Data Validation (DV) Report
for TESS ID 266593143
Sectors 15 - 15

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

21-Sep-2019 11:05:03 Z

Contents

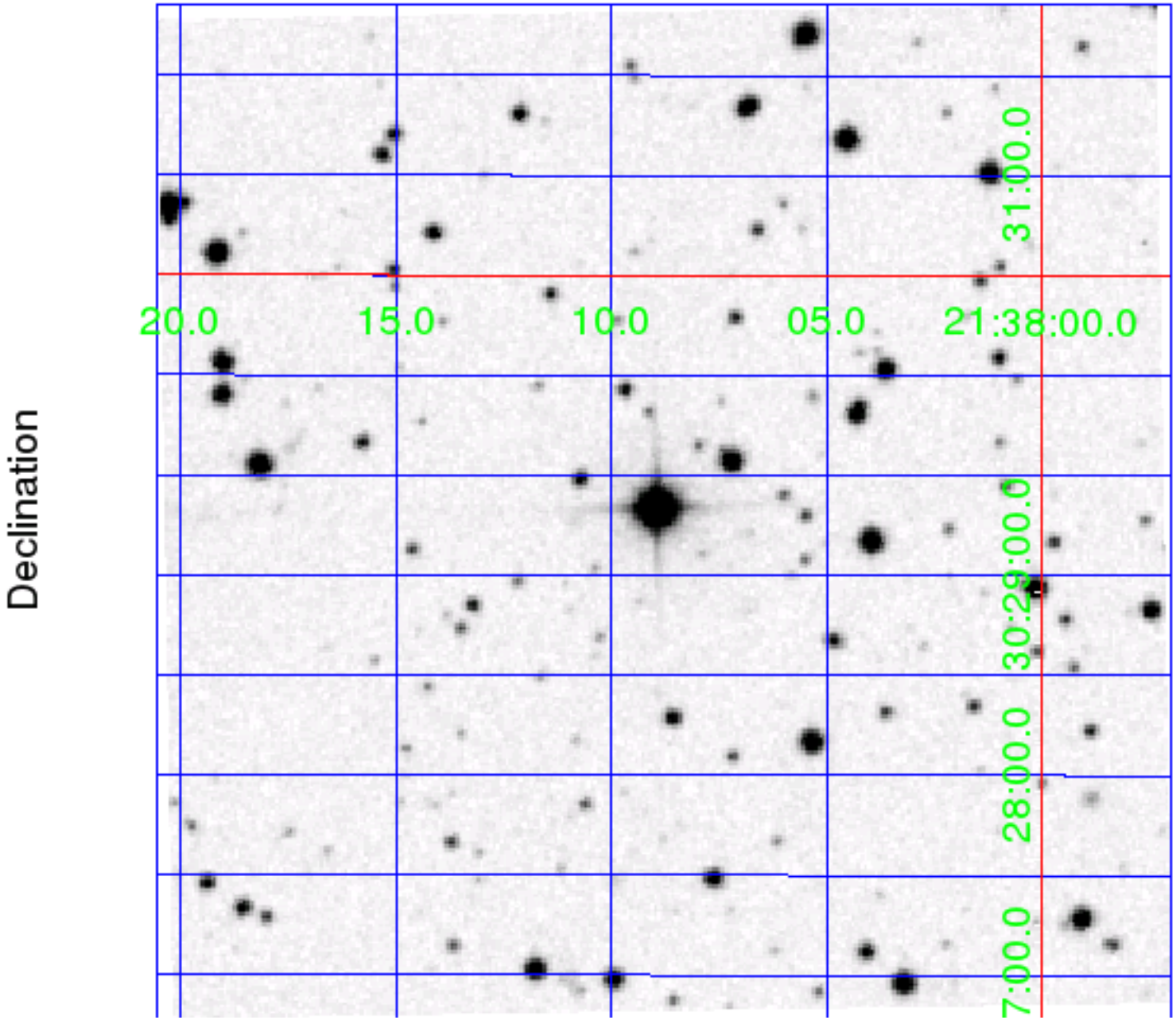
1 Summary

Target Properties	Value	Uncertainty	Units	Provenance
Catalog ID	266593143			
TOI ID	-			
TESS Name	-			
RA	324.53637975	0	degrees	TIC8
Dec	30.48873488	0	degrees	TIC8
Magnitude	9.7525	0.006		TIC8
Radius	0.839	0.039	Solar radii	TIC8
Effective Temperature	5337	105	Kelvin	TIC8
log(g)	4.555	0.077034	cm/sec^2	TIC8
[M/H]	0.051	0.02809	Solar metallicity	TIC8
Stellar Density	1.560	0.286	Solar density	TIC8-Derived
Limb Darkening Coefficient 1	0.66419			
Limb Darkening Coefficient 2	-0.43198			
Limb Darkening Coefficient 3	0.88355			
Limb Darkening Coefficient 4	-0.40875			
Number of Planet Candidates	1			
TOI Model	toi-plus-2019-09-20.csv			
TESS Names Model	-			
External TCE Model	-			
Software Revision	spoc-4.0.9-20190919			
Date Report Generated	21-Sep-2019 11:05:03 Z			

Sector	Target Table	Camera/ CCD	Crowding Metric	Flux Fraction
15	169	1:4	0.9681	0.8568

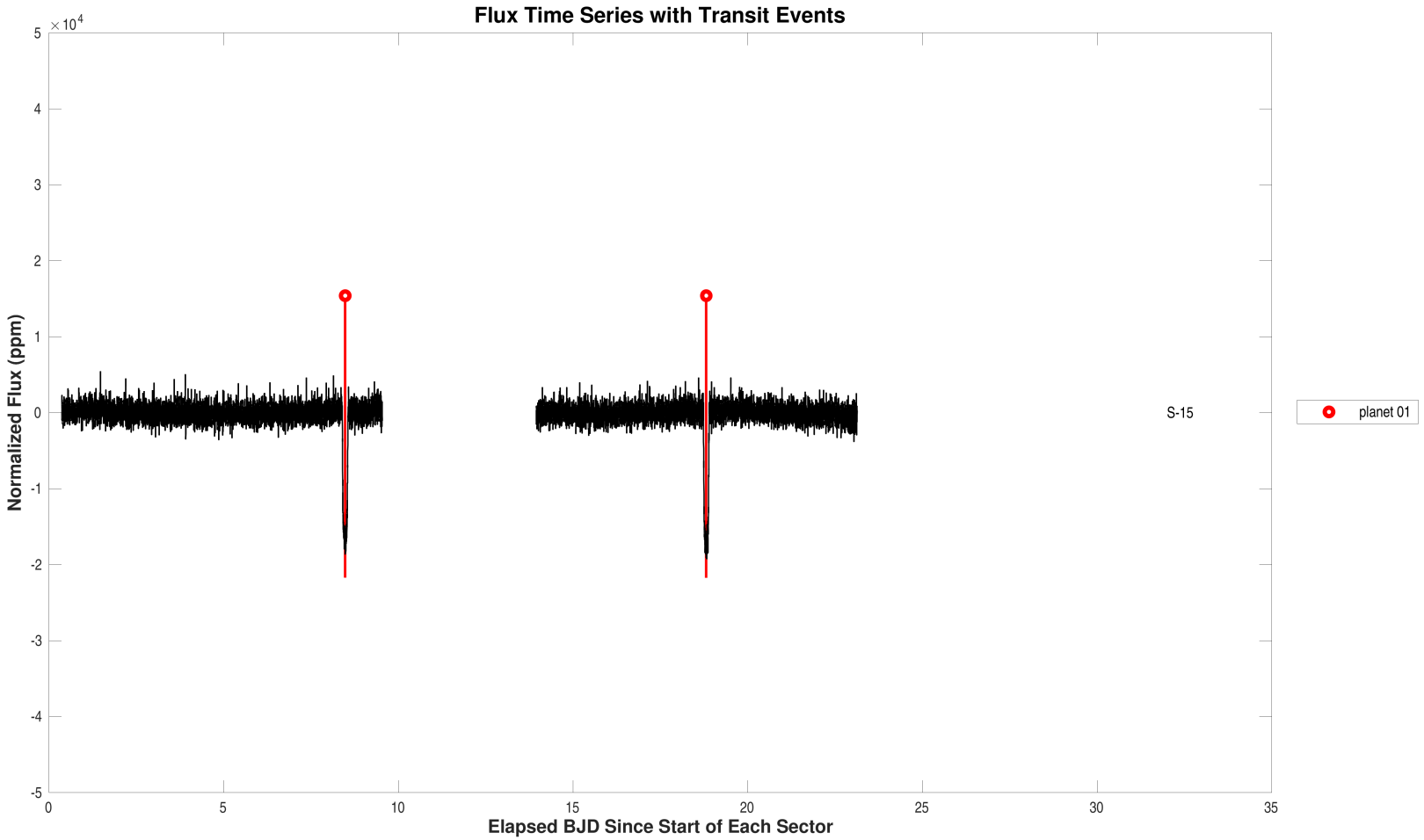
Planet Candidate	TOI ID	TESS Name	TOI Correlation	Period (days)	Period Ratio	Epoch (BTJD)	Semi-major Axis (AU)	Radius (Re)	Seff	Teq (K)	False Alarm	Suspected EB
1	-	-	-	10.338	1.00	1719.476	0.09	11.2	62.6	717	0.00e+00	false

2 Survey Image

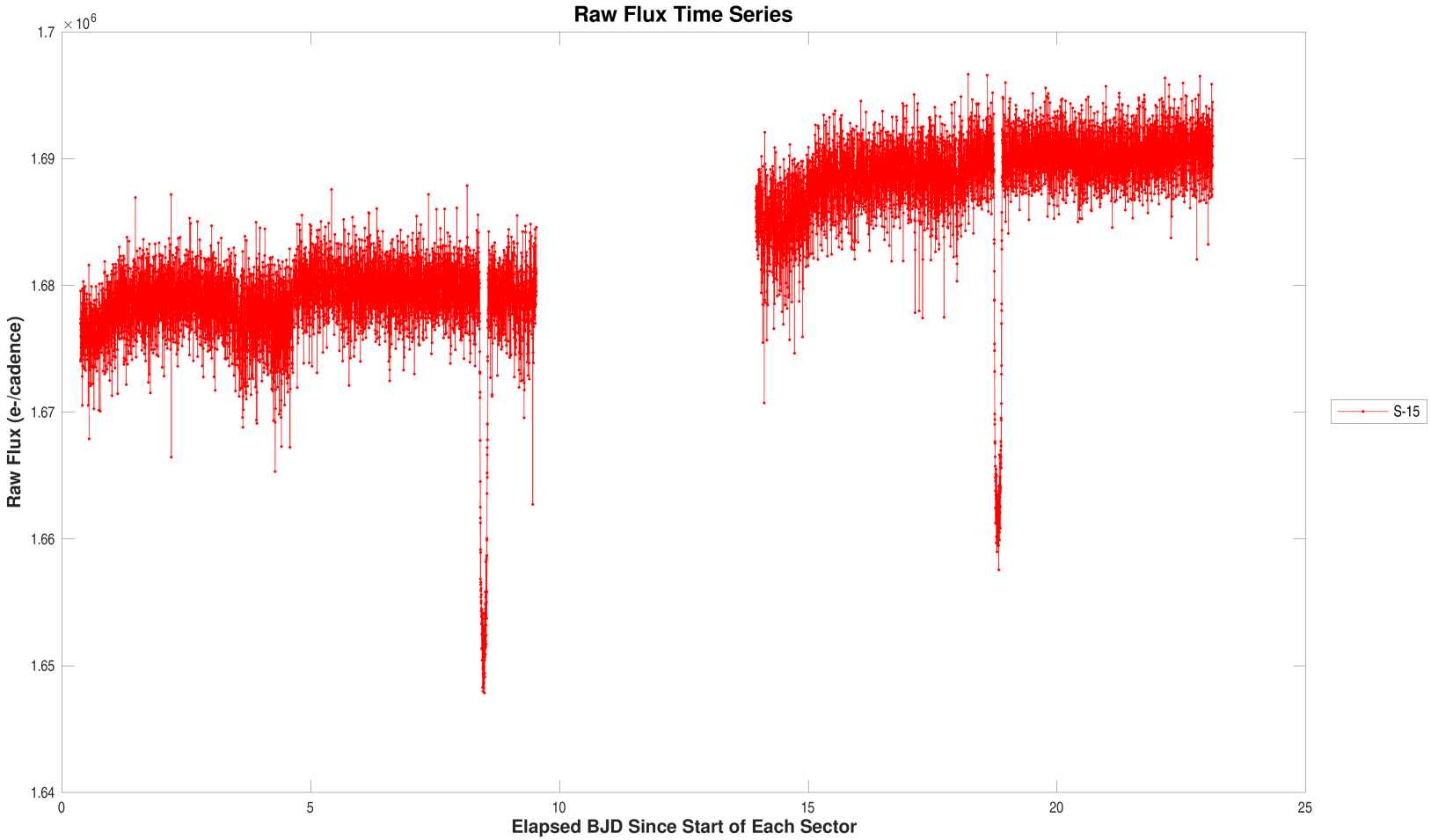


Digitized Sky Survey (DSS) red image. The 5' x 5' image is centered on the J2000 coordinates of target (266593143).

