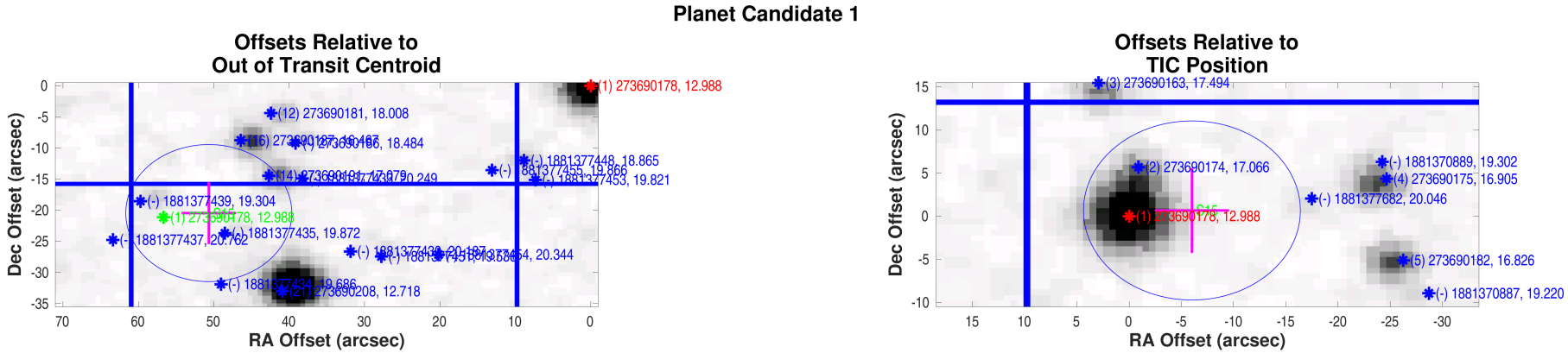
	RA	Dec	Units
Offset	$50.6573 \pm 3.45e+00$	$-20.4439 \pm 4.79e+00$	arcseconds
Offset/σ	14.67	-4.26	
Offset Distance	$54.6271 \pm 3.67e+00$		arcseconds
Offset Distance/σ	14.89		
3σ Radius	11.0088		arcseconds

Mean offset from the TIC RA and Dec

	RA	Dec	Units
Offset	$-6.0119 \pm 3.44e+00$	$0.6766 \pm 4.79e+00$	arcseconds
Offset/σ	-1.75	0.14	
Offset Distance	$6.0499 \pm 3.46e+00$		arcseconds
Offset Distance/σ	1.75		
3σ Radius	10.3880		arcseconds



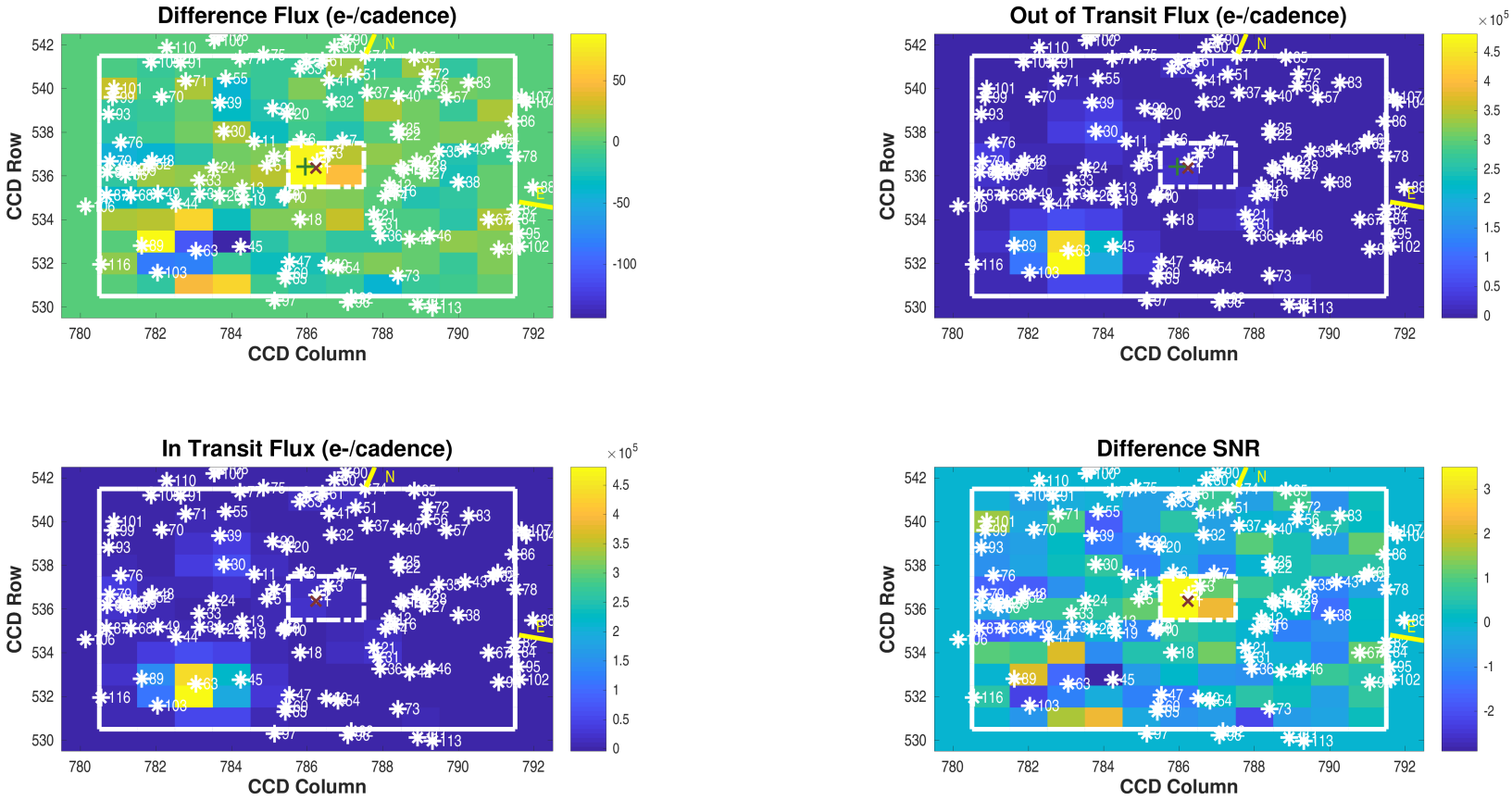
Difference image centroid offsets for target 273690178, planet candidate 1. Left: difference image PRF centroid offsets in RA and Dec with respect to the per sector out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the TC coordinates of the given target. Symbol key: green cross: per sector centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all sectors with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red asterisk: location of target star (out-of-transit centroid in left panel and TIC position in right panel); green asterisk: TIC location of target star with respect to out-of-transit centroid; blue asterisk: location of other TIC objects in the neighborhood. TIC ID and magnitude are noted in the text associated with each marked object. A constant error term of 2.5000 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset.
Open `./planet-01/difference-image/0000000273690178-01-difference-image-centroid-offsets.fig`



Difference image centroid offsets for target 273690178, planet candidate 1, diplayed on survey image for given target. Left: difference image PRF centroid offsets in RA and Dec with respect to the per sector out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the TIC coordinates of the given target. Symbol key: green cross: per sector centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all sectors with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red asterisk: location of target star (out-of-transit centroid in left panel and TIC position in right panel); green asterisk: TIC location of target star with respect to out-of-transit centroid; blue asterisk: location of other TIC objects in the neighborhood. TIC ID and magnitude are noted in the text associated with each marked object. A constant error term of 2.5000 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset.
Open `./planet-01/difference-image/0000000273690178-01-difference-image-centroid-offsets-survey.fig`

Difference Image Summary Metrics

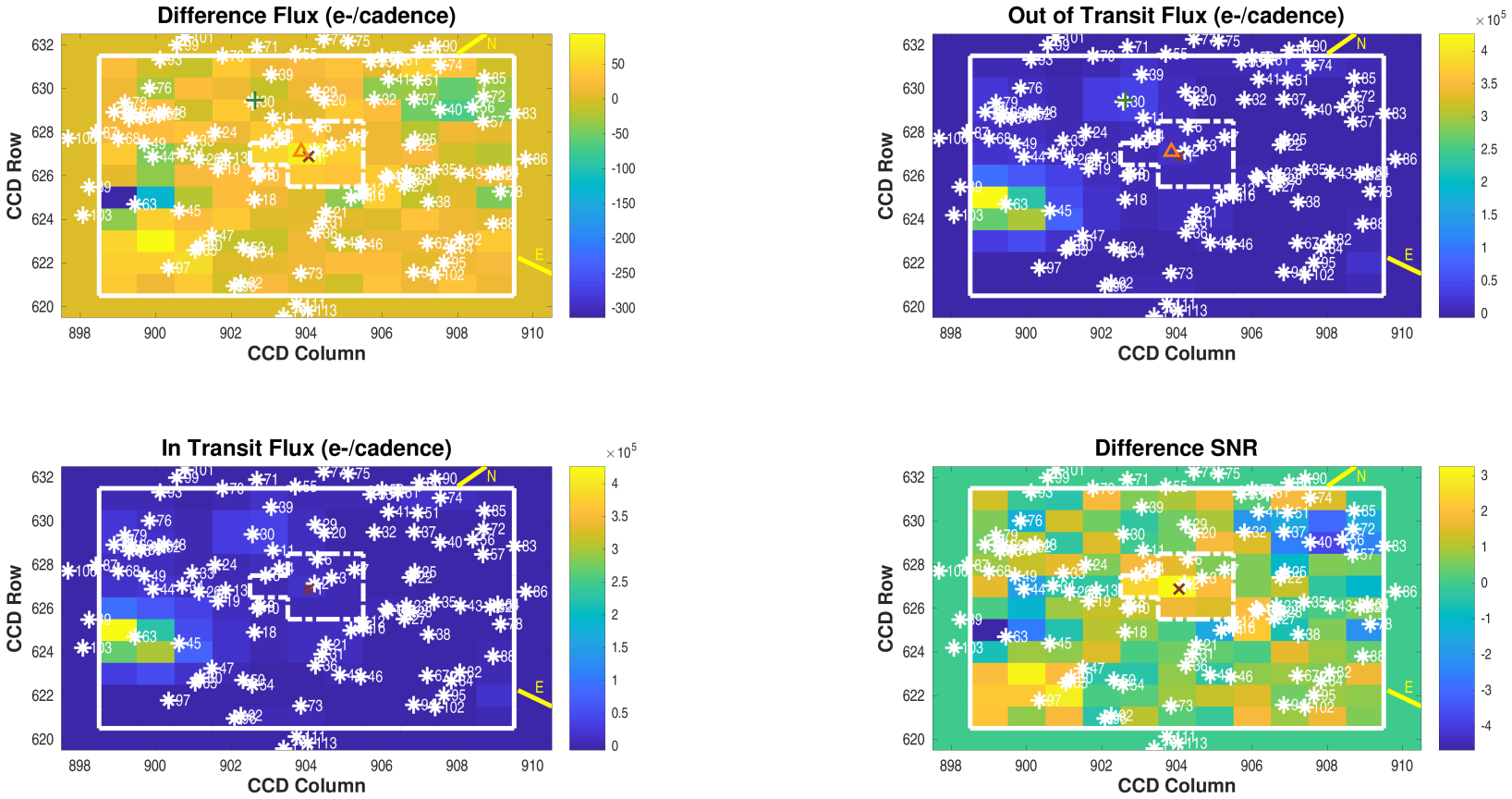
Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
2	1	0	0.0000	0.70



Difference image for target 273690178, 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 = 2; number of valid in-transit cadences = 156; number of in-transit cadence gaps = 0; number of valid out-of-transit cadences = 405; number of out-of-transit cadence gaps = 0. Difference image quality metric = N/A.
Open `./planet-01/difference-image/0000000273690178-01-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 273690178, planet candidate 1, in target table 167.



