PHT Data Validation Report
TIC 94986319

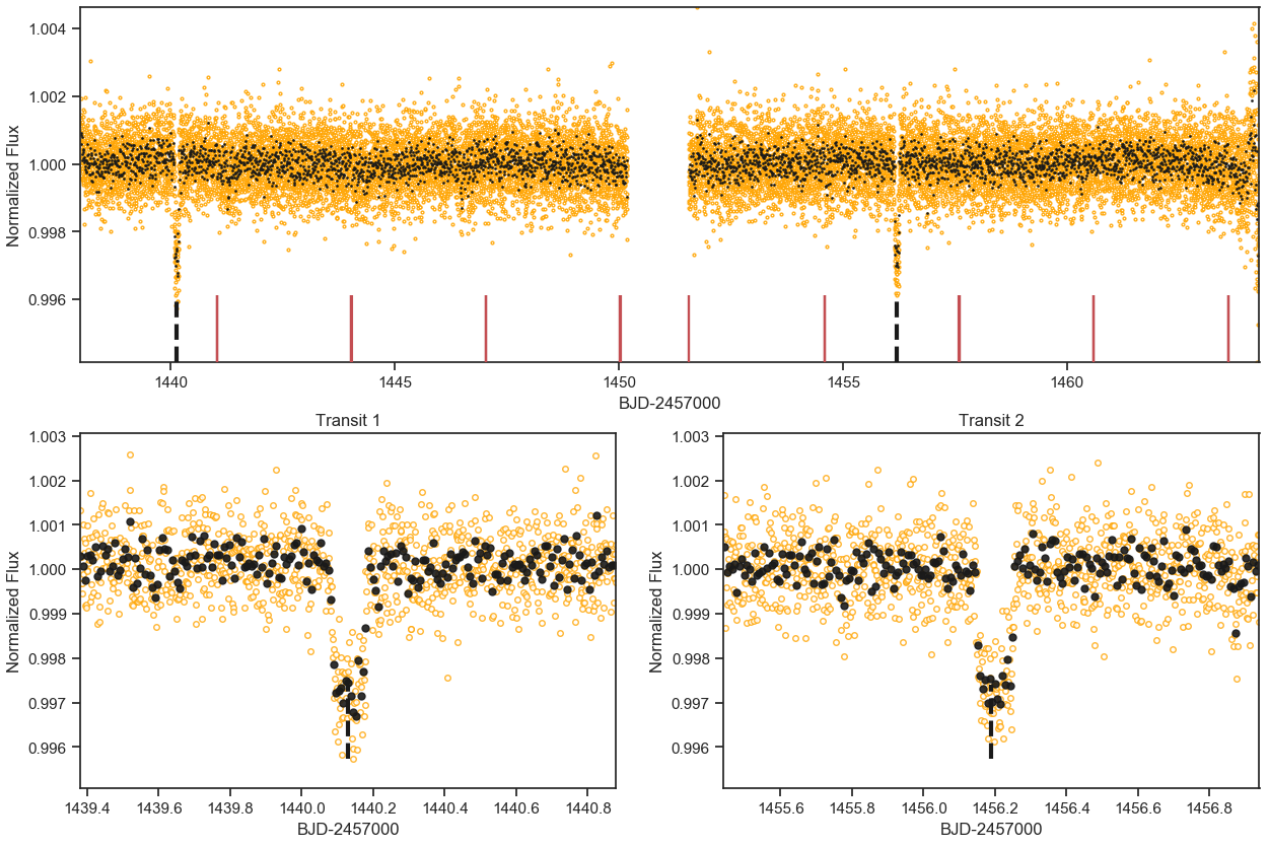

Fig 1. Full lightcurve for target TIC 94986319. The solid red lines at the bottom of the figure indicated the times of the momentum dumps and the dashed black line(s) show the time(s) of the marked transit event(s).