3 Flux Time Series



Summary plot of sector-stitched flux time series and transits for target 266593143, 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 15, target table 169, start BJD is 2458711.
Open `./summary-plots/0000000266593143-00-flux-dv-fit-15-169.fig`



Summary plot of raw flux time series. For the data of sector 15, target table 169, start BJD is 2458711.
Open `./summary-plots/0000000266593143-00-raw-flux-15-169.fig`

4 Dashboards

Planet Candidate 1

<table>
<tr><td rowspan="2">Model Fitter</td><td colspan="2">Stellar Radius
0.8 ± 0.0 Solar units</td><td rowspan="2">Core Aperture Correlation Statistic
Value = 108.75
Significance = 100.00%
Halo Aperture Correlation Statistic
Value = 23.23
Significance = 100.00%
Core/Halo Ratio
Ratio = 4.68</td><td rowspan="2">Ghost Diagnostic Test</td></tr>
<tr><td colspan="2">Period = 10.3 ± 0.0 days
Depth = 17448 ± 107 ppm
Planet Radius = 11.2 ± 0.5 Earth radii
Semi-major Axis = 0.1 ± 0.0 AU
Effective Stellar Flux = 62.6 ± 9.1
Equilibrium Temperature = 717 ± 26 Kelvin
Chi-squared/DoF = 0.8
SNR = 167.4</td></tr>
<tr><td rowspan="2">Eclipsing Binary Discrimination Test</td><td colspan="2">Odd-Even Depth Comparison Statistic
Value = 4.72e+00
Significance = 2.99%</td><td>Offsets Relative to Out of Transit Centroid
Source RA Offset = 2.59e-01 ± 2.50e+00 arcsec (0.10 σ)
Source Dec Offset = -4.35e-02 ± 2.50e+00 arcsec (-0.02 σ)
Source Offset Distance = 2.62e-01 ± 2.50e+00 arcsec (0.10 σ)
Offsets Relative to TIC Position
Source RA Offset = -5.72e-01 ± 2.50e+00 arcsec (-0.23 σ)
Source Dec Offset = 7.32e-01 ± 2.50e+00 arcsec (0.29 σ)
Source Offset Distance = 9.30e-01 ± 2.50e+00 arcsec (0.37 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 = 0.00e+00
Transit Count = 2
Max Multiple Event Statistic = 181.2</td><td>Bootstrap Test</td></tr>
</table>

Summary of model fitter results and validation test results for target 266593143, 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

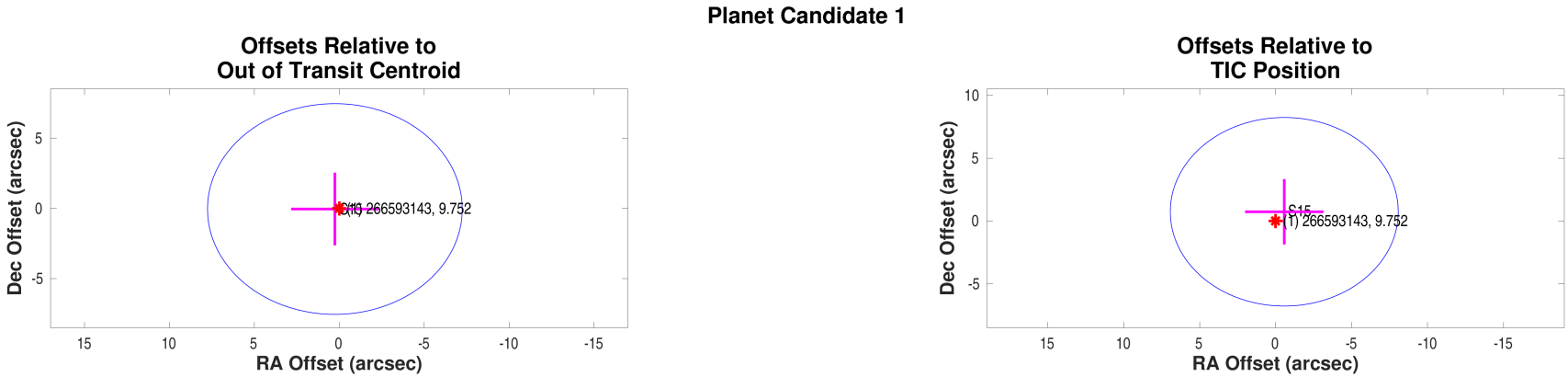
Multi-Sector Average PRF Fit of the Difference Images

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

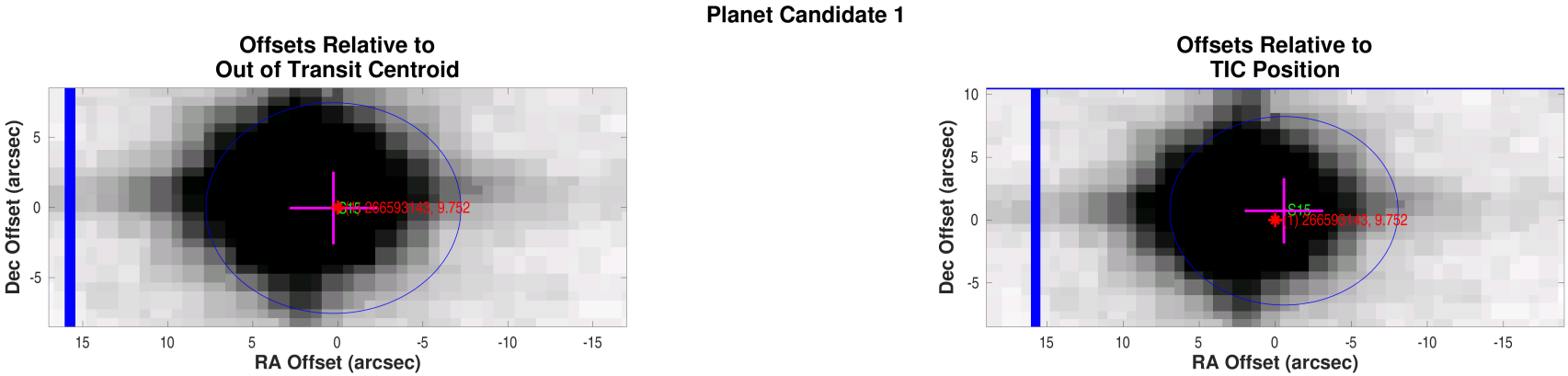
	RA	Dec	Units
Offset	$0.2587 \pm 2.50e+00$	$-0.0435 \pm 2.50e+00$	arcseconds
Offset/σ	0.10	-0.02	
Offset Distance	$0.2623 \pm 2.50e+00$		arcseconds
Offset Distance/σ	0.10		
3σ Radius	7.5025		arcseconds

Mean offset from the TIC RA and Dec

	RA	Dec	Units
Offset	$-0.5723 \pm 2.50e+00$	$0.7325 \pm 2.50e+00$	arcseconds
Offset/σ	-0.23	0.29	
Offset Distance	$0.9295 \pm 2.50e+00$		arcseconds
Offset Distance/σ	0.37		
3σ Radius	7.5034		arcseconds



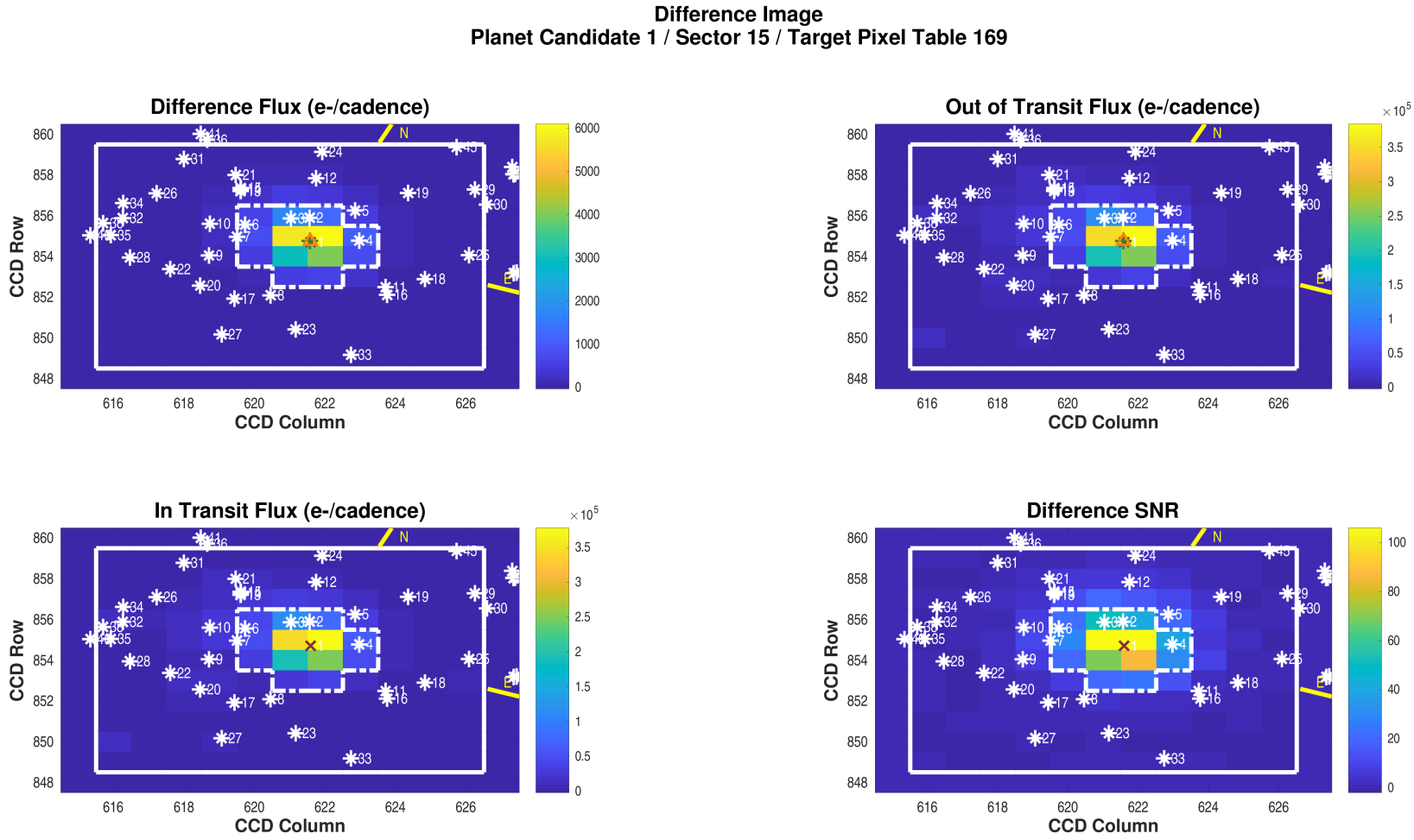
Difference image centroid offsets for target 266593143, planet candidate 1. Left: difference image PRF centroid offsets in RA and Dec with respect to the per sector out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the TC coordinates 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; 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/0000000266593143-01-difference-image-centroid-offsets.fig`



Difference image centroid offsets for target 266593143, 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; 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/0000000266593143-01-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
1	1	1	1.0000	0.70



Difference image for target 266593143, 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 = 183; number of in-transit cadence gaps = 0; number of valid out-of-transit cadences = 503; number of out-of-transit cadence gaps = 1. Difference image quality metric = 1.00 (good).
Open `./planet-01/difference-image/0000000266593143-01-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	$854.76 \pm 3.29e-05$	$621.56 \pm 2.98e-05$	pixels	$324.53560250 \pm 6.26e-07$	$30.48825716 \pm 6.56e-07$	degrees
Difference Image Centroid	$854.75 \pm 3.93e-03$	$621.57 \pm 3.61e-03$	pixels	$324.53568589 \pm 2.05e-05$	$30.48824508 \pm 2.26e-05$	degrees
Offset	$-0.0068 \pm 3.93e-03$	$0.0108 \pm 3.61e-03$	pixels	$0.2587 \pm 6.37e-02$	$-0.0435 \pm 8.13e-02$	arcseconds
Offset/σ	−1.73	2.98		4.06	−0.53	
Offset Distance	$0.0128 \pm 3.67e-03$		pixels	$0.2623 \pm 6.45e-02$		arcseconds
Offset Distance/σ	3.47			4.06		

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

	Row	Column	Units	RA	Dec	Units
TIC Reference Centroid	$854.70 \pm 1.10e-04$	$621.58 \pm 1.06e-04$	pixels	$324.53587036 \pm 0.00e+00$	$30.48804161 \pm 0.00e+00$	degrees
Difference Image Centroid	$854.75 \pm 3.93e-03$	$621.57 \pm 3.61e-03$	pixels	$324.53568589 \pm 2.05e-05$	$30.48824508 \pm 2.26e-05$	degrees
Offset	$0.0436 \pm 3.94e-03$	$-0.0125 \pm 3.61e-03$	pixels	$-0.5723 \pm 6.37e-02$	$0.7325 \pm 8.13e-02$	arcseconds
Offset/σ	11.09	−3.46		−8.99	9.01	
Offset Distance	$0.0454 \pm 3.89e-03$		pixels	$0.9295 \pm 7.58e-02$		arcseconds
Offset Distance/σ	11.66			12.26		