Difference image for target 273690178, planet candidate 1, sector 15, target pixel table 169. 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 = 2; number of valid in-transit cadences = 155; number of in-transit cadence gaps = 1; number of valid out-of-transit cadences = 391; number of out-of-transit cadence gaps = 14. Difference image quality metric = 0.24 (not good).
Open `./planet-01/difference-image/0000000273690178-01-difference-image-15-169.fig`

PRF Fit of the Difference Image

Offset from the PRF fit to the out of transit image

	Row	Column	Units	RA	Dec	Units
Out of Transit Image Centroid	$629.47 \pm 2.01e-04$	$902.63 \pm 2.15e-04$	pixels	$298.05727658 \pm 1.36e-06$	$44.75209133 \pm 1.43e-06$	degrees
Difference Image Centroid	$627.10 \pm 1.87e-01$	$903.85 \pm 1.76e-01$	pixels	$298.07709111 \pm 9.26e-04$	$44.74641246 \pm 1.14e-03$	degrees
Offset	$-2.3699 \pm 1.87e-01$	$1.2247 \pm 1.76e-01$	pixels	$50.6573 \pm 2.38e+00$	$-20.4439 \pm 4.09e+00$	arcseconds
Offset/σ	-12.65	6.96		21.28	-5.00	
Offset Distance	$2.6677 \pm 1.68e-01$		pixels	$54.6271 \pm 2.73e+00$		arcseconds
Offset Distance/σ	15.84			20.02		

Offset from the TIC RA and Dec converted to pixels via motion polynomials

	Row	Column	Units	RA	Dec	Units
TIC Reference Centroid	$626.88 \pm 1.28e-04$	$904.06 \pm 1.27e-04$	pixels	$298.07944243 \pm 0.00e+00$	$44.74622451 \pm 0.00e+00$	degrees
Difference Image Centroid	$627.10 \pm 1.87e-01$	$903.85 \pm 1.76e-01$	pixels	$298.07709111 \pm 9.26e-04$	$44.74641246 \pm 1.14e-03$	degrees
Offset	$0.2135 \pm 1.87e-01$	$-0.2021 \pm 1.76e-01$	pixels	$-6.0119 \pm 2.37e+00$	$0.6766 \pm 4.09e+00$	arcseconds
Offset/σ	1.14	-1.15		-2.54	0.17	
Offset Distance	$0.2939 \pm 1.61e-01$		pixels	$6.0499 \pm 2.41e+00$		arcseconds
Offset Distance/σ	1.82			2.51		

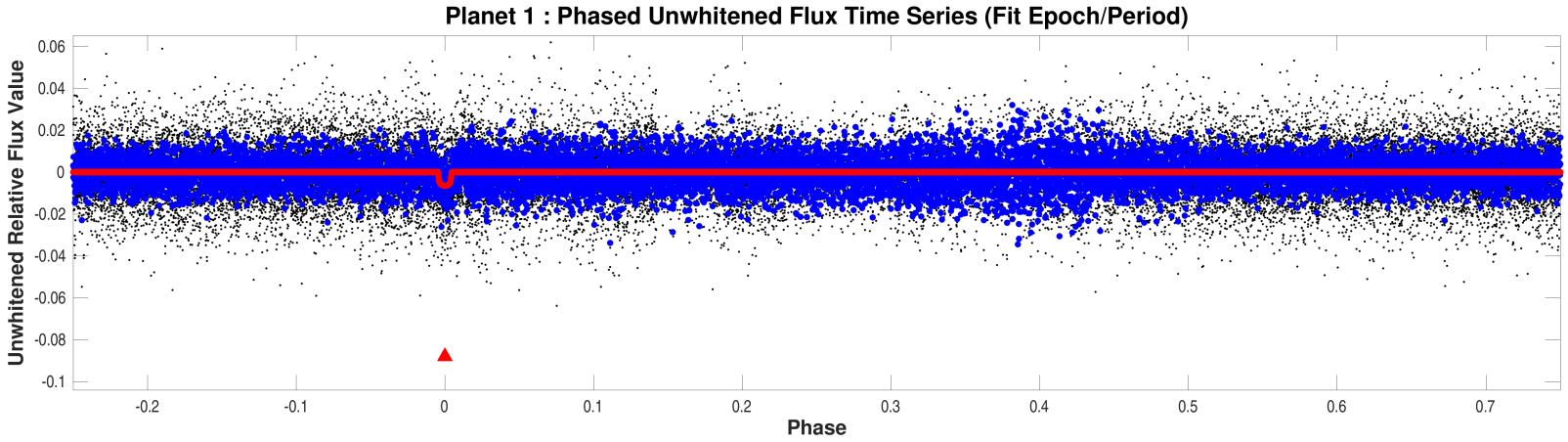
5.2 Difference Image TIC Key

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
1	273690178	12.988	298.07944245	44.74622473	0.00
2	273690174	17.066	298.07909523	44.74781129	5.78
3	273690163	17.494	298.08058553	44.75052707	15.76
4	273690175	16.905	298.06979997	44.74743422	25.04
5	273690182	16.826	298.06917122	44.74480864	26.75
6	1881377678	18.058	298.07383045	44.75276319	27.57
7	273690153	15.738	298.08236411	44.75419339	29.64
8	1881370685	15.781	298.07559826	44.73838073	29.90
9	273690202	15.397	298.07559000	44.73832300	30.10
10	1881370688	16.931	298.07559598	44.73766733	32.34
11	273690164	17.227	298.06441430	44.75034587	41.19
12	273690181	18.008	298.09603332	44.74500569	42.65
13	273690204	17.108	298.06612926	44.73821040	44.62
14	273690191	17.079	298.09613955	44.74221200	45.07
15	273690166	15.683	298.09682281	44.74968408	46.15
16	273690187	16.467	298.09758911	44.74379030	47.22
17	1881377467	17.445	298.09754484	44.74944250	47.71
18	273690218	17.763	298.08078576	44.73282418	48.36
19	1881370684	17.907	298.06751839	44.73538651	49.52
20	273690138	16.207	298.06862952	44.75852539	52.20
21	273690208	12.718	298.09544629	44.73705758	52.57
22	273690140	17.342	298.09338974	44.75796149	55.29
23	273690157	17.303	298.09943153	44.75210871	55.32
24	273690192	16.227	298.05839296	44.74215108	55.78
25	273690135	16.655	298.09275598	44.75945445	58.54
26	273690211	16.381	298.06219434	44.73539066	58.87
27	273690169	17.166	298.10215683	44.74939336	59.19
28	273690160	16.358	298.10151536	44.75126705	59.28
29	273690137	17.028	298.06523326	44.75928834	59.43
30	273690159	11.940	298.05727427	44.75156849	59.86
31	273865772	18.078	298.09706610	44.73487208	60.83
32	1881377688	18.062	298.07672493	44.76336656	62.10
33	273690200	15.859	298.05662139	44.73841754	64.77
34	273690214	17.900	298.05796909	44.73501008	68.15
35	1881377441	17.973	298.10309399	44.75541753	68.94
36	273690222	17.600	298.09864154	44.73208013	70.73
37	273690114	16.475	298.08317939	44.76712893	75.86
38	273865820	17.217	298.10982022	44.74862597	78.15

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
39	273690139	13.371	298.05391071	44.75854254	78.92
40	273690112	16.544	298.08991643	44.76757714	81.40
41	273690110	16.720	298.07423252	44.76861234	81.69
42	273690219	17.076	298.10492918	44.73251150	81.75
43	273690146	15.468	298.10826487	44.75715161	83.54
44	1881370870	17.985	298.05400900	44.73159519	83.68
45	273690247	17.327	298.07105525	44.72362471	84.14
46	273690216	17.555	298.10871456	44.73412418	86.60
47	273690251	17.704	298.08238416	44.72185833	88.04
48	273690194	16.886	298.04528097	44.74130002	89.13
49	273690217	15.155	298.04941715	44.73335904	89.66
50	273690250	17.510	298.09025337	44.72249612	89.78
51	273690095	17.895	298.07921554	44.77116560	89.79
52	1881370896	18.072	298.04487705	44.74033344	90.89
53	273690100	15.431	298.06724174	44.77034000	92.25
54	273690249	15.515	298.09286855	44.72242569	92.30
55	273690120	16.620	298.05294638	44.76480217	95.20
56	273690097	16.290	298.09459073	44.77112527	97.65
57	273690108	17.361	298.09976751	44.76923744	97.80
58	273690092	17.844	298.06795758	44.77223828	98.14
59	273690203	17.917	298.04254466	44.73818471	98.68
60	273690265	16.112	298.08273303	44.71889552	98.74
61	273690091	16.050	298.07112497	44.77322664	99.51
62	273865861	16.970	298.11342058	44.75971268	99.53
63	273690257	9.545	298.06230637	44.72075136	101.63
64	273865865	17.974	298.11406148	44.76088254	103.05
65	273690269	17.115	298.08305213	44.71749276	103.85
66	273690209	17.170	298.04105043	44.73674729	103.92
67	273865792	17.154	298.11934068	44.74057005	104.02
68	273690225	16.593	298.04401147	44.73186971	104.29
69	273690205	16.017	298.04020966	44.73808072	104.51
70	273690144	17.013	298.04146986	44.75758256	105.35
71	273690125	16.993	298.04499469	44.76255554	105.90
72	273690085	16.928	298.09381222	44.77418389	107.15
73	1881377361	17.914	298.10579987	44.72288633	107.71
74	273690076	17.080	298.07944811	44.77617367	107.82
75	273690093	17.902	298.05855800	44.77224944	107.84
76	273690184	17.107	298.03723406	44.74455006	108.09

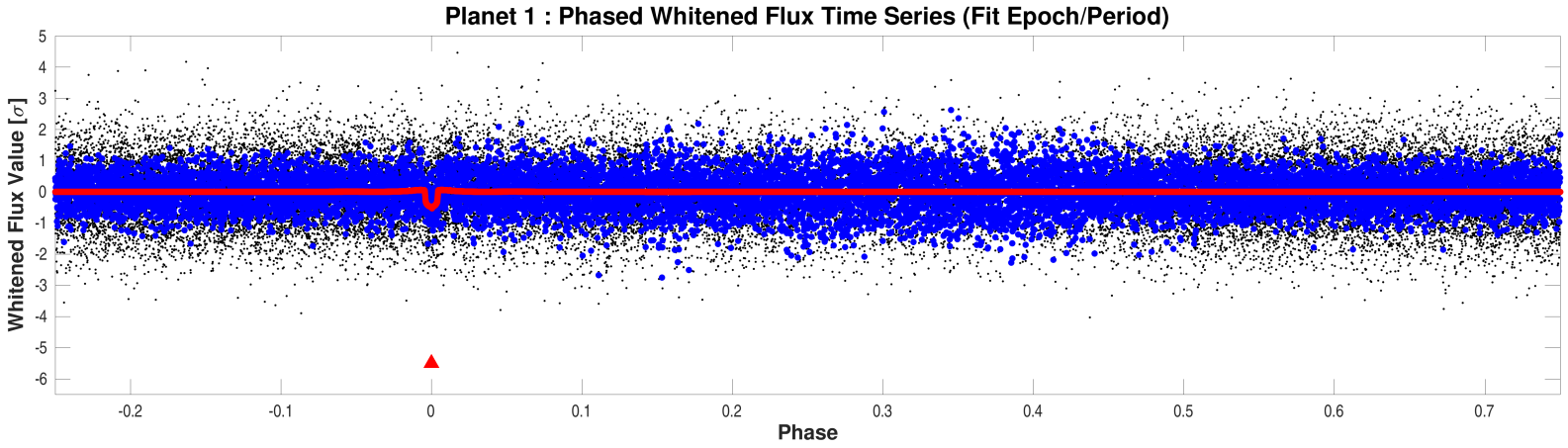
RA, Dec and Distances are corrected for proper motion. This table may not contain all of the objects shown.