Target Properties

Parameter	Value	Unit
TIC ID	94986319	
RA	81.8533	degrees
Dec	-14.2767	degrees
Radius	1.1097	Solar Radii
Tess Mag	9.2160	Mag
Teff	5718	Kelvin
Sectors	5, 6 *	
TCE	Yes **	
TOI	421.01	

Table 1. Stellar properties of TIC 94986319. * List of the sectors in which the target will be has been observed. ** Click here for the TCE report.

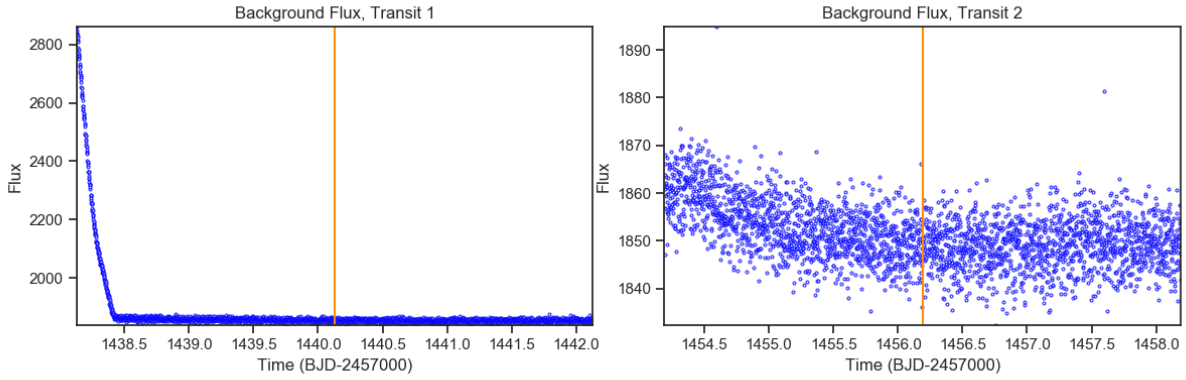

Fig 2. Background flux vs. time around the time of each transit-like event. The vertical orange line indicates the time of the transit-like event.