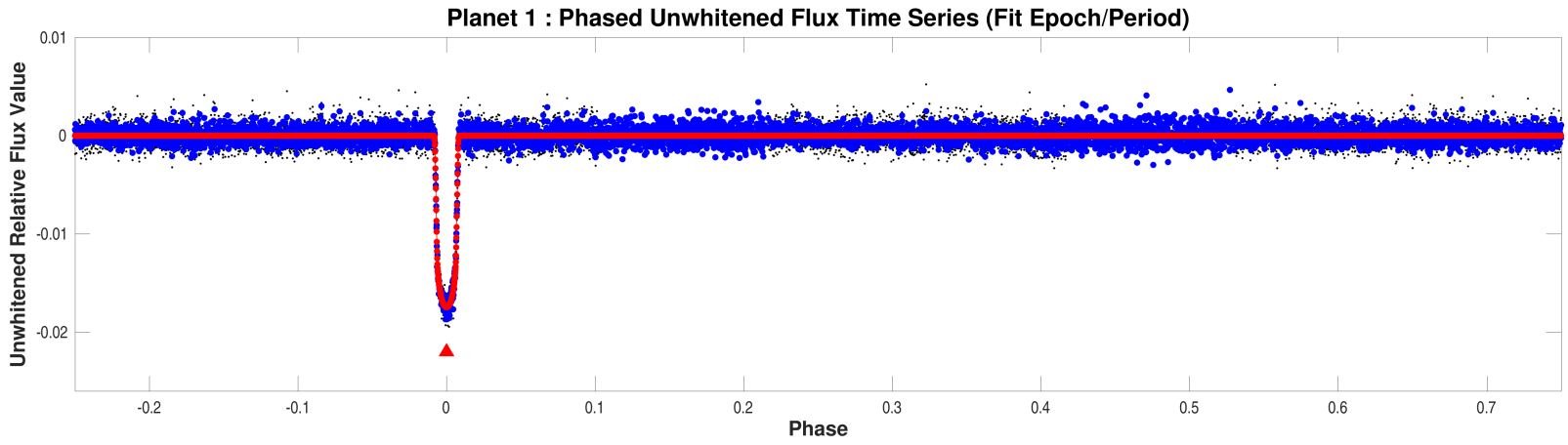
5.2 Difference Image TIC Key

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
1	266593143	9.752	324.53587036	30.48804161	0.00
2	2002107042	17.628	324.53276209	30.49431116	24.54
3	266593146	13.750	324.52955173	30.49296839	26.44
4	266593144	15.979	324.54421294	30.49150867	28.73
5	266593155	16.184	324.53986421	30.49906283	41.57
6	266593142	16.805	324.52227973	30.48843557	42.19
7	266593135	17.684	324.52229788	30.48478574	43.71
8	266593119	15.520	324.53525347	30.47166350	58.99
9	266593127	16.188	324.51964828	30.47813833	61.67
10	266593138	13.220	324.51597151	30.48645168	62.00
11	266593133	16.615	324.55444054	30.48103642	62.89
12	266593165	16.676	324.52913712	30.50499426	64.51
13	266593152	15.042	324.51741935	30.49688446	65.50
14	266593153	15.843	324.51726300	30.49736600	66.78
15	2002107046	16.064	324.51707806	30.49770419	67.89
16	266593129	17.272	324.55563749	30.47914788	69.18
17	2002106865	17.573	324.52933896	30.46848107	73.28
18	266654749	17.077	324.56036229	30.48567563	76.46
19	266593166	16.649	324.54704668	30.50697095	76.46
20	266593116	13.569	324.52173333	30.46972348	79.20
21	266593158	14.430	324.51463641	30.50075835	80.22
22	266593120	16.825	324.51451621	30.47211123	87.62
23	266593114	16.958	324.54374284	30.46437592	88.63
24	266593172	16.772	324.52700418	30.51225873	91.42
25	266654737	16.324	324.56523262	30.49465099	94.15
26	2002106900	17.265	324.50296813	30.49099739	102.62
27	266593106	14.796	324.53138884	30.45839133	107.64
28	266593121	16.865	324.50603337	30.47260256	107.97
29	266593171	15.476	324.55831661	30.51208572	111.09
30	266654722	16.951	324.56225632	30.50895245	111.21
31	266593161	16.080	324.50360596	30.50163027	111.41
32	266593134	14.066	324.50002559	30.48241955	113.03
33	266593113	16.986	324.55651526	30.46128785	115.66
34	266593137	16.804	324.49828223	30.48629372	116.78
35	2002106870	17.432	324.49996914	30.47720992	118.00
36	266593167	16.839	324.50536980	30.50808596	119.00
37	266654741	13.225	324.57521081	30.49280969	123.24
38	266593130	17.268	324.49716447	30.47983218	123.66

Index	Catalog ID	Mag	RA (degrees)	Dec (degrees)	Distance (arcsec)
39	2002106966	16.998	324.57563577	30.49311224	124.71
40	2002107069	15.085	324.52851652	30.52233862	125.56
41	266593169	17.530	324.50355605	30.50923684	125.98
42	266593180	14.358	324.52806300	30.52260000	126.75
43	266593175	13.389	324.51837294	30.51992621	126.97
44	2002107070	15.207	324.52790038	30.52271264	127.24
45	266593179	15.616	324.55002302	30.52197705	129.82
46	2002106869	17.678	324.49641808	30.47587744	129.99
47	2002107057	16.274	324.56323667	30.51852898	138.76
48	266654709	15.957	324.56332845	30.51854813	138.99
49	2002107055	17.138	324.56348346	30.51877333	139.92
50	266654708	16.037	324.56217781	30.52030815	141.96
51	266593174	13.966	324.50455648	30.51706548	142.67
52	266654778	17.035	324.57439482	30.45507444	168.43

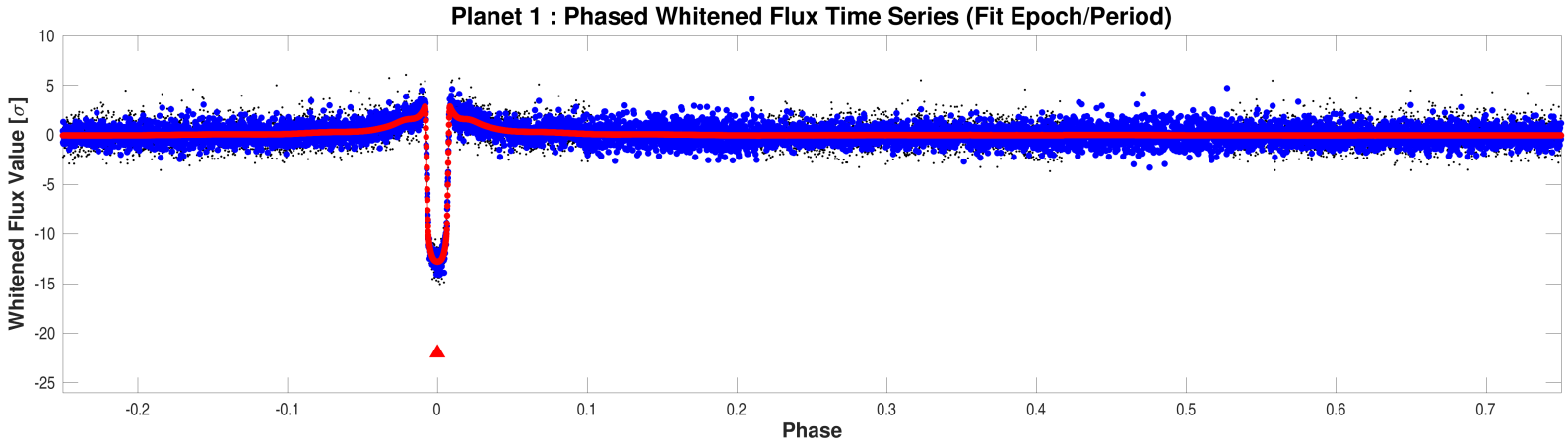
RA, Dec and Distances are corrected for proper motion. This table may not contain all of the objects shown.

6 Phased Light Curves

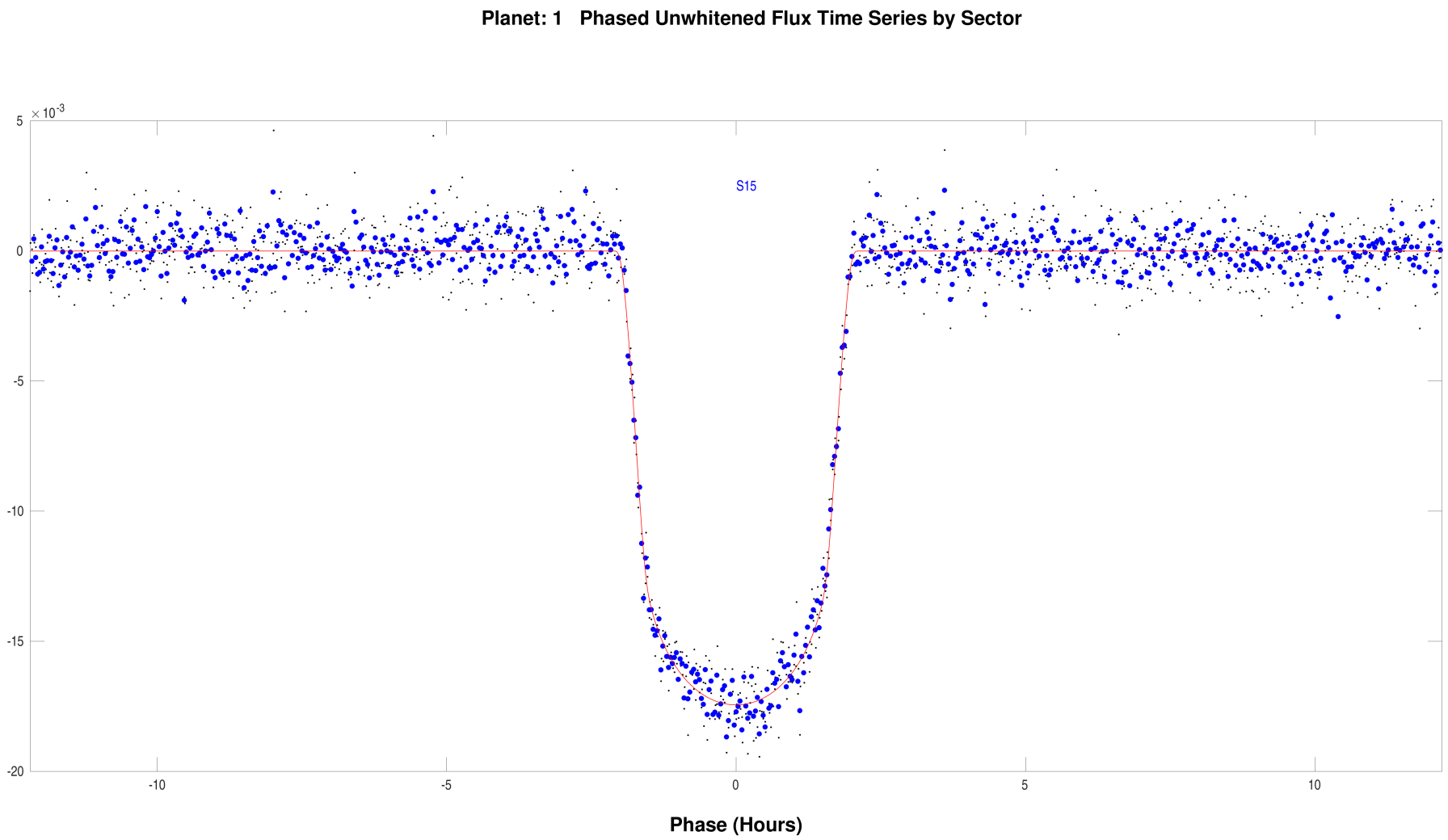


Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series 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/0000000266593143-01-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/0000000266593143-01-phased-whitened-flux-time-series.fig`



Phased unwhitened flux time series by sector for target 266593143, planet candidate 1. Period = 10.3379 days; transit epoch = 1719.4758 BTJD.
Open `./summary-plots/0000000266593143-01-phased-unwhitened-flux-time-series-by-sector.fig`