6 Phased Light Curves

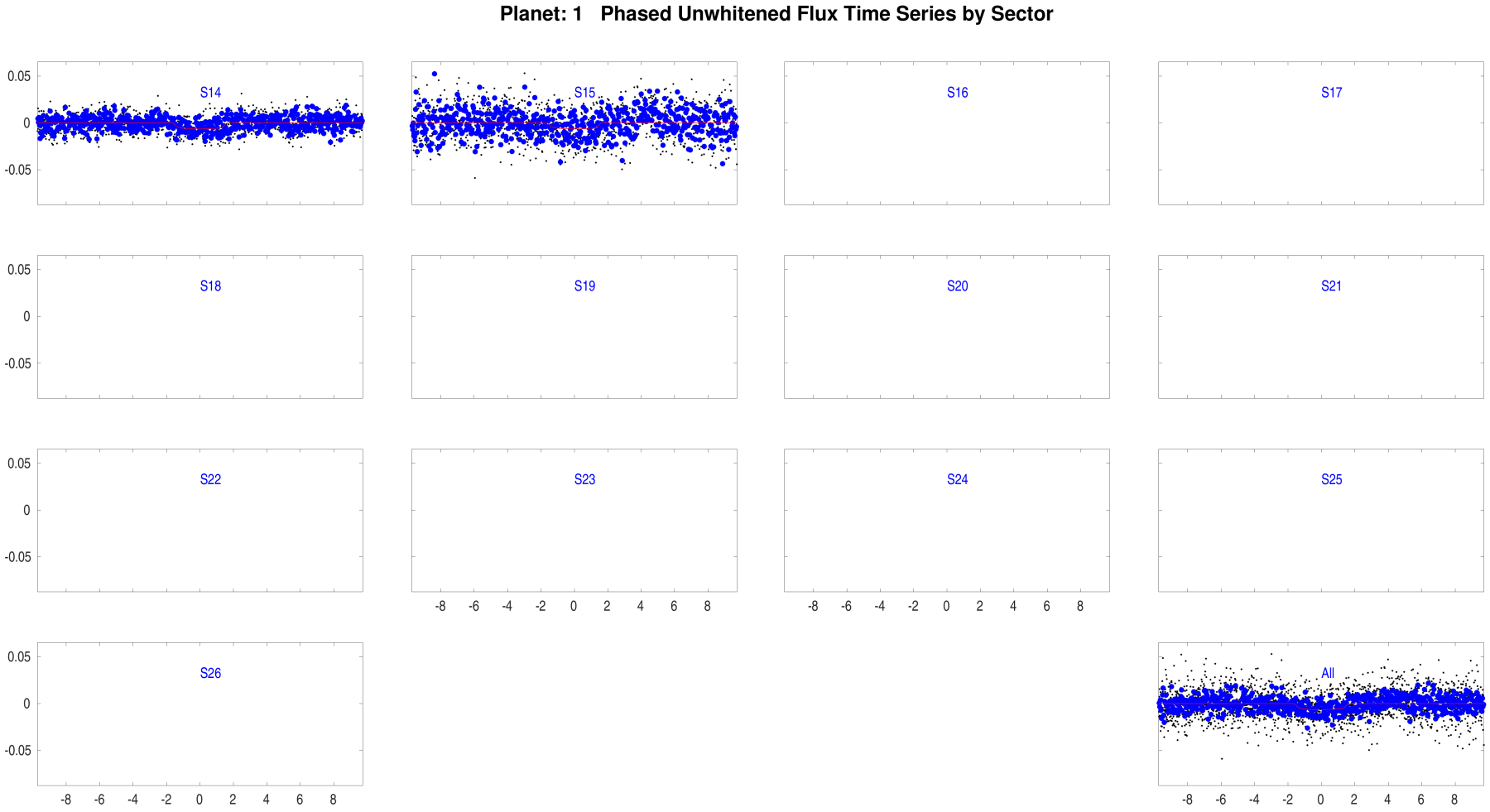


Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series 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/0000000273690178-01-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/0000000273690178-01-phased-whitened-flux-time-series.fig`



Phased unwhitened flux time series by sector for target 273690178, planet candidate 1. Period = 14.8531 days; transit epoch = 1690.749 BTJD.
Open `./summary-plots/0000000273690178-01-phased-unwhitened-flux-time-series-by-sector.fig`

7 Planet Candidate 1

7.1 Model Fitter: All Transits

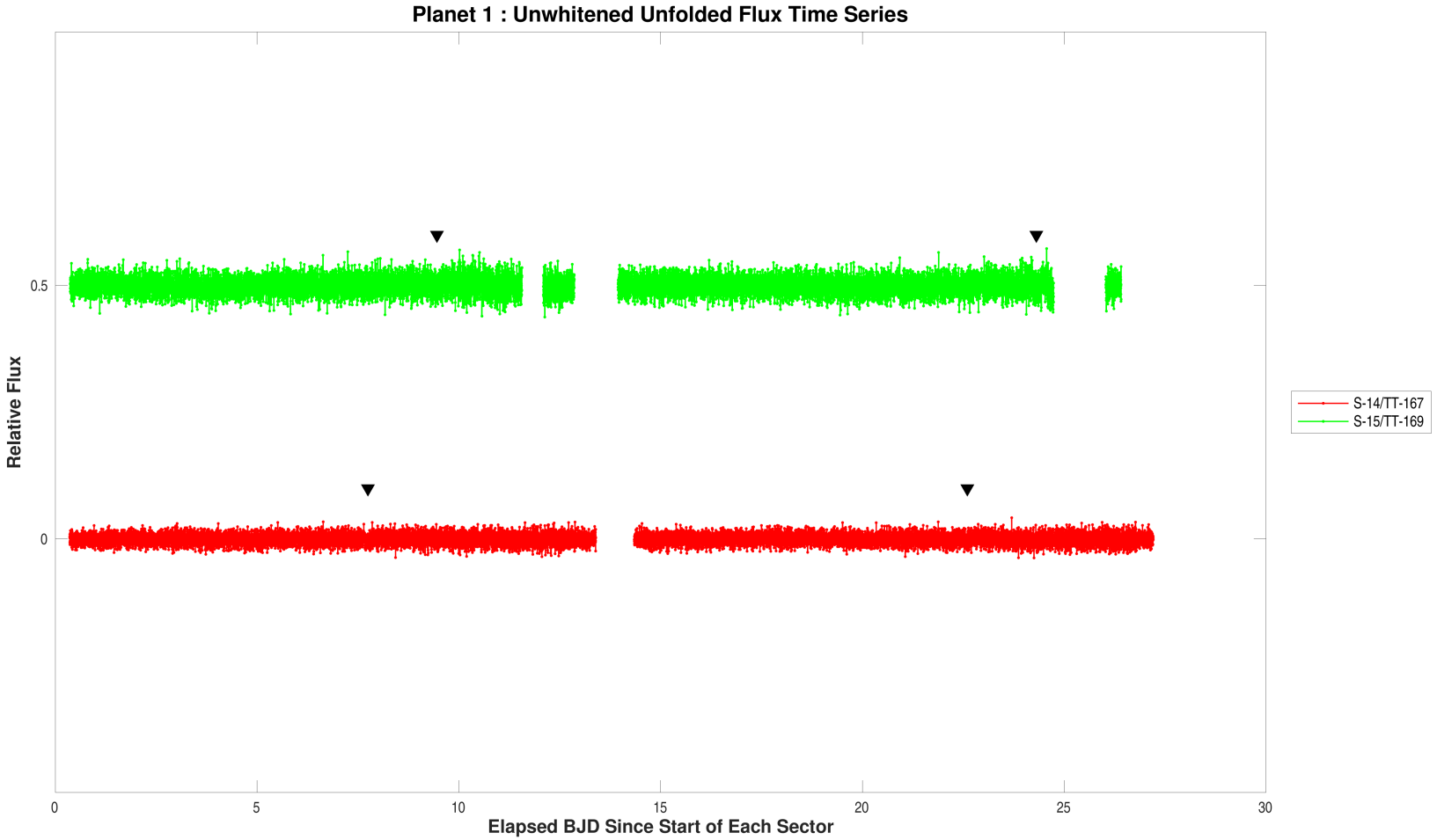
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	3.0	hours
Transit Epoch	1690.7476719	TJD
Orbital Period	14.8527718	days
Maximum SES	6.8	
Maximum MES	7.9	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	286.7 (357)	
Chi Square2 Statistic (DoF)	3.0 (7.6)	
Threshold for Desired PFA		

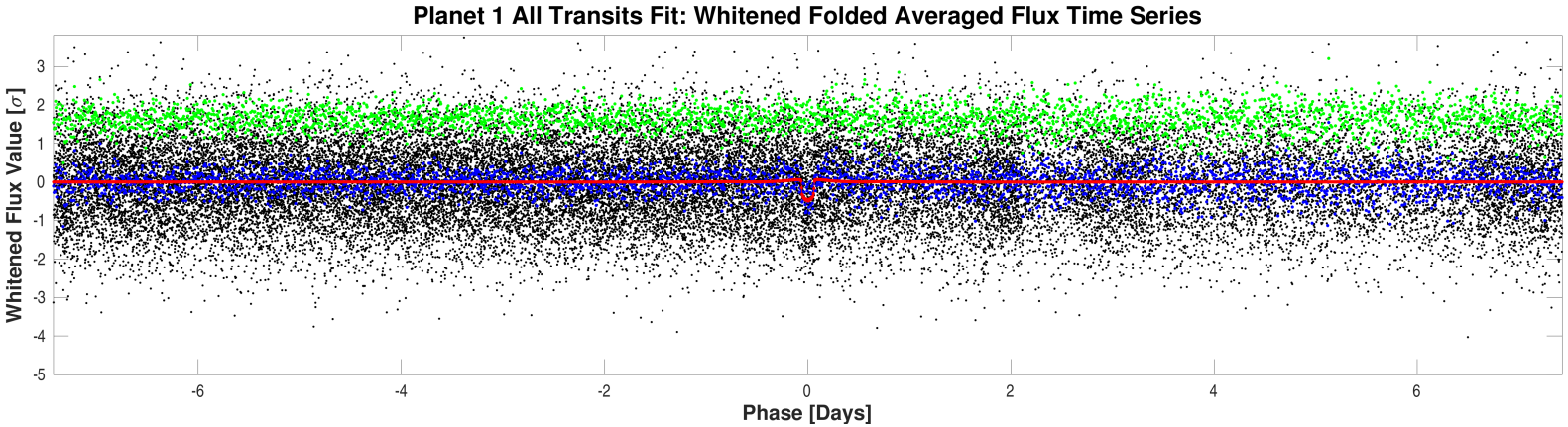
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	8.2		
Orbital Period	14.8530821	3.5917e-03	days
Transit Epoch	1690.7489557	5.1398e-03	BTJD
Impact Parameter	0.2486	4.7301e+00	
Planet Radius to Star Radius Ratio	0.0740150	2.0485e-02	
Semi-major Axis to Star Radius Ratio	36.5822	4.5362e+01	
Planet Radius	7.6909	2.1840e+00	Earth radii
Semi-major Axis	0.1154	8.9613e-03	AU
Effective Stellar Flux	50.2998	7.9088e+00	Goldilocks
Equilibrium Temperature	679	2.6699e+01	Kelvin
Stellar Density	2.9814	1.1091e+01	Solar density
Transit Depth	6466	8.2293e+02	ppm
Transit Duration	3.2414	6.2439e-01	hours
Transit Ingress Duration	0.2371	6.5729e-01	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	1625.4 (1878.7)		
Model Chi Square Goodness of Fit Statistic (DoF)	244.5 (401)		
Model Chi Square2 Statistic (DoF)	1.7 (3)		

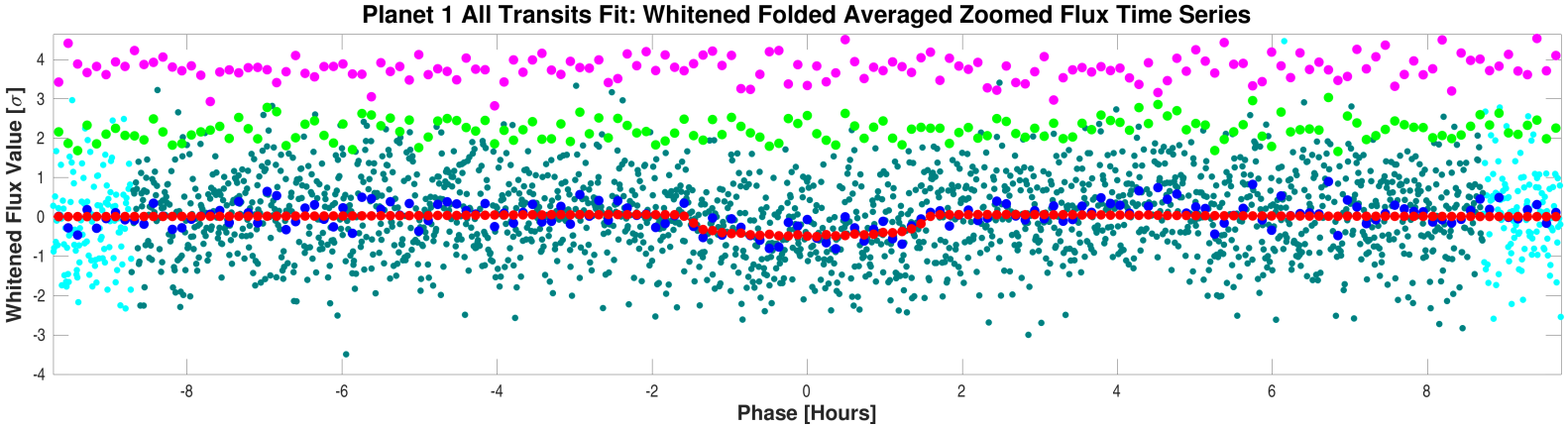
DoF: Degrees of Freedom



Flux time series for CatId 273690178, Planet candidate 1 in the unwhitened domain. For the data of Sector-14/TargetTableId-167, start BJD is 2458683 and the vertical offset is 0. For the data of Sector-15/TargetTableId-169, start BJD is 2458711 and the vertical offset is 0.5. 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/0000000273690178-01-all-unwhitened-14-167.fig`