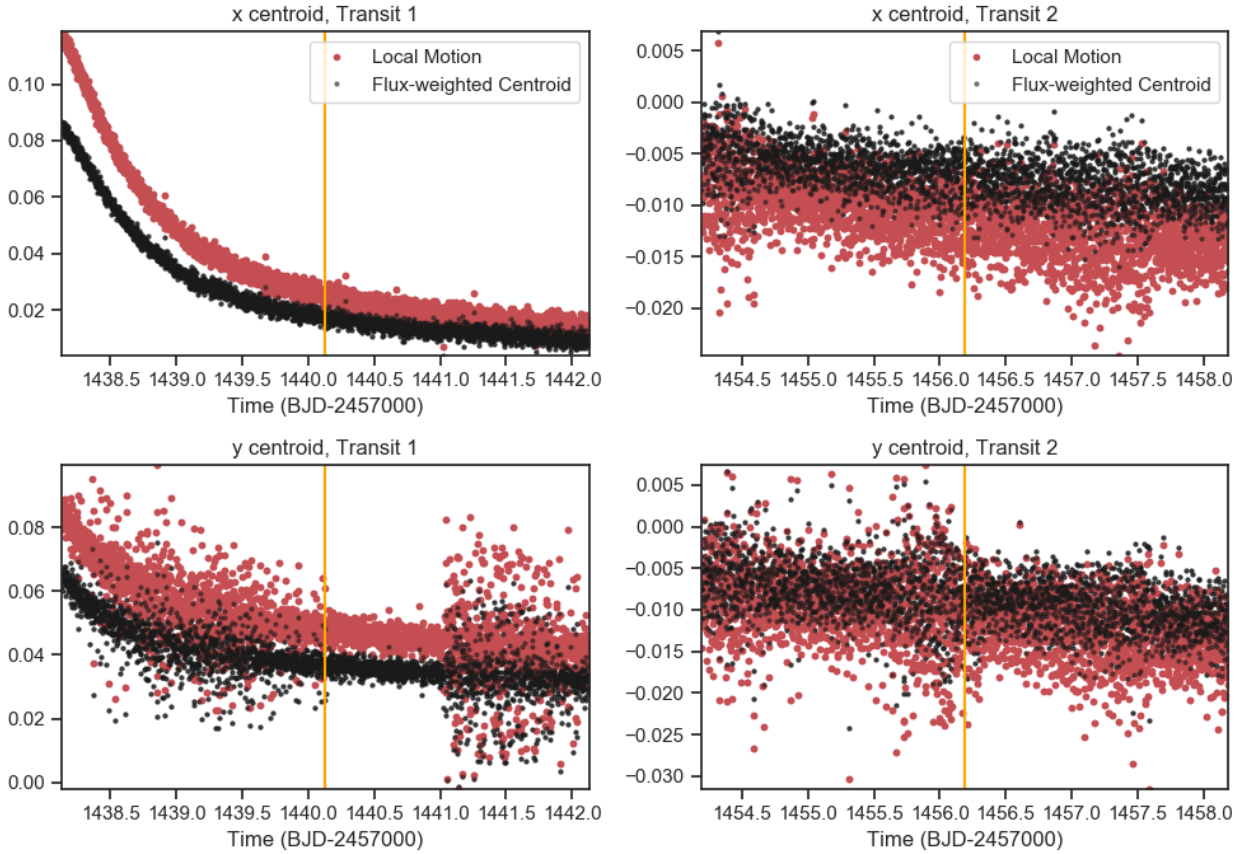

Fig 3. The x and y centroid positions around the time of each transit-like event. The black points shows the CCD column and row position of the target's flux-weighted centroid. The red shows the CCD column and row local motion differential velocity aberration (DVA), pointing drift, and thermal effects. The vertical orange line indicates the time of the transit-like event

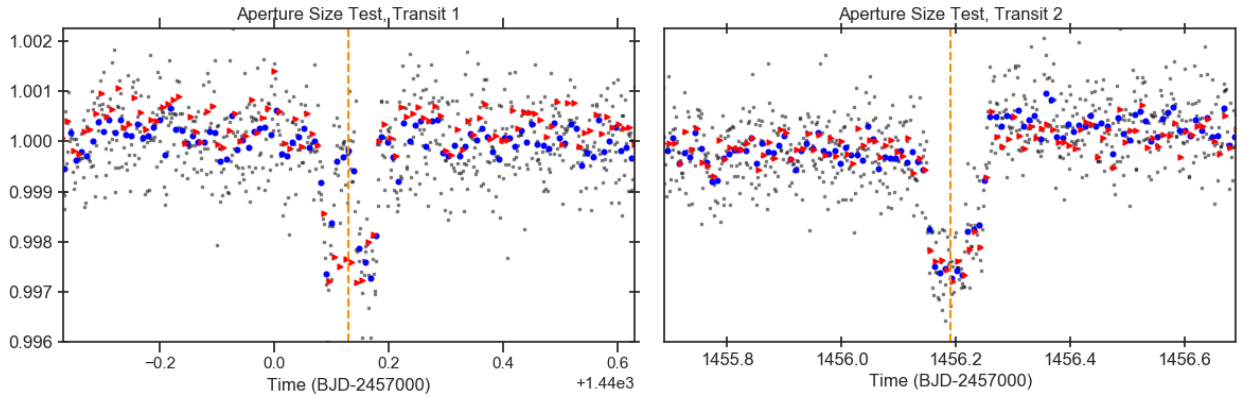

Fig 4. The lighcurve around the time of each transit-like event extracted with the SPOC pipeline defined aperture (binned:blue, unbinned:grey) and the with an aperture that is 50% smaller (red). The flux is extracted from the target pixel files (TPFs) and has not been detrended or corrected for systematics. The vertical orange line indicates the time of the transit-like event.