7 Planet Candidate 1

7.1 Model Fitter: All Transits

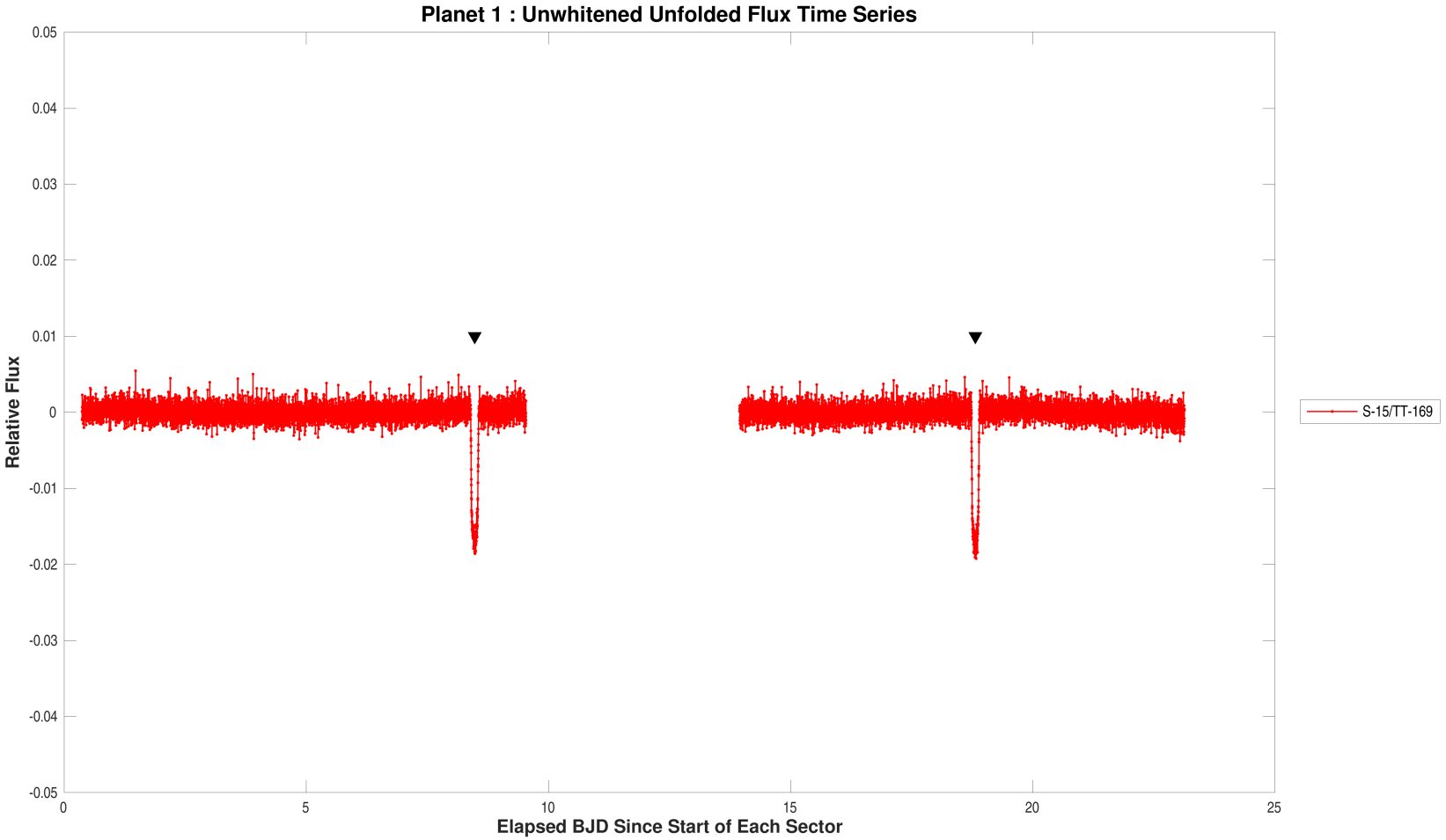
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_tess_nonlinear_limb_darkening_model

TCE Parameter	Value	Units
Trial Transit Pulse Duration	3.5	hours
Transit Epoch	1719.4719649	TJD
Orbital Period	10.3374958	days
Maximum SES	130.4	
Maximum MES	181.2	
Robust Statistic	162.3	
Chi Square Goodness of Fit Statistic (DoF)	246.1 (209)	
Chi Square2 Statistic (DoF)	8.0 (2458.2)	
Threshold for Desired PFA		

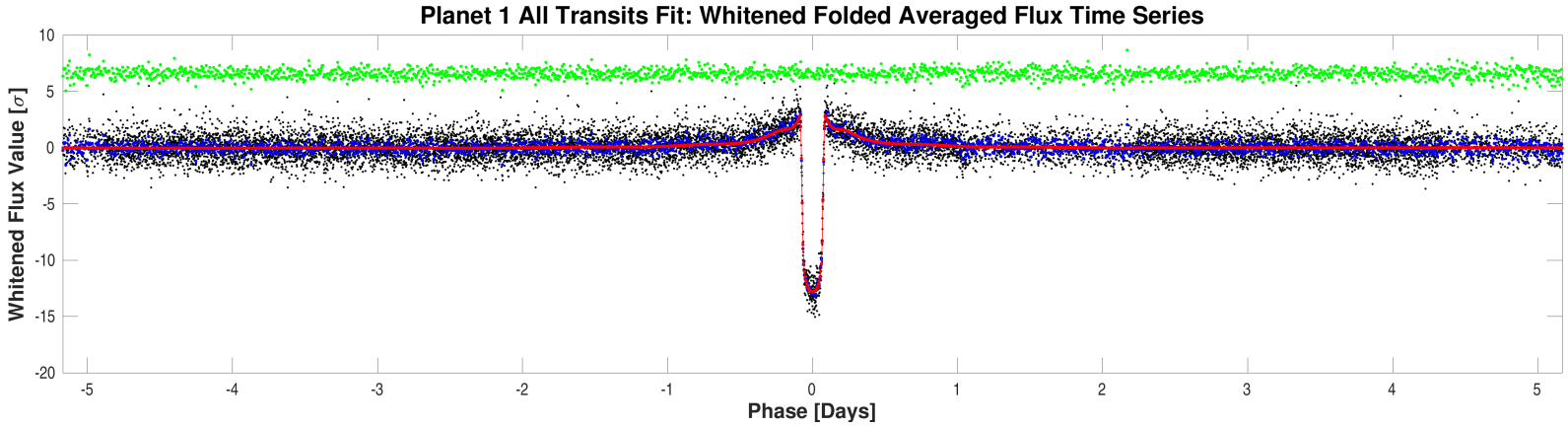
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	167.4		
Orbital Period	10.3378915	4.1339e-04	days
Transit Epoch	1719.4757697	2.9516e-04	BTJD
Impact Parameter	0.3301	7.0804e-02	
Planet Radius to Star Radius Ratio	0.1223952	8.1919e-04	
Semi-major Axis to Star Radius Ratio	20.8517	5.4158e-01	
Planet Radius	11.2064	5.2758e-01	Earth radii
Semi-major Axis	0.0904	6.0364e-03	AU
Effective Stellar Flux	62.5945	9.1022e+00	Goldilocks
Equilibrium Temperature	717	2.6080e+01	Kelvin
Stellar Density	1.1397	8.8806e-02	Solar density
Transit Depth	17448	1.0678e+02	ppm
Transit Duration	4.0654	2.8126e-02	hours
Transit Ingress Duration	0.4922	2.8924e-02	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	961.0 (1139.1)		
Model Chi Square Goodness of Fit Statistic (DoF)	135.8 (249)		
Model Chi Square2 Statistic (DoF)	4.7 (1)		

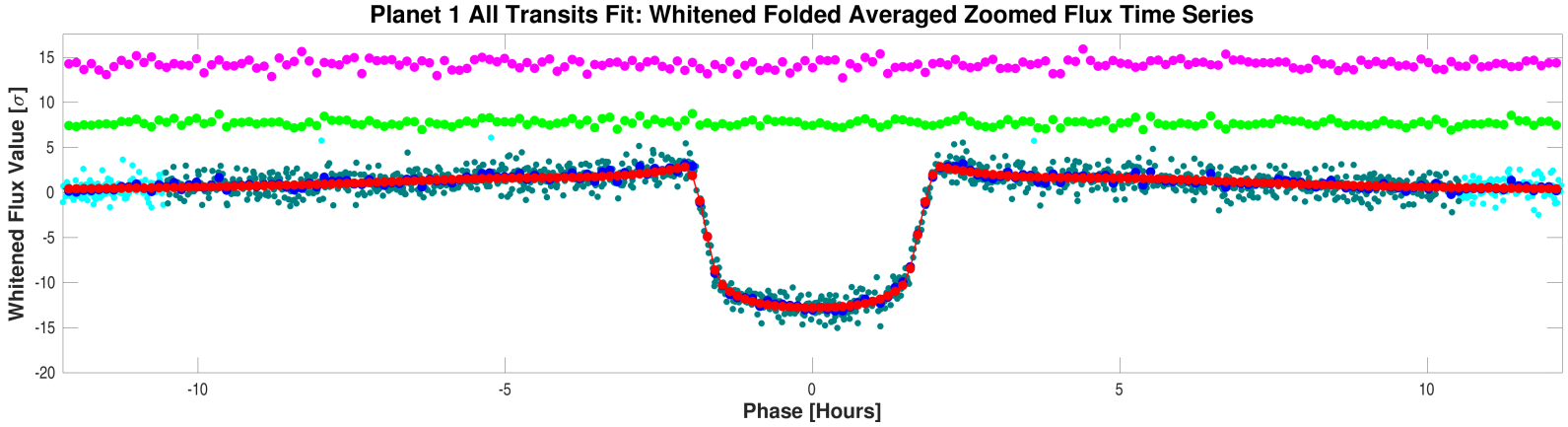
DoF: Degrees of Freedom



Flux time series for CatId 266593143, Planet candidate 1 in the unwhitened domain. For the data of Sector-15/TargetTableId-169, start BJD is 2458711. 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/0000000266593143-01-all-unwhitened-15-169.fig`



Folded flux time series for CatId 266593143, 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/0000000266593143-01-all-whitened.fig`

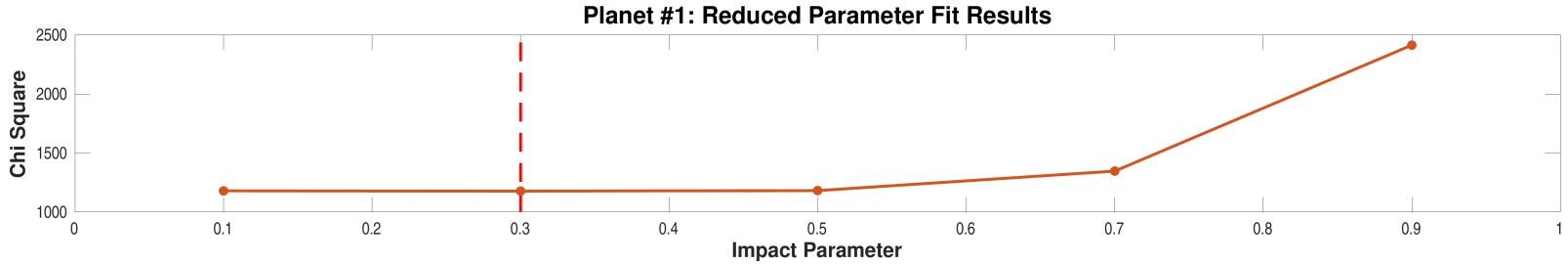


Folded flux time series for CatId 266593143, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged 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/0000000266593143-01-all-whitened-zoomed.fig`

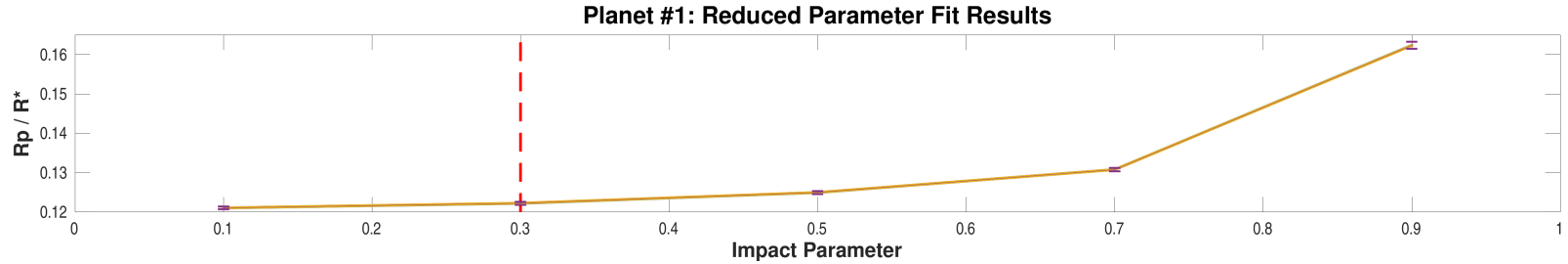
7.2 Model Fitter: Reduced Parameter Fit Results

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	174.7	1179.4	0.1210532	3.6625e-04	21.9570	6.2189e-02	17446	1.0488e+02	4.0180	1.1267e-02
0.30	175.2	1177.6	0.1222183	3.6929e-04	21.0692	6.1752e-02	17474	1.0488e+02	4.0556	1.1771e-02
0.50	174.6	1181.6	0.1249580	3.8216e-04	19.1760	6.1468e-02	17535	1.0645e+02	4.1537	1.3189e-02
0.70	173.7	1346.7	0.1307947	4.3881e-04	15.9466	6.5828e-02	17688	1.1752e+02	4.4048	1.8008e-02
0.90	172.8	2413.3	0.1623632	8.8285e-04	11.6208	9.7977e-02	19326	1.9463e+02	5.0175	4.0062e-02

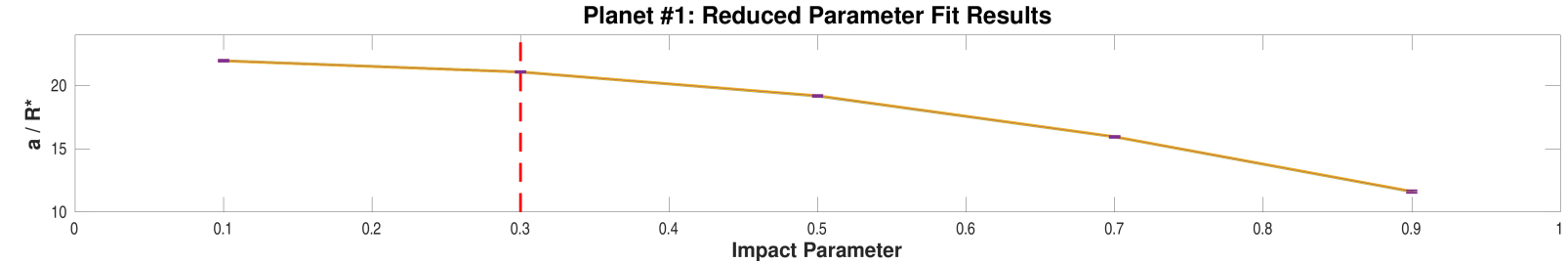
Highlighted row is the best reduced-parameter model fit.