Folded flux time series for CatId 273690178, 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/0000000273690178-01-all-whitened.fig`

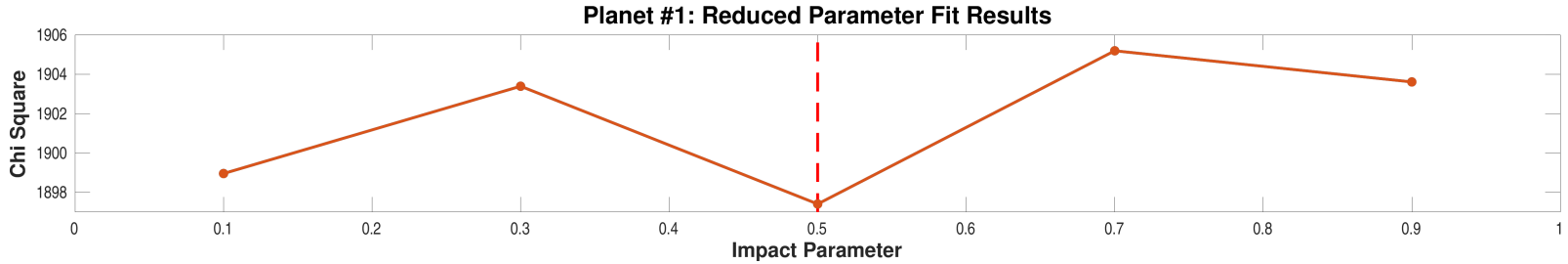


Folded flux time series for CatId 273690178, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged 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/0000000273690178-01-all-whitened-zoomed.fig`

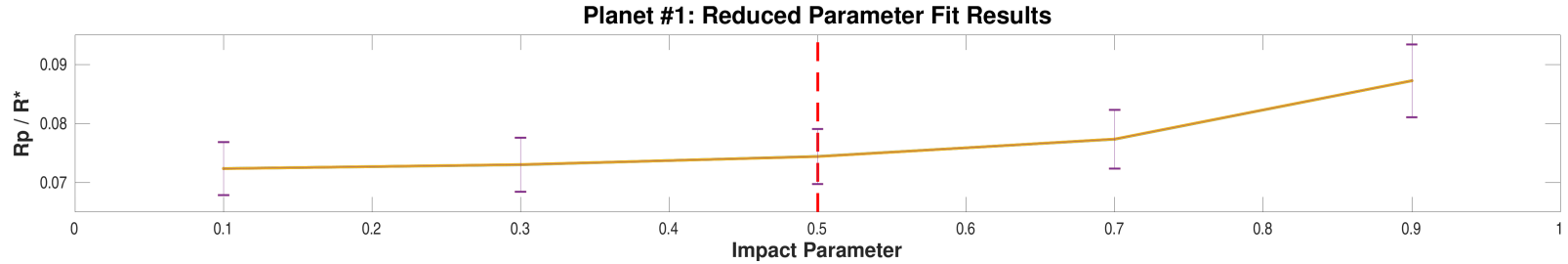
7.2 Model Fitter: Reduced Parameter Fit Results

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	8.3	1899.0	0.0723683	4.4871e-03	37.3506	2.2964e+00	6252	7.7095e+02	3.2440	1.9744e-01
0.30	8.3	1903.4	0.0730200	4.5618e-03	35.8503	2.2788e+00	6254	7.7698e+02	3.2612	2.0509e-01
0.50	8.3	1897.4	0.0744216	4.6659e-03	32.4515	2.1888e+00	6237	7.7742e+02	3.3260	2.2160e-01
0.70	8.2	1905.2	0.0773408	4.9738e-03	26.9215	2.0468e+00	6210	7.9322e+02	3.4529	2.5855e-01
0.90	8.3	1903.6	0.0872390	6.1595e-03	15.7102	1.8069e+00	6432	8.8938e+02	4.4138	4.9144e-01

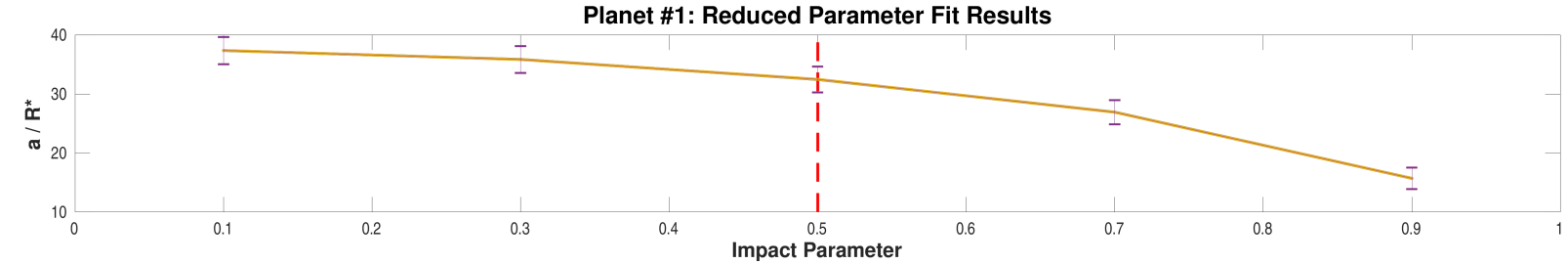
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 273690178, 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/0000000273690178-01-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 273690178, 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/0000000273690178-01-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 273690178, 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/0000000273690178-01-reduced-fits-a-over-rstar.fig`

7.3 Model Fitter: Trapezoidal Fit Results

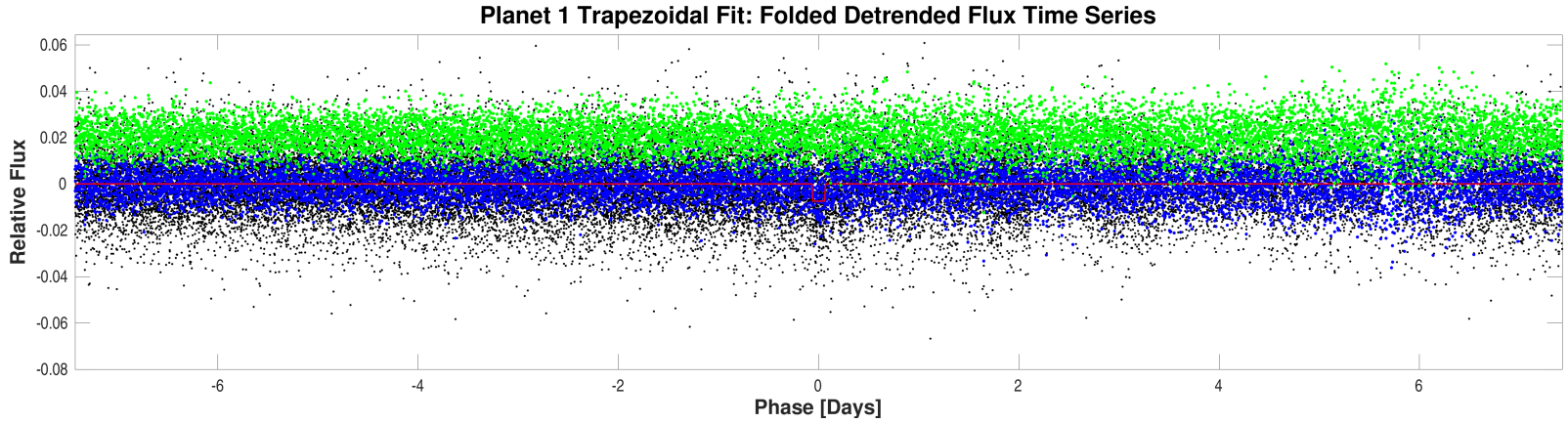
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	3.0	hours
Transit Epoch	1690.7476719	TJD
Orbital Period	14.8527718	days
Maximum SES	6.8	
Maximum MES	7.9	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	286.7 (357)	
Chi Square2 Statistic (DoF)	3.0 (7.6)	
Threshold for Desired PFA		

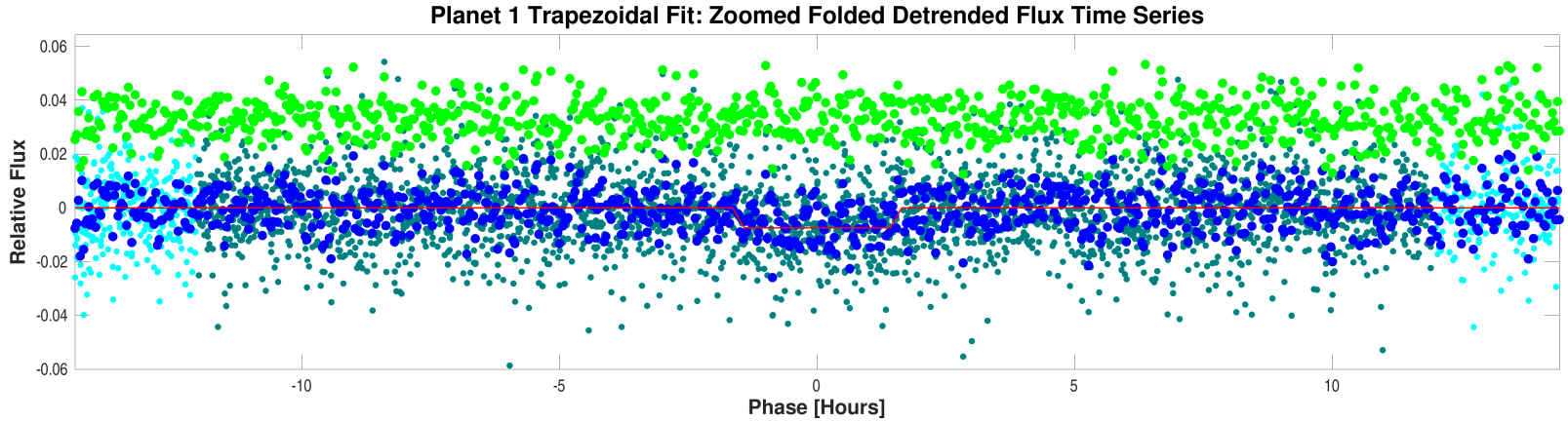
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	8.5		
Orbital Period	14.8527718		days
Transit Epoch	1690.7506321		BTJD
Transit Depth	7436		ppm
Transit Duration	4.8006		hours
Transit Ingress Duration	1.7435		hours
Model Chi Square Statistic (DoF)	35247.7 (2767)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 273690178, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000273690178-01-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 273690178, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000273690178-01-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	14.8528		days		
Transit Duration	3		hours		
Maximum MES	7.9				
Secondary Phase	-2.6597		days		
Secondary MES	2.4				
Minimum Phase	8.7889		days		
Minimum MES	-2.5				
Median MES	-0.0				
MAD MES	0.60281				
Robust Statistic	2.0				
Secondary Depth	1666.6	8.5913e+02	ppm		
Geometric Albedo	206.3	1.5859e+02		1.2946	9.77
Planet Effective Temperature	3980	7.5654e+02	Kelvin	4.3603	0.00