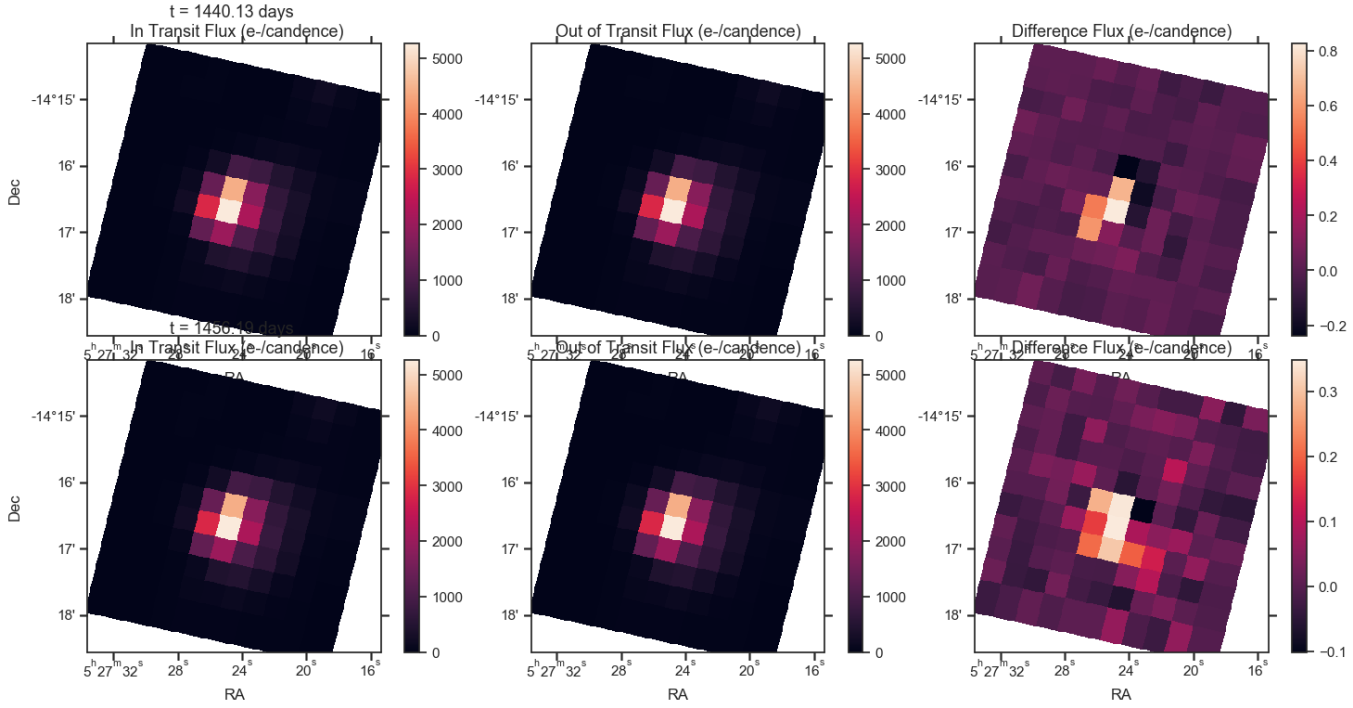

Fig 5. Diffrence images for target TIC 94986319 for each transit like event. Left: mean in-transit flux(left). Right: mean out-of-transit flux. Right: difference between the mean out-of-transit and mean in-transit flux.