Model chi squares of reduced parameter fits vs. impact parameter for CatId 266593143, 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/0000000266593143-01-reduced-fits-chi-square.fig`



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for CatId 266593143, 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/0000000266593143-01-reduced-fits-rp-over-rstar.fig`



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for CatId 266593143, 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/0000000266593143-01-reduced-fits-a-over-rstar.fig`

7.3 Model Fitter: Trapezoidal Fit Results

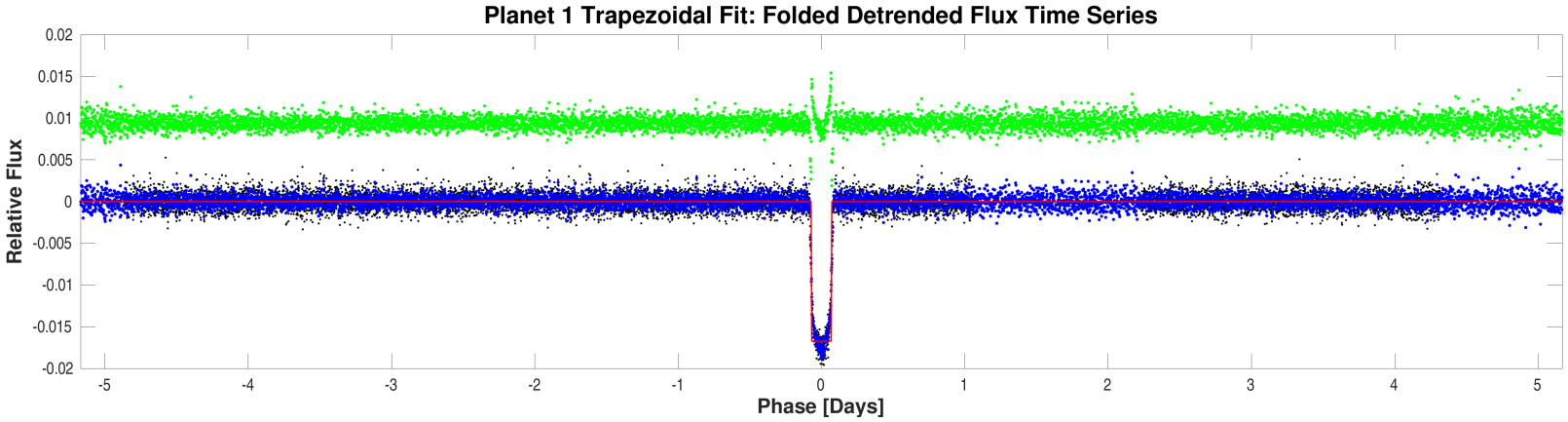
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	3.5	hours
Transit Epoch	1719.4719649	TJD
Orbital Period	10.3374958	days
Maximum SES	130.4	
Maximum MES	181.2	
Robust Statistic	162.3	
Chi Square Goodness of Fit Statistic (DoF)	246.1 (209)	
Chi Square2 Statistic (DoF)	8.0 (2458.2)	
Threshold for Desired PFA		

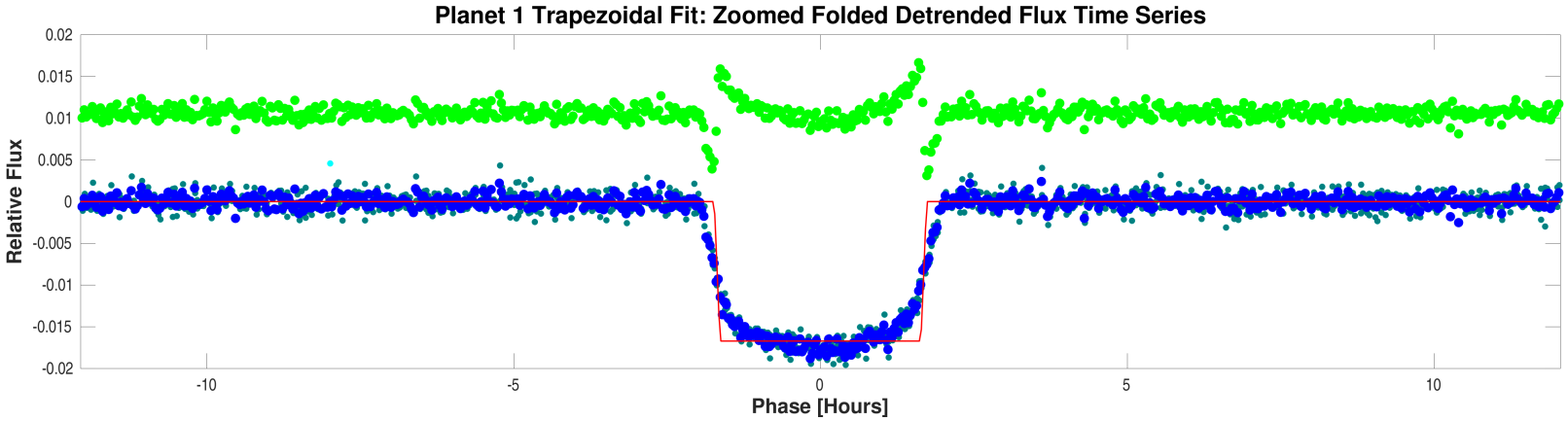
DoF: Degrees of Freedom

Parameter	Value	Uncertainty	Units
SNR	243.2		
Orbital Period	10.3374958		days
Transit Epoch	1719.4758066		BTJD
Transit Depth	16723		ppm
Transit Duration	4.0195		hours
Transit Ingress Duration	0.6520		hours
Model Chi Square Statistic (DoF)	14537.6 (1649)		

DoF: Degrees of Freedom



Folded detrended flux time series for CatId 266593143, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000266593143-01-all-trapezoidal.fig`



Zoomed folded detrended flux time series for CatId 266593143, Planet candidate 1 and folded trapezoidal model light curve.
Open `./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/0000000266593143-01-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	10.3375		days		
Transit Duration	3.5		hours		
Maximum MES	181.2				
Secondary Phase	-0.53889		days		
Secondary MES	5.7				
Minimum Phase	-0.36944		days		
Minimum MES	-7.6				
Median MES	0.0				
MAD MES	0.58748				
Robust Statistic	1.2				
Secondary Depth	172.4	1.3628e+02	ppm		
Geometric Albedo	6.2	4.9350e+00		1.0472	14.75
Planet Effective Temperature	1748	3.4723e+02	Kelvin	2.9596	0.15

7.4.2 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	4.7178e+00	2.1720	2.99

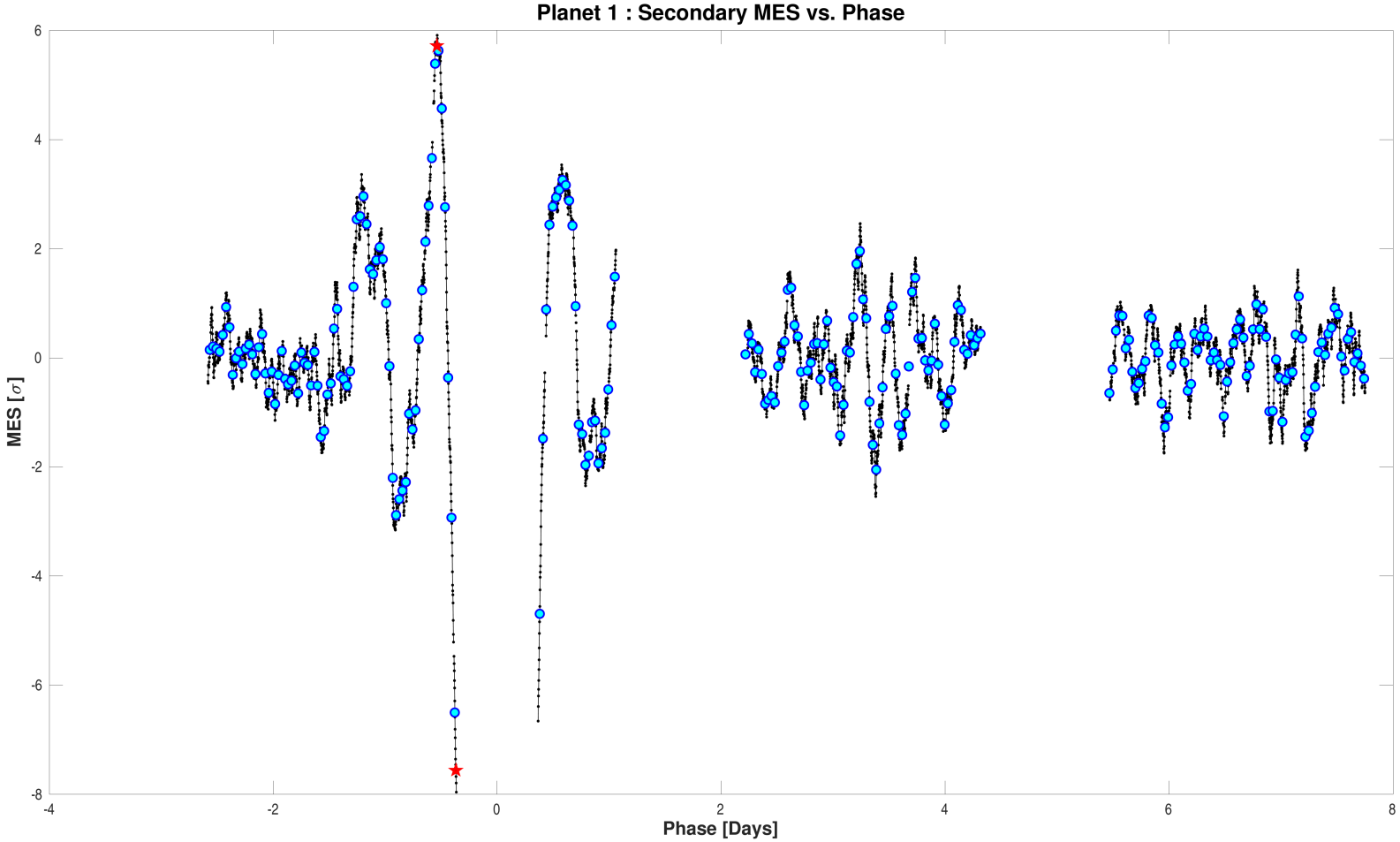
7.4.3 Bootstrap Test

Result	Value
False Alarm Probability	0.0000e+00
Bootstrap Threshold for Desired PFA	4.0
MES Mean	1.15
MES Standard Deviation	0.58
Transit Count	2

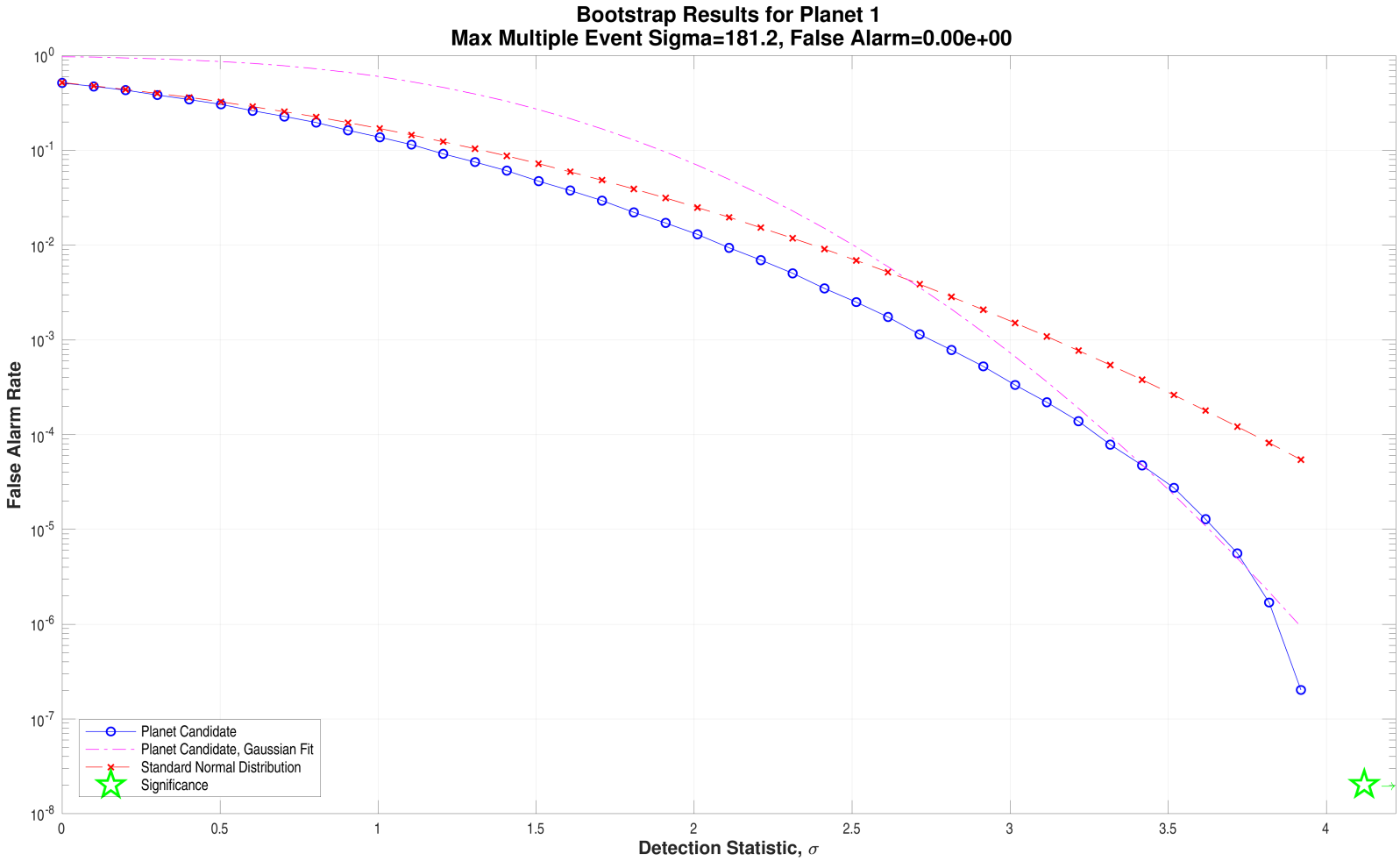
7.4.4 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	181.2	
SNR	167.4	
Core Aperture Statistic	1.0875e+02	100.00
Halo Aperture Statistic	2.3228e+01	100.00
Ratio of Core/Halo Aperture Statistics	4.6819e+00	