7.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	1.5567e+00	1.2477	21.21

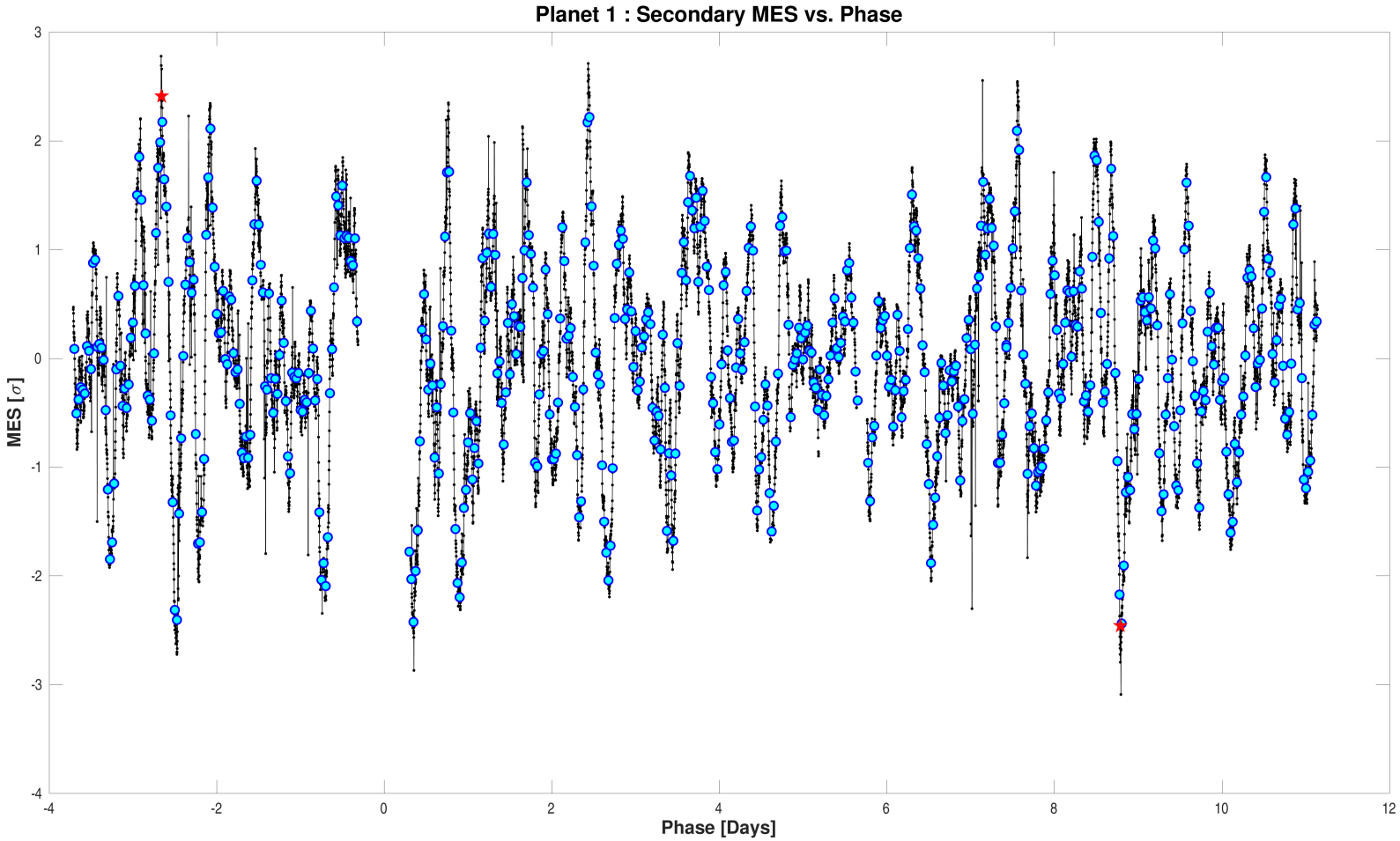
7.4.3 Bootstrap Test

Result	Value
False Alarm Probability	1.4787e-21
Bootstrap Threshold for Desired PFA	6.1
MES Mean	1.00
MES Standard Deviation	0.73
Transit Count	4

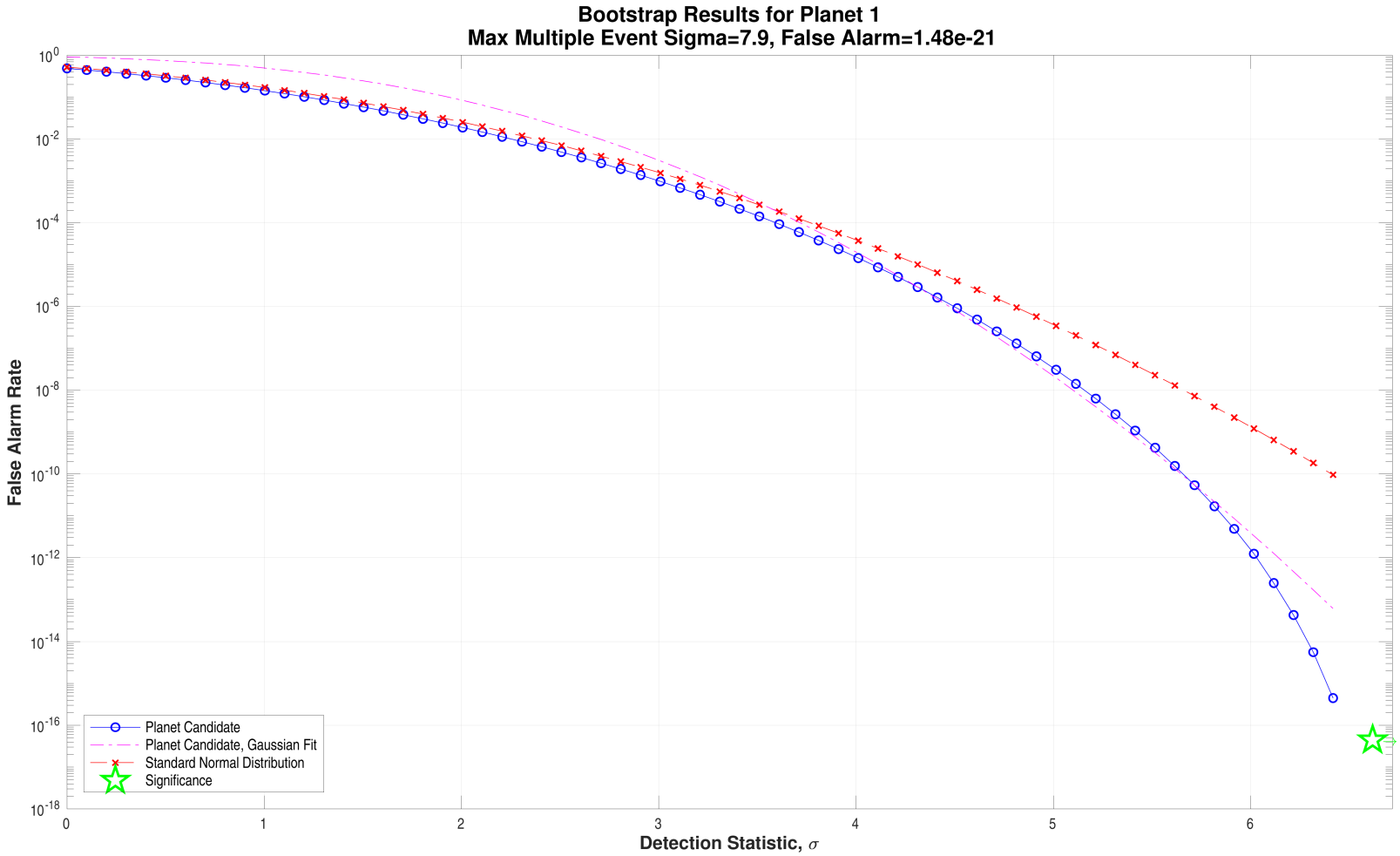
7.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	7.9	
SNR	8.2	
Core Aperture Statistic	4.9780e+00	100.00
Halo Aperture Statistic	1.5063e+00	93.40
Ratio of Core/Halo Aperture Statistics	3.3048e+00	

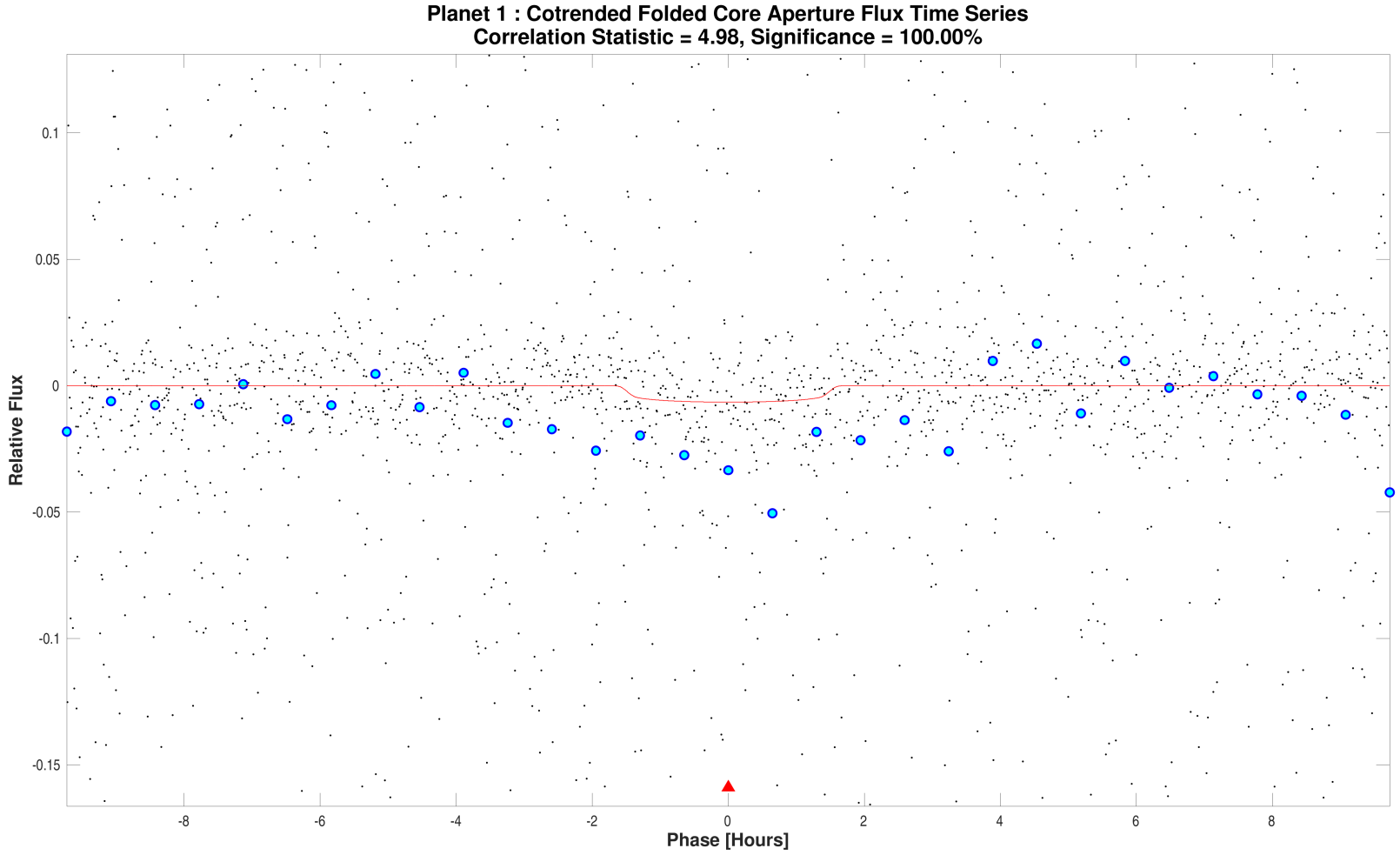
7.4.5 Validation Test Figures



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 3. The maximum secondary MES and corresponding phase are 2.411 and -2.6597 days respectively. The minimum secondary MES and corresponding phase are -2.4581 and 8.7889 days respectively.
Open `./planet-01/report-summary/0000000273690178-01-weak-secondary-diagnostic.fig`