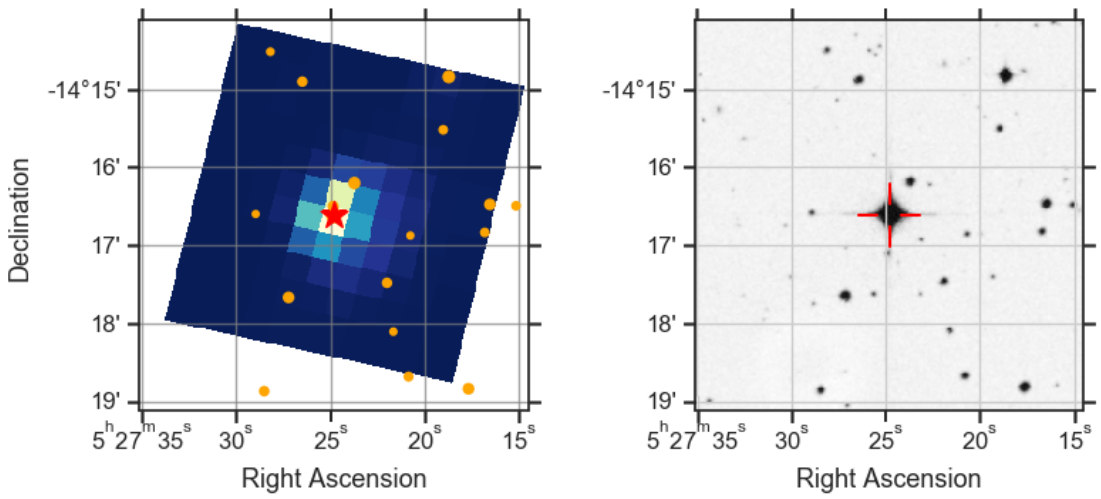

Fig 6. Left: The locations of nearby GAIA DR2 stars with mag < 15 (orange circle) within the Tess Cut Out around TIC 94986319 (red star). Only shown for one sector. Right: SDSS image of the surrounding field.