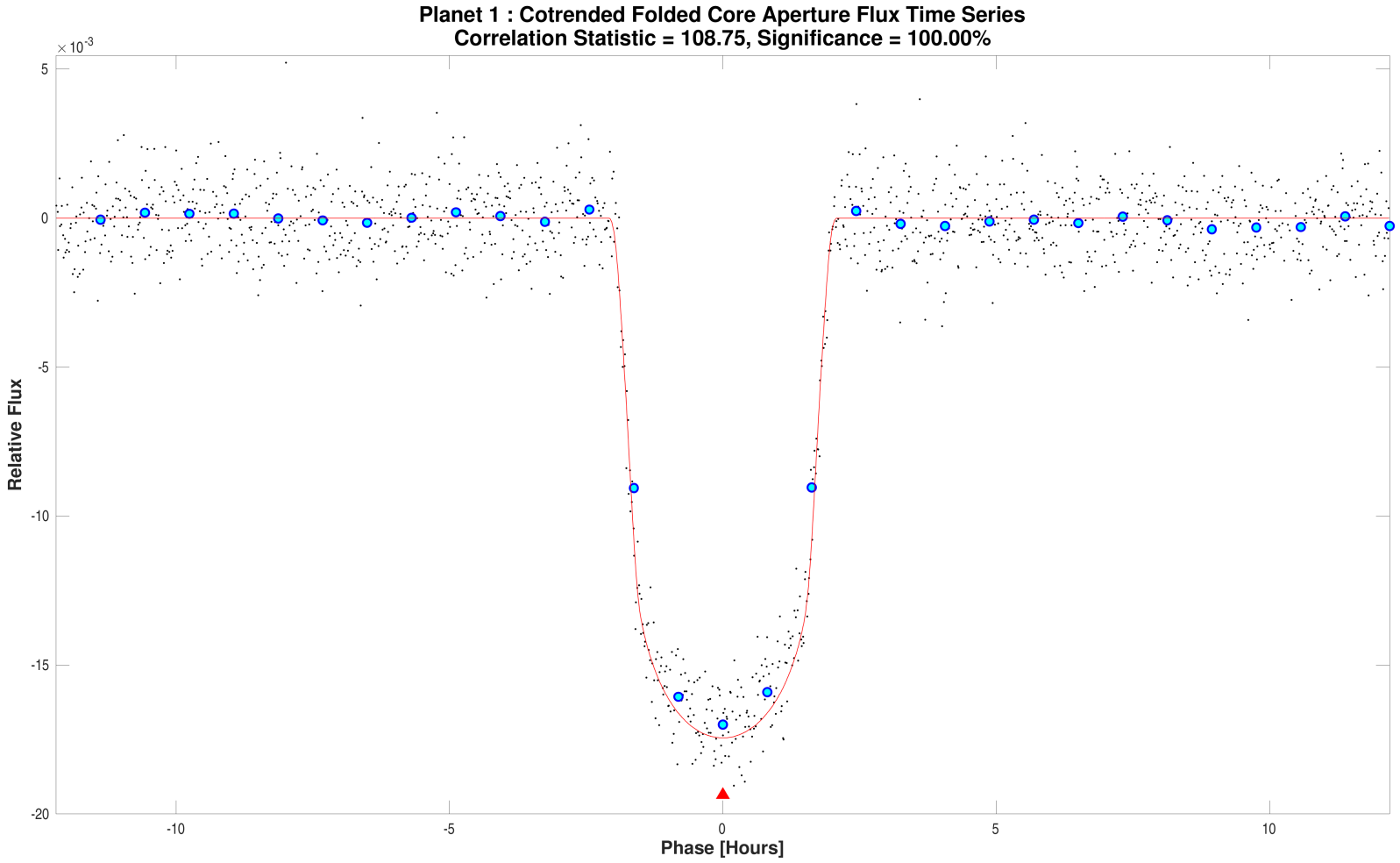
7.4.5 Validation Test Figures



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 3.5. The maximum secondary MES and corresponding phase are 5.7174 and -0.53889 days respectively. The minimum secondary MES and corresponding phase are -7.5616 and -0.36944 days respectively.
Open `./planet-01/report-summary/0000000266593143-01-weak-secondary-diagnostic.fig`

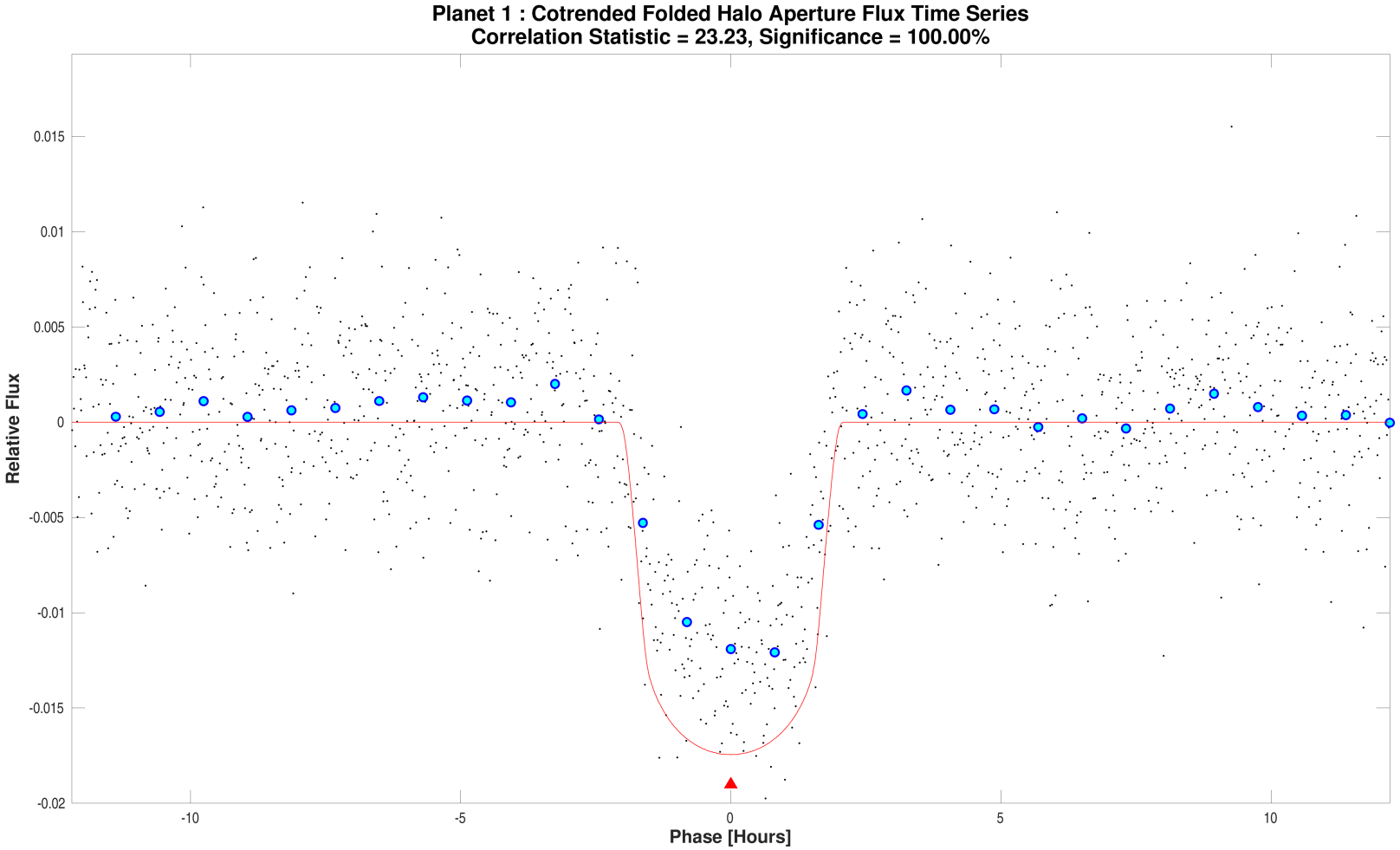


Bootstrap results for target 266593143, planet 1. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is Inf. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 4.0201.
Open `./planet-01/bootstrap-results/0000000266593143-01-bootstrap-false-alarm.fig`



Optical ghost diagnostic core aperture flux time series for target 266593143, 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/0000000266593143-01-core-unwhitened-cotrended-zoomed-model.fig`

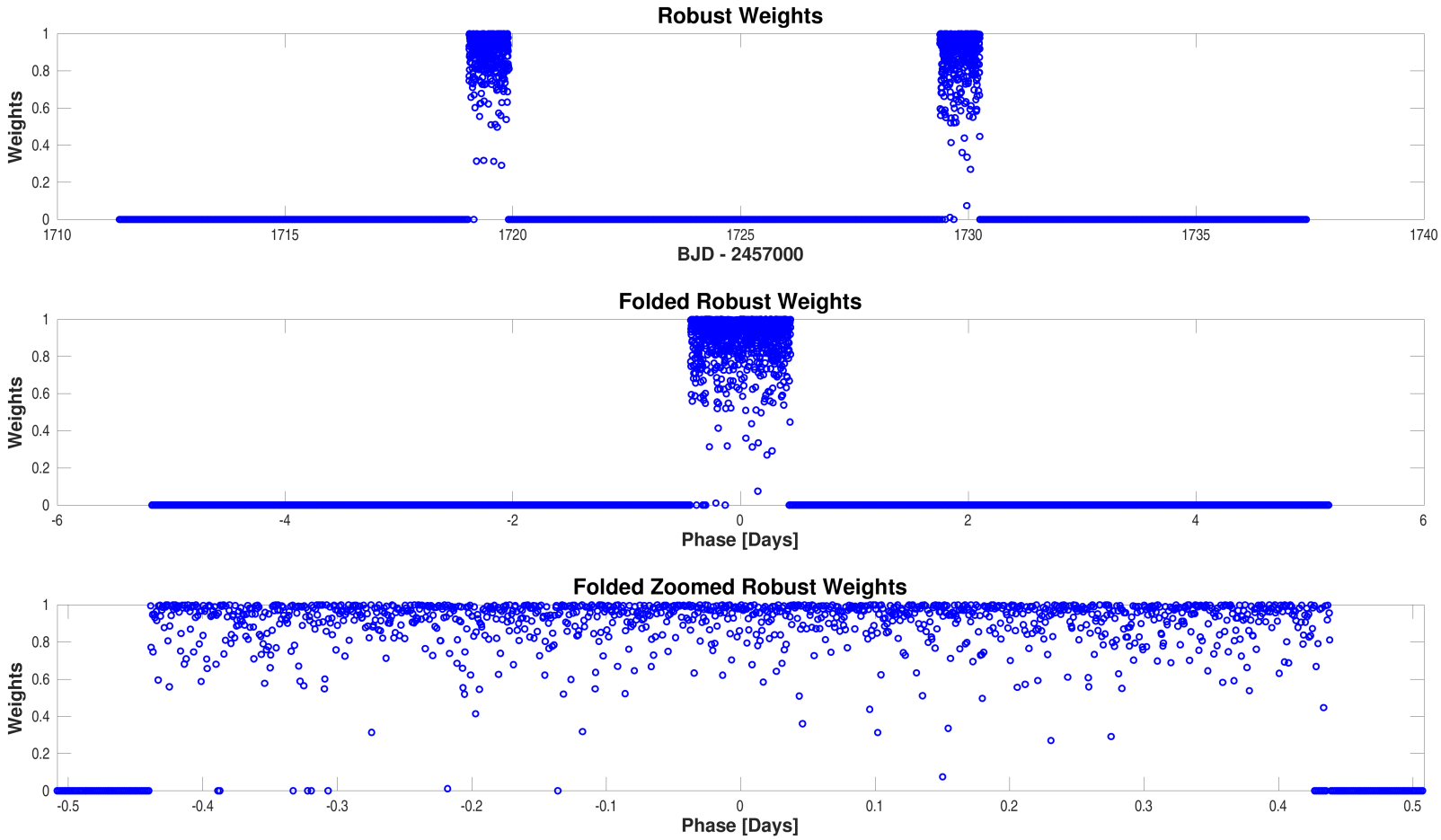


Optical ghost diagnostic halo aperture flux time series for target 266593143, planet candidate 1. The unwhitened time series is phase folded at the orbital period associated with the planet candidate and centered on the epoch of the first transit. The time series was first cotrended against spacecraft 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.