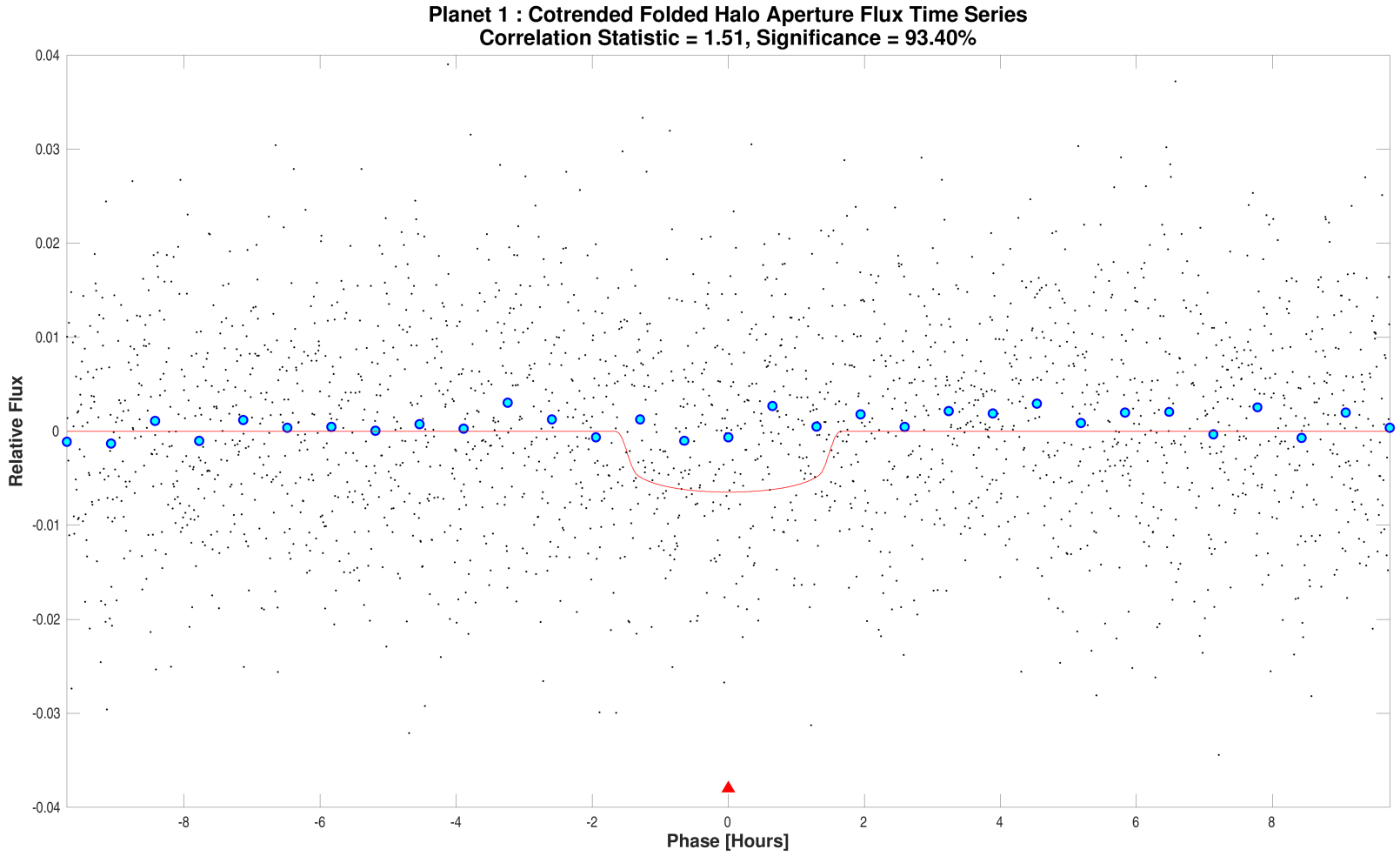


Bootstrap results for target 273690178, planet 1. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 9.4642. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 6.0794.
Open `./planet-01/bootstrap-results/0000000273690178-01-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 273690178, 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/0000000273690178-01-core-unwhitened-cotrended-zoomed-model.fig`

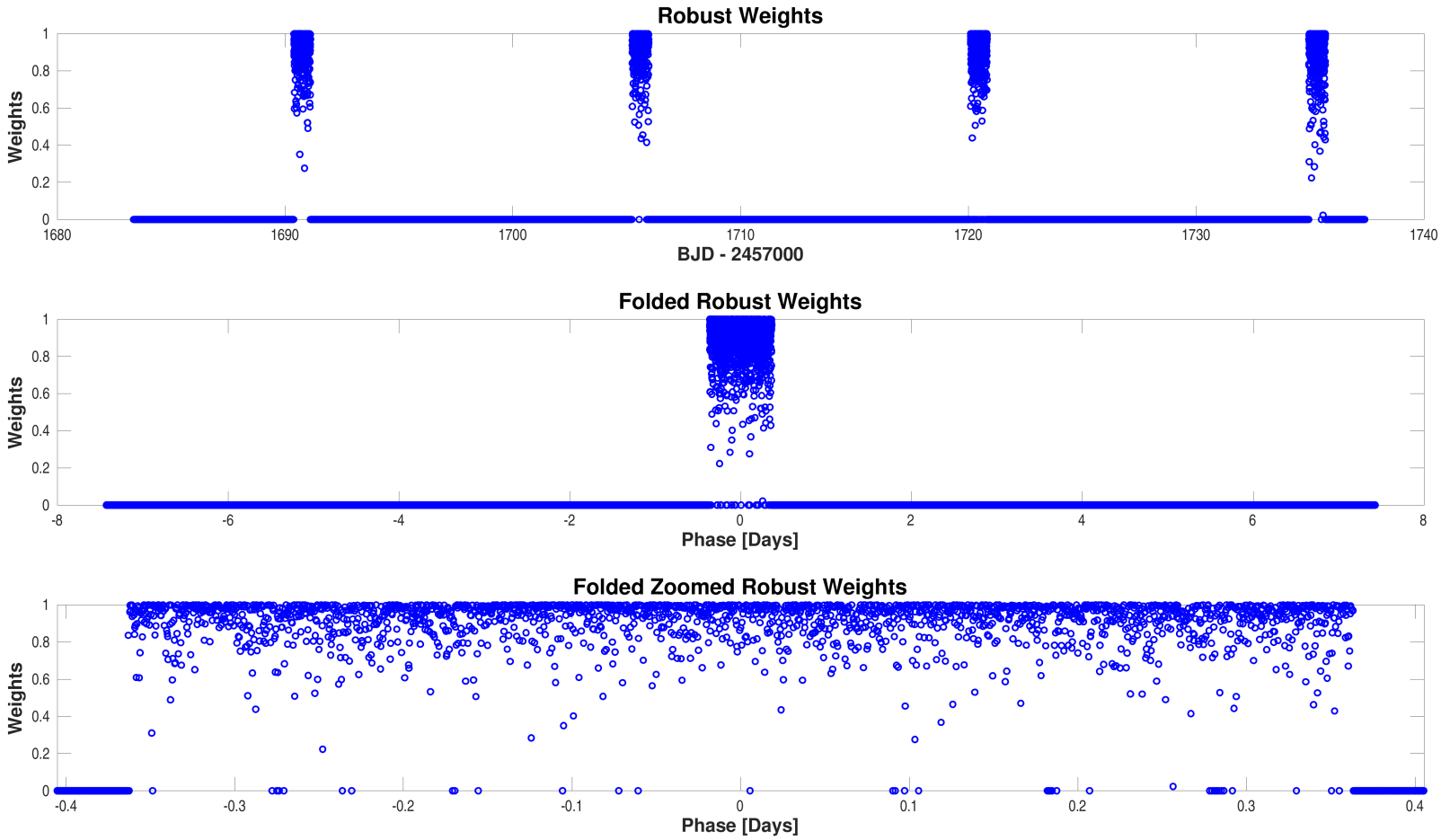


Optical ghost diagnostic halo aperture flux time series for target 273690178, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft 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.

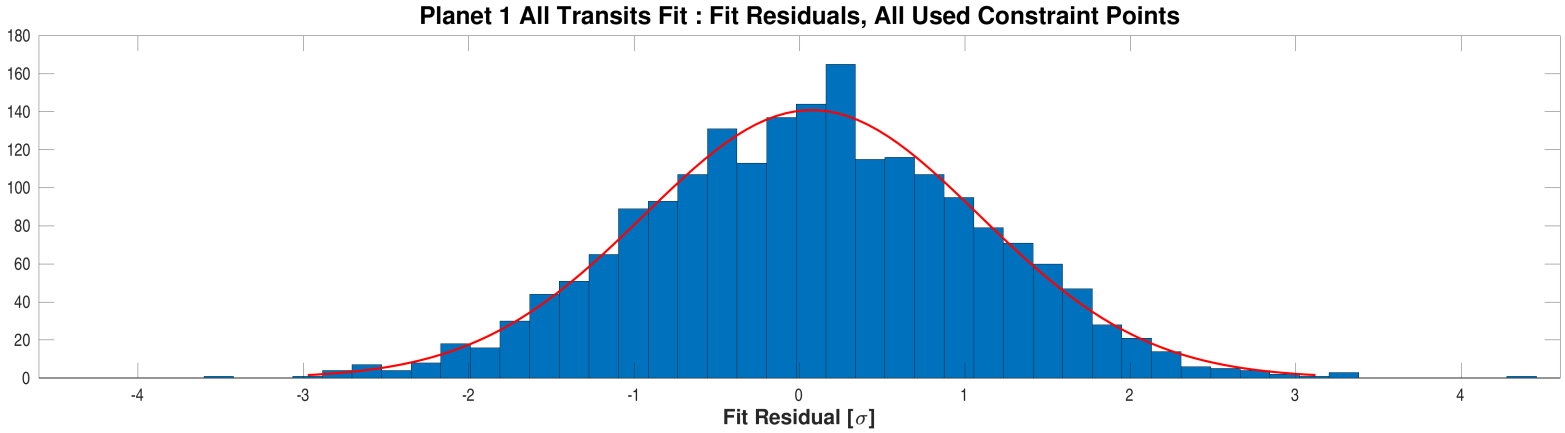
Open `./planet-01/ghost-diagnostic-results/0000000273690178-01-halo-unwhitened-cotrended-zoomed-model.fig`

Appendix A Planet Candidate 1

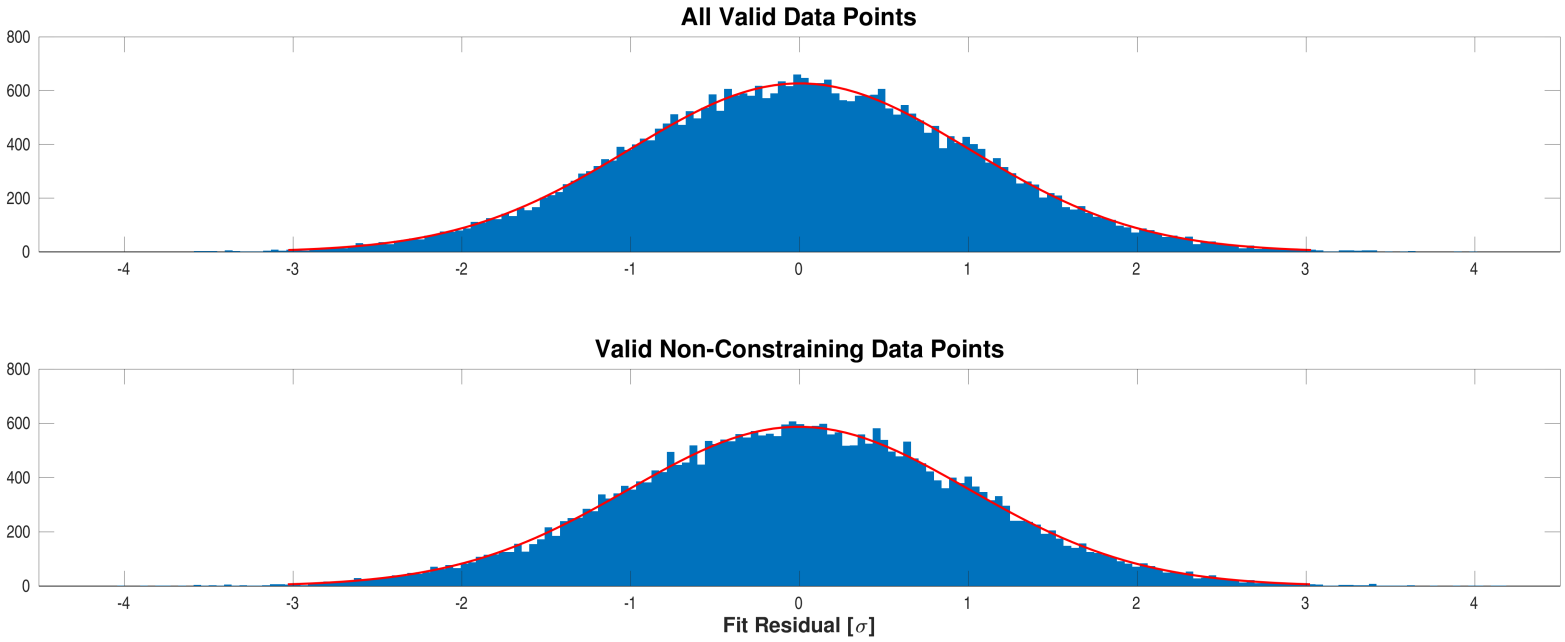
A.1 Model Fitter: All Transits



Robust weights distribution for CatId 273690178, 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/0000000273690178-01-all-robust-weights.fig`