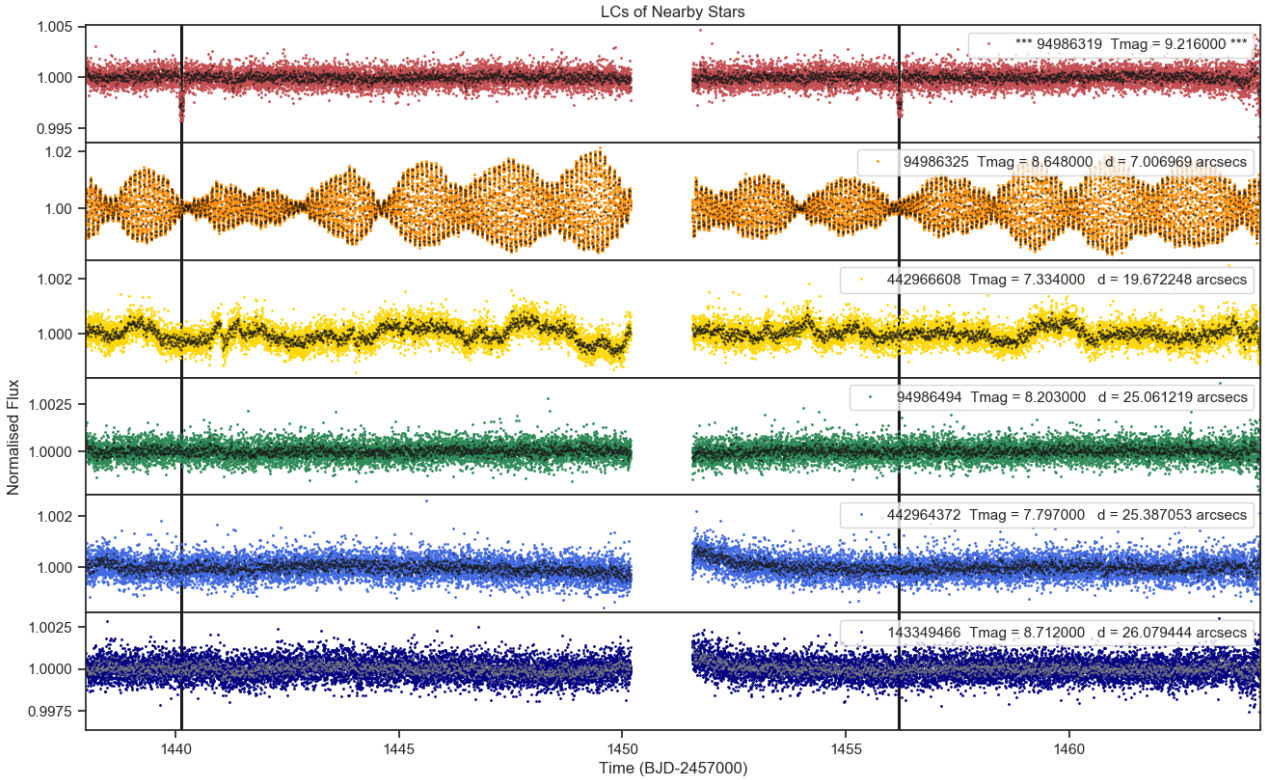

Fig 7. Lightcurves of the six closest stars to target 94986319 (top pannel). The distances to the target star and the TESS magnitudes are shown for each star. Only ever shown for one sector.

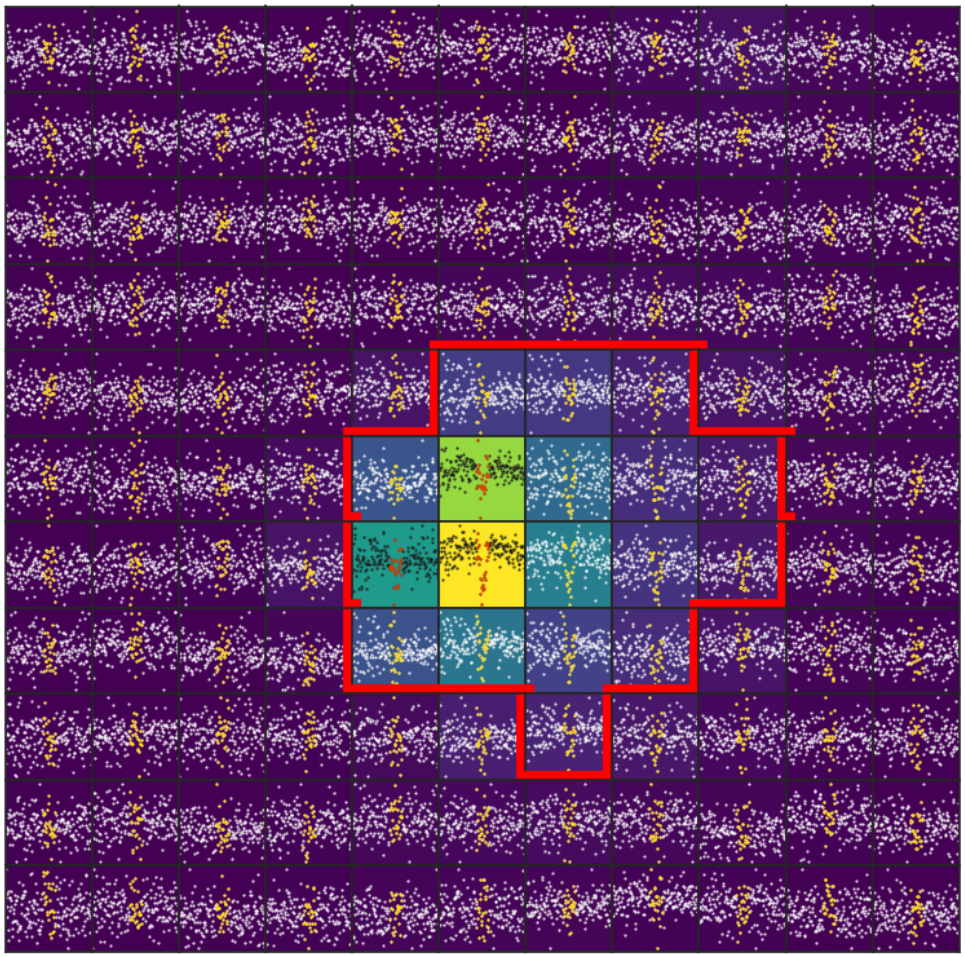

Fig 8. Normalised flux extracted for each pixel, using the SPOC pipeline mask, around the time of the transit-like event. The orange/red data points show the in-transit data. The solid red lines show the SPOC pipeline mask. Only shown for one sector.