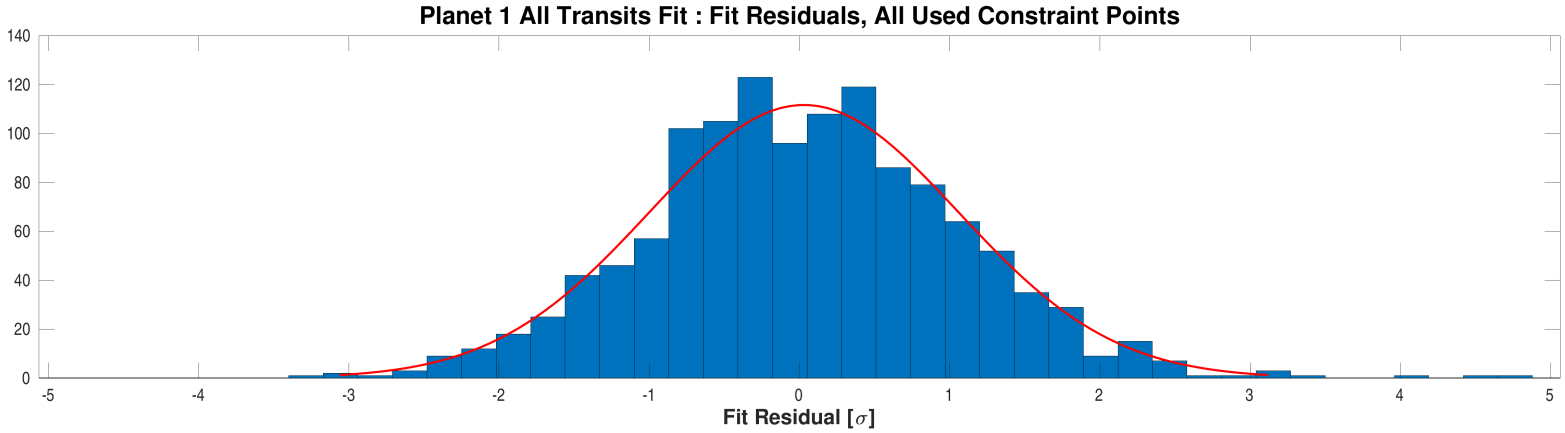
Open `./planet-01/ghost-diagnostic-results/0000000266593143-01-halo-unwhitened-cotrended-zoomed-model.fig`

Appendix A Planet Candidate 1

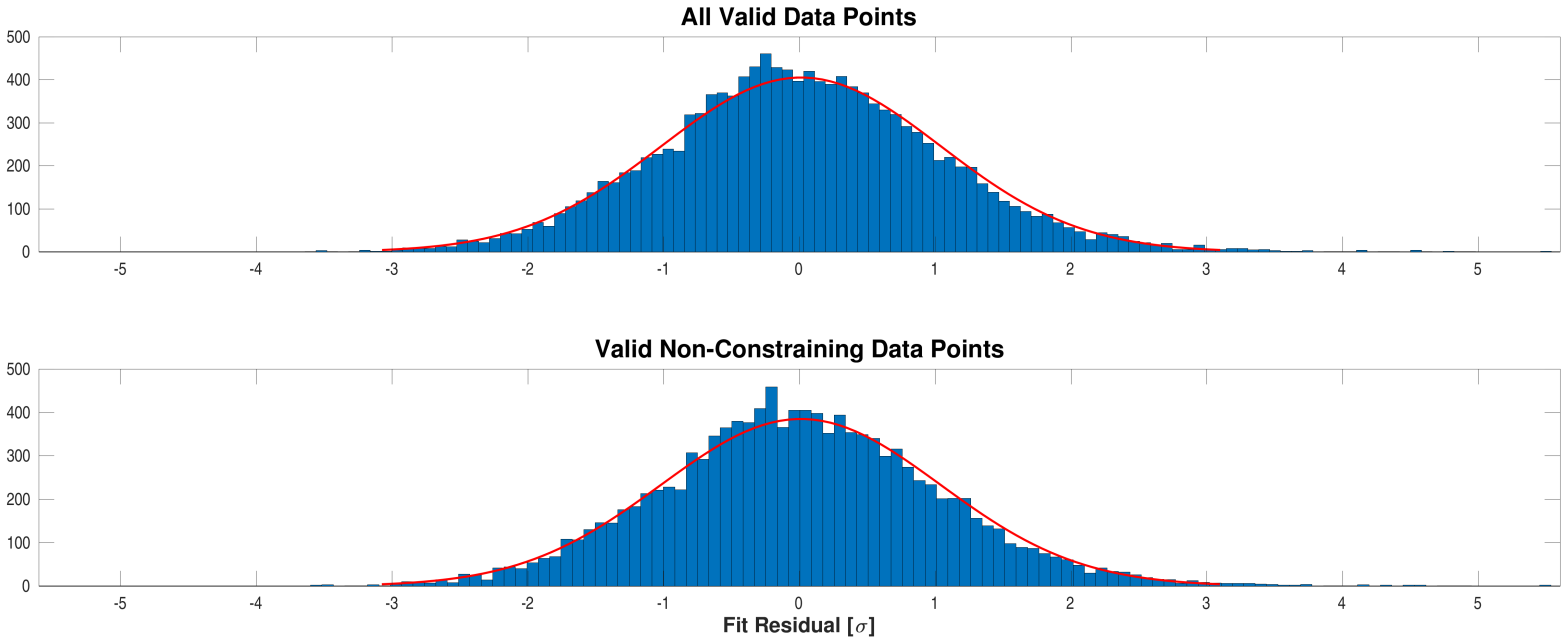
A.1 Model Fitter: All Transits



Robust weights distribution for CatId 266593143, 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/0000000266593143-01-all-robust-weights.fig`



Fit residuals distribution for CatId 266593143, 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/0000000266593143-01-all-histo-used.fig`

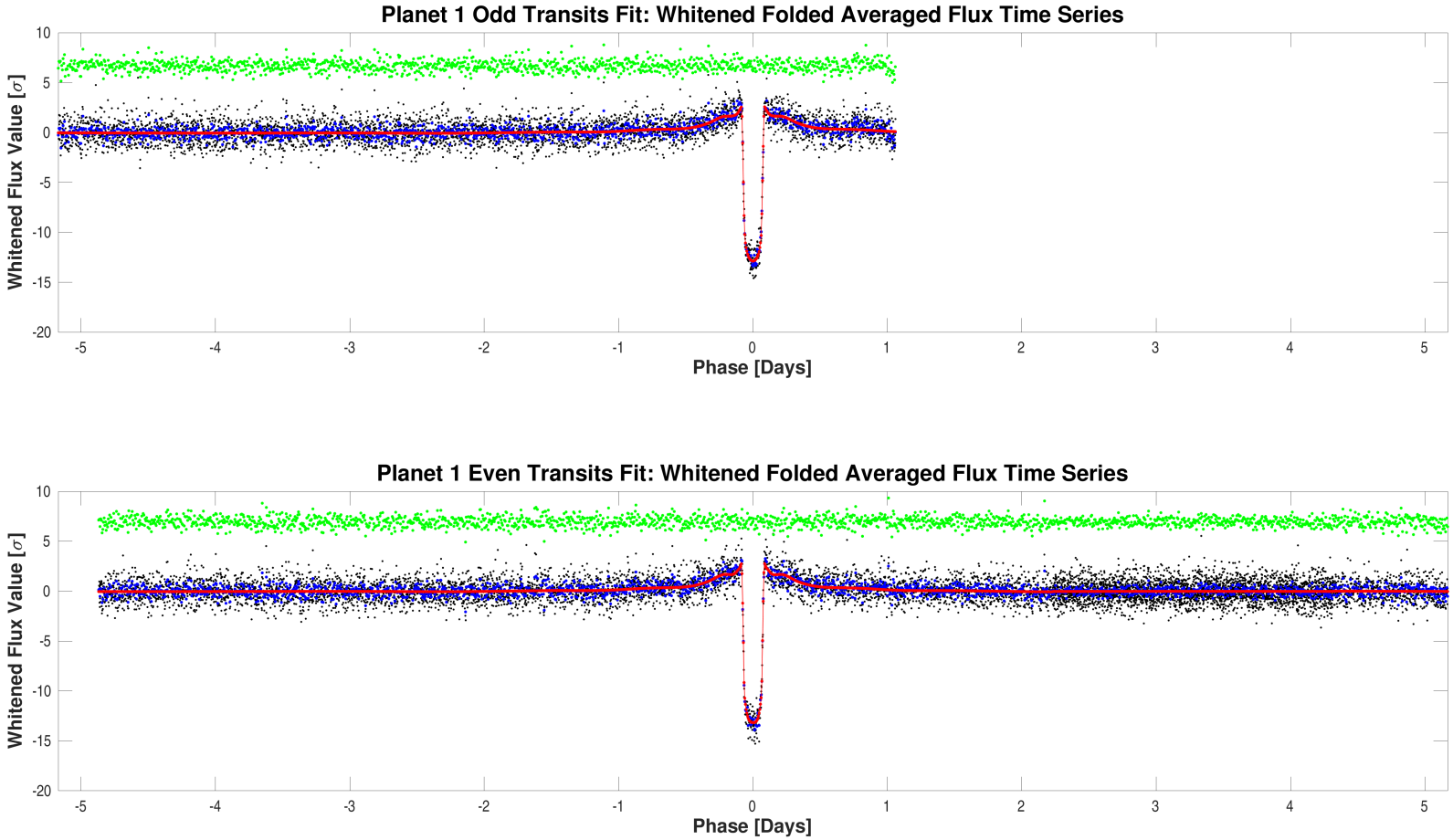


Fit residuals distribution for CatId 266593143, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/all-transits-fit/0000000266593143-01-all-histo-all-and-unused.fig`