Fit residuals distribution for CatId 273690178, 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/0000000273690178-01-all-histo-used.fig`

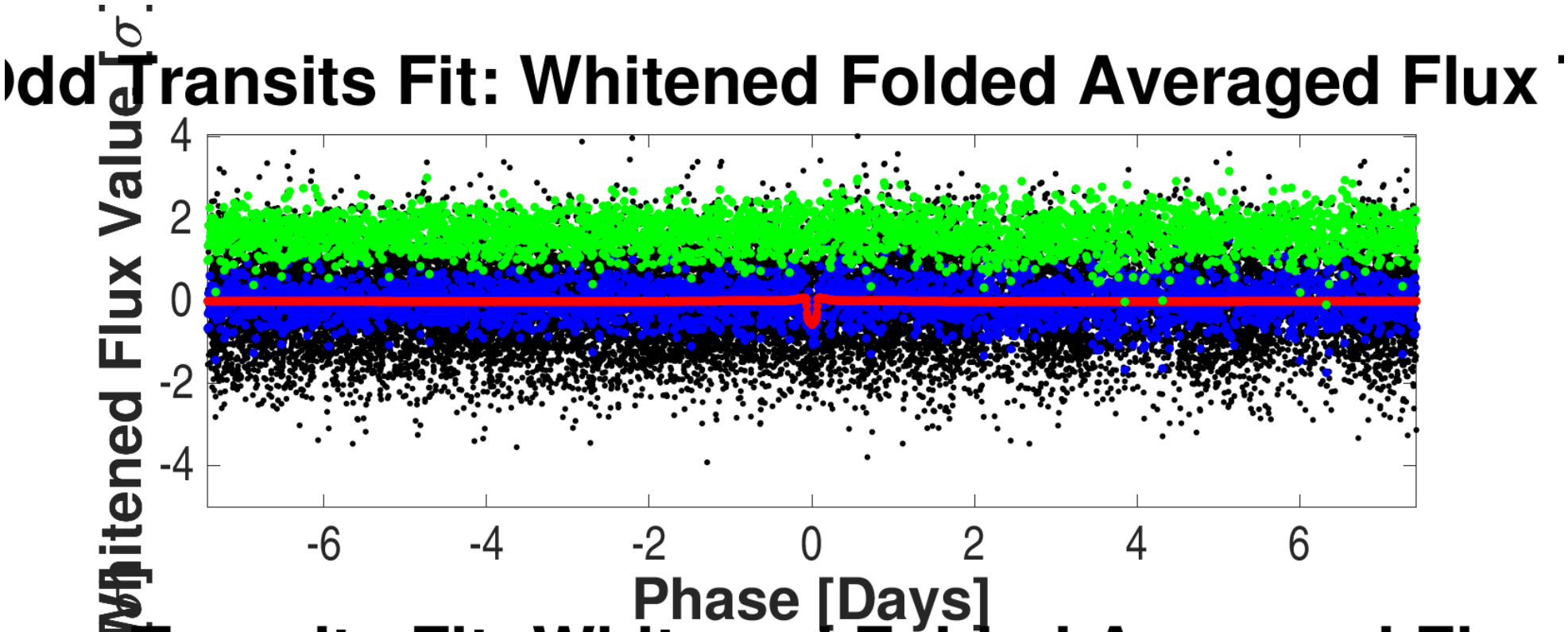


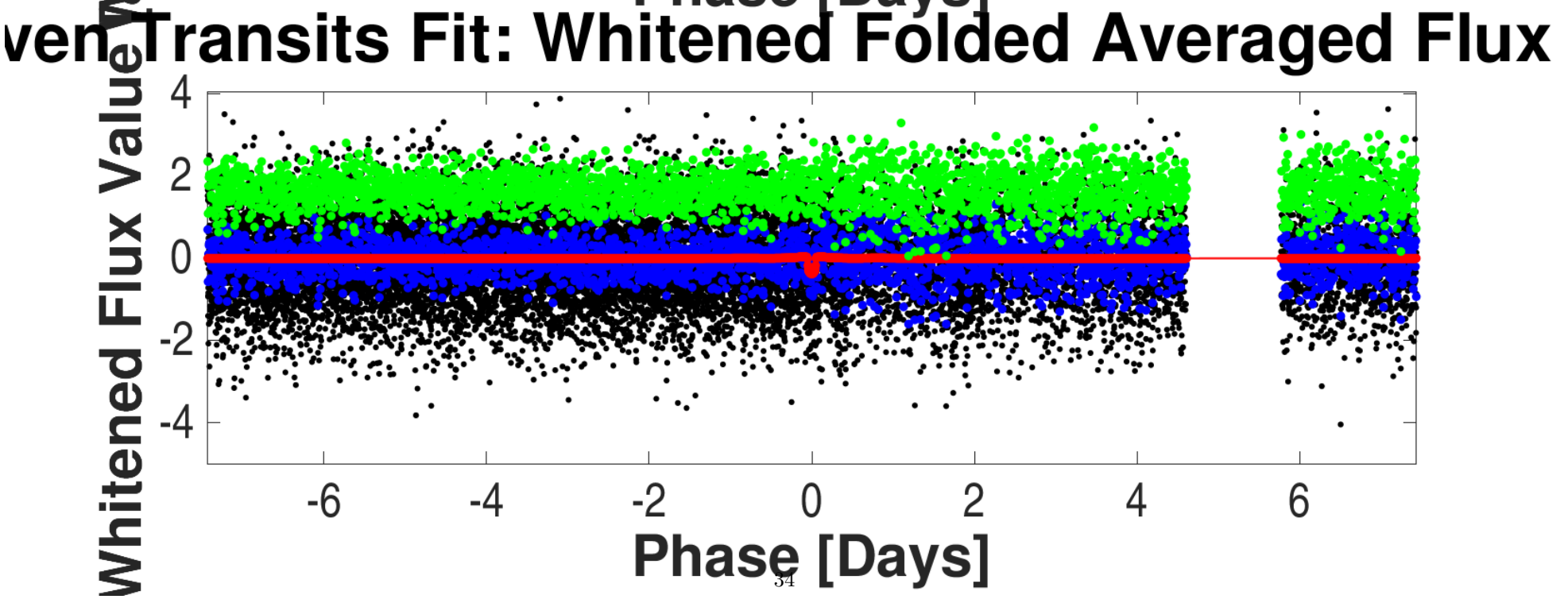
Fit residuals distribution for CatId 273690178, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000273690178-01-all-histo-all-and-unused.fig`

A.2 Model Fitter: Odd & Even Transits

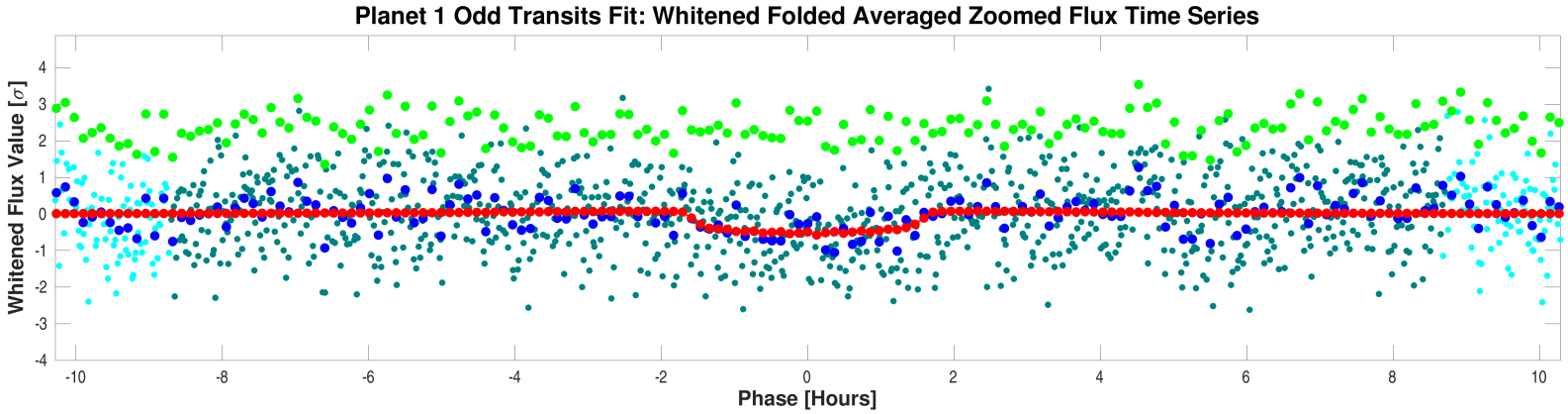
Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / ‖Uncertainty‖
SNR	6.5		4.0			
Orbital Period	14.8539258	5.5985e-03	14.8530292	6.8231e-03	days	1.0160e-01
Transit Epoch	1690.7492697	5.5300e-03	1705.6011783	7.0047e-03	BTJD	1.3149e-01
Impact Parameter	0.1619	9.4125e+00	0.0100	4.0215e+02		3.7750e-04
Planet Radius to Star Radius Ratio	0.0767874	2.6547e-02	0.0638092	5.5077e-02		2.1227e-01
Semi-major Axis to Star Radius Ratio	35.2491	5.4640e+01	46.4994	1.8536e+02		5.8217e-02
Planet Radius	7.9789	2.8047e+00	6.6304	5.7385e+00	Earth radii	2.1113e-01
Semi-major Axis	0.1154	8.9616e-03	0.1154	8.9613e-03	AU	3.6637e-04
Effective Stellar Flux	50.2960	7.9083e+00	50.3000	7.9089e+00	Goldilocks	3.6199e-04
Equilibrium Temperature	679	2.6699e+01	679	2.6699e+01	Kelvin	3.6199e-04
Stellar Density	2.6669	1.2402e+01	6.1228	7.3223e+01	Solar density	4.6535e-02
Transit Depth	7014	1.1337e+03	4871	1.2906e+03	ppm	1.2477e+00
Transit Duration	3.4276	8.3151e-01	2.5960	1.2977e+00	hours	5.3956e-01
Transit Ingress Duration	0.2506	8.6760e-01	0.1558	1.3830e+00	hours	5.8110e-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)	1632.8 (1875.2)		1632.8 (1875.2)			

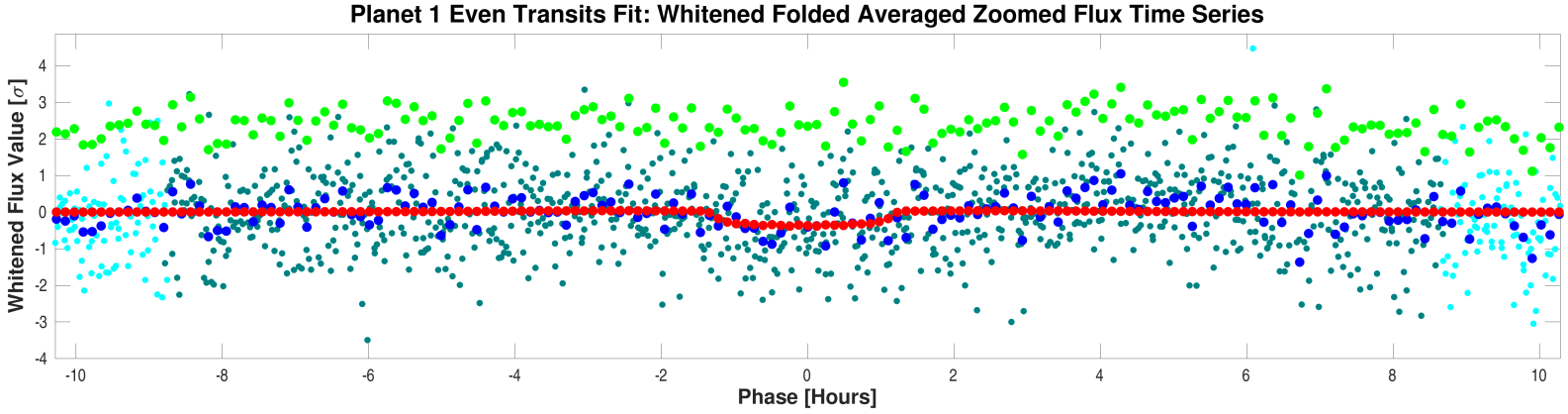
DoF: Degrees of Freedom


dd Transits Fit: Whitened Folded Averaged Flux
Whitened Flux Value [σ]
4
2
0
-2
-4
-6
-4
-2
0
2
4
6
Phase [Days]