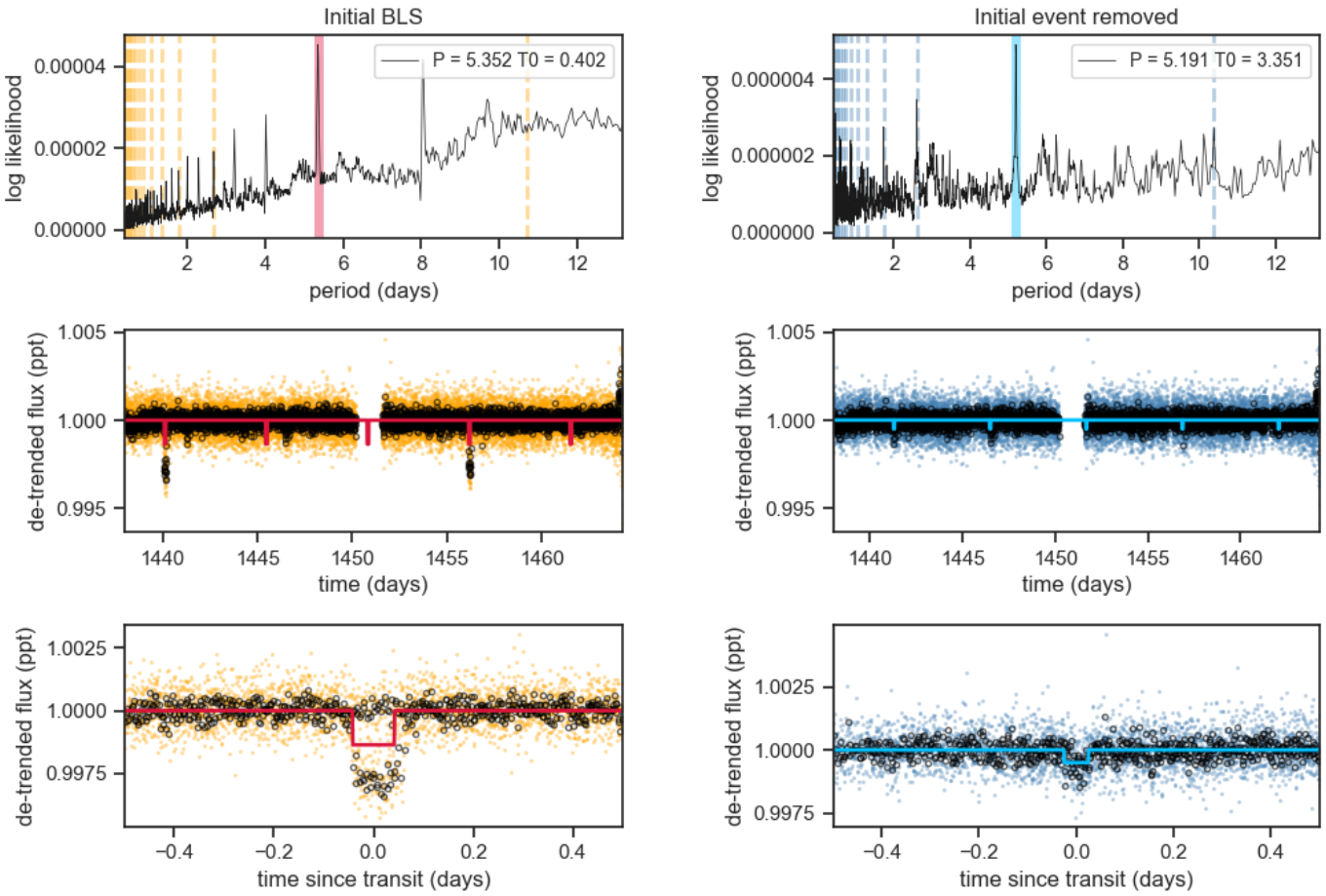

Fig 9. Box Least Square fitting for whole lightcurve binned to 10 minutes. Top left panel: log liklihood periodogram. The solid red line indicates the peak period and the dashed orange lines show the integer harmonics of this period. Middle left panel: Full light curve, unbinned (orange) and binned to 10 minutes (black). The peak period is highlighted by the solid red line. Bottom left Panel: Phase folded light curve where the found transit-event is fit with a simple box (red line). The pannels on the right show the same diagnostics, however the diagnostic was run with the highest detected signal-to-noise transits removed.

BLS parameters

Parameter	bls1	bls2
period	5.191	5.352
t0	3.35	0.40
depth	0.00136 ± 0.14385	0.00005 ± 0.16989
depth phased	-0.00012 ± 0.12916	-0.00001 ± 0.18976
depth half	0.00054 ± 0.09685	0.00003 ± 0.12715
depth odd	0.00142 ± 0.20071	0.00014 ± 0.21889
depth even	0.00130 ± 0.20482	-0.00007 ± 0.26781

Table 2. Summary of the two BLS fits. Fit one is run withthe whole lightcurve and fit two is run with the highest detected signal-to-noise transits removed.