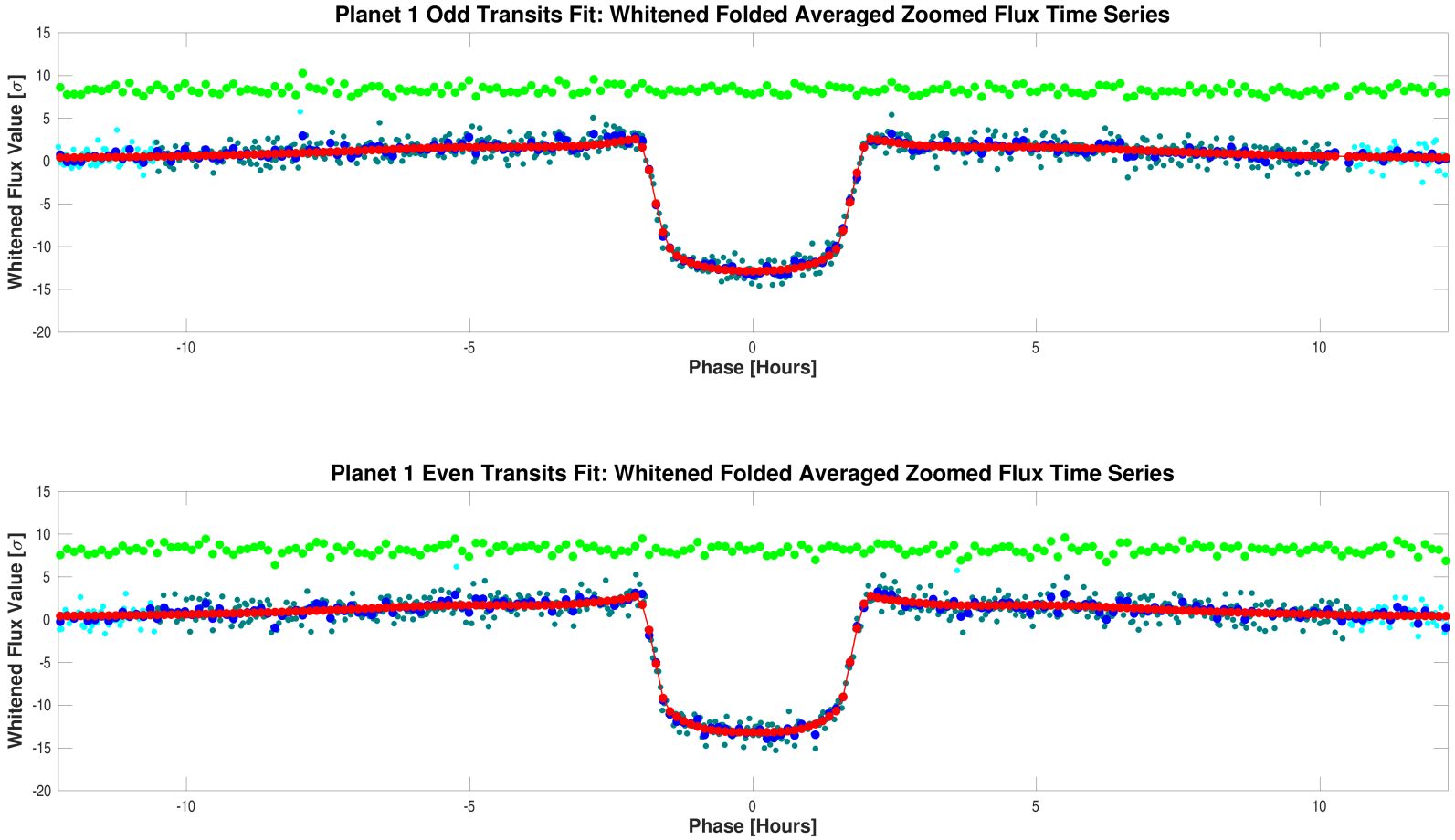
A.2 Model Fitter: Odd & Even Transits

Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference / ‖Uncertainty‖
SNR	118.9		122.4			
Orbital Period	10.3379628	0.0000e+00	10.3379628	0.0000e+00	days	
Transit Epoch	1719.4757793	3.0521e-04	1729.8136618	2.8259e-04	BTJD	2.1779e-02
Impact Parameter	0.4026	7.6919e-02	0.2719	1.2517e-01		8.9029e-01
Planet Radius to Star Radius Ratio	0.1223935	1.1620e-03	0.1227170	1.1402e-03		1.9869e-01
Semi-major Axis to Star Radius Ratio	20.2653	7.4082e-01	21.2313	7.7293e-01		9.0227e-01
Planet Radius	11.2062	5.3294e-01	11.2358	5.3390e-01	Earth radii	3.9259e-02
Semi-major Axis	0.0904	6.0364e-03	0.0904	6.0364e-03	AU	0.0000e+00
Effective Stellar Flux	62.5939	9.1021e+00	62.5939	9.1021e+00	Goldilocks	0.0000e+00
Equilibrium Temperature	717	2.6080e+01	717	2.6080e+01	Kelvin	0.0000e+00
Stellar Density	1.0462	1.1474e-01	1.2031	1.3140e-01	Solar density	8.9920e-01
Transit Depth	17223	1.4982e+02	17681	1.4848e+02	ppm	2.1720e+00
Transit Duration	4.0856	4.1658e-02	4.0541	3.8248e-02	hours	5.5620e-01
Transit Ingress Duration	0.5227	4.3367e-02	0.4752	3.9064e-02	hours	8.1316e-01
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)	970.6 (1138.6)		970.6 (1138.6)			

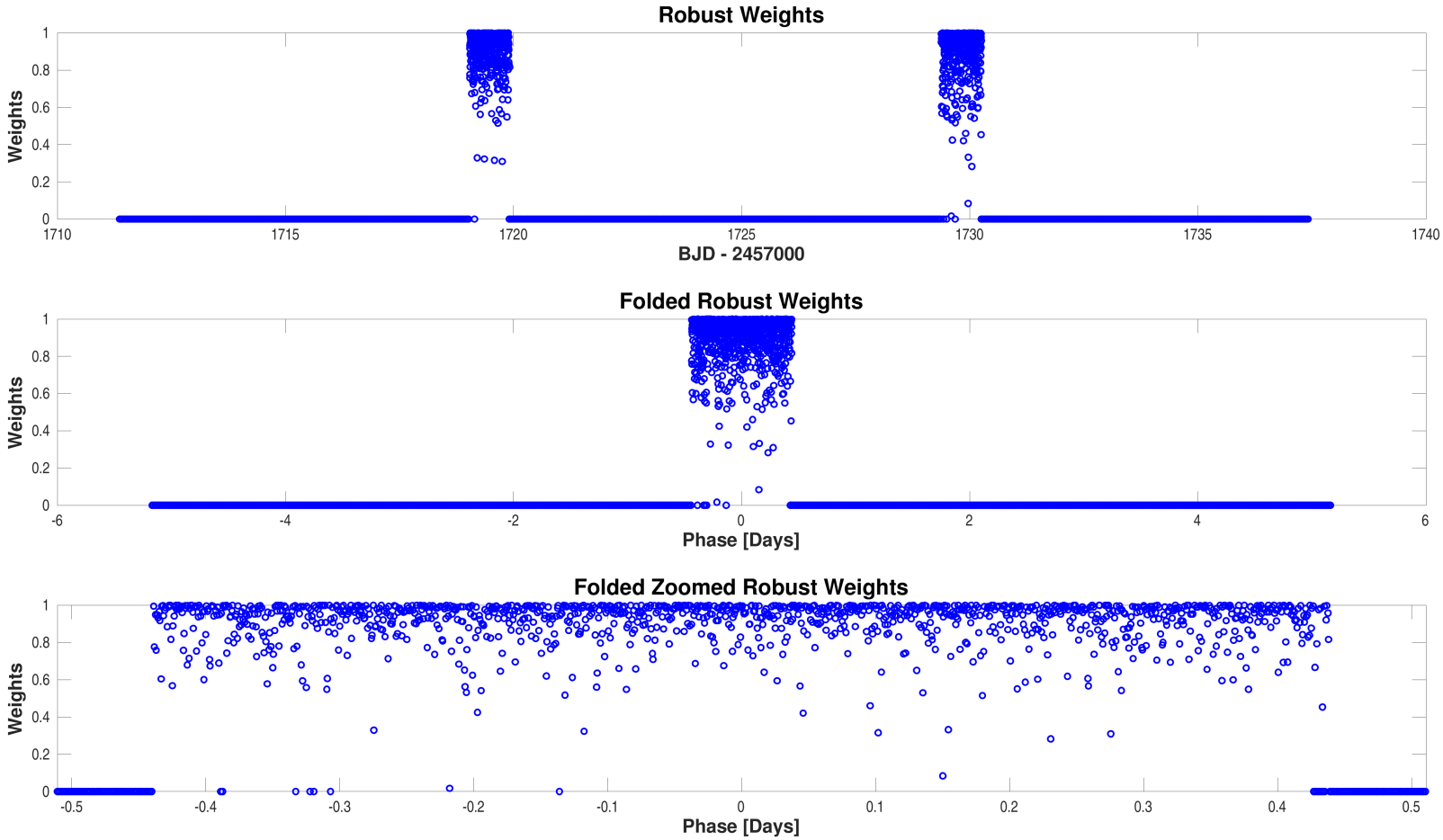
DoF: Degrees of Freedom



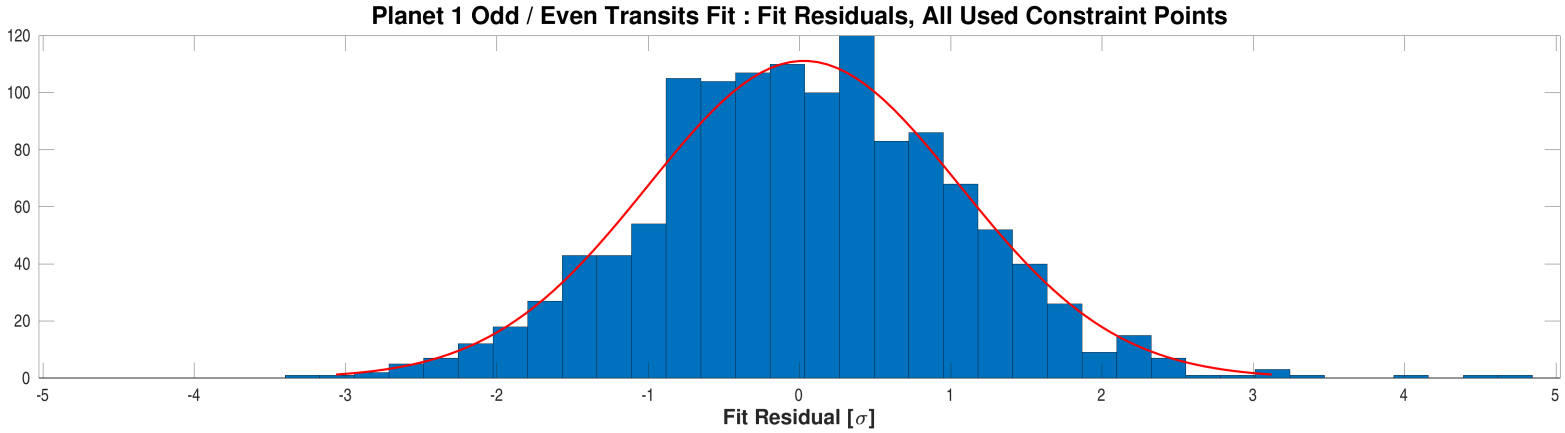
Folded flux time series for CatId 266593143, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light 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/0000000266593143-01-odd-even-whitened.fig`



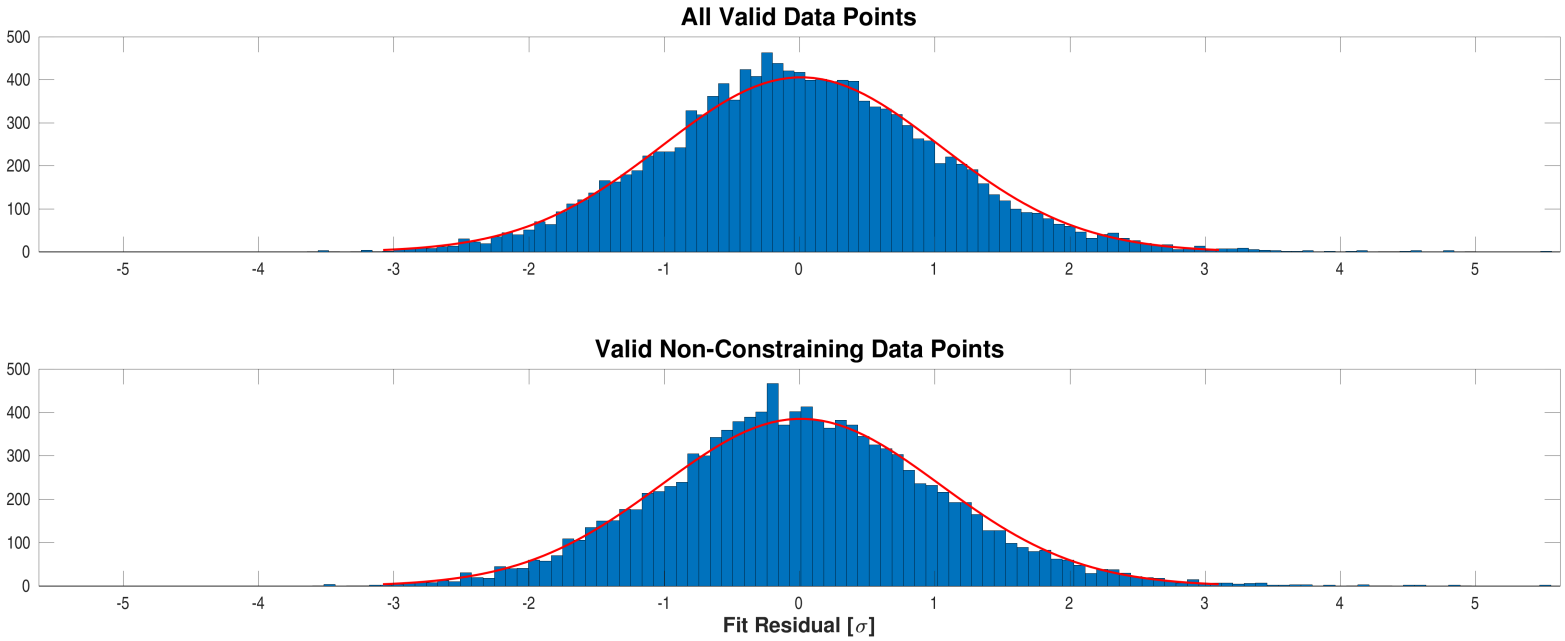
Folded flux time series for CatId 266593143, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged 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/0000000266593143-01-odd-even-whitened-zoomed.fig`



Robust weights distribution for CatId 266593143, 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/0000000266593143-01-odd-even-robust-weights.fig`

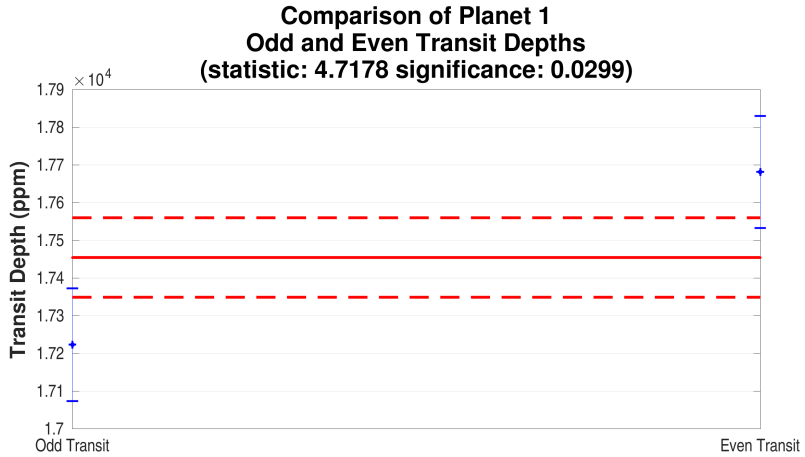


Fit residuals distribution for CatId 266593143, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.
Open `./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/0000000266593143-01-odd-even-histo-used.fig`



Fit residuals distribution for CatId 266593143, 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/0000000266593143-01-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 266593143, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary. Open `./planet-01/binary-discrimination-test-results/0000000266593143-01-eclipsing-binary-discrimination-tests.fig`

Appendix B Alerts

This target did not trigger any alerts.