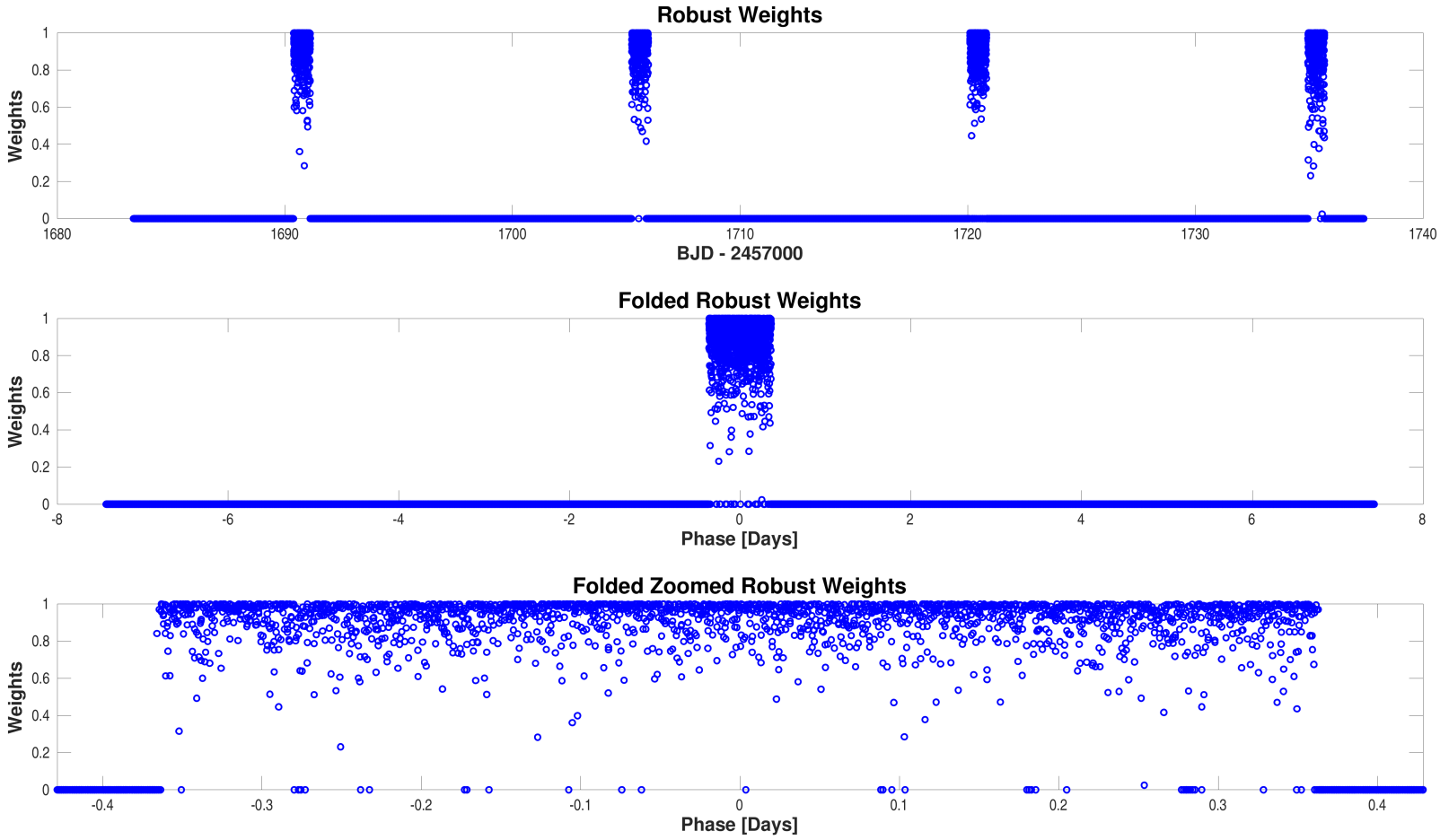

ven Transits Fit: Whitened Folded Averaged Flux
Whitened Flux Value [σ]
4
2
0
-2
-4
-6
-4
-2
0
2
4
6
Phase [Days]

Folded flux time series for CatId 273690178, 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/0000000273690178-01-odd-even-whitened.fig`

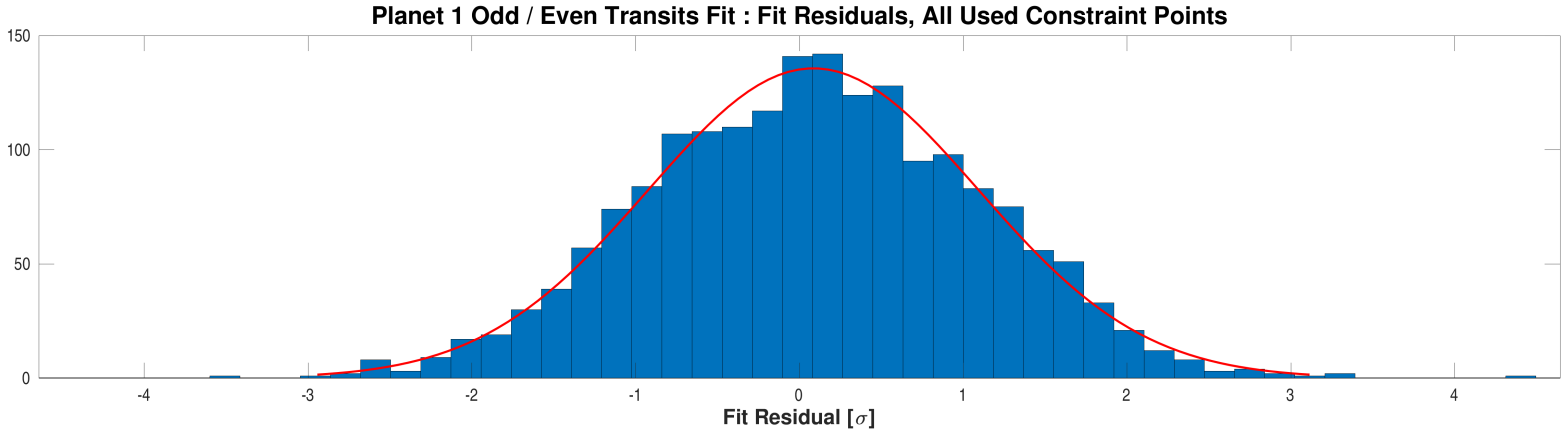




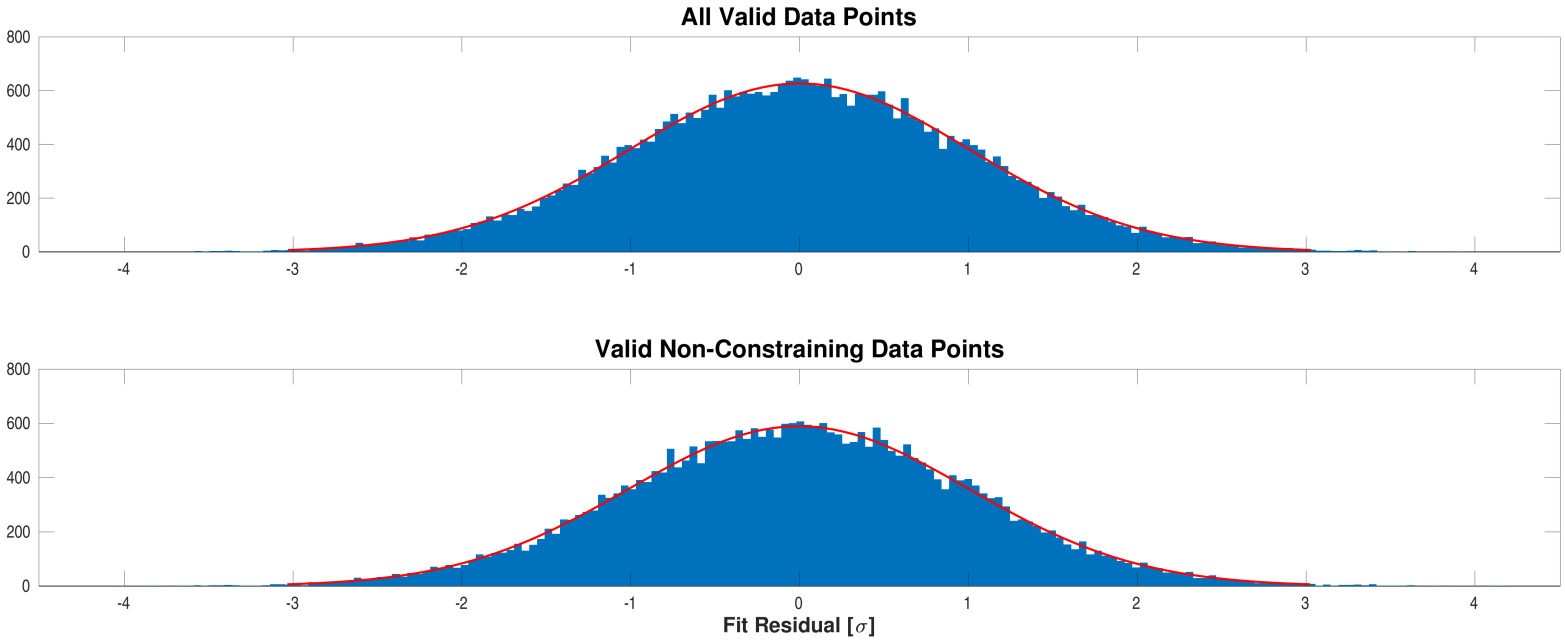
Folded flux time series for CatId 273690178, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged 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/0000000273690178-01-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 273690178, 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/0000000273690178-01-odd-even-robust-weights.fig`

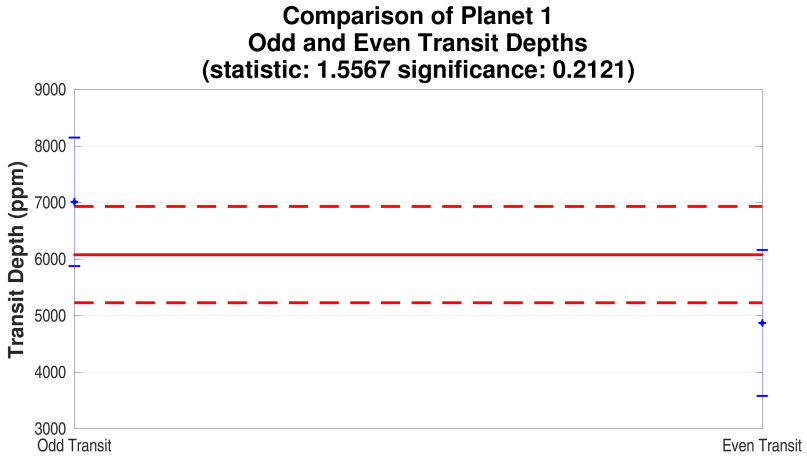


Fit residuals distribution for CatId 273690178, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000273690178-01-odd-even-histo-used.fig`



Fit residuals distribution for CatId 273690178, 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/0000000273690178-01-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 273690178, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Open `./planet-01/binary-discrimination-test-results/0000000273690178-01-eclipsing-binary-discrimination-tests.fig`

Appendix B Alerts

This target did not trigger any alerts.