Modeling

The modeling of target TIC 94986319 using the open source Pyaneti package.

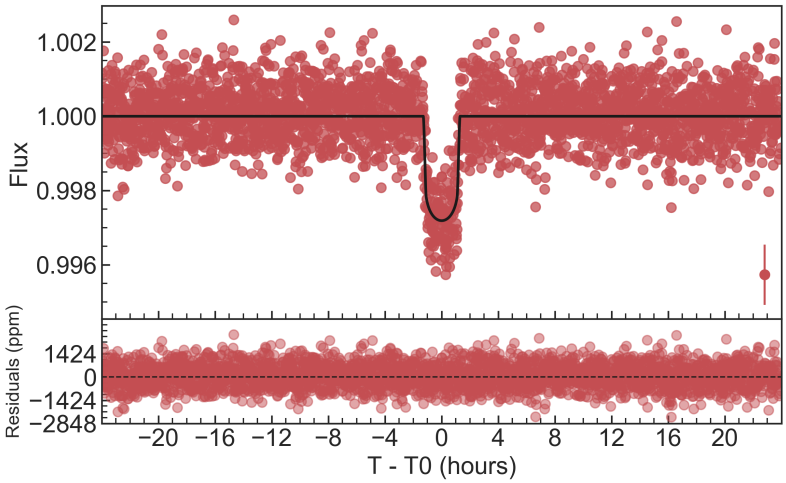

Fig 10. The phase folded lightcurve from the the Pyaneti modeling. The solid black line shows the best fit model. See Table 2 for model parameters.

Candidate Model Parameters

Parameters	Value	Uncertainty	Unit
T0	1440.123	+1440.1284 -1440.6149	days
P	16.070	+15.9923 -16.0724	days
e	0.000	+0.0000 -0.0000	
w	0.000	+0.0000 -0.0000	deg
b	0.670	+0.0818 -0.9856	
a/R*	34.206	+29.6699 -643.4538	
rp/R*	0.052	+0.0066 -0.0548	
Rp	6.223	+0.7918 -7.6068	R_earth
Tperi	1436.111	+1436.1105 -1436.6124	days
i	89.006	+88.4165 -89.9599	deg
a	0.166	+0.1411 -3.7444	AU
Insolation	22.157	+0.0890 -53.1903	F_Earth
rho*	728.835	+1.9140 -19695.6561	g/cm^3 (transit)
g_p	0.000	+0.0000 -0.0000	cm/s^2 (K and Rp/R*)
Teq	641.390	+152.0413 -751.6483	K (albedo=0)
T_tot	2.596	+0.0550 -2.7687	hours
T_full	nan	+nan -nan	hours

Table 3. The candidate paramaters from the Pyaneti modeling.